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Abstracts book

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THE NA62 RICH DETECTOR

Content :

The CERN NA62 experiment aims to measure the ultra-rare charged kaon decay K+ -> pi+ nu nubar(branching fraction O(10-10)) with a 10% accuracy. The detector must be able to reject background events from decay channels which branching fractions are up to 10 order of magnitude higher than the signal and with similar experimental signature. To suppress the main background from K+ -> mu+ nu decay (BR ~ 63%), NA62 will rely on a gas based RICH detector for pion/muon separation in a momentum range between 15 and 35 GeV/c with a muon rejection factor better than 5x10-3. The RICH detector will be used as Level 0(LO) trigger and event time measurement with a resolution better than 100ps to minimize wrong matching with the mother particle measured by an upstream detector.
To provide such a very demanding task a RICH detector filled with Neon at atmospheric pressure, 18 m long and equipped with 2000 photomultipliers has been proposed. The details of the RICH project will be described. A RICH prototype of the same length of the final detector, equipped with 96 PMs has been built and tested on a pion beam at CERN in the 2007 fall. A second prototype of a full length Neon filled vessel equipped with a spherical mirror and 414 PMs in the focal plane was built and tested in 2009 at CERN SPS on a positive hadron beam. The results of the two test beams will be presented: the muon misidentification probability is found to be about 0.7% and the time resolution better than 100 ps in the whole momentum range. Preliminary results on test beam data and Montecarlo comparison for runs collected with CO2 and Oxygen polluted Neon will be also presented.

Primary authors : PEPE, Monica (INFN Perugia)

Co-authors :

Presenter : PEPE, Monica (INFN Perugia)

Track classification : Particle Identification

Contribution type : Oral Presentation

Submitted by : PEPE, Monica

Submitted on Monday 17 January 2011

Last modified on : Monday 25 April 2011

Comments :

I would appreciate if you could let me know if the abstract has been accepted for presentation as soon as you'll know. In case it is accepted, I would like to know when the presentation is scheduled, in order to organize at best my travel.
Thank you and best regards,
Monica Pepe

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 25 April 2011 19:16
Comments : "accept this one before plan of the track finalized. after discussing it with Toru. This is the very first abstract for TIPP 2011."

Abstract ID : 10

Directly Coupled Scintillator Tiles and Silicon Photomultipliers

Content :

Scintillator tiles directly coupled to photo-sensors (without wavelength shifting fiber) offer greatly simplified construction for highly granular detectors. The performance of these detectors requires uniform response across the surface of the scintillator. Flat and shaped scintillator tiles directly coupled to silicon photo-multipliers have been investigated with both a radioactive source and high energy protons. We present results which indicate that, as expected, flat cells have high response near the photo-sensors while shaped cells have a much more uniform response, suggesting cells can be tailored to ensure uniform response. We also present results demonstrating that the response of the cells to a source and to beam particles are in qualitative agreement. Investigations into fully integrated electronics and directly coupled scintillators and photo-sensor readout modules are reported.

Primary authors : Prof. BLAZEY, Gerald (Northern Illiniois University)

Co-authors : Dr. ZUTSHI, Vishnu (Northern Illiniois University) ; Dr. DYCHKANT, Alexandre (Northern Illiniois University) ; Mr. COLE, Stehphen (Northern Illiniois University)

Presenter : Dr. DYCHKANT, Alexandre (Northern Illiniois University)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : BLAZEY, Gerald

Submitted on Tuesday 18 January 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:01
Comments : ""

Abstract ID : 11

CMD-3 Liquid Xenon Calorimeter’s signals processing for timing measurements.

Content :

One of the goals of the CMD 3 experiment (BINP, Russia) is a study of the hadron production in electron-positron annihilation. An important example of such process is a neutron-antineutron pair production near threshold. A signature of this process is a large energy deposition in the liquid xenon (LXe) calorimeter due to antineutron annihilation which typically occurs by 5 ns or later after beams collision. For identification of such events and for providing a trigger by them it is necessary to determine the time of signal appearance with accuracy of 2-3 ns On-Line. The LXe-calorimeter of the CMD-3 consists of 14 coaxial cylindrical ionization chambers with anode and cathode readout. The duration of the charge collection to the anodes is about 4.5 microseconds. Thus, to obtain the required accuracy of the On-Line measurements of the signal arrival time a special signal processing method has been developed. In this paper the signal processing algorithm and a selection of the optimal parameters of the measuring channel are described.

Primary authors : Mr. EPSHTEYN, Leonid (Budker Institute of Nuclear Physics (BINP))

Co-authors : Dr. YUDIN, Yuriy (Budker Institute of Nuclear Physics (BINP))

Presenter : Mr. EPSHTEYN, Leonid (Budker Institute of Nuclear Physics (BINP))

Track classification : Front-end Electronics

Contribution type : --not specified--

Submitted by : Mr. EPSHTEYN, Leonid

Submitted on Tuesday 25 January 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Poster Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 01:55
Comments : ""

Abstract ID : 12

An ATCA-based High Performance Compute Node for Trigger and Data Acquisition in Large Experiment

Content :

This paper describes the design of ATCA-based high performance compute Node for high level trigger and data acquisition in large physics experiment like PANDA, BESIII and Belle II. For an experiment like PANDA, the trigger and data acquisition system needs to handle interaction rates of the order of more than 10^7/s and data rates of 200 GB/s and more. The high level trigger and data processing with high performance is necessary. An ATCA compliant FPGA-based Compute Nodes system is designed for this purpose. Each CN features 5 Xilinx Virtex-4 FX60 FPGA chips and up to 10GB DDR2 memory. A total bandwidth of 52Gbps optical links (8ch x 6.5Gbps/ch) and 39Gbps electrical backplane links (13ch x 3Gbps/ch) are provided to receive data from front-end electronics and data transmission among different channels. The high data processing performance are accomplished by the fabric resources provided by 5 FPGA chips. 5 Gigabit Ethernet links are used to transmit processing results to mass storage. The finished version has been proved successful and is being used in trigger and DAQ development for PANDA system, and also under investigation for use in PXD in Belle II. The ATCA-based Trigger and Data Acquisition System is scalable and suitable for various applications for next-generation nuclear and particle experimental physics.

Primary authors : Dr. XU, Hao (IHEP,Beijing)

Co-authors : Prof. LIU, Zhen'an (IHEP,Beijing) ; Mr. WANG, Qiang (IHEP,Beijing) ; Mr. ZHAO, Jingzhou (IHEP,Beijing) ; Dr. JIN, Dapeng (IHEP,Beijing) ; Prof. KUEHN, Wolfgang (Giessen University) ; Dr. LANGE, Soeren (Giessen University) ; Mr. MING, Liu (Giessen University)

Presenter : Dr. XU, Hao (IHEP,Beijing)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : XU, Hao

Submitted on Thursday 03 February 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:33
Comments : ""

Abstract ID : 13

Online monitor framework for network distributed data acquisition systems

Content :

Data acquisition (DAQ) systems in recent HEP experiments consist of
sub systems distributed in the local area networks (LANs). Therefore it is required to handle with the monitoring information which is also distributed in the LANs. We developed a new software framework for online monitoring, which collects distributed information and achieves easy access to the information far from DAQ systems via internet. The framework consists of three parts, DAQ-subsystems, “Monitor server” and “Monitor viewer”. Each DAQ-subsystem converts the monitored information to histograms and handles with them as an object named “Histogram package”, a collection of histograms. Monitor server collects and transfers the histogram packages to the viewers. Monitor Viewers creates graphical plots on their GUI windows. We also developed two types of viewers. One is a java application, which can achieve real time monitoring by connecting with Monitor server directly. The other is a web application works on web browsers with Ajax and HTML5 technologies. GUIs of each viewer are generated automatically by XML based configuration files and therefore DAQ developers can create viewer plots with modifying the viewers. We will present the detail structure of the online monitor framework with some application examples of the Double Chooz reactor neutrino experiment.

Primary authors : Mr. KONNO, Tomoyuki (Tokyo Institute of Technology)

Co-authors : Dr. CABRERA, Anatael (CNRS/IN2P3-APC Laboratory (Paris)) ; Prof. ISHITSUKA, Masaki (Tokyo Institute of Technology) ; Prof. KUZE, Masahiro (Tokyo Institute of Technology) ; Prof. SAKAMOTO, Yasunobu (Tohoku gakuin University)

Presenter : Mr. KONNO, Tomoyuki (Tokyo Institute of Technology)

Track classification : Trigger and Data Acquisition Systems

Contribution type : --not specified--

Submitted by : KONNO, Tomoyuki

Submitted on Friday 04 February 2011

Last modified on : Friday 22 April 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 22 April 2011 22:09
Comments : ""

Abstract ID : 14

High Voltage system for the Double Chooz experiment

Content :

Double Chooz experiment is a reactor neutrino experiment to measure the undetected mixing angle theta_13 , which is one of the most demanded parameters in neutrino physics. We will place two identical detectors to accomplish the systematic-free measurement of the neutrino disappearance.
Each detector has 468 PMTs which will detect scintillation light
generated by neutrino or background events. And nominal High voltage values are defined so that every PMT have 10^7 gain. High voltage system is very important in the experiment, since the PMT gain should be affected by the high voltage directly. In Double Chooz, we adopted the HV crate SY1527LC and the module A1535P produced by CAEN, and developed the online system for both control and monitoring. Moreover, we have calibrated the each module using a special calibration module developed by CAEN. The offline data quality monitoring system is also developed for physics analyses. In this presentation, the high voltage system for the Double Chooz experiment and the performance will be presented.

Primary authors : Mr. SATO, Fumitaka (Tokyo Metropolitan University)

Co-authors : Dr. MAEDA, Junpei (Tokyo Metropolitan University) ; Prof. SUMIYOSHI, Takayuki (Tokyo Metropolitan University) ; Mr. TSUKAGOSHI, Kento (Tokyo Metropolitan University)

Presenter : Mr. SATO, Fumitaka (Tokyo Metropolitan University)

Track classification : Detectors for neutrino physics

Contribution type : --not specified--

Submitted by :

Submitted on Saturday 05 February 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:41
Comments : ""

Abstract ID : 15

CCDs for particle physics experiments

Content :

The R effort currently going on at Fermilab to investigate new applications of thick CCD detectors in particle physics is described. These application include : low threshold dark matter experiments, neutrino-nucleus coherent scattering, neutron imager and particle tracking.

Primary authors : ESTRADA, Juan (Fermilab)

Co-authors :

Presenter : ESTRADA, Juan (Fermilab)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : ESTRADA, Juan

Submitted on Sunday 06 February 2011

Last modified on : Wednesday 27 April 2011

Comments :

I would prefer to give an oral presentation, but I that is not possible I would also be happy to present a poster.

Status : SUBMITTED

Track judgments :

Track : Dark Matter Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 16

A prototype of high-level trigger system for the PANDA EMC detector based on an FPGA-based compute node

Content :

The PANDA experiment at FAIR has a rich physics program. The EMC detector provides almost 4⊠ coverage, good granularity and good energy resolution which are significant for charged and uncharged particles detection. Its trigger and data acquisition (TDAQ) system features a novel self-trigger data pushed architecture. Data from EMC readout electronics are processed in its high-level trigger system to reconstruct electromagnetic showers. The extracted features are combined with information from other detectors in order to discriminate photons from electrons and hadrons.
An adaptive EMC TDAQ scheme is proposed employing an FPGA based Compute Node (CN) developed at IHEP Beijing in collaboration with Giessen University. The CN provides flexible connections with high bandwidth between processing modules, up to 10GByte DDR2 memory per board for data buffering and five high-end FPGAs for sophisticated algorithm applications. Embedded system design methodology is employed to reduce large system design complexity. An open source Linux system is ported to the platform for TCP/IP package processing and slow control tasks handling. A fast electromagnetic showers online reconstruction algorithm is finished with consideration of FPGA-based processing architecture. High performance data switching capability for multiple modules on the chip is fulfilled based on a Multi-port memory controller (MPMC). A PLB master device provides high bandwidth for optical link data receiving and consequently buffering in DDR2 memory. EMC trigger algorithms are encapsulated as an EDK IP core with a LocalLink interface which is compatible with the MPMC and the embedded DMA engine in MPMC port offloads the data transmission tasks from CPU. Relative issues on custom device driver design are also covered. System verification and performance evaluation methods for the algorithms are presented in last part.

Primary authors : Mr. WANG, Qiang (Institute of High Energy Physics, Chinese Academy of Scicence)

Co-authors : Prof. LIU, Zhen-an (Institute of High Energy Physics, Chinese Academy of Scicence) ; Dr. XU, Hao (Institute of High Energy Physics, Chinese Academy of Scicence) ; Mr. SUN, Dehui (Institute of High Energy Physics, Chinese Academy of Scicence) ; Prof. KUEHN, Wolfgang (Physics Institute II, Giessen University) ; Dr. LANGE, Soeren (Physics Institute II, Giessen University) ; Mr. LIU, Ming (Physics Institute II, Giessen University)

Presenter : Mr. WANG, Qiang (Institute of High Energy Physics, Chinese Academy of Scicence)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : WANG, Qiang

Submitted on Thursday 17 February 2011

Last modified on : Friday 22 April 2011

Comments :

Status : WITHDRAWN

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 22 April 2011 20:45
Comments : ""

Abstract ID : 18

Study of gamma absorption properties of some water soluble Becosule capsule by varying concentration at 511 KeV.

Content :

Mass and linear attenuation coefficients are two quantities used in the study of gamma rays. Their methods of measurement have been developed by many people for solid and aqueous solutions. But the method developed for aqueous solutions is not complete so we have tried to develop an equation for direct measurement of linear attenuation coefficient of becosule capsule in aqueous solutions. This method is useful in measuring the absorption coefficient of capsules (Vitamins) without obtaining them in pallet form. Also it verifies the composition specified by the manufacturer, which defines originality of capsule.

Primary authors : Dr. DONGARGE, Sidram (M.B.College, Latur.)

Co-authors : Mrs. PATIL, Asha (M.B.College, Latur)

Presenter : Dr. DONGARGE, Sidram (M.B.College, Latur.)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : DONGARGE, Sidram

Submitted on Thursday 24 February 2011

Last modified on : Thursday 21 April 2011

Comments :

Consider the paper for oral presentation. We will try to send the whole paper when you call for that.

Status : PROPOSED TO REJECT

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to reject
Judged by : CATTAI, Ariella
Date : 21 April 2011 17:44
Comments : "not relevant subject for a Detector oriented Conference"

Abstract ID : 19

CoGeNT-4: Prospects for an expanded search for light-mass WIMPS

Content :

The CoGeNT experiment located at the Soudan Underground Laboratory has reported an excess of events below an electron scattering equivalent of 1 keV. This result may be interpreted alternatively as either an unidentified background contribution or a signature of light-mass (5-10 GeV/c^2) weakly interacting massive particle (WIMP) dark matter. The initial CoGeNT results were produced using a single 440 gram high-purity germanium radiation detector operated at liquid nitrogen temperature. To further test these unexpected results, an expanded CoGeNT-4 experimental design is under development. The shield design concept is presented and the science impact of a four-detector experiment is explored. Of particular interest is the sensitivity to a hypothesis for light-mass WIMP dark matter particles in the 5-10 GeV/c^2 mass range that could potentially explain the initial CoGeNT results as well as the results of the DAMA/LIBRA experiment.

Primary authors : ORRELL, John (Pacific Northwest National Laboratory)

Co-authors : AALSETH, Craig (Pacific Northwest National Laboratory) ; COLLAR, Juan (University of Chicago) ; HOSSBACH, Todd (Pacific Northwest National Laboratory) ; VANDEVENDER, Brent (Pacific Northwest National Laboratory) ; FIELDS, Nicole (University of Chicago) ; OVERMAN, Cory (Pacific Northwest National Laboratory) ; FULLER, Erin (Pacific Northwest National Laboratory)

Presenter : ORRELL, John (Pacific Northwest National Laboratory)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by :

Submitted on Thursday 24 February 2011

Last modified on : Saturday 12 March 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HALL, Jeter
Date : 12 March 2011 21:07
Comments : "CoGeNT is an active dark matter experiment that generates a lot of interest."

Abstract ID : 20

ATLAS TDAQ system: current status and performance

Content :

In 2010 the ATLAS Trigger and Data Acquisition (TDAQ) system has been operated with an overall efficiency of 96%, while meeting evolving and demanding conditions. By the end of the proton run, the LHC instantaneous peak luminosity had increased by 5 orders of magnitudes. Correspondingly the ATLAS first-level trigger rate grew by a factor 100, reaching 40 kHz, roughly half of the design rate. Concurrently, the event building and data saving rates reached and exceeded the design performance. Moreover, the installation of additional computing power yielded a system whose characteristics are now comparable with the final ones.
In this paper we will report on achievements and issues encountered during 2010. On this basis, we will follow discussing the preparations for the 2011 data-taking period, in particular with respect to the expected increase in LHC luminosity and the predicted reaching of the design first-level trigger rate.

Primary authors : Dr. VANDELLI, Wainer (Conseil Europeen Recherche Nucl. (CERN)) ; Dr. AVOLIO, Giuseppe (University of California Irvine (UCI))

Co-authors :

Presenter : Dr. VANDELLI, Wainer (Conseil Europeen Recherche Nucl. (CERN)) ; Dr. AVOLIO, Giuseppe (University of Calif

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : VANDELLI, Wainer

Submitted on Friday 25 February 2011

Last modified on : Friday 22 April 2011

Comments :

Despite what is reported in the "Primary Author" section (apparently a speaker name is required by the form), we are simply submitting the abstract on behalf of the ATLAS TDAQ community. If the paper is accepted, the person actually in charge of presenting will be decided on the basis of our internal talk assignment procedures. Once selected, the speaker name will be promptly communicated to the conference organizers.

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:36
Comments : ""

Abstract ID : 21

ATLAS Lepton, Photon, and B-Physics Triggers in 2010 LHC proton-proton collisions

Content :

The ATLAS trigger system has collected proton-proton collisions over 5 orders of magnitude in instantaneous luminosity during the 2010 LHC running. The trigger system is designed to reduce the event rate from 40MHz to 200Hz using a hardware-based Level 1 Trigger (L1) and a software-based High Level Trigger (HLT). The trigger selection is based on identifying object candidates, such as, electrons, photons, muons, tau leptons, and jets as well as global event features, such as missing transverse energy. This talk will present the commissioning, operations, and performance of the tau, electron, photon, muon, and b-phyiscs trigger systems. We describe how the instrumentation of these triggers has evolved with increasing LHC luminosity and give a brief overview of plans for forthcoming LHC running.

Primary authors : HAMILTON, Andrew (Universite de Geneve)

Co-authors :

Presenter : HAMILTON, Andrew (Universite de Geneve)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : HAMILTON, Andrew

Submitted on Friday 25 February 2011

Last modified on : Friday 22 April 2011

Comments :

This talk will be presented on behalf of the ATLAS Collaboration by a member of the ATLAS Collaboration other than myself.

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:51
Comments : ""

Abstract ID : 22

ATLAS Jet, B-Jet, Minimum Bias, and Missing Transverse Energy Triggers in 2010 LHC proton-proton collisions

Content :

The ATLAS trigger system has collected proton-proton collisions over 5 orders of magnitude in instantaneous luminosity during the 2010 LHC running. The trigger system is designed to reduce the event rate from 40MHz to 200Hz using a hardware-based Level 1 Trigger (L1) and a software-based High Level Trigger (HLT). The trigger selection is based on identifying bunch crossings with object candidate,s such as, electrons, photons, muons, tau leptons, and jets; as well as global event features, such as, missing transverse energy (MET) and inclusive production of charged particle (minbias). This talk will present the commissioning, operations, and performance of the jet, b-jet, minbias, and MET trigger systems. We describe how the instrumentation of these triggers has evolved with increasing LHC luminosity and give a brief overview of plans for forthcoming LHC running.

Primary authors : HAMILTON, Andrew (Universite de Geneve)

Co-authors :

Presenter : HAMILTON, Andrew (Universite de Geneve)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : HAMILTON, Andrew

Submitted on Friday 25 February 2011

Last modified on : Friday 22 April 2011

Comments :

This talk will be presented on behalf of the ATLAS Collaboration, by a member of the ATLAS Collaboration other than myself.

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:55
Comments : ""

Abstract ID : 23

20 cm sealed tube photon counting detectors with novel microchannel plates for imaging and timing applications

Content :

As part of a collaborative program between university of California, Berkeley, the Argonne National Laboratory, University of Chicago, and several commercial companies, we are developing a 20 cm square sealed tube microchannel plate detector scheme with a proximity focused bialkali photocathode. Sealed tube microchannel plate devices have good imaging and timing characteristics, but large areas have been unavailable up till now. We have made considerable progress in fabricating large size microchannel plates. A key feature is the novel implementation of low cost microchannel plates using borosilicate hollow core tubes. The resistive and photo-emissive surfaces are then applied by atomic layer deposition, eliminating the wet etch and thermal reduction processes for normal glass microchannel plates. Initial results with 33 mm format microchannel plates for gain, pulse width, imaging performance and lifetime are very encouraging. Large 20 cm square microchannel plate prototypes with 20 μm and 40μm pores have been made and are currently being tested. Fabrication for the 20 cm sealed tube assembly is well advanced and includes a borosilicate entrance window, a proximity focused bialkali photocathode, a pair of microchannel plates and a strip-line readout anode. Our design employs a brazed ceramic walled enclosure and a transfer tube type indium seal. Somewhat different packaging techniques are being used to achieve the same goal at Argonne National Laboratory. We have adopted a baseline bialkali photocathode to match our input spectrum, and have made a number of test photocathodes with >20% peak quantum efficiency on our chosen borofloat-33 window material. Stripline anodes are also being developed which will give better than 1mm spatial resolution using novel timing electronics.

Primary authors : Dr. SIEGMUND, Oswald (University of California)

Co-authors : Dr. MCPHATE, Jason (University of California) ; Dr. TREMSIN, Anton (University of California) ; Mrs. JELINSKY, Sharon (University of California) ; Prof. FRISCH, Henry (University of Chicago) ; Dr. ELAM, Jeffrey (Argonne National Laboratory) ; Dr. MANE, Anil (Argonne National Laboratory)

Presenter : Dr. SIEGMUND, Oswald (University of California)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : SIEGMUND, Oswald

Submitted on Saturday 26 February 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)

Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:43
Comments : ""

Abstract ID : 24

ATLAS Silicon Microstrip Tracker Operation and Performance

Content :

The SemiConductor Tracker (SCT), comprising of silicon micro-strip detectors is one of the key precision tracking devices in the ATLAS Inner Detector. ATLAS is one of the experiments at CERN LHC.
The completed SCT is in very good shapes with 99.3% of the SCT's 4088 modules (a total of 6.3 million strips) are operational. The noise occupancy and hit efficiency exceed the design specifications.
In the talk the current status of the SCT will be reviewed. We will report on the operation of the detector, its performance and observed problems, with stress on the sensor and electronics performance.
In December 2009 the ATLAS experiment at the CERN Large Hadron Collider (LHC) recorded the first proton-proton collisions at a centre-of-mass energy of 900 GeV and this was followed by the unprecedented energy of 7 TeV in March 2010. The Semi-Conductor Tracker (SCT) is the key precision tracking device in ATLAS, made from silicon micro-strip detectors processed in the planar p-in-n technology. The signals from the strips are processed in the front-end ASICS ABCD3TA, working in the binary readout mode. Data is transferred to the off-detector readout electronics via optical fibers.
The completed SCT has been installed inside the ATLAS experimental hall since 2007 and has been operational since then. Calibration data has been taken and analyzed to determine the noise performance of the system. In addition, extensive commissioning with cosmic ray events has been performed both with and without magnetic field. The sensor behavior in the 2 Tesla solonoidal magnetic field was studied by measurements of the Lorentz angle. After this commissioning phase, the SCT was ready for the first LHC pp collision run. We find 99.3% of the SCT modules are operational, noise occupancy and hit efficiency exceed the design specifications, the alignment is already close enough to the ideal to allow on-line track reconstruction and invariant mass determination.
In the talk the current status of the SCT will be reviewed, including results from the latest data-taking periods in 2009 and 2010, and from the detector alignment. We will report on the operation of the detector including overviews on services, connectivity and observed problems. The main emphasis will be given to the performance of the SCT with the LHC in collision mode and to the performance of individual electronic components. The SCT commissioning and running experience will then be used to extract valuable lessons for future silicon strip detector projects.

Primary authors : Dr. CIOCIO, Alessandra (Lawrence Berkeley National Laboratory (LBNL))

Co-authors :

Presenter : Dr. CIOCIO, Alessandra (Lawrence Berkeley National Laboratory (LBNL))

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : CIOCIO, Alessandra

Submitted on Saturday 26 February 2011

Last modified on : Friday 29 April 2011

Comments :

On behalf of the Atlas SCT speakers committee I'm submitting this abstract that I hope will be accepted.
I will then provide an excellent speaker from our collaboration

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 09:29
Comments : ""

Abstract ID : 25

An EUDET/AIDA pixel beam telescope for detector development

Content :

A high resolution (\sigma <3um) beam telescope based on monolithic active pixel sensors was developed within the EUDET collaboration. EUDET was a coordinated detector R programme for the future International Linear Collider providing test beam infrastructure to detector R groups.The telescope consists of six sensor planes with a pixel pitch of either 18.4 um or 10 um and can be operated inside a solenoidal magnetic field of up to 1.2 T. A general purpose cooling, positioning, data acquisition (DAQ) and offline data analysis tools are available for the users. The excellent resolution, readout rate and DAQ integration capabilities made the telescope a primiry beam tests tool also for several CERN based experiments. In this primary report the performance of the final telescope will be presented, as well as new test beam results from spring 2011. Furthermore the plans for an even more flexible telescope with three different pixel technologies (Timepix, Mimosa, ATLAS Pixel) within the new European detector infrastructure project AIDA will be presented.

Primary authors : Dr. RUBINSKIY, Igor (Deutsches Elektronen-Synchrotron (DESY)-Unknown-Unknown)

Co-authors :

Presenter : Dr. RUBINSKIY, Igor (Deutsches Elektronen-Synchrotron (DESY)-Unknown-Unknown)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : RUBINSKIY, Igor

Submitted on Sunday 27 February 2011

Last modified on : Friday 29 April 2011

Comments :

the talk is presented on behalf of the EUDET and AIDA consortium

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:20
Comments : ""

Abstract ID : 26

The EDRO board connected to the Associative Memory: a "Baby" FastTracKer processor for the ATLAS experiment

Content :

The FastTracKer (FTK) is a dedicated hardware system able to perform online fast and precise track reconstruction of the full events at the Atlas experiment, within an average latency of few dozens of microseconds. It is made of two pipelined processors: the Associative Memory (AM), finding low precision tracks called "roads", and the Track Fitter (TF), refining the track quality with high precision fits.

The FTK design [1] that works well at the Large Hadron Collider (LHC) Phase I luminosity requires the best of the available technology for tracking in high occupancy conditions.
While the new processor is designed for the most demanding LHC conditions, we want to use already existing prototypes, part of them developed for the SLIM5 collaboration [2], to exercise the FTK functions in the new Atlas environment.

During Laboratory tests, the EDRO board (Event Dispatch and Read-Out) receives on a clustering mezzanine (able to calculate the pixel and SCT cluster centroids) "fake" detector raw data on S-links from a "pseudo front-end" (a CPU). Then the whole system will grow to become the FTK "Vertical Slice": at this point it will be possible to perform tests on real data in ATLAS during beam time. The clusters are transferred through the P3 connector to the AM board that finds roads, to be provided back to the EDRO. The EDRO delivers back to the CPU the found roads using an S-link connection. The EDRO will have also the capability to associate roads with their internal clusters to be provided to the TF that initially will be the GigaFitter developed for the SVT processor at CDF [3]. Our goal is to take the first data before the end of the 2012 run. The vertical slice will cover a small projective tower in the detector, but it will be a demonstrator since it will be functionally complete.

We report on the performances and structure of the first nucleus of the vertical slice, including the pixel/strip hit clustering (clustering mezzanine), hit organization and distribution (EDRO) and the Associative Memory road funding function.

[1] A. Andreani et al., The FastTracker Real Time Processor and Its Impact on Muon Isolation, Tau and b-Jet Online Selections at ATLAS, Conference Record 17th IEEE NPSS Real Time Conference Record of the 17th Real Time Conference, Lisbon, Portugal, 24 - 28 May 2010.

[2] S. Bettarini et al., The SLIM5 low mass silicon tracker demonstrator, Nuclear Instruments and Methods in Physics Research A 623 (2010) 942–953

[3] S. Amerio et al., GigaFitter: Performance at CDF and perspective for future applications, Nuclear Instruments and Methods in Physics Research A 623(2010)540–542

Primary authors : Dr. CRESCIOLI, Francesco (INFN Pisa / Universita` di Pisa)

Co-authors : Dr. ANNOVI, Alberto (INFN Frascati) ; Mr. BERETTA, Matteo (INFN Frascati) ; Ms. BEVILACQUA, Valentina (INFN Pisa / Universita` di Pisa) ; Mr. CERVIGNI, Francesco (INFN Pisa / Universita` di Pisa) ; Dr. GIANNETTI, Paola (INFN Pisa / Universita` di Pisa) ; Dr. GIORGI, Filippo (INFN Bologna) ; Mr. MAGALOTTI, Daniel (Universita` di Perugia) ; Dr. NEGRI, Andrea

(INFN Pavia) ; Mr. PIENDIBENE, Marco (INFN Pisa / Universita` di Pisa) ; Dr. RODA, Chiara (INFN Pisa / Universita` di Pisa) ; Mr. VITILLO, Roberto (INFN Pisa / Universita` di Pisa) ; Dr. VOLPI, Guido (University of Chicago) ; Prof. VILLA, Mauro (INFN Bologna / Universita` di Bologna)

Presenter : Dr. CRESCIOLI, Francesco (INFN Pisa / Universita` di Pisa)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : CRESCIOLI, Francesco

Submitted on Sunday 27 February 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:33
Comments : ""

Abstract ID : 27

Searching for Dark Matter with COUPP

Content :

COUPP is an experimental campaign with the goal of detecting dark matter in the form of Weakly Interacting Massive Particles (WIMPs) using continuously sensitive bubble chambers, operated under mildly superheated conditions. Recoils of dark matter particles off the target nuclei in the chamber would produce single, isolated bubbles, which are detectable both optically and acoustically. Under normal operating conditions, the detector has an energy threshold for nuclear recoils of approximately 10 keV but is insensitive to electron recoils, which typically constitute the background in dark matter searches. Nuclear recoils can be discriminated from alpha decays in the target liquid with the acoustic signal produced by the bubbles, which show excess power at high frequencies for alpha events.
Recent results from a 4 kg chamber (COUPP-4) at a shallow depth produced new limits on WIMP-nucleon interactions while also demonstrating the acoustic rejection of alpha events. The COUPP-4 detector is now taking data in SNOLAB, producing stronger limits on both alpha rejection and dark matter interactions. The COUPP collaboration is also actively working on installing a 60 kg chamber at SNOLAB, with the goal of achieving world-best sensitivity to spin- independent dark matter. This talk will summarize the recent results from COUPP-4 and describe progress on COUPP-60.

Primary authors : Dr. LIPPINCOTT, Hugh (Fermilab)

Co-authors :

Presenter : Dr. LIPPINCOTT, Hugh (Fermilab)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : LIPPINCOTT, Hugh

Submitted on Monday 28 February 2011

Last modified on : Saturday 12 March 2011

Comments :

Presentation on behalf of the COUPP collaboration

Status : ACCEPTED

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HALL, Jeter
Date : 12 March 2011 21:09
Comments : "It will be interesting to hear about the progress of the COUPP detector. The alpha/n separation may be useful for other areas of physics."

Abstract ID : 28

CMD-3 and SND Detectors for VEPP-2000

Content :

Two detectors – CMD-3 and SND successfully started experiments at new electron-positron collider VEPP-2000 at Novosibirsk Budker Institute. First physics runs in which c.m. energy region from 1 to 2 GeV was scanned with integrated luminosity of 20 pb-1allowed to measure parameters of detection systems and conditions of work such as machine luminosity and background. The results show that the reach physical program including study of light vector mesons recurrences, measurements of nucleon form factors near threshold and investigation of hadrons production dynamic will be successfully fulfilled.
The detectors subsystems like drift chambers, electromagnetic calorimeters based on liquid Xenon as well as on CsI, BGO and NaI crystals, Cherenkov and TOF counters will be described.

Primary authors : Mr. KHAZIN, Boris Isaakovich (Budker Institute of Nuclear Physics (BINP))

Co-authors :

Presenter : Mr. KHAZIN, Boris Isaakovich (Budker Institute of Nuclear Physics (BINP))

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : KHAZIN, Boris Isaakovich

Submitted on Tuesday 01 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 17:45
Comments : ""

Abstract ID : 29

The Argon Dark Matter experiment

Content :

The ArDM experiment is a double phase argon TPC/calorimeter soon to be operated at LSC (Laboratorio Subterraneo de Canfranc, Spain). It's aim is the direct detection of weakly interacting massive particles (WIMPs) by scintillation light and ionization charge.
In this talk we review the status of the project.

Primary authors : Mr. EPPRECHT, Lukas (Institut for particle physics-ETH Zurich)

Co-authors :

Presenter : Mr. EPPRECHT, Lukas (Institut for particle physics-ETH Zurich)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : EPPRECHT, Lukas

Submitted on Wednesday 02 March 2011

Last modified on : Saturday 12 March 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HALL, Jeter
Date : 12 March 2011 21:10
Comments : "Argon based dark matter experiments have the promise of revolutionizing the field. It will be interesting to hear about the technical progress of ArDM. Some of the argon technologies they are developing may be useful for other areas of physics."

Abstract ID : 30

Belle2Link — a unified high speed link in Belle II experiment

Content :

The Belle II experiment is an upgrade of the KEK B-Factory Belle experiment. Upgrade of the accelerator to SuperKEKB, which will increase its luminosity to 8 x 10^35 cm^-2 s^-1, requires many new detector components: a totally new pixel detector, a significantly larger silicon vertex detector (SVD), replacement central drift chamber (CDC), new particle identification (PID) detector technologies, an improved readout electromagnetic calorimeter (ECL), higher rate KL and muon detector (KLM), and also completely upgraded trigger (TRG) and data acquisition systems (DAQ) to handle the 40 times higher rate. The collaboration has decided to use optical fibers and RocketIO for simple and reliable connections between Front-End Electronics (FEE) and Trigger and DAQ system for signal and data transmission. The system design is almost complete and a so-called Belle2Link --- a unified high speed(HS) link for Belle II -- has been defined for use between the FEE and DAQ in all subsystems. Proto-types of this unified HS link has been designed and Firmware in FEE part data collection and in DAQ part preprocessing has been developed. 3.125Gbps of stable data rate and <10^-15 BER has been reached. Some slow control over this high speed link is also implemented. Overall test with CDC prototype and file server system showed the present design satisfy the requirement. This presentation will give general description and also some technical issues.

Primary authors : Mr. SUN, Dehui (Institute of High Energy Physics, Chinese Academy of sciences) ; Prof. LIU, Zhen'an (Institute of High Energy Physics, Chinese Academy of sciences)

Co-authors : Mr. ZHAO, Jingzhou (Institute of High Energy Physics, Chinese Academy of sciences) ; Dr. XU, Hao (Institute of High Energy Physics, Chinese Academy of sciences) ; Ms. GONG, Wenxuan (Institute of High Energy Physics, Chinese Academy of sciences) ; Mr. WANG, Qiang (Institute of High Energy Physics, Chinese Academy of sciences)

Presenter : Mr. SUN, Dehui (Institute of High Energy Physics, Chinese Academy of sciences)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : SUN, Dehui

Submitted on Thursday 03 March 2011

Last modified on : Monday 09 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 09 May 2011 13:52
Comments : ""

Abstract ID : 31

Silicon Strip Detectors for the ATLAS sLHC Upgrade

Content :

While the Large Hadron Collider (LHC) at CERN is continuing to deliver an ever-increasing luminosity to the experiments, plans for an upgraded machine called Super-LHC (sLHC) are progressing. The upgrade is foreseen to increase the LHC design luminosity by a factor ten. The ATLAS experiment will need to build a new tracker for sLHC operation, which needs to be suited to the harsh sLHC conditions in terms of particle rates and radiation doses. In order to cope with the increase in pile-up backgrounds at the higher luminosity, an all silicon detector is being designed. To successfully face the increased radiation dose, a new generation of extremely radiation hard silicon detectors is being designed.
Silicon sensors with sufficient radiation hardness are the subject of an international R programme, working on pixel and strip sensors. The efforts presented here concentrate on the innermost strip layers. We have developed a large number of prototype planar detectors produced on p-type wafers in a number of different designs. These prototype detectors were then irradiated to a set of fluences matched to sLHC expectations. The irradiated sensors were subsequently tested with prototype sLHC readout electronics in order to study the radiation-induced degradation, and determine their performance after serious hadron irradiation of up to a few 1015 1-MeV neutron-equivalent per cm2.
One key figure of merit is the signal that can still be measured with a silicon detector after irradiation to increasing radiation doses representative of the severe sLHC conditions. Due to radiation-damage effects such as carrier trapping and growing depletion voltage of the detectors, the measurable signal is degraded as a function of irradiation. We measure a signal of roughly 25,000 electrons for an unirradiated sensor, which reduces to about 17,500 electrons after 2·1015 1-MeV neutron-equivalent per cm2 . We have also measured signals around 9,500 electrons for radiation doses expected for the pixel detectors in the ATLAS tracker upgrade.
From these data, it is evident that sufficient charge can still be recorded even at the highest fluence.
In our presentation, we will give an overview of the ATLAS tracker upgrade project, in particular focusing on the crucial innermost silicon strip layers. Results from a wide range of irradiated silicon detectors will be presented, and layout concepts for lightweight yet mechanically very rigid detector modules with high service integration will be shown.
We will draw conclusions on what type and design of strip detectors to employ for the upgrades of the tracking layers in the sLHC upgrades of LHC experiments.

Primary authors : Dr. CIOCIO, Alessandra (Lawrence Berkeley National Laboratory (LBNL))

Co-authors :

Presenter : Dr. CIOCIO, Alessandra (Lawrence Berkeley National Laboratory (LBNL))

Track classification : Experimental Detector Systems ; Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : CIOCIO, Alessandra

Submitted on Thursday 03 March 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed for other tracks (Semiconductor Detectors)
Judged by : CATTAI, Ariella
Date : 21 April 2011 17:51
Comments : ""

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 07:52
Comments : ""

Abstract ID : 32

SLID-ICV Vertical Integration Technology for the ATLAS Pixel Upgrades

Content :

A new pixel module concept is presented, where thin sensors and a novel vertical integration technique are combined. This R activity is carried out in view of the future ATLAS pixel detector upgrades.
A first set of n-in-p pixel sensors with active thicknesses of 75 and 150 microns has been produced from standard thickness wafers using a thinning process developed at the Max-Planck-Institut Semiconductor Laboratory. The pre-irradiation characterization of these sensors shows a very good device yield and high break down voltages.
After proton irradiations up to a fluence of 1E16 n eq./cm**2, Charge Collection Efficiency (CCE) measurements have been performed, yielding a higher CCE than expected from the present radiation damage models [1].

The interconnection of thin n-in-p pixels to the FE-I3 ATLAS electronics has been completed, exploiting the Solid Liquid Interdiffusion technique (SLID) developed by the Fraunhofer institute EMFT-Munich, as a possible alternative to the standard bump-bonding. One of the main advantages of this interconnection technique with respect to bump-bonding is that it can be applied to a second layer of chips on top of the first one, without destroying the pre-existing bonds, paving the way to a full exploitation of vertical integration technologies.

The SLID interconnection is characterized by a very thin eutectic Cu-Sn alloy, achieved through the deposition of 5 microns of Cu on both sides, and 3 microns of Sn on one side only. The feasibility of its application in the parameter range needed for the ATLAS pixel detector has been investigated with a test-structure production used to explore both the “wafer-to-wafer” and the “chip-to-wafer” interconnection.
We will present the preliminary results of the characterization of the first FE-I3 pixel modules interconnected through SLID, performed with the ATLAS pixel read-out system USBPix.

In addition, the status of the Inter Chip Vias (ICV) etched into the FE-I3 chip wafers will be reported. ICVs will be used to route the signals vertically through the read-out chips, to newly created pads on their backside. In the EMFT-Munich approach the chip wafer is thinned to about 50 microns and support wafers are used during the thinning and interconnection phases.
If successful this will serve as a proof of principle for future four-side buttable pixel assemblies, without the cantilever presently needed in the chip for the wire bonding.

[1] A. Macchiolo et al., “Performance of thin pixel sensors irradiated up to a fluence of 1E16 n eq./cm**2 and development of a new interconnection technology for the upgrade of the ATLAS pixel system”, NIM A, in press, doi:10.1016/j.nima.2010.11.163

Primary authors : Dr. MACCHIOLO, Anna (Max-Planck-Institut fuer Physik)

Co-authors : ANDRICEK, Ladislav (Max-Planck-Institut Semiconductor Laboratory) ; BEIMFORDE, Michael (Max-Planck-Institut für Physik) ; MOSER, Hans-guenther (Max-Planck-Institut Semiconductor Laboratory) ; NISIUS, Richard (Max-Planck-Institut für Physik) ; RICHTER, Rainer H. (Max-Planck-Institut Semiconductor Laboratory) ; WEIGELL, Philipp (Max-Planck-Institut für Physik)

Presenter : Dr. MACCHIOLO, Anna (Max-Planck-Institut fuer Physik)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : MACCHIOLO, Anna

Submitted on Tuesday 08 March 2011

Last modified on : Friday 29 April 2011

Comments :

This paper, focused on a particular application of 3D integration techniques, could also be considered for the 3D Satellite Meeting foreseen in the conference.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:17
Comments : ""

Abstract ID : 33

Performance of Silicon n-in-p Pixel Detectors irradiated up to 5E15 n eq. /cm**2 for the future ATLAS Upgrades

Content :

We present the results of the characterization of novel n-in-p planar pixel detectors, designed for the future upgrades of the ATLAS pixel system. N-in-p silicon devices are a promising candidate to replace the n-in-n sensors thanks to their radiation hardness and cost effectiveness, that could allow for an increased pixel instrumented area at larger radius.
The n-in-p modules presented here are composed of pixel sensors produced by CiS (Germany) connected with bump-bonding to the FE-I3 ATLAS readout chip. Differently than for the n-in-n technology, the n-in-p pixel sensors, 285 microns thick, are characterized by a guard-ring structure implemented on the front-side, avoiding the necessity of a double-side process. An additional passivation layer of Benzocyclobutene (BCB) has been applied on the sensor surface to prevent sparks between the sensor edges, at high voltage, and the chip, kept at ground, facing each other at a distance of about 25 microns.
The characterization of these devices has been performed with the ATLAS pixel read-out systems, TurboDAQ and USBPIX, before and after irradiation with 24 GeV/c protons and neutrons up to a fluence of 5E15 n eq. /cm**2. The CCE measurements carried out with radioactive sources have proven the feasibility of employing this kind of detectors up to these particle fluences. The collected charge has been measured to be always in excess of twice the value of the FE-I3 threshold, tuned to 3200 e-. In particular, pixel detectors irradiated at a fluence of 5E15 n eq. /cm**2 yield a charge of 8000 e- at a bias voltage of 800V.
The analysis of the data from a beam test with pions at CERN-SPS, also presented, yield high tracking efficiency of these devices before and after irradiation.
A new pixel production at CiS is in preparation for sensors compatible with the new ATLAS FE-I4 chip and reduced thickness (down to 150 microns) to investigate the radiation hardness of thinner detectors at HL-LHC (High Lumi HLC) fluences.

Primary authors : Dr. MACCHIOLO, Anna (Max-Planck-Institut fuer Physik)

Co-authors : BEIMFORDE, Michael (Max-Planck-Institut fuer Physik) ; GALLRAPP, Christian (CERN-PH) ; LA ROSA, Alessandro (CERN-PH) ; NISIUS, Richard (Max-Planck-Institut fuer Physik) ; PERNEGGER, Heinz (CERN-PH) ; RICHTER, Rainer H. (Max-Planck-Institut Semiconductor Laboratory) ; WEIGELL, Philipp (Max-Planck-Institut fuer Physik)

Presenter : Dr. MACCHIOLO, Anna (Max-Planck-Institut fuer Physik)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : MACCHIOLO, Anna

Submitted on Friday 11 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 09:58
Comments : ""

Abstract ID : 34

ADRIANO: A Dual-readout Integrally Active Non-segmented Option for future colliders

Content :

The physics program at future colliders demands an energy resolution of the calorimetric component of detectors at the limits of traditional techniques.
A novel Dual-Readout (ADRIANO) technology is under development with an expected excellent performance. Results from detailed Montecarlo studies on performance with respect to energy resolution, linear response and transverse containment and a preliminary optimization of the layout are presented. A baseline configuration is chosen with an estimated energy resolution of $\sigma(E)/E \approx 30\%/\sqrt{E}$, to support an extensive R program recently started by TWICE Collaboration. A test beam of a ~1 labda_I prototype is under way in FTBF at Fermilab.

Primary authors : Dr. GATTO, Corrado (INFN)

Co-authors : Dr. DI BENEDETTO, Vito (INFN) ; Dr. MAZZACANE, Anna (Fermilab) ; Dr. TERRACCIANO, Giuseppina (none)

Presenter : Dr. GATTO, Corrado (INFN)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by :

Submitted on Monday 14 March 2011

Last modified on : Monday 04 April 2011

Comments :

If not accepted as oral presentation, we would like to submit the same abstract for a poster presentation

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 17:54
Comments : "New development in calorimetry"

Abstract ID : 35

A Gigabit transceiver for data transmission in future high energy physics experiments

Content :

The transmission of data from detectors in future high energy experiments will be driven by a number of requirements. In many cases, raw bandwidth is the strongest of these but other needs such as diverse functionality, compactness, low power and radiation resistance are equally important. The GigaBit-Transceiver (GBT) project has been launched to provide a solution to these problems. The aim is to deliver a chip-set to build a bidirectional optical link transmitting and receiving serial data at 4.8 Gigabit/s.
The GBT project is based on four integrated circuits; a trans-impedance amplifier to receive signals from a photo-diode, a laser driver, an ancillary interface chip, and a transceiver (GBTX) containing a high-speed serialiser and de-serialiser. All of these have been successfully prototyped, and this paper will focus on the design and results from the GBTX prototype. This has been designed in commercial 130 nm CMOS with particular emphasis on enhancing its immunity to single-event-effects, which would otherwise lead to data corruption and link down-time. The chip has been fully characterized in the lab, with bit error rates in data transmission below 10^-15. These and other results will be presented, together with additional functionality included in the chip for the distribution of timing signals and built-in test features. The high speed serial data requires the use of dense flip-chip interconnects on the chip which will be described together with a corresponding custom ball-grid-array package. The paper will conclude with the application of the GBT in the planned upgrade of the LHCb experiment at CERN, where the bandwidth and functionality play a crucial role in this trigger-less data acquisition system.

Primary authors : Dr. WYLLIE, Ken (CERN)

Co-authors :

Presenter : Dr. WYLLIE, Ken (CERN)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : WYLLIE, Ken

Submitted on Monday 14 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 01:57
Comments : "30 min"

Abstract ID : 36

The QUIET Pseudo Correlation Polarimetry for Measuring the CMB polarization

Content :

QUIET is a ground-based experiment in Chile, designed to measure the CMB polarization.

QUIET currently has the largest array of Pseudo Correlation Receivers, utilizing High Electron Mobility Transistors (HEMT) technology, for detecting the CMB at 44 and 90 GHz. The HEMT technology, developed at JPL and Northrop Grumman, allows for operation at 26 Kelvin and cancellation of gain drifts by fast electronic switching.

The first Phase of QUIET achieved a sensitivity of about 70 microKelvin/sqrt(Hz), with gain-related systematic errors well below the statistical errors.

We discuss this design, and the improvements being made for the second phase of QUIET, which aims to increase the sensitivity by x3.

Primary authors : Dr. NGUYEN, Hogan (Fermilab)

Co-authors :

Presenter : Dr. NGUYEN, Hogan (Fermilab)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : Dr. NGUYEN, Hogan

Submitted on Monday 14 March 2011

Last modified on : Friday 22 April 2011

Comments :

I am submitting this on behalf of the QUIET Collaboration. We will be selecting the final speaker very shortly.

Regards,

Hogan Nguyen, for the QUIET Collaboration

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 22 April 2011 21:58

Comments : ""

Abstract ID : 37

Single module test of a Micromegas TPC Large Prototype

Content :

A Micromegas readout module has been tested within the EUDET facility at DESY. Measurements carried out within a 1T magnetic field and with no magnetic field allowed a measurement of the point resolution to be measured : a value of 60 microns extrapolated at zero drift distance was obtained, thanks to the technique of charge spreading with a resistive anode. The homogeneity of the detector and possible distortions have been studied. A plan in progress to fully cover the prototype with 7 modules with integrated electronics will also be presented.

Primary authors : COLAS, Paul (IRFU-cea - Centre d'Etudes de Saclay)

Co-authors :

Presenter : COLAS, Paul (IRFU-cea - Centre d'Etudes de Saclay)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : COLAS, Paul

Submitted on Monday 14 March 2011

Last modified on : Monday 04 April 2011

Comments :

Test version. Should be 'on behalf of LCTPC'

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 04 April 2011 10:24
Comments : ""

Abstract ID : 38

Spherical GEMs

Content :

We developed a method to make GEM foils with a spherical geometry. Tests of this procedure and with the resulting spherical GEMs are presented. Together with a spherical drift electrode, a spherical conversion gap can be formed in which there is a radial electric field. This eliminates the parallax error for detection of x-rays, neutrons or UV photons with a gaseous converter. This parallax error limits the spatial resolution at wide scattering angles.

Besides spherical GEMs, we have developed curved spacers to maintain accurate spacing, and a conical field cage to prevent edge distortion of the radial drift field up to the limit of the angular acceptance of the detector. With these components first tests are done in a setup with a spherical entrance window but a planar readout structure; results will be presented and discussed.

A flat readout structure poses difficulties, however. Therefore we will show advanced plans to make a prototype of an entirely spherical multiple-GEM detector, including a spherical 2D readout structure. This detector will have a superior position resolution, also at wide angles, and a high rate capability.

Primary authors : DUARTE PINTO, Serge (CERN)

Co-authors : ROPELEWSKI, Leszek (CERN) ; BROCK, Ian (University of Bonn) ; DE OLIVEIRA, Rui (CERN) ; TAUREG, Hans (CERN) ; VAN STENIS, Miranda (CERN)

Presenter : DUARTE PINTO, Serge (CERN)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : DUARTE PINTO, Serge

Submitted on Tuesday 15 March 2011

Last modified on : Monday 04 April 2011

Comments :

This contribution could alternatively be put in the category "Photon Detectors".

Status : WITHDRAWN

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 04 April 2011 10:44
Comments : "This kind of detector is innovative and never be realized with MWPCs."

Abstract ID : 39

Gas Electron Multipliers for the Antiproton Decelerator

Content :

A new beam profile detector for the Antiproton Decelerator (AD) at CERN is based on a single Gas Electron Multiplier (GEM) with a 2D readout structure. This detector is very light (~0.25 X0), and measures horizontal and vertical profiles directly in one plane. This overcomes the problems previously encountered with multiwire proportional chambers (MWPCs) for the same purpose, where beam interactions with the detector affected the obtained profiles severely.

A prototype was installed in late 2010, and successfully tested. Another 3 detectors are installed in the ASACUSA beam line now, and results will be shown, together with an accurate description of the detector. Production of these chambers is being prepared, to eventually replace all MWPCs on the AD beam lines.

Like MWPCs, the working principle of GEMs is based on proportional mode charge amplification in gaseous media. GEMs however have a high rate capability, strong resistance to aging or mechanical failures, and are inexpensive. This makes them promising candidates for upgrade of profile monitors on many other beam lines at CERN as well.

Primary authors : DUARTE PINTO, Serge (CERN)

Co-authors : SPANGGAARD, Jens (CERN) ; ROPELEWSKI, Leszek (CERN) ; TRANQUILLE, Gerard (CERN)

Presenter : DUARTE PINTO, Serge (CERN)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : DUARTE PINTO, Serge

Submitted on Tuesday 15 March 2011

Last modified on : Tuesday 15 March 2011

Comments :

Status : WITHDRAWN

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 41

Calibration and Performance of the precision chambers of the ATLAS muon spectrometer.

Content :

The ATLAS muon spectrometer consists of a system of precision tracking and trigger chambers embedded in a 2T magnetic field generated by three large air-core superconducting toroids. The precision Monitored Drift Tube (MDT) chambers measure the track sagitta up to a pseudo-rapidity of 2.7 with a 50 μm uncertainty yielding a design muon transverse momentum resolution of 10% at 1 TeV. Muon tracking is augmented in the very forward region by Cathode Strip Chambers (CSC).
The calibration program, essential to achieve the spectrometer design
performance and physics reach, is conducted at three worldwide computing centers. These centers each receive a dedicated High Level Trigger data stream that enables high statistics based determination of T0's and drift-time to drift-space relations. During the first year of data taking a system of periodic calibration updates has been established. The calibration algorithms, methods and tools and performance results for this first year of LHC collision data
collected by the muon spectrometer will be presented.

Primary authors : BINI, Cesare (Sapienza Università and INFN Roma)

Co-authors :

Presenter : BINI, Cesare (Sapienza Università and INFN Roma)

Track classification : Experimental Detector Systems ; Gaseous Detectors

Contribution type : --not specified--

Submitted by : BINI, Cesare

Submitted on Wednesday 16 March 2011

Last modified on : Tuesday 26 April 2011

Comments :

On behalf of the ATLAS collaboration. The presenter could be changed.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed for other tracks (Gaseous Detectors)
Judged by : CATTAI, Ariella
Date : 21 April 2011 17:52
Comments : ""

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)

Judged by : KOBAYASHI, Makoto
Date : 26 April 2011 18:37
Comments : ""

Abstract ID : 42

GEM-MIGAS gain optimisation for high pressure operation in CF4 and He/CF4 mixtures

Content :

The Microstrip Gas Chamber was the first micropattern detector used for thermal neutron detection. Several studies regarding the Gas Electron Multiplier (GEM) to neutron detection have been performed. High charge gains could not be achieved at high pressures, but the readout of the scintillation produced in the electron avalanches, using a CCD camera, allowed the development of GEM-based neutron detectors.
This work investigates the viability of a hybrid structure based on Gas Electron Multiplier with a Micromegas Gap Amplifying Structure, GEM-MIGAS, as a neutron gaseous detector. The GEM-MIGAS was recently introduced by J. A. Mir as a GEM coupled to a Micromegas induction gap, i. e. a GEM having a short induction gap of a few tens of microns, typically 50 μm.The operation principle is based on the electron multiplication within both the GEM holes and in induction gap, combining the amplification properties of the GEM and Micromegas electron multipliers in a single device. This results in a more efficient extraction of the charge from the GEM and improved gas gain uniformity over large areas, as in Micromegas. In addition, lower operational voltages in the GEM can be set, with minimization of sparks and prolonged life of the GEM.
The experimental work is divided into three phases starting with the optimization of the GEM-MIGAS gaps in the 20-250 μm range whilst operating in pure CF4. Having established the best induction gap, the second phase examined the influence of the GEM hole diameter whilst keeping the induction gap fixed at 50 μm (in pure CF4). Finally, the optimum GEM-MIGAS configuration (50 μm induction gap and 30 μm GEM hole diameter) determine gains in He (2.6 bar: 1 bar) and CF4 /He (2.6 bar: 2 bar). For a 1 mm thermal neutron position resolution, a pressure of about 2.6 bar is required for CF4.
The charge gain results obtained for the different gaps operating in 2.6 bar of CF4, show that shallow gaps do not perform better at high pressures and the highest gain values were obtained using the highest gaps of 250 and 150 μm. However, some electrical instabilities were observed for these gaps and for that reason, we concluded that the 50 μm gap was the optimum for elevated pressures. For the GEM-MIGAS using a standard GEM, with 50 μm hole diameter, the gain decreased rapidly with pressure, from 1.5 x10^4 to 400 at 1 and 2.6 bar CF4, respectively. In contrast, the gain drop with pressure is less steep when using a GEM-MIGAS with GEM hole diameter of 30μm, decreasing from 3.0x10^4 to 6.0x10^3 for 1 and 2.6 bar CF4, respectively. The optimum GEM-MIGAS configuration was found to be 50 μm induction gap and a GEM with 30 μm hole diameter.
The highest gains with the optimum GEM-MIGAS using CF4 /He (2.6 bar: 1 bar) and CF4 /He (2.6 bar: 2 bar) were 3x10^3 and 2x10^3, respectively, almost two orders of magnitude above that required for thermal neutron detection. This implies that it may be possible to raise CF4 pressure above 2.6 bars, for sub-mm position resolution, until gain drops to few tens. However, this aspect remains to be determined experimentally.
It was successfully demonstrated that GEM-MIGAS, with 50 μm induction gap and the 30 μm hole GEM, is a viable choice to be used in neutron gaseous detectors based in He/CF4 mixtures. The gain achieved using 2.6 bar CF4/ 2bar He was above 10^3 and sufficient to achieve 1 mm thermal neutron position resolution. Higher CF4/He filling pressures can be used before the reduction of the gain down few tens.

Primary authors : CONCEIçãO, Ana (Instrumentation Center, Physics Department, University of Coimbra)

Co-authors : Dr. A. MIR, Jamil (Science and Technology Facilities Council, Rutherford Appleton Laboratory) ; Prof. SANTOS, Joaquim (Instrumentation Center, Physics Department, University of Coimbra)

Presenter : CONCEIçãO, Ana (Instrumentation Center, Physics Department, University of Coimbra)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : CONCEIçãO, Ana

Submitted on Friday 18 March 2011

Last modified on : Thursday 14 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 14 April 2011 16:55
Comments : ""

Abstract ID : 43

The discrimination capabilities of Micromegas detectors at low energies

Content :

The latest generation of Micromegas detectors show a good energy resolution, spatial resolution and low threshold, which make them idoneous in low energy applications. Two micromegas detectors have been built for dark matter experiments: CAST, which uses a dipole magnet to convert axion into detectable x-ray photons, and MIMAC, which aims to reconstruct the tracks of low energy nuclear recoils in a mixture of CF_4 and CHF_3. These readouts have been respectively built with the microbulk and bulk techniques, which show different gain, electron transmission and energy resolutions. The detectors and the operation conditions will be described in detail as wells as their discrimination capabilities for low energy photons will be discussed.

Primary authors : Mr. IGUAZ GUTIERREZ, Francisco Jose (CEA - Centre d'Etudes de Saclay (CEA))

Co-authors : Mrs. FERRER-RIBAS, Esther (CEA - Centre d'Etudes de Saclay (CEA)) ; Mr. GIOMATARIS, Ioannis (CEA - Centre d'Etudes de Saclay (CEA)) ; Mr. SANTOS, Daniel (LPSC-Grenoble)

Presenter : Mr. IGUAZ GUTIERREZ, Francisco Jose (CEA - Centre d'Etudes de Saclay (CEA))

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : IGUAZ GUTIERREZ, Francisco Jose

Submitted on Sunday 20 March 2011

Last modified on : Sunday 20 March 2011

Comments :

This presentation, based on CAST and MIMAC Micromegas detectors, have several co-authors. I have included the three most important ones but the rest will be mentioned in the presentation.

Status : SUBMITTED

Track judgments :

Track : Dark Matter Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 44

New developments of microbulk Micromegas detectors

Content :

A new Micromegas manufacturing technique, based on kapton etching technology, has been recently developped, improving the uniformity and stability of this kind of readouts. Excellent energy resolutions have been obtained, reaching a 11% FWHM for the 5.9 keV photon peak of 55Fe source and 1.8% FWHM for the 5.5 MeV alpha peak of the 241Am source. The new detector has other advantages like its flexible structure, low material and high radio-purity. The two actual approaches of this technique will be described and the features of these readouts in argon-isobutane mixtures will be presented. Moreover, the low material present in the amplification gap makes these detectors approximate the Rose and Korff model for the avalanche amplification, which will be discussed for the same type of mixtures. Finally, we will present several applications of the microbulk technique.

Primary authors : Mr. IGUAZ GUTIERREZ, Francisco Jose (CEA - Centre d'Etudes de Saclay (CEA))

Co-authors : Mrs. FERRER-RIBAS, Esther (CEA - Centre d'Etudes de Saclay (CEA)) ; Mr. GIOMATARIS, Ioannis (CEA - Centre d'Etudes de Saclay (CEA)) ; Mr. IRASTORZA, Igor G. (Laboratorio de F\'isica Nuclear y Astropart\'iculas, Universidad de Zaragoza, Zaragoza, Spain)

Presenter : Mr. IGUAZ GUTIERREZ, Francisco Jose (CEA - Centre d'Etudes de Saclay (CEA))

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : IGUAZ GUTIERREZ, Francisco Jose

Submitted on Sunday 20 March 2011

Last modified on : Monday 04 April 2011

Comments :

This presentation, based on Microbulk Micromegas technology, have several co-authors. I have only included three authors but the rest will be mentioned in the presentation.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 04 April 2011 12:16
Comments : "The paper will describe the performance of Micromegas manufactured with a totally new process."

Abstract ID : 45

Resource utilization of the ATLAS High Level Trigger during 2010 LHC running

Content :

In 2010 the ATLAS experiment has successfully recorded data from LHC collisions with high efficiency and excellent data quality. ATLAS employs a three-level trigger system to select events of interest for physics analyses and detector commissioning. The trigger system consists of a custom-designed hardware trigger at level-1 (L1) and software algorithms executing on commodity servers at the two higher levels: second level trigger (L2) and event filter (EF). The corresponding trigger rates are 75~kHz, 3~kHz and 200~Hz. The L2 uses custom algorithms to examine a small fraction of data at full detector granularity in Regions of Interest selected by the L1. The EF employs offline algorithms and full detector data for more computationally intensive analysis.

The trigger selection is defined by trigger menus which consist of more than 500 individual trigger signatures, such as electrons, muons, particle jets, etc. An execution of a trigger signature incurs computing and data storage costs. A composition of the deployed trigger menu depends on instantaneous LHC luminosity, experiment's goals for recorded data and limits imposed by the available computing power, network bandwidth and storage space. We have developed a monitoring infrastructure to assign computing cost for individual trigger signatures and the trigger menu as whole. These costs can be extrapolated to higher luminosity allowing development of trigger menus for a higher LHC collision rate than currently achievable.

Total execution times of L2 and EF algorithms are monitored to ensure that sufficient computing resources are available to process events accepted by lower trigger levels. For events accepted by the L1, data fragments are buffered by the Readout System (ROS) which provides them on demand to the L2 algorithms. The rate and volume of these data requests by the individual L2 algorithms are also monitored, and the trigger menus are corrected when necessary, to prevent exceeding a maximum allowed ROS request rate. In addition, patterns for cabling readout links from sub-detectors front-ends are checked for potential inefficiencies which could limit ROS performance. Finally, an acceptance rate of individual signatures at higher luminosity is computed using specially recorded detector data. The acceptance rate of the entire menu is also computed taking into account correlations between signatures.

In this presentation we describe the software infrastructure for measuring resource utilization of the ATLAS High Level Trigger. We also describe the procedure and tools employed by ATLAS in 2010 to develop trigger menus as the LHC collision rate increased by several orders of magnitude.

Primary authors : OSPANOV, Rustem (University of Pennsylvania)

Co-authors :

Presenter : OSPANOV, Rustem (University of Pennsylvania)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : OSPANOV, Rustem

Submitted on Monday 21 March 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:56
Comments : ""

Abstract ID : 46

Operational experience with the ATLAS Pixel Detector at the LHC

Content :

The ATLAS Pixel Detector is the innermost detector of the ATLAS experiment at the Large Hadron Collider at CERN, providing high-resolution measurements of charged particle tracks in the high radiation environment close to the collision region. This capability is vital for the identification and measurement of proper decay times of long-lived particles such as b-hadrons, and thus vital for the ATLAS physics program.
The detector provides hermetic coverage with three cylindrical layers and three layers of forward and backward pixel detectors.
It consists of approximately 80 million pixels that are individually read out via chips bump-bonded to 1744 n-in-n silicon substrates.
In this talk, results from the successful operation of the Pixel Detector at the LHC will be presented, including monitoring, calibration procedures, timing optimization and detector performance. The detector performance is excellent: 97,5% of the pixels are operational, noise occupancy and hit efficiency exceed the design specification, and a good alignment allows high quality track resolution.

Primary authors : Dr. TRONCON, Clara (Milano INFN & University)

Co-authors :

Presenter : Dr. TRONCON, Clara (Milano INFN & University)

Track classification : Experimental Detector Systems ; Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : TRONCON, Clara

Submitted on Monday 21 March 2011

Last modified on : Friday 29 April 2011

Comments :

I submit this abstract as a member of the ATLAS Pixel Detector Speaker Committe.
The speaker will be defined later.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed for other tracks (Semiconductor Detectors)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:22
Comments : ""

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula

Date : 29 April 2011 08:32
Comments : ""

Abstract ID : 47

Detector Control System Design of Daya Bay Neutrino Experiment

Content :

The Daya Bay reactor neutrino experiment is aimed at a measurement of the neutrino mixing angle θ_{13} with the sensitivity of 0.01 in $\sin^2 2\theta_{13}$ at the 90% confidence level. The experiment design takes two short baselines and one long baseline positioned with identical detectors to measure the relative rates and energy spectra of electron antineutrinos. The detector experiment will start taking data with the first two near site detectors in the second half year of 2011. Data taking with the full complement of eight detectors will start in 2012. This paper will present the design of Detector Control System(DCS) of the experiment. The system schema, the software and hardware technology and the remote control and monitoring method will be introduced.

Primary authors : Ms. YE, Mei (INSTITUTE OF HIGH ENERGY PHYSICS, ACADEMIA SINICA)

Co-authors :

Presenter : Ms. YE, Mei (INSTITUTE OF HIGH ENERGY PHYSICS, ACADEMIA SINICA)

Track classification : Detectors for neutrino physics

Contribution type : Poster Presentation

Submitted by : Miss. YE, Mei

Submitted on Tuesday 22 March 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:41
Comments : ""

Abstract ID : 48

Photon Detection Systems for Modern Cherenkov Detectors

Content :

Modern experiments in hadronic physics require detector systems capable of identifying and reconstructing all final-state particles and their momentum vectors. The PANDA experiment at FAIR and the CLAS12 experiment at Jefferson Laboratory both plan to use imaging Cherenkov counters for particle identification. CLAS 12 will feature a Ring Imaging Cherenkov counter (RICH), while PANDA plans to construct Cherenkov counter relying on the Detection of Internally Reflected Cherenkov light (DIRC).
These detectors require high-rate, single-photon capable light detection system with sufficient granularity and position resolution. Several candidate systems are available, ranging from multi-anode photomultiplier tubes to micro-channel plate systems to silicon photomultipliers. Each of these detection solutions has particular advantages and disadvantages.
We present detailed studies of rate dependence, cross-talk, time-resolution and position resolution for a range of available photon detection solutions: Hamamatsu MAPMTs, MCP-PMTs from Photonis and Hamamatsu and a variety of SiPMs. We will conclude on their applicability to the PANDA and CLAS12 Cherenkov counters.

Primary authors : Dr. SEITZ, Björn (University of Glasgow)

Co-authors : Dr. HOEK, Matthias (University of Glasgow) ; Mrs. MONTGOMERY, Rachel A (University of Glasgow) ; Dr. KERI, Tibor (University of Glasgow) ; Dr. LEHMANN, Albert (University of Erlangen-Nuernberg) ; Mr. UHLIG, Fred (University of Erlangen-Nuernberg) ; Dr. ROSSI, Patrizia (INFN Frascati) ; Dr. CONTALBRIGO, Marco (INFN Ferrara)

Presenter : Dr. SEITZ, Björn (University of Glasgow)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : Dr. SEITZ, Björn

Submitted on Tuesday 22 March 2011

Last modified on : Friday 29 April 2011

Comments :

Talk could fit alternatively into the session on Particle Identification Detectors

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:44
Comments : ""

Abstract ID : 49

Optimization of Strip Isolation for Silicon Sensors

Content :

Precision machines like electron-positron-colliders and b-factories demand for low material budget and high resolution when it comes to particle tracking. A low material budget can be achieved by using thin double sided silicon detectors (DSSDs) and lightweight construction. Since thin sensors only give low signals, one has to be very careful to achieve high charge collection efficiency, which requires an appropriate sensor design.
In this talk we present a detailed investigation of different p-stop patterns used for strip isolation on the n-side of p-on-n sensors. We developed test sensors featuring the common p-stop, the atoll p-stop and a combined p-stop pattern, whereas for every pattern four different geometric layouts were considered. These sensors were tested at the Super Proton Synchrotron (SPS) at CERN (Geneva, Switzerland) in an 120 GeV hadron beam. Then they were irradiated to 70 MRad with a 60Co source and subsequently tested in the same beam as before.
The conclusions of these tests will be applied to the design of DSSDs for the Belle II experiment at KEK (Tsukuba, Japan).

Primary authors : VALENTAN, Manfred (Institute for High Energy Physics Vienna (HEPHY) - OeAW)

Co-authors : Dr. BERGAUER, Thomas (Institute for High Energy Physics Vienna (HEPHY) - OeAW) ; Dr. DRAGICEVIC, Marko (Institute for High Energy Physics Vienna (HEPHY) - OeAW) ; Dr. FRIEDL, Markus (Institute for High Energy Physics Vienna (HEPHY) - OeAW) ; IRMLER, Christian (Institute for High Energy Physics Vienna (HEPHY) - OeAW) ; HUEMER, Erik (Institute for High Energy Physics Vienna (HEPHY) - OeAW)

Presenter : VALENTAN, Manfred (Institute for High Energy Physics Vienna (HEPHY) - OeAW)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : VALENTAN, Manfred

Submitted on Tuesday 22 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:15
Comments : ""

Abstract ID : 50

Prototype Instrumentation for the Dark Energy Survey

Content :

The Dark Energy Survey (DES) is an astronomical survey covering 5000 square degrees of the Southern Hemisphere, scheduled for first light in late 2011. Survey observations will be made with the Dark Energy Camera (DECam), a 570 Megapixel camera consisting of 62 extremely red-sensitive (QE > 50% at 1000 nm) 2k x 4k science CCDs (along with associated guide and focus CCDs). DECam will be mounted on the Blanco Telescope at Cerro Tololo Inter-American Observatory (CTIO), and its large (3 square degree) field of view will allow for the detection of millions of galaxies and thousands of supernovae over the 525 nights of the Survey.
A 1/32 scale precursor camera (PreCam) was designed, constructed, and tested at Argonne National Laboratory, and was installed on the Curtis-Schmidt telescope at CTIO in the fall of 2010. Following a several week commissioning process, PreCam observations began in November 2010. PreCam was designed as a critical testbed for DECam detectors and data acquisition systems, along with many other aspects of the hardware, software, and Survey observing strategy. Furthermore, because the PreCam detectors are identical to the DECam CCDs, PreCam science data provide standard star calibrations that can save DES up to 10% of its planned observing time (since DES on-sky calibration time will be dramatically reduced).
We describe the basics of DECam and the Dark Energy Survey, and provide significant detail of the PreCam instrument, focusing on those aspects that make it an excellent precursor to the full DECam system.

Primary authors : Dr. KUEHN, Kyler (Argonne National Laboratory)

Co-authors : Dr. KUHLMANN, Steve (Argonne National Laboratory)

Presenter : Dr. KUEHN, Kyler (Argonne National Laboratory)

Track classification : Astrophysics and Space Instrumentation

Contribution type : --not specified--

Submitted by : KUEHN, Kyler

Submitted on Tuesday 22 March 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 11 May 2011 14:29
Comments : ""

Abstract ID : 51

Design of a Data Acquisition System for Large Area, Picosecond-Level Photodetectors

Content :

This paper presents the Data Acquisition (DAQ) System designed for Large Area, Picosecond-Level Photodetectors. The measurements of time and position, as well as charge and amplitude, are performed using PSEC3, a custom 4-channel, 17-GSPS, Fast Sampling ASIC, designed at The University of Chicago. The prototype detector incorporates six Micro-Channel Plate Photomultipliers (MCP-PMT), placed in two rows of three, like tiles in a tray. The DAQ comprises three different modules. One Analog Card (AC), designed with 10 PSEC3 chips, is placed at each end of a row, and services 40 analog signals from the MCPs. Each Analog Card interfaces with two, small Digital Cards (DC), placed right behind it, each attached with a matched impedance connector. A Digital Card communicates with 5 ASICs, generates a local trigger pulse, and reads the acquired data in parallel. After local processing and reduction, data are ready to be passed along to the Tray Master Card (TMC). The TMC controls a full Tray of 4 ACs and 8 DCs. It sends a low-jitter system clock to all cards in the Tray, it receives data from all DCs, and sends data out, via a Gigabit interconnect, for further processing and storage. Multiple tray systems are also possible. The full design and preliminary test results will be described.

Primary authors : Mr. BOGDAN, Mircea (The University of Chicago)

Co-authors : Prof. FRISCH, Henry (The University of Chicago) ; Mr. GENAT, Jean-francois (The University of Chicago) ; Mr. GRABAS, Harve (The University of Chicago) ; Dr. MAY, Edward (Argonne National Laboratory) ; Dr. NISHIMURA, Kurtis (The University of Hawaii) ; Mr. NORTHROP, Richard (The University of Chicago) ; Mr. OBERLA, Eric (The University of Chicago) ; Prof. VARNER, Gary (The University of Hawaii)

Presenter : Mr. BOGDAN, Mircea (The University of Chicago)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Poster Presentation

Submitted by : BOGDAN, Mircea

Submitted on Tuesday 22 March 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 22 April 2011 20:51
Comments : ""

Abstract ID : 52

Initial Performance from the NOvA Surface Prototype Detector

Content :

NOνA, the NuMI Off-Axis νe Appearance experiment will study νμ→νe oscillations, characterized by the mixing angle Θ13. Provided Θ13 is large enough, NOνA will ultimately determine the ordering of the neutrino masses and measure CP violation in neutrino oscillations. A complementary pair of detectors will be constructed 14 mrad off beam axis to optimize the energy profile of the neutrinos. This system consists of a surface based 15 kTon liquid scintillatior tracking volume located 810 km from the main injector source (NuMI) in Ash River, Minnesota and an underground 222 Ton near detector at Fermi National Accelerator Laboratory (FNAL). The first neutrino signals at the Ash River Site are expected prior to the 2012 accelerator shutdown. In the meantime, a near detector surface prototype has been completed and neutrinos from the NuMI source at FNAL have been observed using the same novel PVC and liquid scintillator detector system that will be deployed in the full scale experiment. Design and initial performance characteristics of this prototype system along with implications for the full NOνA program will be presented. Additional talks on specific subsystem will also be highlighted.

Primary authors : MUETHER, Mathew (Fermilab)

Co-authors :

Presenter : MUETHER, Mathew (Fermilab)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : MUETHER, Mathew

Submitted on Tuesday 22 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:33
Comments : ""

Abstract ID : 53

First year of running for the LHCb calorimeter system

Content :

The LHCb calorimeter system is composed of four subdetectors. In addition to the electromagnetic and hadronic calorimeters (ECAL and HCAL respectively), the system includes in front of them the Scintillating Pad Detector (SPD) and Pre-Shower (PS), which are two planes of scintillating pads separated by a 2.5 radiation length lead sheet, aimed at tagging the electric charge and the electromagnetic nature of the calorimeter clusters for the first level of trigger. During 2010 operation, hadronic, leptonic and photon triggers of particular interest for hadronic B decays and radiative decays was given by the calorimeter system.
The design and construction characteristics of the LHCb calorimeter will be recalled. Strategies for monitoring and calibration during data taking will be detailed in all aspects. The performances achieved will be illustrated by selected channels of interest for the B physics.

Primary authors : PERRET, Pascal (Universite Blaise Pascal de Clermont-Ferrand II)

Co-authors :

Presenter : PERRET, Pascal (Universite Blaise Pascal de Clermont-Ferrand II)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : PERRET, Pascal

Submitted on Wednesday 23 March 2011

Last modified on : Monday 04 April 2011

Comments :
On behalf the LHCb Collaboration

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 17:55
Comments : "Running experiment"

Abstract ID : 54

Mechanical Performance of Large Format Underwater Photomultipliers

Content :

Large, deep, well shielded liquid detectors have become an important technology for the detection of neutrinos over a wide dynamic range of few MeV to TeV. The critical component of this technology is the large format semi-hemispherical photo-multiplier with diameter in the range of 25 to 50 cm. The survival of the glass envelopes of these photo-multipliers under high pressure is the subject of this paper. We report initial results from an R program to understand the pressure performance of some photo-multiplier candidates. In particular we analyze the modes of implosion failures in these bulbs.
We report detailed measurements on the shock waves that would results from such implosions and compare them to modern hydrodynamic simulation codes. Using these results we extrapolate to other bulb geometries and make initial recommendations on deployment of the PMT sensors in deep detectors with focus on mitigation of an implosion chain reaction.

Primary authors : LING, Jiajie (BNL)

Co-authors : DIWAN, Milind (BNL) ; SIMOS, Nikolaos (BNL) ; SHARMA, Rahul (BNL) ; TANAKA, Hidekazu (BNL) ; SEXTON, Kenneth (BNL)

Presenter : LING, Jiajie (BNL)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : LING, Jiajie

Submitted on Wednesday 23 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:02
Comments : ""

Abstract ID : 55

Results from the NA62 Gigatracker prototype: a low-mass and sub-ns time resolution silicon pixel detector

Content :

The Gigatracker (GTK) is a hybrid silicon pixel detector developed for NA62, the experiment studying ultra-rare kaon decays at the CERN SPS. Three GTK stations will provide precise momentum and angular measurements on every track of the high intensity NA62 hadron beam with a time-tagging resolution of 150 ps. Multiple scattering and hadronic interactions of beam particles in the GTK has to be minimized to keep background events at acceptable levels, hence the total material budget is fixed to 0.5% X0 per station. In addition the calculated fluence for 100 days of running is 2 x 10^14 1 MeV neq/cm^2, comparable to the one expected for the inner trackers of LHC detectors in 10 years of operation. These requirements pose challenges for the development of an efficient and low-mass cooling system, to be operated in vacuum, and on the thinning of read-out chips to 100 microns or less.
The most challenging requirement is represented by the time resolution, which can be achieved by carefully compensating for the discriminator time-walk. For this purpose, two complementary read-out architectures have been designed and produced as small-scale prototypes: the first is based on the use of a Time-over-Threshold circuit followed by a TDC shared by a group of pixels, while the other uses a constant-fraction discriminator followed by an on-pixel TDC. The readout pixel ASICs are produced in 130 nm IBM CMOS technology and bump-bonded to 200 micron thick silicon sensors.
The Gigatracker detector system is described with particular emphasis on recent experimental results obtained from laboratory and beam tests of prototype bump-bonded assemblies, which show a time resolution of less than 200 ps for single hits.

Primary authors : Dr. FIORINI, Massimiliano (CERN)

Co-authors :

Presenter : Dr. FIORINI, Massimiliano (CERN)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : FIORINI, Massimiliano

Submitted on Wednesday 23 March 2011

Last modified on : Friday 29 April 2011

Comments :

Presentation on behalf of the NA62 Gigatracker Working Group.
Detailed co-author list will be provided if necessary.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula

Date : 29 April 2011 10:47
Comments : ""

Abstract ID : 56

The Instrumented Flux Return detector of the SuperB project: R & D studies and first results of the Fermilab Beam Test.

Content :

SuperB is a next generation super-flavor factory which will be built in Italy with a strong international involvement . The project, recently approved by the Italian Government, and classified as one of the flagship projects of the Italian INFN, foresees the construction of a high intensity asymmetric electron-positron collider and of the related detector. The expected luminosity of 2 x 10^36 cm^-2 s^-1, a factor 100 higher than the present generation of B-factories, will allow the high statistic study of rare decays and, possibly, will show evidences of new physics.

Part of the SuperB apparatus is the Instrumented Flux Return (IFR). This detector, mainly devoted to the identification of muons and neutral hadrons, consists of ~1m of iron interleaved by 8-9 layers of highly segmented scintillators. The detection technique is based on relatively inexpensive extruded plastic scintillator bars (2.0x 4.0 cm^2 produced in the FNAL-NICADD facility). The scintillation light is collected thanks to 3 WLS fibers, which guide it to recently developed devices called Silicon Photon Multipliers used as photo-sensors.
The use of plastic scintillator as active material ensures reliability, robustness and long term stability while the high granularity and the fast response guarantee a good space-time resolution, extremely important to cope with the expected high particles flux.
At present two different readout schemes are under evaluation: a “double coordinate readout” where two layers of orthogonal scintillator bars provide both, the polar and azimuthal coordinate; and a second option, the “time readout”, where the polar coordinate is measured, instead, by the arrival time of the signal.
In order to deeply understand the performances and possible drawbacks of the above techniques, a full scale prototype has been designed and built in Ferrara/Padova, and tested at the Fermilab Test Beam Facility (FBTF) in December 2010.

In the proposed talk, a comprehensive description of the IFR-related R & D studies will be presented.
In particular, we will focus on the results of the Fermilab beam test: performances, issues and future activities will be presented.

Primary authors : Dr. BALDINI, Wander (Istituto Nazionale di Fisica Nucleare (INFN))

Co-authors :

Presenter : Dr. BALDINI, Wander (Istituto Nazionale di Fisica Nucleare (INFN))

Track classification : Particle Identification

Contribution type : Oral Presentation

Submitted by : BALDINI, Wander

Submitted on Thursday 24 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : Toru Iijima
Date : 27 April 2011 13:11
Comments : ""

Abstract ID : 57

RADIATION-HARD ASICS FOR OPTICAL DATA TRANSMISSION

Content :

The LHC (CERN), the highest energy hadron collider in the world, will be upgraded in two phases to increase the design luminosity by a factor of five. The ATLAS experiment plans to add a new pixel layer to the current pixel detector during the first phase of the upgrade. The optical data transmission will also be upgraded to handle the high data transmission speed. Two ASICs have been prototyped for this new generation of optical links to incorporate the experience gained from the current system. The ASICs were designed using 130 nm CMOS process. One ASIC contains a 4-channel VCSEL driver array and the other a 4-channel PIN receiver/decoder array with one channel of each array designated as a spare to bypass a bad VCSEL or PIN channel.

Each of the receiver/decoder contains a pre-amplification, a bi-phase mark (BPM) clock/data recovery circuit, and low voltage differential signal (LVDS) outputs for both the clock and data. In order to allow remote control of the chip, the ASIC includes command decoders that have been designed to be single event upset (SEU) tolerance. The command word for configuring the chip is formed by a majority vote of the command decoders. To further improve the SEU tolerance, all latches are based on a dual interlocked storage cell (DICE) latch.

The driver ASIC is designed to operate at 5 Gb/s. Each channel has an LVDS receiver, an 8-bit DAC, and a VCSEL driver. One channel is designated as the spare channel and contains a 16:1 multiplexer. The multiplexer allows routing of the received signal from any of the three channels to the spare channel output. The 8-bit DAC is used to set the VCSEL modulation current. To enable operation in case of a failure in the communication link to the command decoder, we have included a power on reset circuit that will set the VCSEL modulation current to 10 mA upon power up.

We have extensively characterized the ASICs and then irradiated the ASICs to measure the radiation hardness and SEU tolerance. We will present the results of the study. In addition, the ASICs have been expended to 12 channels with improvements based from the prototype results. We will briefly discuss the new design that will be submitted in May.

Primary authors : Prof. GAN, K.k. (The Ohio State University)

Co-authors : Dr. STRANG, Mike (The Ohio State University)

Presenter : Dr. STRANG, Mike (The Ohio State University)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : Prof. GAN, K.k.

Submitted on Thursday 24 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 01:58
Comments : "20 min"

Abstract ID : 58

Construction of PVC Extrusions for the NOvA Near and Far Detectors

Content :

NOvA, or NuMI Off-Axis ve Appearance experiment, is a long baseline neutrino experiment using an off-axis beam produced by the main injector (NuMI) neutrino beamline at Fermilab. The experiment is designed to study muon neutrino to electron neutrino oscillations. It consists of two PVC and liquid scintillator detectors and a beamline upgrade. The large far detector weighs 15 kTon and will be located in Ash River, Minnesota, 810 km from NuMI. The smaller, 222 Ton near detector will be located underground at Fermi National Accelerator Laboratory. Each detector consists of planes of PVC extrusions containing liquid scintillator and wavelength shifting fiber. The PVC extrusions are made using a formula specially designed for high reflectivity, ease of extrusion and tensile qualities. Custom extrusion dies and extruding procedures have been created to ensure a uniform product that holds to strict dimensional and material tolerances. The construction of the NOvA near detector on the surface (NDOS) extrusions will be presented, addressing the challenges of creating physics quality PVC extrusions and the QA techniques used to ensure that quality. Finally, preparations for construction of the far detector will be discussed.

Primary authors : Dr. PHAN-BUDD, Sarah (Argonne National Laboratory)

Co-authors :

Presenter : Dr. PHAN-BUDD, Sarah (Argonne National Laboratory)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : BUDD, Sarah

Submitted on Thursday 24 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:34
Comments : ""

Abstract ID : 59

The Large Angle Photon Veto System for the NA62 Experiment at CERN

Content :

The branching ratio (BR) for the decay K+ -> pi+ nu anti-nu is about 10-10 and can be predicted in the Standard Model with minimal theoretical uncertainties, making it a sensitive probe for new physics. Measurement of this BR is challenging because of the background from dominant channels. The goal of the NA62 experiment is to measure this BR to within about 10%.
A system of photon vetoes is needed to reject e.g. pi0's from K+ -> pi+ pi0. We describe the design and construction of one of the main components of the photon veto system: the large-angle vetoes (LAV), a series of 12 ring-shaped detectors stationed at intervals of about 10 m along the beam line. The LAVs make creative reuse of lead-glass blocks recycled from the OPAL electromagnetic calorimeter barrel. We describe the mechanical design and challenges faced during construction, the development of front-end electronics to allow simultaneous time and energy measurements over an extended dynamic range using the time-over-threshold technique, and the development of an in situ calibration and monitoring system. Our results are based on test beam data taken to assist the design of the LAV detectors.

Primary authors : FANTECHI, Riccardo (INFN Sezione di Pisa (INFN))

Co-authors :

Presenter : FANTECHI, Riccardo (INFN Sezione di Pisa (INFN))

Track classification : Calorimetry

Contribution type : --not specified--

Submitted by : FANTECHI, Riccardo

Submitted on Thursday 24 March 2011

Last modified on : Tuesday 12 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 12 April 2011 12:51
Comments : "Running experiment"

Abstract ID : 60

Steps Towards 8”x8” Photocathode For The Large Area Picosecond Photodetector Project At Argonne

Content :

A photocathode with appropriate properties and large area (8”x8”) is required for the Large Area Picosecond Photodetector (LAPPD) project. In our effort to achieve that goal, we have designed a fabrication system based on lessons learned from commercial PMT production at Burle Industries. This involves, as the starting point, a duplication of the photocathode fabrication inside a PMT, using the identical Burle Industries apparatus. This is followed by an intermediate plan to fabricate a 4”x4” photocathode to test the scalability of the procedure from small PMT to large area. Finally, lesson learned from the intermediate step will be applied to the design and fabrication of the 8”x8” photocathode. This final step will also involve an integration with assembly of the photodetector.

Primary authors : Dr. YUSOF, Zikri (Argonne National Laboratory)

Co-authors :

Presenter : Dr. YUSOF, Zikri (Argonne National Laboratory)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : YUSOF, Zikri

Submitted on Thursday 24 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:07
Comments : ""

Abstract ID : 61

HF GFlash

Content :

We have developed HF GFlash, a very fast simulation of electromagnetic showers using parameterizations of the profiles in Hadronic Forward Calorimeter. HF GFlash has good agreement to 7 TeV Collision Data and previous Test Beam results. In addition to good agreement to Data and previous Test Beam results, we also have improve the speed of HF GFlash significantly. HF GFlash can simulate about 10000 times faster than Geant4.

Primary authors : Dr. RAHMAT, Rahmat (University of Mississippi)

Co-authors :

Presenter : Dr. RAHMAT, Rahmat (University of Mississippi)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : RAHMAT, Rahmat

Submitted on Thursday 24 March 2011

Last modified on : Monday 04 April 2011

Comments :

We have developed HF GFlash, a very fast simulation of electromagnetic showers using parameterizations of the profiles in Hadronic Forward Calorimeter. HF GFlash has good agreement to 7 TeV Collision Data and previous Test Beam results. In addition to good agreement to Data and previous Test Beam results, we also have improve the speed of HF GFlash significantly. HF GFlash can simulate about 10000 times faster than Geant4.

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:00
Comments : "Simulation of calorimeters"

Abstract ID : 62

Data Acquisition and Readout for the LUX Dark Matter Experiment

Content :

LUX is a two-phase (liquid/gas) xenon time projection chamber designed to detect nuclear recoils from interactions with dark matter particles. Signals from the LUX detector are processed by custom-built analog electronics which provide properly shaped signals for the trigger and data acquisition (DAQ) systems. The DAQ is comprised of commercial digitizers with firmware customized for the LUX experiment. Data acquisition systems in rare event searches must accommodate high rate and large dynamic range during precision calibrations involving radioactive sources, while also delivering low threshold for maximum sensitivity. The LUX DAQ meets these challenges using real-time baseline suppression that allows for a maximum event acquisition rate in excess of 1.5kHz with virtually no deadtime. This talk describes the LUX DAQ, and the novel acquisition techniques employed in the LUX experiment. Data processing and reduction techniques are also described.

Primary authors : CHAPMAN, Jeremy (Brown University)

Co-authors :

Presenter : CHAPMAN, Jeremy (Brown University)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : CHAPMAN, Jeremy

Submitted on Thursday 24 March 2011

Last modified on : Friday 22 April 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 22 April 2011 20:52
Comments : ""

Abstract ID : 63

The Belle II Silicon Vertex Detector

Content :

The KEK-B factory (Tsukuba, Japan) has been shut down in mid-2010 after reaching a total integrated luminosity of 1 ab^-1. Recently, the work on an upgrade of the collider (SuperKEKB), aiming a peak luminosity of 8 x 10^35 cm^-2s^-1, has started. This is 40 times the peak value of the previous system and thus also requires a redesign of the Belle detector (leading to Belle II), especially its Silicon Vertex Detector (SVD), which surrounds the beam pipe.

Similar to its predecessor, the future Belle II SVD will again consist of four layers of double-sided silicon strip sensors (DSSD), but at higher radii. Moreover, a double-layer pixel detector will complement the SVD as the innermost sensing device. All DSSDs will be made from 6" silicon wafers and read out by APV25 chips, which were originally developed for the CMS experiment. That system was proven to meet the requirements for Belle II in matters of occupancy and dead time. Since the KEK B-factory operates at relatively low energy, material inside the active volume has to be minimized in order to reduce multiple scattering. This can be achieved by the Origami chip-on-sensor concept, and a very light-weight mechanical support structure made from carbon fiber reinforced Airex foam. Moreover, CO2 cooling for the front-end chips will ensure high efficiency at minimum material budget.

We will give an overview of the design, the sensors, the mechanics, the readout electronics as well as the cooling system of the future Belle II Silicon Vertex Detector.

Primary authors : Mr. IRMLER, Christian (Institute of High Energy Physics (HEPHY) Vienna)

Co-authors : Dr. BERGAUER, Thomas (Institute of High Energy Physics (HEPHY) Vienna) ; Mrs. FRANKENBERGER, Annekathrin (Institute of High Energy Physics (HEPHY) Vienna) ; Dr. FRIEDL, Markus (Institute of High Energy Physics (HEPHY) Vienna) ; Mr. GFALL, Immanuel (Institute of High Energy Physics (HEPHY) Vienna) ; Mr. VALENTAN, Manfred (Institute of High Energy Physics (HEPHY) Vienna) ; Dr. TSUBOYAMA, Toru (High Energy Accelerator Research Organization, KEK) ; Dr. ONUKI, Yoshiyuki (Tohoku University)

Presenter : Mr. IRMLER, Christian (Institute of High Energy Physics (HEPHY) Vienna)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : Mr. IRMLER, Christian

Submitted on Thursday 24 March 2011

Last modified on : Sunday 01 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 10:51
Comments : ""

Abstract ID : 64

Design and Status of the Data Acquisition Software for the NOvA Experiment Detectors

Content :

The NOvA (NuMI Off-Axis nue Appearance) experiment is a long baseline neutrino experiment using the NuMI main injector neutrino beam at Fermilab and is designed to search for numu→nue oscillations. The experiment will consist of two detectors; both positioned 14 mrad off the beam axis: a 222 ton Near detector to be located in an underground cavern at Fermilab and a 15 kton Far detector to be located in Ash River, MN, 810 km from the beam source. In addition, a prototype Near detector is currently in operation in a surface building at Fermilab. The detectors have similar design, and consist of planes of PVC extrusions cells containing liquid scintillator and wavelength shifting fibers. The fiber ends are readout by Avalanche Photodiodes (APDs). The primary task for the Data Acquisition (DAQ) system is to concentrate the data from the large number of APD channels (393000 channels at the Far Detector, 15700 channels at the Near Detector), buffer this data long enough to apply an online trigger, and record the selected data. The concentration of the data is accomplished through the use of a custom hardware component Data Concentrator Module (DCM). The intermediate buffering of the data is accomplished through a computing buffer farm, in which each node runs software to apply an online trigger to a time slice of data received from the DCMs. Data correlated with the beam spill time as well as random data samples for calibration purposes and events with interesting topology may be selected by the online trigger. In addition to those components involved in managing the data flow, the DAQ system consists of peripheral components for monitoring data quality and DAQ performance, run control, configuration management, etc. The design of the DAQ system, with emphasis on the DAQ software, will be discussed as will experience with its deployment on the prototype Near Detector.

Primary authors : Dr. KASAHARA, Susan (University of Minnesota)

Co-authors :

Presenter : Dr. KASAHARA, Susan (University of Minnesota)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : KASAHARA, Susan

Submitted on Thursday 24 March 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:27

Comments : ""

Abstract ID : 65

Readout ASIC and electronics for the 144ch HAPD for Aerogel RICH at Belle2

Content :

In the Belle2 experiment at SuperKEKB, we are developing
a proximity focusing ring imaging Cherenkov detector using aerogel as
a radiator (Aerogel RICH) as a PID device in the endcap.
A 144ch multi-anode HAPD (Hybrid avalanche photo-detector) developed
with Hamamatsu Photonics K.K. (HPK) is used as a photodetector.
In order to read out a total of around 10^5 channels from
Aerogel RICH, we have been developing an ASIC that amplifies and
digitizes the signal from HAPDs.
Because we need to detect single photons and the gain of HAPDs is lower
than conventional photo-multipliers,
the ASIC must be of high gain and low noise.
After several productions of the prototype ASICs, the final version
of the ASIC is now being developed. The signal from the ASICs
is read out by FPGAs, and sent to the central DAQ systems of Belle2.
The electronics have to be compact to be fitted in a limited space
behind the detector. The design and development status of the electronics
are reported in the presentation.

Primary authors : NISHIDA, Shohei (KEK)

Co-authors :

Presenter : NISHIDA, Shohei (KEK)

Track classification : Front-end Electronics

Contribution type : Poster Presentation

Submitted by : NISHIDA, Shohei

Submitted on Friday 25 March 2011

Last modified on : Thursday 21 April 2011

Comments :

On behalf of the Belle2 Aerogel RICH group.

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Poster Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 01:58
Comments : ""

Abstract ID : 66

Large Mass Bolometers for Neutrinoless Double Beta Decay Searches

Content :

(For the CUORE Collaboration) A bolometer measures the energy deposition through a corresponding temperature rise. The Cryogenic Underground Observatory for Rare Events (CUORE) is a ton scale bolometric experiment to search for neutrinoless double beta decay in 130Te. In CUORE, a single bolometer module consists of a 5X5X5 cm3 tellurium oxide crystal, a silicon heater, and one or two Neutron Transmutation Doped germanium thermistors. Running at 10 mK base temperature, the bolometer module can achieve an energy resolution of 5 keV (0.2%) at the energy region of interest of neutrinoless double beta decay. With 988 such modules, an expected background of 0.01 counts per (keV kg year), and five years of running time, CUORE will be one of the most competitive neutrinoless double beta decay experiments on the horizon.

Primary authors : HAN, Ke (Lawrence Berkeley National Lab, US)

Co-authors :

Presenter : HAN, Ke (Lawrence Berkeley National Lab, US)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : HAN, Ke

Submitted on Friday 25 March 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:42
Comments : ""

Abstract ID : 67

CMS Tracker layout studies for HL-LHC

Content :

High instantaneous luminosity are expected at the LHC after major upgrades will be performed around 2020. A completely new outer tracker is foreseen for this High Luminosity scenario, which will probably implement also some trigger capabilities.

In order to evaluate the best possible design, a lightweight tool was developed (tkLayout) to generate layouts, make an estimate of the material budget and even provide an a priori estimation of the tracking performance.

tkLayout can be used to optimize a given layout concept, or to compare the performance of different approaches. tkLayout is not specific to CMS, thus it can be used to design upgrades for other experiments.

The technology of tkLayout will be presented i this talk and results for several layout designs will be discussed.

Primary authors : Dr. MERSI, Stefano (CERN)

Co-authors :

Presenter : Dr. MERSI, Stefano (CERN)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : MERSI, Stefano

Submitted on Friday 25 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:20
Comments : ""

Abstract ID : 68

EASIROC, an easy & versatile readout device for SiPM

Content :

EASIROC, standing for Extended Analogue SI-pm ReadOut Chip is a 32 channels fully analogue front end ASIC dedicated to readout SiPM detectors. This low power and highly versatile ASIC was developped from the chip SPIROC which has been designed for the Analogue Hadronic Calorimeter foreseen at the International Linear Collider.
EASIROC integrates a 4.5V range 8-bit DAC per channel for individual SIPM gain adjustment. A multiplexed charge measurement from 160 fC up to 320 pC is available thanks to 2 analogue outputs. These charge paths are made of 2 variable gain preamplifiers followed by 2 tuneable shapers and a track and hold.
A trigger path integrates a fast shaper followed by a discriminator the threshold of which is set by an integrated 10-bit DAC. These 32 trigger outputs can be used for timing measurements.
The power consumption is lower than 5 mW/channel and unused features can be powered OFF to decrease the power.
The chip has been designed in AMS 0.35m SiGe technology and 4000 dies have been produced in 2010. Its versatility allows its use in many photo detector experiments and is already used for PEBS, MuRAY, JPARC and medical imaging.

Primary authors : Mr. CALLIER, Stéphane (OMEGA / IN2P3) ; Mr. RAUX, Ludovic (OMEGA / IN2P3)

Co-authors : Dr. MARTIN-CHASSARD, Gisèle (OMEGA - IN2P3) ; Dr. DE LA TAILLE, Christophe (OMEGA - IN2P3)

Presenter : Mr. CALLIER, Stéphane (OMEGA / IN2P3)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : CALLIER, Stéphane

Submitted on Friday 25 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 01:59
Comments : "20 min"

Abstract ID : 69

Detection and removal of short-circuits on GEM-foils

Content :

High resolution scanning system was used to locate the areas on GEM-foils that might contain short-circuit. These areas were analyzed by threshold method for fast identification. Different methods to remove short-circuits on GEM-foils were studied. Since using the standard procedure of “burning” shorts with high current might incur additional damage to the foil, we have also studied several non-destructive methods. These methods were for example washing with high power ultrasonic, manual extirpation and by using resonance frequencies. We will show results on locating and removing the GEM-shorts from standard bi-conical 10 cm × 10 cm foils.

Primary authors : Mr. KALLIOKOSKI, Matti (Helsinki Institute of Physics HIP)

Co-authors : Mr. HILDéN, Timo (Helsinki Institute of Physics) ; Mr. LAUHAKANGAS, Rauno (Helsinki Institute of Physics) ; Mr. KARPPINEN, Pasi (University of Helsinki) ; Dr. KARPPINEN, Timo (University of Helsinki) ; Dr. GARCIA, Francisco (Helsinki Institute of Physics) ; Mr. HEINO, Jouni (Helsinki Institute of Physics) ; Dr. TUOMINEN, Eija (Helsinki Institute of Physics) ; Mr. TURPEINEN, Raimo (Helsinki Institute of Physics)

Presenter : Mr. KALLIOKOSKI, Matti (Helsinki Institute of Physics HIP)

Track classification : Gaseous Detectors

Contribution type : --not specified--

Submitted by : KALLIOKOSKI, Matti

Submitted on Friday 25 March 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 03 May 2011 18:07
Comments : ""

Abstract ID : 70

LUX Cryogenics and Circulation

Content :

LUX is a new dark matter direct detection experiment being carried out at the Sanford Lab, the renewed underground facility at the Homestake mine in Lead, SD. The detector's large size supports effective internal shielding from natural radioactivity of the surrounding materials and environment. The LUX detector consists of a cylindrical vessel containing 350 kg of liquid xenon (LXe) cooled down using a novel cryogenic system. We tested a small-scale four PMT prototype utilizing over 300 gm of active xenon, installed in the full-sized cryostat. We report the efficiency of a unique internal heat exchanger with standard gas phase purification using a heated getter, which allows for very high flow purification without requiring large cooling power, as well as the efficiency of a thermosyphon-based cooling system. Such systems are required for multi-ton scale up.

Primary authors : Mr. BRADLEY, Adam (Case Western Reserve University)

Co-authors :

Presenter : Mr. BRADLEY, Adam (Case Western Reserve University)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : BRADLEY, Adam

Submitted on Friday 25 March 2011

Last modified on : Friday 01 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HALL, Jeter
Date : 01 April 2011 22:21
Comments : "LUX is a leading dark matter detector and the cryogenics system is essential to the success of the program."

Abstract ID : 71

Germanium Detectors for Dark Matter Searches

Content :

Germanium detectors operated at temperatures of about 30 mK are commonly used for direct dark matter searches, in experiments such as CDMS or Edelweiss. Over the past decade, these detectors played a crucial role in improving the sensitivity of the searches for Weakly Interacting Massive Particles. Recent detector design modifications have significantly improved the efficiency with which these detectors can identify and reject electromagnetic backgrounds. Additional studies are being conducted to establish the crystalline structure and purity levels required for successful operation of germanium-based detectors. Such studies indicate the possibility of significantly increasing the size of individual germanium detectors, thereby simplifying their design and reducing their cost. I will review the current status of the germanium-based dark matter detector technology, and I will discuss the prospects of using it for developing a ton-scale dark matter experiment.

Primary authors : Prof. MANDIC, Vuk (University of Minnesota)

Co-authors :

Presenter : Prof. MANDIC, Vuk (University of Minnesota)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : MANDIC, Vuk

Submitted on Friday 25 March 2011

Last modified on : Tuesday 12 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HALL, Jeter
Date : 12 April 2011 19:21
Comments : "It would be good to use this abstract for a experimental overview talk covering generic future dark matter detectors based on solid germanium detectors."

Abstract ID : 72

Performance and Radioactivity Measurements of the Photomultiplier Tubes for the LUX and LZ Dark Matter Experiments

Content :

The Large Underground Xenon (LUX) experiment and LZ (LUX-ZEPLIN) experiments are dark matter search experiments based on ultra-low background liquid xenon time projection chambers. In collaboration with the experiments, Hamamatsu Photonics has developed a series of very low background photomultiplier tubes (PMTs), culminating in a new fully operational 3-inch diameter PMT (R11410MOD) that has U/Th radioactivity less than 1 mBq per PMT, representing a significant improvement over existing photodetectors. The LUX experiment relies on photon counting with 122 2-inch Hamamatsu R8778 PMTs for detecting the energy and position of all interactions in the active xenon space. Thus, it requires PMTs with single photon sensitivity and high quantum efficiency at 178 nm in order to detect low-energy depositions from dark matter. The PMTs need to have low intrinsic radioactivity levels since they are located in the active region of the experiment, and low-energy scatters in the xenon from radioactive decay byproducts can mimic a positive dark matter signal. Results from performance tests and radioactivity measurements for the Hamamatsu R8778 PMTs, and their impact on LUX, will be presented. Results from the developmental Hamamatsu R11410MOD PMTs, and their projected impact on next-generation dark matter experiments, will also be shown.

Primary authors : FAHAM, Carlos (Brown University)

Co-authors :

Presenter : FAHAM, Carlos (Brown University)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : FAHAM, Carlos

Submitted on Friday 25 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:02
Comments : ""

Abstract ID : 73

Operation and Performance of the CMS Level-1 Trigger during 7 TeV Collisions

Content :

The Compact Muon Solenoid (CMS) experiment at the Large Hadron Collider (LHC) has been collecting data at center-of-mass energy 7 TeV since March 2010. CMS detects the products of proton beams colliding at a rate of 40 MHz. The Level-1 trigger reduces this collision rate to an output rate of 100 kHz, which is forwarded to the High-Level trigger, a dedicated computer farm, which reduces that further to a rate of 100 Hz, suitable for storage of full event data. The Level-1 trigger uses high-speed custom electronics to combine information from electromagnetic and hadronic calorimeters and three muon detection systems and identifies potential physics objects of interest in only a few microseconds. To ensure good performance of the Level-1 trigger hardware, robust configuration and monitoring software is also required. This talk will concentrate on the performance of the Level-1 trigger in the 2010 and ongoing 2011 collision runs, as well as presenting an overall picture of the hardware and operation.

Primary authors : KLABBERS, Pamela Renee (University of Wisconsin)

Co-authors :

Presenter : KLABBERS, Pamela Renee (University of Wisconsin)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : KLABBERS, Pamela Renee

Submitted on Saturday 26 March 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:58
Comments : ""

Abstract ID : 74

The LUX Dark Matter Experiment: Design, Calibration, and Simulation

Content :

The LUX (Large Underground Xenon) experiment will attempt to directly detect the WIMP (Weakly Interacting Massive Particle), or, in the case of no signal, produce improved, world-class limits on the WIMP-nucleon interaction cross-section. The detector is two-phase, utilizing an electric field to drift charge liberated by a recoil event in the liquid, producing additional scintillation in the gas. The ratio of primary (liquid) to secondary (gas) scintillation is the basic means for discriminating between electron and nuclear recoils. The liquid portion is 350 kg (100 kg fiducial) in mass, providing excellent self-shielding, augmented by a water shield. The detector is currently deployed above ground at the Sanford Surface Lab for initial testing prior to underground deployment at Homestake, which is scheduled to begin in late 2011. Various internal and external sources of neutrons and gammas will be used to calibrate the detector, coupled with comprehensive and rigorous Monte Carlo simulations. Results will be presented from simulating full detector geometry and incorporating relevant scintillation and ionization physics for xenon.

Primary authors : Dr. SZYDAGIS, Matthew (UC Davis)

Co-authors :

Presenter : Dr. SZYDAGIS, Matthew (UC Davis)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : SZYDAGIS, Matthew

Submitted on Saturday 26 March 2011

Last modified on : Friday 01 April 2011

Comments :
representing the LUX collaboration

Status : ACCEPTED

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HALL, Jeter
Date : 01 April 2011 22:28
Comments : "LUX is a leading dark matter search. It will be interesting to hear about the design optimizations/tradeoffs. Calibration is a significant issue that large xenon experiments are facing."

Abstract ID : 75

Ultra-thin fully depleted DEPFET active pixel sensors

Content :

The prototyping of the latest generation of DEPFET active pixel sensors designed for the vertex detector at the Belle-II experiment at KEK, Japan, and experiments at a future linear collider, has recently been finalized. For the first time the thinning technology based on SOI wafers finds now its application in a high energy physics experiment. The DEPFET (DEpleted P-channel FET) is a field effect transistor with an additional implant underneath the channel and integrated on a fully depleted substrate. It combines the functions of a detector and the first amplification stage in one single device. The in-sensor amplification makes it possible to create very thin sensors with an excellent signal/noise ratio for minimum ionizing particles. The fabrication of thin wafer-scale (150 mm wafers) active pixel sensors requires the combination of a highly specialized MOS technology, including two poly-silicon and three metal layers, on fully depleted bulk with MEMS technologies. This approach paves also the way to a self-supporting all-silicon pixel module providing high precision measurements with a minimum of material.

The paper will present in detail the features of the DEPFETs designed for Belle-II and future linear collider applications and gives an insight in the manufacturing technology for thin fully depleted active pixel sensors and the resulting module concept. For the first time we will present a direct comparison between DEPFETs produced on standard thick material (450 micron) and the same devices on 50 micron thin silicon in terms of signal/noise, cluster size and other basic parameters. These measurements are done on a dedicated low noise test stand allowing a close insight into the properties of the pixel cell itself. The mechanical properties like bowing, warp, and distortions of the thin silicon with a full layer stack of poly-silicon, metal traces and inter level dielectrics are probed on self-supporting full size Belle-II modules.

Primary authors : ANDRICEK, Ladislav (MPI Halbleiterlabor)

Co-authors : GAERTNER, K. (WIAS Berlin) ; HEINZINGER, K. (PNSensor, Munich) ; KIESLING, C. (MPI fuer Physik, Munich) ; KOFFMANE, C. (MPI Halbleiterlabor) ; LIEMANN, G. (MPI Halbleiterlabor) ; MIESNER, D. (MPI Halbleiterlabor) ; MOSER, H-g. (MPI Halbleiterlabor) ; NINKOVIC, J. (MPI Halbleiterlabor) ; OSWALD, C. (Charles University, Prague) ; PLIS, A. (MPI Halbleiterlabor) ; RICHTER, R.h. (MPI Halbleiterlabor) ; RITTER, A. (MPI Halbleiterlabor) ; SCHALLER, G. (MPI Halbleiterlabor) ; SCHEIRICH, J. (Charles University, Prague) ; SCHNECKE, M. (MPI Halbleiterlabor) ; SCHOPPER, F. (MPI Halbleiterlabor) ; SCHWEINFEST, B. (PNSensor, Munich) ; TREIS, J. (PNSensor, Munich) ; WASSATSCH, A. (MPI Halbleiterlabor)

Presenter : ANDRICEK, Ladislav (MPI Halbleiterlabor)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : ANDRICEK, Laci

Submitted on Saturday 26 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:19
Comments : ""

Abstract ID : 76

High Precision Vertexing at the Belle-II Experiment

Content :

With a world-record integrated luminosity of 1/ab the Belle detector has impressively verified the CP violation in the B-meson system as formulated within the Standard Model (SM). On the other hand, Belle has also found some tantalizing hints, although statistically not yet significant, of new physics beyond the SM. In order to further explore this exciting field, an upgrade of the existing KEKB machine in Tsukuba, Japan, is planned. The new Super Flavor Factory, SuperKEKB, will be an asymmetric (4GeV,7GeV) e+e-collider, working at the center of mass energy of the Y(4S) resonance, achieving a luminosity 40 times higher than the KEKB machine. To fully exploit the physics potential of the new B-factory and to cope with the higher occupancy and radiation levels expected at SuperKEKB, an upgrade of the Belle detector is being pursued by the Belle II collaboration. The most challenging requirements of the new detector are precise vertexing and momentum measurements giving a good impact parameter resolution for low energy secondary particles. Hence a vertex detector must be designed to achieve a spatial resolution of 10μm and a material budget of 0.19X0 per layer to reduce as much as possible the multiple Coulomb scattering. This will be provided by a new silicon pixel vertex detector ("PXD") placed in the central region of the Belle II detector. The PXD will consist of the two layers of thin (75μm) DEPFET Active Pixel Sensors with radii at 14mm and 22mm. The inner layer consists of 8 planar sensors, each with a width of 15mm, and a sensitive length of 90mm. The outer layer consists of 12 modules with a width of 15mm and a sensitive length of 123mm. The sensitive lengths in each of the layers are determined by the required angular acceptance of the tracker. In this paper, an overview of the full system will be given, including the sensor, the front-end electronics and both the mechanical and thermal solutions specially designed for this system. Additionally, the expected performance of the detector system will be presented.

Primary authors : Dr. NINKOVIC, Jelena (Max PlanckInstitute for Physics)

Co-authors : ON BEHALF OF BELLE II PXD COLLABORATION, __ (__)

Presenter : Dr. NINKOVIC, Jelena (Max PlanckInstitute for Physics)

Track classification : Experimental Detector Systems ; Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : NINKOVIC, Jelena

Submitted on Saturday 26 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed for other tracks (Semiconductor Detectors)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:23
Comments : ""

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 10:51
Comments : "Requested to be merged with abstract 63"

Abstract ID : 77

The time Calibration system for KM3NeT Neutrino Telescope

Content :

KM3NeT is a future deep-sea Research Infrastructure hosting a cubic kilometre-scale neutrino telescope and facilities for marine and earth sciences in the Mediterranean Sea. The consortium is made up of 40 institutes from 10 European countries, and includes all the groups that have developed the pilot projects, ANTARES, NEMO and NESTOR.
The KM3NeT telescope will consist of a three-dimensional array of optical modules arranged on vertical “detection units (DUs)”, anchored to the sea floor and held in tension by submerged buoys.
The time resolution of this detector has to be known with great accuracy since the angular resolution of the track reconstruction depends on the accurate measurement of the relative arrival times of Cherenkov photons reaching the photon sensors. The intrinsic, unavoidable limitation in time resolution (chromatic dispersion and PMT transit time spread) imply that the calibration system of a water-based neutrino telescope must provide a precision at the nanosecond level
The experience with the ANTARES deep sea neutrino telescope has shown that a distributed system of external light sources illuminating the photon detectors with short (~ 5ns FWHM) time-referenced light flashes is very useful to ensure the time calibration of the detector and to measure water optical properties.
Whilst the basic timing calibration concept applied in ANTARES will be retained, the larger spacing between photo-detectors required in a cubic-kilometre-scale detector results in modified requirements for the KM3NeT system.
A three-dimensional system of optical emitters has been studied: several LED models have been tested, and four models preselected as suitable for use in KM3NeT were incorporated into ANTARES for in-situ testing.
Based on the resulting data, several LED beacons will be integrated in the forthcoming deployment of a pre-production KM3NeT detection unit planned for autumn 2011.

The design, optimization and construction of the KM3NeT optical time calibration devices are described.

Supported through the EU, FP6 Contract no. 011937 and FP7 grant agreement no. 212252.

Primary authors : Dr. EMANUELE, Umberto (IFIC)

Co-authors :

Presenter : Dr. EMANUELE, Umberto (IFIC)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : EMANUELE, Umberto

Submitted on Sunday 27 March 2011

Last modified on : Sunday 24 April 2011

Comments :

Dear organizers,
I submitted as an oral presentation,
but if it's not possible, my speech could be turned into a poster.
Best regards.

Umberto

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:43
Comments : "Propose as poster."

Abstract ID : 78

The near neutrino detector complex of the T2K experiment

Content :

The main purpose of the near neutrino detector (ND280) of the long baseline experiment T2K designed for a sensitive search of the muon neutrino into electron neutrino transition is to measure the parameters of the non-oscillated neutrino beam close to the production target. The near detector complex, located in J-PARC at 280 meters from the target, consists of the on-axis INGRID (Interactive Neutrino GRID) detector and the ND280 off-axis detector. The primary purpose of the INGRID is to monitor the beam profile and stability. The off-axis detector includes a pi-zero detector, a tracker (2 fine-grained detectors + 3 time-projection chambers) and electromagnetic calorimeter located inside the UA1 magnet which is instrumented with scintillator detectors. The detailed detector description, its performance in the neutrino beam and obtained results will be presented.

Primary authors : Prof. KUDENKO, Yuri (Institute for Nuclear Research (INR)-Russian Academy of Sciences)

Co-authors :

Presenter : Prof. KUDENKO, Yuri (Institute for Nuclear Research (INR)-Russian Academy of Sciences)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : Prof. KUDENKO, Yuri

Submitted on Sunday 27 March 2011

Last modified on : Thursday 21 April 2011

Comments :

The abstract is submitted on behalf of the T2K collaboration. If this talk is accepted for presentation, my name is replaced of the real presenter who will be selected as a speaker for this talk.

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:24
Comments : "still waiting for opinion of neutrino conveners"

Abstract ID : 79

Neutron detectors array system for ICF experiments

Content :

In recent years, the increasing neutron yields of ICF implosions have made it possible to attempt measurements of low yield secondary neutrons. The secondary neutron energy spectra from ICF targets can be used to diagnose the temperature or areal density (ρR) of the fuel. Because the neutron emission time is short (≤1 ns), the spectra can be obtained from time-of-flight (TOF) measurements. But the yields from these secondary reactions are too low for accurate spectra from conventional current-mode TOF detectors. Single-hit neutron detector arrays are used to increase sensitivity while maintaining good time resolution for low-yield targets.
A 960-channel detector array is designed to obtain neutron spectra from targets on SG-III prototype laser facility in China. It consists of 960 channels of a neutron sensitive plastic scintillator (BC422 type) coupled to a photomultiplier tube (PMT) and data acquisition electronics. Every PMT is followed by a discriminator, TDC, Shaper and ADC to allow the measurement of neutron arrival time as well as pulse amplitude. The array is capable of measuring yields as low as 4×105 DT neutrons (100 detected hits) with resolution of 1.0 ns (90 keV for 14.1MeV DT neutrons with 16.67-m flight path).
In the ICF experiments, the secondary neutrons arrive at the detector array after X and gamma rays, and before the primary neutrons. All these uninterested particles can produce pulses in scintillators and PMTs. And they can not be shielded completely. To ensure the proper functioning of the single-hit-mode neutron detectors array, a timing controller module is in need either. It will supply relevant control signals for the electronics system.
The whole system should be properly designed, tested and calibrated to obtain the accurate secondary neutron spectra.

Primary authors : Dr. LI, Feng (USTC)

Co-authors : Dr. JIANG, Xiao (USTC) ; Mr. CHEN, Lian (USTC) ; Mr. LIANG, Futian (USTC) ; Prof. JIN, Ge (USTC)

Presenter : Dr. LI, Feng (USTC)

Track classification : Experimental Detector Systems

Contribution type : Poster Presentation

Submitted by : LI, Feng

Submitted on Sunday 27 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:25
Comments : "poster"

Abstract ID : 80

DSSC - an X-ray Imager with Mega-Frame Readout Capability for the European XFEL

Content :

The paper presents the concept and the status of the DSSC project, an ultra-high speed detector system for the European XFEL in Hamburg. The DSSC (DEPFET Sensor with Signal Compression) is a 1Mpix camera with a sensitive area of 200x200 mm2 designed to record X-ray images at a maximum frame rate of 4.5MHz. The system is based on a DEPFET Active Pixel Sensor as the central amplifying structure providing a detection efficiency of close to 100% for X-rays from 0.5 keV up to 10keV. 256 readout ASICs are bump-bonded to the detector in order to provide full parallel readout. The signals coming from the sensor, after being processed by an analogue filter, are digitized by 8-bit ADCs and locally stored in a SRAM.

The expected high brilliance of the XFEL beam calls for an extremely high dynamic range of up to 1e4 photons of 1 keV per pixel and requires at the same time for other experiments a single 1keV photon resolution. To achieve that, a strongly non-linear characteristic is required. The proposed DEPFET provides the required dynamic range compression at the sensor level. The most challenging property is that the single 1keV photon resolution and the high dynamic range are accomplished within the 220 ns frame read-out time.

The paper will discuss the main building blocks of the system, including the sensor with signal compression, read-out ASICs, module design, and report the status of the developments.

Primary authors : ANDRICEK, Ladislav (MPI Halbleiterlabor, Munich)

Co-authors :

Presenter : ANDRICEK, Ladislav (MPI Halbleiterlabor, Munich)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : ANDRICEK, Laci

Submitted on Sunday 27 March 2011

Last modified on : Saturday 23 April 2011

Comments :

The contribution is on behalf of the DSSC Consortium.

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 23 April 2011 14:24
Comments : ""

Abstract ID : 91

A non-linearity correction method for the fast digital multi-channel analyzers

Content :

Fast digital multi-channel analyzers (FDMCA) which base on flash ADC have been intensively used recently. The principle of FDMCA is different from the traditional MCA which based on the Wilkinson ADC. The non-linearity, including the INL and DNL, arising from flash ADC, degraded the accuracy of FDMCA. To improve the non-linearity of fast digital MCA, a practical off-line correction method has been proposed in this paper. A special measurement was made to obtain the non-linearity feature of the MCA system previously. And the non-linearity data should be saved to correct the other data originated from general measurement with the same system. Because the non-linearity in the same system is changeless strictly, the non-linearity can be eliminated by comparing the data between the general measurement and the previous special measurement.

A definition of the required algorithms is presented in this paper. Both electronics tests and radiation tests were done comparing the results with a commercial MCA. The results show that the correction method proposed is more helpful in improving measure accuracy than precision.

Primary authors : Mr. SANG, Ziru (University of Science and Technology of China)

Co-authors : Dr. LI, Feng (University of Science and Technology of China) ; Prof. JIN, Ge (University of Science and Technology of China)

Presenter : Mr. SANG, Ziru (University of Science and Technology of China)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : SANG, Ziru

Submitted on Monday 28 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Poster Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 01:59
Comments : ""

Abstract ID : 92

Large area Micromegas chambers with embedded front-end electronics for hadron calorimetry

Content :

Micromegas (Micro-mesh gaseous structure) is an attractive technology for applications in particle physics experiments (TPC, calorimeters, muon systems, etc.). The most important results of an extensive R program aiming to develop a new generation of a fine-grained hadron calorimeter with low power consumption digital readout using Micromegas chambers as an active element are presented. The emphasis is put on an innovative engineering solutions of the chamber construction, development of low noise ASIC and its calibration, and simulation of the physics performance of a complete calorimeter. In 2010, the first large scale prototype of Micromegas chamber with almost 8000 readout channels has been built and tested with high energy particle beams at CERN. The fundamental results, such as detection efficiency, hit multiplicity, gain stability, response uniformity and effect of power pulsing of detector front-end electronics are reported. Eventually, the prospective towards the construction of a technological prototype of a 4.5 lambda deep digital calorimeter for a future linear collider will be also presented.

Primary authors : Dr. BLAHA, Jan (LAPP/CNRS)

Co-authors :

Presenter : Dr. BLAHA, Jan (LAPP/CNRS)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : BLAHA, Jan

Submitted on Monday 28 March 2011

Last modified on : Monday 04 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:00
Comments : "New development"

Abstract ID : 93

First result of T2K new neutrino detector, Proton Module

Content :

The T2K (Tokai-to-Kamioka) long baseline neutrino oscillation experiment started in Apr. 2009. T2K is aiming to measure the oscillation parameters associated with muon neutrino disappearance precisely and to search for electron neutrino appearance. A high intensity neutrino beam from J-PARC (Japan Proton Accelerator Research Complex) is measured with the 280m near detector complex (ND280) and the 295km far detector (Super-Kamiokande).
For the oscillation analysis of T2K, there is a large systematic error attributed to uncertainty of neutrino interaction. So we have constructed a new neutrino detector, "Proton Module" to measure the neutrino interaction precisely and suppress the systematic error. The Proton Module consists of 1204 plastic scintillator bars with Fiber-MPPC (Multi-Pixel Photon Counter) readout. Since it is a fully-active detector, it can reconstruct tracks of various kinds of particles from interaction point. The Proton Module started taking beam data from Nov. 2010. We will report the first result of the analysis of the beam data.

Primary authors : Mr. KIKAWA, Tatsuya (Kyoto University)

Co-authors : Dr. BESNIER, Magali (LLR Ecole Polytechnique) ; Mr. BRONNER, Christophe (LLR Ecole Polytechnique) ; Mr. FERREIRA, Oscar (LLR Ecole Polytechnique) ; Prof. GONIN, Michel (LLR Ecole Polytechnique) ; Prof. ICHIKAWA, Atsuko (Kyoto University) ; Ms. MATSUMURA, Chie (Osaka City University) ; Prof. MINAMINO, Akihiro (Kyoto University) ; Mr. MURAKAMI, Akira (Kyoto University) ; Prof. NAKAYA, Tsuyoshi (Kyoto University) ; Mr. OTANI, Masashi (Kyoto University) ; Mr. PEDRO, João (LLR Ecole Polytechnique) ; Mr. SUZUKI, Kento (Kyoto University) ; Prof. YAMAMOTO, Kazuhiro (Osaka City University) ; Prof. YOKOYAMA, Masashi (University of Tokyo)

Presenter : Mr. KIKAWA, Tatsuya (Kyoto University)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : KIKAWA, Tatsuya

Submitted on Monday 28 March 2011

Last modified on : Monday 28 March 2011

Comments :

Status : WITHDRAWN

Track judgments :

Track : Detectors for neutrino physics

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 94

Thermally Conducting Carbon Foam for Support of Pixel and Silicon Strip Detectors

Content :

A new type of low density, thermally conducting carbon foam has been developed for fabrication of low-mass support structures for silicon pixel and silicon strip detectors. The properties of the foam will be described. Prototype structures using the carbon foam have been constructed and tested. Mechanical and thermal measurements will be presented. Results after extensive thermal cycling and irradiation up to doses of 1 GRad will also be described. Future structures and implementation will be proposed.

Primary authors : GILCHRIESE, Murdock (Lawrence Berkeley National Laboratory (LBNL))

Co-authors : ANDERSSEN, Eric (Lawrence Berkeley National Laboratory (LBNL)) ; SILBER, Joseph (Lawrence Berkeley National Laboratory (LBNL)) ; GARCIA-SCIVERES, Maurice (Lawrence Berkeley National Laboratory (LBNL)) ; MILLER, William (Allcomp, Inc) ; SHIH, Wei (Allcomp, Inc)

Presenter : GILCHRIESE, Murdock (Lawrence Berkeley National Laboratory (LBNL))

Track classification : Semiconductor Detectors

Contribution type : --not specified--

Submitted by : GILCHRIESE, Murdock

Submitted on Monday 28 March 2011

Last modified on : Friday 06 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 06 May 2011 21:29
Comments : ""

Abstract ID : 95

The upstream detectors of the FIRST experiment at GSI

Content :

The FIRST (Fragmentation of Ions for Relevant Space and Therapy) experiment at GSI has been designed for the measurement of Carbon fragmentation cross sections at different energies between 100 and 1000 AMeV.
The experimental setup integrates an already existing magnet, TPC (Music), neutron detector (Land) and ToF scintillator wall with some newly designed detectors in the, so called, interaction region (IR) around the carbon removable target. The IR target upstream detectors are the scintillator Start Counter and a Beam Monitor drift chamber optimized for a precise measurement of the beam interaction time and impinging point on the target. The downstream detectors are a silicon vertex detector and a calorimeter for detection of the fragments emitted at large angles.
In this presentation we review the design of the upstream detectors as well as the test beam results obtained on 511 keV electrons (at the BTF facility in the INFN Frascati laboratories) and on protons and carbon ions (at the INFN LNS Laboratories in Catania) of 80 AMeV energy.
The Start Counter is a scintillator (EJ-228, Pilot U) detector designed for triggering and timing purposes, optimized trough a careful balancing of detector time resolution (the time of flight measured at the end of the Music TPC is used to disentangle the different fragments) and minimization of the detector thickness (and hence pre target beam interaction probability). The final adopted layout is implemented trough a 150 μm thick scintillator disc, with the light collected by means of optical fibers radially glued and connected to four UBA H10721-201 photomultipliers.
A preliminary evaluation of the time resolution obtained in the test beams ranges from 400 ps on protons to 200 ps on carbon ions.
The Beam Monitor is a drift chamber made of alternated horizontal and vertical wire layers, each with 3 rectangular cells 16 mm wide and 10 mm thick along the beam direction. The geometry layout has been optimized in order to minimize the beam interactions on the wires. A total of 12 layers provides tracking redundancy and ensures an high tracking efficiency and an excellent spatial resolution. On electron, proton and carbon ions beams, different gas mixtures have been tested (Ar/CO2 and P10) and preliminary results show that detector single cell space resolution matches the 100 μm design value.

Primary authors : Dr. SARTI, Alessio (Università di Roma "La Sapienza" and INFN - LNF)

Co-authors : Dr. PIERSANTI, Luca (Università di Roma "La Sapienza" and INFN - LNF) ; Dr. PAOLONI, Alessandro (INFN - LNF) ; Prof. SCIUBBA, Adalberto (Università di Roma "La Sapienza" and INFN - LNF) ; Prof. PATERA, Vincenzo (Università di Roma "La Sapienza" and INFN - LNF)

Presenter : Dr. PIERSANTI, Luca (Università di Roma "La Sapienza" and INFN - LNF) ; Dr. PAOLONI, Alessandro (INFN - LN

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : SARTI, Alessio

Submitted on Monday 28 March 2011

Last modified on : Saturday 23 April 2011

Comments :

While we would really like to have an oral presentation to report our study, in case there will be no time / space for such presentation, we can also prepare a poster....

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 23 April 2011 14:25
Comments : ""

Abstract ID : 96

The Enriched Xenon Observatory (EXO)

Content :

The Enriched Xenon Observatory (EXO) is an experimental program designed to search for the neutrinoless double beta decay (0nbb) of Xe-136. Observation of 0nbb would determine an absolute mass scale for neutrinos, prove that neutrinos are massive Majorana particles (indistinguishable from their own antiparticles), and constitute physics beyond the Standard Model. The current phase of the experiment, EXO-200, uses 200 kg of liquid xenon with 80% enrichment in Xe-136, and also serves as a prototype for a future 1-10 ton scale EXO experiment. The double beta decay of xenon is detected in an ultra-low background time projection chamber (TPC) by collecting both the scintillation light and the ionization charge. The detector is now operational at the Waste Isolation Pilot Plant (WIPP) in New Mexico. It was first run with natural xenon to fully commission it and study its performance. Preparation for physics data taking is underway. The projected two-year sensitivity for neutrinoless double beta decay half-life is 6.4E25 y at 90% confidence level. In view of a future ton scale experiment, the collaboration is performing R to realize an ideal, background-free search for which the daughter nucleus produced by the double beta decay is also individually detected. In this talk, the current status and preliminary results from EXO-200 will be presented, and prospects for a ton scale EXO experiment will be discussed.

Primary authors : NEILSON, Russell (Stanford University)

Co-authors :

Presenter : NEILSON, Russell (Stanford University)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : NEILSON, Russell

Submitted on Monday 28 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:34
Comments : ""

Abstract ID : 97

Development of a UV/X-ray imaging device based on large area gas photo-multiplier.

Content :

A new type high spatial resolution radiation detector based on UV scintillators + gaseous imaging device is presented. In the last decades, gaseous photo-multipliers with ultraviolet sensitive CsI photocathodes have been tested. In addition, these days, large area micro pattern gaseous detectors, such as Micromegas, GEM, and μPIC have been developed. These devices can provide a low cost large area UV photon detector with position sensitivity. The UV imaging detector itself can be applied to material analysis researches and to liquid Ar/Xe scintillators for astro-particle physics . Furthermore, if combined with UV scintillating crystals, it can be a hard X-ray imaging device which compensates the low detection efficiency of the gas detectors; thus we are developing both CsI based position sensitive gaseous photo-multipliers and Fluoride crystal UV scintillators.

The prototype UV detector consists of 10 cm x 10 cm size of uPIC and GEM, and a transmissive/reflective CsI photocathode layer. 2GEMs and a uPIC were used for the charge amplification, which allows to suppress the avalanche-induced photon and ion feedback and provide the high gain operation. The readouts are 400um-pitch strips.

We have already reported the imaging properties of this prototype detector, such as in JINST 4 (2009) P11006. Recently, we have succeeded in developing a high luminosity UV scintillators and optimized the electric fields in photo-electron multiplication, so the detection efficiency of the device is much improved.

Primary authors : Dr. SEKIYA, Hiroyuki (University of Tokyo)

Co-authors :

Presenter : Dr. SEKIYA, Hiroyuki (University of Tokyo)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : SEKIYA, Hiroyuki

Submitted on Tuesday 29 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:44
Comments : ""

Abstract ID : 98

Timing detectors with 10 ps resolution

Content :

We have developed particle detectors (QUARTICs) with 10 ps resolution, based on Cherenkov light in fused silica read out by micro-channel plate photomultipliers (MCP-PMTs) or silicon photomultipliers (SiPMs). Their geometry is edgeless, allowing an active area very close to the intense Large Hadron Collider (LHC) beam, with the photodetectors away from the beam to minimize radiation damage. They satisfy the requirements of a project to localize the collision point and study exclusive Higgs boson production at the LHC.

Primary authors : Dr. ALBROW, Michael (Fermi National Accelerator Laboratory (FNAL))

Co-authors : Dr. RAMBERG, Eric (Fermilab) ; Dr. RONZHIN, Anatoly (Fermilab) ; Dr. ZATSERKLYANIY, Andriy (Fermilab) ; Dr. MALIK, Sarah (Rockefeller University)

Presenter : Dr. ALBROW, Michael (Fermi National Accelerator Laboratory (FNAL))

Track classification : Particle Identification

Contribution type : --not specified--

Submitted by : ALBROW, Michael

Submitted on Tuesday 29 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

This could be included in other classifications; it is time of flight but not for particle ID, but it seems we are not allowed to click more than one button. Mike

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : Toru Iijima
Date : 27 April 2011 13:04
Comments : ""

Abstract ID : 99

DAMA/LIBRA at Gran Sasso

Content :

The DAMA/LIBRA set-up (about 250 kg highly radiopure NaI(Tl)) is running at the Gran Sasso National Laboratory of the I.N.F.N..
It has already released the results obtained in 6 annual cycles;
the cumulative exposure with the one released by the former DAMA/NaI is 1.17 ton × yr, corresponding to 13 annual cycles. The data further confirm the model independent evidence for the presence of Dark Matter particles in the galactic halo on the basis of the Dark Matter annual modulation signature (8.9 sigma C.L.). The data of a further annual cycle have already been collected before the new important upgrading performed at the end of 2010. The set-up has now started the data taking in this new configuration. Results, comparisons and perspectives will be summarized.

Primary authors : Dr. CERULLI, Riccardo (INFN-LNGS)

Co-authors :

Presenter : Dr. CERULLI, Riccardo (INFN-LNGS)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : CERULLI, Riccardo

Submitted on Tuesday 29 March 2011

Last modified on : Friday 01 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HALL, Jeter
Date : 01 April 2011 22:23
Comments : "DAMA/LIBRA has a compelling experiment with a claimed dark matter signal. The DM-Ice experiment is designed to test the DAMA signal in a model independent way and it would be nice to have both talks together."

Abstract ID : 100

A GEM-TPC prototype detector for PANDA

Content :

High-precision spectroscopy of hadrons in the strange and charm sector, as envisaged in the PANDA experiment requires an excellent charged particle tracking system with multiple track identification (up to 4000 tracks superimposed inside the TPC all the time), high spatial resolution ($\sigma r\phi$~150 μm,σz~1mm),high momentum resolution (~1%),minimal material budget (~1% of radiation length),high rate capability, resistance against aging, etc. Therefore, a cylindrical Time Projection Chamber(TPC)was proposed as the central tracking detector for PANDA.In addition to its excellent tracking properties, a TPC would strongly improve particle identification (PID) in the sub-GeV region, which is very important for most of the interesting physics channels and for rejection of low momentum pions from ppbar annihilation at PANDA. Owing to the beam properties at the High Energy Storage Ring (HESR), the TPC has to operate at high particle rates and in a continuous mode, i.e. without gating. The use of GEM foils as amplification stage instead of conventional MWPC's allows us to bypass the necessity of a gating structure, as the back drift of ions into the drift volume has been shown to be intrinsically suppressed due to the asymmetric internal field configuration in a GEM-based gas amplification system.A large prototype detector has been designed, built and tested at FOPI experiment at GSI Darmstadt. Triple GEM stack is used at the amplification stage. The prototype has been commissioned with cosmic rays before it was installed in the FOPI experiment at the end of 2010. The application of the prototype in a running physics experiment constitutes a very useful test and provides valuable data on the tracking performance of an ungated GEM-TPC in PANDA. For FOPI, in turn, the TPC will provide a significant improvement for the detection of Λ-vertices. Here the design of the prototype and first results obtained during the beam test in FOPI will be presented.

Primary authors : Mr. ARORA, Rahul (GSI)

Co-authors :

Presenter : Mr. ARORA, Rahul (GSI)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : ARORA, Rahul

Submitted on Tuesday 29 March 2011

Last modified on : Tuesday 05 April 2011

Comments :

References: 1. L.Fabbietti et al.,"The PANDA GEM-based TPC prototype" NIM A 628(2011) p.204-208

2. Voss B. et al., GSI Scientific Report 2008, GSI Report 2009-1, p.238.

3. Deutsche Physikalische Gesellschaft e.V. (DPG Conference) Münster 2011, Poster Presentation (March 2011) "Design, Construction and Test of a precursor prototype TPC for PANDA"

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 05 April 2011 05:43
Comments : ""

Abstract ID : 101

The KM3NeT Deep-Sea Research Infrastructure

Content :

KM3NeT is a future deep-sea research infrastructure in the Mediterranean Sea that will hold a multi-cubic-kilometer neutrino telescope. Located in the Northern Hemisphere, KM3NeT will be able to observe point-like sources of cosmic neutrinos in a region of the sky that includes the Galactic Center.

KM3NeT will employ a number of innovative technologies that are the main subject of the presentation. It is currently planned to install optical modules of 17 inch diameter that will contain 31 photomultiplier tubes each. Triggered data will be digitized off-shore. These "digital optical modules" will be installed on horizontal bar structures of several meters of length. Several of these structures will be stacked to form a vertical tower, interconnected by tethers at distances of several tens of meters.

To reconstruct the Cherenkov cones of charged particles produced in neutrino interactions, a time synchronization on a sub-nanosecond level is required. To calibrate the complete timing in situ, LED beacons, integrated into the optical modules, will be used. The devices are currently tested within the ANTARES neutrino telescope. To calibrate the position of the optical modules on the towers, which are free to sway with the sea currents, a system of acoustic transceivers at fixed positions on the sea floor and receivers along the towers will be used. The data will be sent continuously to shore, where the algorithms for position calibration will be applied. Sending all data to shore will allow both for flexibility in applying the position calibration algorithms and for using the data for further analyses, such as for marine science investigations or acoustic neutrino detection.

Primary authors : Dr. LAHMANN, Robert (Erlangen Centre for Astroparticle Physics)

Co-authors :

Presenter : Dr. LAHMANN, Robert (Erlangen Centre for Astroparticle Physics)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : LAHMANN, Robert

Submitted on Tuesday 29 March 2011

Last modified on : Sunday 24 April 2011

Comments :

This presentation is on behalf of the KM3NeT Consortium

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:44
Comments : ""

Abstract ID : 102

The Ring Imaging CHerenkov detectors of the LHCb experiment

Content :

Particle identification is the
fundamental requirement of the LHCb experiment to fulfill its physics programme. Positive hadron identification is performed by two Ring Imaging CHerenkov (RICH) detectors. This system covers the full angular acceptance of the experiment and is equipped with three Cherenkov radiators to identify particles in the wide momentum range from 1 GeV/c up to 100 GeV/c. The Hybrid Photon Detectors (HPDs) located outside the detector acceptance provide the photon detection with 500,000 channels. Specific readout electronics have been developed to readout and processing data from the HPDs including data transmission and power distribution. A dedicated very high voltage control system has been implemented to operate and monitor the photon detectors. The operation and performance of the RICH system are ensured by the constant control and monitoring of low voltage and high voltage systems, of the gas quality and enviromental parameters, of the mirror alignment, and finally detector safety. The description of the LHCb RICH will be given.
The experience to operate the detector at the Large Hadron Collider will be presented and discussed.

Primary authors : PEREGO, Davide (Univ. Milano-Bicocca+ INFN)

Co-authors :

Presenter : PEREGO, Davide (Univ. Milano-Bicocca+ INFN)

Track classification : Particle Identification

Contribution type : Oral Presentation

Submitted by : MATTEUZZI, Clara

Submitted on Tuesday 29 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

The presentation is on behalf of the LHCb RICH collaboration

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : Toru Iijima
Date : 27 April 2011 12:56
Comments : "Candidate of 30min. talk by combining with #104"

Abstract ID : 103

Data Acquisition System for Three Position-Sensitive-Counter Based Neutron Dosimeter

Content :

Neutron dosimeter is used to measure and analyze neutron dose. Because of the energy range of neutron radiation field is wide, single moderator with single counter dosimeter is hard to get a good energy response, while the multi-moderator with multi-counter dosimeter could provide a good energy response but a poor usability. Neutron dosimeter based on single moderator with multi-counter could balance the performance and usability, but there is no special measuring equipment for it in China. In this paper, a well performed data acquisition system (DAS) is presented for the neutron dosimeter which is based on single moderator with three 3He position-sensitive counters. With the Digital Pulse Processing (DPP) techniques, six-channel waveform from the Analog to Digital Converter (ADC) is processed by digital time-coincidence and digital peak searching logics in Field-Programmable Gate Array (FPGA). A position information statistics of events which match the time-coincidence is given out by PC client. With electronics performance test and applicant test, it concludes that the DAS could provide a high resolution of position information at high counting rate, and it is a significant support for principle verification, detector performance verification and product development.

Key words: data acquisition, neutron dosimeter, position-sensitive counter

Primary authors : Mr. LIANG, Futian (University of Science and Technology of China)

Co-authors : Mr. CHEN, Lian (University of Science and Technology of China) ; Dr. LI, Feng (University of Science and Technology of China) ; Prof. JIN, Ge (University of Science and Technology of China)

Presenter : Mr. LIANG, Futian (University of Science and Technology of China)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : LIANG, Futian

Submitted on Tuesday 29 March 2011

Last modified on : Friday 22 April 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 22 April 2011 20:53
Comments : ""

Abstract ID : 104

Performance of the RICH detectors of LHCb

Content :

Hadron identification, in particular the ability to distinguish charged kaons and pions, is crucial to many of LHCb core physics analyses. LHCb Ring Imaging Cherenkov (RICH) detector fulfills this role by providing charged particle identification in the momentum range between 1 and 100 GeV/c. The calibration and monitoring of the RICH detectors is achieved using samples of D^{*}, K_{S}^{0}, Λ and ϕ events, which are plentiful in the data and can be cleanly isolated through their decay kinematics. The particle identification performance of the LHCb RICH detectors, measured in data taken during the 2010 and 2011 LHC runs, will be presented along with the strategy for aligning and calibrating the detector. Finally this performance will be placed in context by highlighting the impact of the RICH performance on some of LHCb benchmark analyses.

Primary authors : BLAKE, Thomas (Imperial College london (UK))

Co-authors :

Presenter : BLAKE, Thomas (Imperial College london (UK))

Track classification : Particle Identification

Contribution type : Oral Presentation

Submitted by : MATTEUZZI, Clara

Submitted on Tuesday 29 March 2011

Last modified on : Tuesday 03 May 2011

Comments :

On behalf of the LHCb RICH collaboration

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 03 May 2011 14:42
Comments : ""

Abstract ID : 105

A large-area detector for precision time-of-flight measurements at LHCb

Content :

The TORCH (Time Of internally Reflected CHerenkov light) detector is an innovative high-precision time-of-flight system which is suitable for large areas, up to tens of square metres, and is being developed for the upgraded LHCb experiment. The TORCH provides a time-of-flight measurement from the imaging of photons emitted in a 1 cm thick quartz radiator, based on the Cherenkov principle. The photons propagate by total internal reflection to the edge of the quartz plane and are then focused onto an array of Micro-Channel Plate (MCP) photon detectors at the periphery of the detector.
The goal is to achieve a timing resolution of 15 ps per particle, over a flight distance of 10 m. This will allow particle identification in the challenging intermediate momentum region, up to 20 GeV/c. Commercial MCPs have been tested in the laboratory and demonstrate the required timing precision. An electronics readout system based on the NINO and HPTDC chipset is being developed to evaluate an 8x8 channel TORCH prototype in a testbeam. The expected performance of the TORCH detector at LHCb in full simulation will also be presented.

Primary authors : HARNEW, Neville (Univ. of Oxford (UK))

Co-authors :

Presenter : HARNEW, Neville (Univ. of Oxford (UK))

Track classification : Particle Identification

Contribution type : Oral Presentation

Submitted by : MATTEUZZI, Clara

Submitted on Tuesday 29 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : Toru Iijima
Date : 27 April 2011 12:58
Comments : ""

Abstract ID : 106

SPACIROC: A Front-End Readout ASIC for JEM-EUSO cosmic ray observatory

Content :

The SPACIROC ASIC is designed for the JEM-EUSO fluorescence imaging telescope onboard of the International Space Station. Its goal is the detection of Giant Air Shower above a few 10^19 eV, developing at a distance of about 400 km, downward in the troposphere. From such distance, most of the time, the number of the photons expected in the pixels is very weak, ranging from a few units to a few tens. For such running conditions, we propose a low-power, rad-hard ASIC which is intended for reading out a 64-channel Multi-Anode Photomultiplier. The two main features of this ASIC are the photon counting mode for each input and the charge-to-time (Q-to-T) conversions for the multiplexed channels. In the photon counting mode, the 100% triggering efficiency is achieved for 50fC input charges. For the Q-to-T converter, the ASIC requires a minimum input of 2pC. The working conditions of JEM-EUSO require the ASIC to have a low power dissipation which is around 1mW/channel. The design of SPACIROC and the test results are presented in this paper. SPACIROC is a result of the collaboration between OMEGA/LAL-Orsay, France, RIKEN, ISAS/JAXA and Konan University, Japan on behalf of the JEM-EUSO consortium.

Primary authors : Mr. AHMAD, Salleh (OMEGA/LAL/IN2P3/Université Paris Sud 11,France)

Co-authors : Dr. BARRILLON, Pierre (OMEGA/LAL/IN2P3/Université Paris Sud 11,France) ; Mrs. BLIN-BONDIL, Sylvie (OMEGA/LAL/IN2P3/Université Paris Sud 11,France) ; Dr. DAGORET-CAMPAGNE, Sylvie (OMEGA/LAL/IN2P3/Université Paris Sud 11,France) ; Dr. DE LA TAILLE, Christophe (OMEGA/LAL/IN2P3/Université Paris Sud 11,France) ; Mr. DULUCQ, Frederic (OMEGA/LAL/IN2P3/Université Paris Sud 11,France) ; Dr. MARTIN-CHASSARD, Gisele (OMEGA/LAL/IN2P3/Université Paris Sud 11,France) ; Dr. KAWASAKI, Yoshiya (RIKEN,Japan) ; Dr. MIYAMOTO, Hiroko (RIKEN,Japan) ; Dr. IKEDA, Hirokazu (ISAS/JAXA,Japan) ; Dr. KAJINO, Fumiyoshi (RIKEN,Japan)

Presenter : Mr. AHMAD, Salleh (OMEGA/LAL/IN2P3/Université Paris Sud 11,France)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : Mr. AHMAD, Salleh

Submitted on Tuesday 29 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:00
Comments : "20 min"

Abstract ID : 107

Silicon sensor R for an upgraded CMS Tracker in HL-LHC

Content :

FNAL is participating in a CMS Tracker silicon sensor R project for the second phase of the planned LHC upgrade (HL-LHC). We present results from the tests conducted at Fermilab to determine the characteristics of thin, single-sided silicon sensors acquired from HPK in order to establish optimal material and strip/pixel features for the upgrade of the CMS Tracker. In addition to increased radiation hardness requirements, the HL-LHC sensors will need to be both robust and relatively low-cost given the very large number of sensors required for the full Tracker. Over one hundred 6 inch wafers were produced by HPK with substrates and thicknesses: MCZ 200 μm, FZ 200 μm, FZ 100 μm, EPI 100 μm, and EPI 75 μm. Sensor geometries included pixel, long pixel, and strips of both n-type and p-type with both p-stop and p-spray isolation. We studied capacitance (to back plane, inter-strip), depletion, and breakdown voltages of the sensors with various thickness and pitches. We also studied the signal-to-noise ratio using a radioactive source. The test setups have the option for repeating the tests at low temperatures, after irradiation of the sensors with protons and neutrons.

Primary authors : Dr. CIHANGIR, Selcuk (Fermi National Accelerator Lab. (Fermilab))

Co-authors : Dr. KWAN, Simon (Fermi National Accelerator Lab. (Fermilab)) ; Mr. LAMICHHANE, Pramod (Wayne State University) ; Dr. SPIEGEL, Lenny (Fermi National Accelerator Lab. (Fermilab)) ; Dr. TAN, Ping (Fermi National Accelerator Lab. (Fermilab)) ; Dr. ZATSERKLYANIY, Andriy (University of Puerto Rico, Mayaguez)

Presenter : Dr. CIHANGIR, Selcuk (Fermi National Accelerator Lab. (Fermilab))

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : CIHANGIR, Selcuk

Submitted on Tuesday 29 March 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 08:06
Comments : ""

Abstract ID : 108

GPUs for fast triggering in NA62 experiment

Content :

We discuss an approach for using commercial graphic processors (GPUs) at the earliest trigger stages in high-energy physics experiments, and study its implementation on a real trigger system in preparation.
In particular we focus on the possibility to reconstruct rings in a Cherenkov detector as building block of a selective trigger condition for rare decay search.
Latency and processing rate measurements on several state-of-the-art devices are presented, and the potential issues related to processing time jitter and data transfer throughput are discussed.

Primary authors : LAMANNA, Gianluca (CERN)

Co-authors : MARCO, Sozzi (Pisa INFN)

Presenter : LAMANNA, Gianluca (CERN) ; MARCO, Sozzi (Pisa INFN)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : LAMANNA, Gianluca

Submitted on Tuesday 29 March 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:48
Comments : ""

Abstract ID : 109

Variations in CVD Diamond Detector’s response to radiations with the crystal’s defects compared with calculated values from MC code (PENELOPE) at low energy Mammographic X-ray range

Content :

The exceptional and unique physical properties of diamond have made the mineral a choice material in radiation measurement. Diamond detectors are currently used extensively in high-energy physics. The tissue equivalence of diamond allows for accurate radiation dose determination without large corrections for different attenuation values in biological tissue. The low Z value limits this advantage however to the lower energy photons such as for example in Mammography X-ray beams.
This paper assays the performance of nine Chemical Vapor Deposition (CVD) diamonds for use as radiation sensing material. The specimens fabricated in wafer form are classified as detector grade, optical grade and single crystals.
It is well known that the presence of defects in diamonds, including CVD specimens, not only dictates but also affects the responds of diamond to radiation in different ways. In this investigation, tools such as electron spin resonance (ESR), thermolumniscence
(TL) Raman spectroscopy and ultra violet (UV) spectroscopy were used to probe each of the samples. The specimen was spectroscopically analyzed with α-particles for a choice of detector sample and for linearity, sensitivity and other characteristics of a detector to photon interaction.
The resistivity of each of the diamond grade is calculated from the I-V characteristics of the samples.
The diamonds categorized into four each, of the so called Detector and Optical grades, and a single crystal CVD were exposed to low X-ray peak voltage range (22 to 27 KVp) with a trans-crystal polarizing fields of 0.4kV.cm-1, 0.66kV.cm-1 and 0.8kV.cm-1.
The presentation discusses the presence of defects identifiable by the techniques used and correlates the radiation performance of the three types of crystals to their presence. The choice of a wafer as either a sensitive alpha detector, spectrometer or as X-ray dosimeter within the selected energy range was made. The analyses was validated with Monte-Carlo code (PENELOPE)

Primary authors : Dr. ZAKARI, Yusuf (DST/NRF Centre of Excellence in strong Materials and School of Physics, University of the Witwatersrand. Private Bag 3, PO Wits 2050, Johannesburg, Republic of South Africa)

Co-authors :

Presenter : Dr. ZAKARI, Yusuf (DST/NRF Centre of Excellence in strong Materials and School of Physics, University of the Wi

Track classification : Semiconductor Detectors

Contribution type : --not specified--

Submitted by : DEMARTEAU, Marcel

Submitted on Tuesday 29 March 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 08:52
Comments : "This presentation is proposed to be accepted as an Oral Presentation"

Abstract ID : 110

RECENT DEVELOPMENTS IN PHOTOMULTIPLIERS AND READ-OUT SYSTEMS

Content :

This paper reviews recent developments in imaging photomultiplier technology.
Recent developments have significantly advanced the time resolution limits of MCP based photomultipliers; this is of particular importance for applications in nuclear physics. For example, PMTs are used for Gamma Reaction History at Omega and similar experiments. Since 2004,PMT diagnostic capability has improved from 224ps to less than 100ps.The response times of various models are shown and we show the response of a new 400mm tube
For neutron diagnostics, we have improved the gating (high speed switch on/off) to discriminate between neutrons and gamma-rays. These are characterized at Photek by walking a fast laser pulse through the gate,which can now achieve switching times approaching 3ns.
We are also developing fast read-out systems based on CERN chips developed for ALICE, which are intended for life science applications such as fluorescence lifetime imaging.

Primary authors : Dr. HOWORTH, Jon (Photek Limited)

Co-authors : Dr. COX, Ian (Photek Limited) ; Dr. JONES, Gareth (Photek Limited)

Presenter : Dr. HOWORTH, Jon (Photek Limited)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Tuesday 29 March 2011

Last modified on : Friday 29 April 2011

Comments :
submitted by Ted Liu for Jon Howorth.

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:45
Comments : ""

Abstract ID : 111

Status of Hyper-Kamiokande detector R&D

Content :

The Hyper-Kamiokande detector, a water Cherenkov detector with one megaton total mass, is a next-generation detector for nucleon decay and neutrino studies.
Main goals are a search for the nucleon decay with ten times better sensitivity than current lifetime limits set by Super-Kamiokande, precise measurement of the neutrino mixing matrix (in particular the CP-violating Dirac phase) with accelerator and atmospheric neutrinos, and other researches in particle and astroparticle physics with extraterrestorial neutrinos.
Technical design of the detector such as large caverns and tanks, photo-sensors and readout system, and water purification system, is ongoing.
This presentation will give an overview of goals and challenges of the experiment and the latest design of the Hyper-Kamiokande detector.

Primary authors : Prof. YOKOYAMA, Masashi (University of Tokyo)

Co-authors : Prof. SHIOZAWA, Masato (ICRR, University of Tokyo) ; Prof. SUZUKI, Yoichiro (ICRR, University of Tokyo) ; Prof. NAKAHATA, Masayuki (ICRR, University of Tokyo) ; Prof. MORIYAMA, Shigetaka (ICRR, University of Tokyo) ; Prof. HAYATO, Yoshinari (ICRR, University of Tokyo) ; Prof. KISHIMOTO, Yasuhiro (ICRR, University of Tokyo) ; Dr. OBAYASHI, Yoshihisa (ICRR, University of Tokyo) ; Dr. KAMEDA, Jun (ICRR, University of Tokyo) ; Dr. SEKIYA, Hiroyuki (ICRR, University of Tokyo) ; Dr. NAKAYAMA, Shoei (ICRR, University of Tokyo) ; Dr. MIURA, Makoto (ICRR, University of Tokyo) ; Dr. OKUMURA, Kimihiro (ICRR, University of Tokyo) ; Prof. KAJITA, Takaaki (ICRR, University of Tokyo) ; Prof. AIHARA, Hiroaki (University of Tokyo) ; Mr. WANG, Jiayin (University of Tokyo) ; Dr. ABE, Toshinori (University of Tokyo) ; Prof. TAKEUCHI, Yasuo (Kobe University) ; Dr. SUZUKI, Atsumu (Kobe University) ; Prof. NAKAYA, Tsuyoshi (Kyoto University) ; Prof. ICHIKAWA, Atsuko (Kyoto University) ; Dr. MINAMINO, Akihiro (Kyoto University) ; Dr. IKEDA, Motoyasu (Kyoto University) ; Prof. ITOW, Yoshitaka (STE lab, Nagoya University)

Presenter : Prof. YOKOYAMA, Masashi (University of Tokyo)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : YOKOYAMA, Masashi

Submitted on Wednesday 30 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)

Judged by : CATTAI, Ariella
Date : 21 April 2011 22:26
Comments : "Review talk - still waiting comment from neutrino conveners"

Abstract ID : 112

Super-Kamiokande's Gadolinium Research and Developement Project

Content :

The proposed introduction of a soluble gadolinium [Gd] compound into water Cherenkov detectors can result in a high efficiency for the detection of free neutrons capturing on the Gd. The delayed 8 MeV gamma cascades produced by these captures in coincidence with a prompt positron signal serve to uniquely identify electron anti-neutrinos interacting via inverse beta decay. Such coincidence detection greatly reduces backgrounds, allowing a large Gd-enhanced water Cherenkov detector to make the first observation of the diffuse supernova neutrino background and high precision measurements of Japan's reactor anti-neutrino flux, while still allowing for all current physics studies to be continued. Now a dedicated Gd test facility is operating in the Kamioka Mine, home of the Super-Kamiokande [SK] detector. This new facility will house a stainless steel tank filled with 200 tons of water and lined with 240 50-cm photomultiplier tubes, a specially designed water system for filtration and gadolinium recovery, and multiple devices for evaluating the quality of the water in the tank. Successful running of this new facility will demonstrate that adding Gd salt to SK is both safe for the detector and is capable of delivering the expected physics benefits.

Primary authors : Mr. RENSHAW, Andrew (UCI)

Co-authors :

Presenter : Mr. RENSHAW, Andrew (UCI)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : RENSHAW, Andrew

Submitted on Wednesday 30 March 2011

Last modified on : Sunday 24 April 2011

Comments :

If for some reason an oral presentation is not appropriate, I would then like to present a poster.

Status : WITHDRAWN

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:45
Comments : "Propose as poster."

Abstract ID : 113

The Belle II detector

Content :

While B factories were built to check whether the Standard Model with the CKM matrix offers a correct description of CP violation,
the next generation of B factories (so called super B factories) will look for departures from the Standard Model. For such a study, a 50 times larger data sample is needed, corresponding to an integrated luminosity of 50 ab^-1. To achieve the necessary increase of event rates by a factor of 40, a substantial upgrade is required both of the accelerator complex as well as of the detector.

To maintain the excellent performance of the detector, the critical issue will be to mitigate the effects of higher backgrounds (by a factor of 10 to 20), leading to an increase in occupancy and radiation damage, as well as fake hits and pile-up noise in the electromagnetic calorimeter. Higher event rates require substantial modifications in the trigger scheme, DAQ and computing relative to the current experiments. In addition, improved vertex detection and hadron identification are needed, and similarly good (or better) hermeticity is required.

For the Belle-II detector, the following solutions will be adopted.
The new vertex detector will have two pixel layers, at r = 14 mm and r = 22 m around a 10 mm radius Be beam pipe, and four double-sided strip sensors at radii of 38 mm, 80 mm, 115 mm, and 140 mm. The pixel detector will be based on DEPFET sensors. A significant improvement in vertex resolution is expected with respect to Belle, both for low momentum particles because of reduced Coulomb scattering, as well as for high momentum particles
because the high resolution pixel detector is closer to the interaction point. Another important feature is a significant improvement in K_S reconstruction efficiency with good vertex resolution because of a larger volume covered by the vertex detector. An improved charged hadron identification performance will be achieved by using two novel devices, a time-of-propagation (TOP) counter in the barrel part, and a RICH with a focusing aerogel radiator in the forward region of the spectrometer. The electromagnetic calorimeter in the barrel part will use the existing CsI(Tl) crystals, but will employ a wave-form sampling read-out system; in the end-caps CsI(Tl) will be replaced by pure CsI. The resistive plate chambers of the end-cap muon and K_L detection system will be replaced by scintillator strips, read out by SiPMs. All components will be read out by a wide-band readout electronics and with an improved computing system.

The proposed talk will focus on the most important features of the new detector system.

Primary authors : VARNER, Gary (University of Hawaii)

Co-authors :

Presenter : VARNER, Gary (University of Hawaii)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : , Peter Krizan

Submitted on Wednesday 30 March 2011

Last modified on : Friday 06 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:27
Comments : ""

Abstract ID : 114

Calibration UV LED System with tunable light intensity for CALICE tile hadron calorimeter

Content :

We report on several versions of the calibration and monitoring system for the scintillator tile hadron calorimeter for the ILC. Our first calibration and monitoring board (CMB) is used to calibrate all 7600 SiPMs of a 1 m3 hadron calorimeter prototype. Each CMB has 12 LEDs and each LED illuminates 18 SiPMs through 18 optical fibers. The pulse is 10 ns wide and delivers a signal equivalent to 70 MIPs to each SiPM. Newer version has Quasi Resonant LED driver, which drives the LED by a sinusoidal signal, which generates ~3.5 ns optical pulse with high intensity (0.4 nJ) and low EM noise. Together with a special notched optical fiber, a single LED can saturate 12 SiPMs at once with a signal equivalent to 200 MIPs per tile. Next version will be improved to generate longer pulse (~5ns), therefore a higher light intensity. Our development includes an optical distribution through a notched fiber, which shines equally from 72, 12 or 24 points. The light in the final AHCAL prototype will be routed from single LED by 3 fibers having 24 notches each, illuminating row of 72 tiles at once.

Primary authors : KVASNICKA, Jiri (Institute of Physics-Acad. of Sciences of the Czech Rep. (ASCR)-)

Co-authors :

Presenter : KVASNICKA, Jiri (Institute of Physics-Acad. of Sciences of the Czech Rep. (ASCR)-)

Track classification : Calorimetry

Contribution type : Poster Presentation

Submitted by : KVASNICKA, Jiri

Submitted on Wednesday 30 March 2011

Last modified on : Wednesday 20 April 2011

Comments :

Extended abstract available here: http://www-hep2.fzu.cz/twiki/pub/CALICE/WebHome/TIPP2011-Kvasnicka-FULL_abstrakt.pdf

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)

Judged by :

Date : 20 April 2011 18:02

Comments : "After discussion with the proponents, this talk will be expanded to cover all calibration issues of the AHCAL"

Abstract ID : 115

Performance of the LHCb Vertex Locator

Content :

LHCb is a dedicated experiment to study new physics in the decays of beauty and charm hadrons at the Large Hadron Collider (LHC) at CERN. The beauty and charm hadrons are identified through their flight distance in the Vertex Locator (VELO), and
hence the detector is essential for both the trigger performance and offline physics analyses. The VELO is the highest resolution vertex detector at the LHC.

The VELO is the silicon detector surrounding the LHCb interaction point, and is located only 7 mm from the LHC beam during normal operation. The VELO is moved into position for each fill of the LHC, once stable beams are obtained. The detector is
centred around the LHC beam during the insertion by the online reconstruction of the primary vertex position. The detector operates in an extreme and highly non-uniform radiation environment, and the effects of surface and bulk radiation damage have already been observed. The VELO consists of two retractable detector halves with 21 silicon micro-strip tracking modules each. A module is composed of two n+-on-n 300 micron thick half disc sensors with R-measuring and Phi-measuring micro-strip geometry, mounted on a carbon fibre support paddle. The minimum pitch is approximately 40 um. The detector is also equipped with one n-on-p module. The detectors are operated in vacuum and a bi-phase C02 cooling system is used to keep the sensors at -10 C. The detectors are readout with an analogue front-end chip and the signals processed by a set of algorithms in FPGA processing boards. The performance of the algorithms is tuned for each individual strip using a bit-perfect emulation of the FPGA code run in the full software framework of the experiment.

The VELO has been successfully operated for the first LHC physics run. Operational results show a signal to noise ratio of around 20:1 and a cluster finding efficiency of 99.5 %. The small pitch and analogue readout, result in a best single hit precision of 4 um having been achieved at the optimal track angle.

(Submitted on behalf of the VELO group, speaker will be identified once the talk is accepted)

Primary authors : Dr. PARKES, Chris (University of Glasgow)

Co-authors :

Presenter : Dr. PARKES, Chris (University of Glasgow)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : PARKES, Chris

Submitted on Wednesday 30 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)

Judged by : COLLINS, Paula
Date : 29 April 2011 08:31
Comments : ""

Abstract ID : 116

Study of TOF PET using Cherenkov Light

Content :

This work investigates the possibilities of improving the measurements of arrival time difference of the two 511 keV photons arising from annihilation of a positron in positron emission tomography (PET). The new technique of detecting the prompt Cherenkov light, produced by absorption of the annihilation photon in a suitable crystal, could considerably improve the image quality. A simple apparatus with PbF2 crystals and microchannel plate photomultipliers (MCP PMTs) has been constructed and coincidence resolutions of 71 ps FWHM and 95 ps FWHM have been achieved with 5 mm and 15 mm thick crystals respectively. Simulation
calculations are in agreement with the experimental findings.

In the contribution, we will first describe the principles of the detection method and present the experimental apparatus. We will then discuss the results of measurements of time resolution for two coincident 511 keV gamma photons absorbed in PbF2 crystals. Finally, we will compare our measurements with simulation calculations, which also included a study with PbWO4 crystals in order to investigate possible improvements of the design.

Primary authors : Prof. KORPAR, Samo (J. Stefan Institute, Ljubljana, and University of Maribor)

Co-authors :

Presenter : Prof. KORPAR, Samo (J. Stefan Institute, Ljubljana, and University of Maribor)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : , Peter Krizan

Submitted on Wednesday 30 March 2011

Last modified on : Saturday 23 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 23 April 2011 14:25
Comments : ""

Abstract ID : 117

The First G-APD Cherenkov Telescope for ground-based gamma-ray astronomy

Content :

The First G-APD Cherenkov Telescope (FACT) project aims to prove that newly developed Geiger-mode avalanche photo-diodes (G-APD) are a viable alternative to widely used vacuum photomultipliers tubes (PMT) for future Cherenkov telescopes for ground-based gamma-ray astronomy.
Compared to PMTs, G-APDs (also called SiPM or MPPC) are much more compact, need a low bias voltage, are less fragile to handle and bear the potential of higher sensitivity and lower costs. On the other hand, G-APDs are not one-to-one replacements for PMTs and there is a lack of experience of operating such novel devices, especially in the harsh environment of Cherenkov Telescopes.
Currently, March 2011, we are assembling a novel camera based on 1440 G-APDs coupled to specially designed solid light-concentrators to increase the active area and restrict the angular acceptance to just the mirror size. The data-acquisition is based on the Domino Ring Sampler chip (DRS-4 running at 2 GHz sampling frequency) and an Ethernet based readout system. The complete camera is undergoing extensive tests in the laboratory, and it is planned to install it in a refurbished HEGRA telescope at the Canary Island La Palma this summer.
In this talk I will describe the camera design, the outcome of the tests and the experience gained so far.

Primary authors : Dr. BILAND, Adrian (ETH Zurich)

Co-authors : ON BEHALF OF, The Fact Collaboration (ETH Zurich)

Presenter : Dr. BILAND, Adrian (ETH Zurich)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by :

Submitted on Wednesday 30 March 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 22 April 2011 21:59
Comments : ""

Abstract ID : 118

Radiation-Hard 3D Silicon Detectors for the HL-LHC

Content :

The luminosity upgrade of CERN's Large Hadron Collider (LHC) to the High-Luminosity-LHC (HL-LHC) will mean a massive increase in radiation levels, in particular for the tracking detectors close to the interaction point. The development of ultra-radiation hard silicon detectors, capable of withstanding particle fluences in the range of a few 10E16 Neutron-equivalent per cm2, is required for the innermost tracking layers. One promising concept for radiation-hard silicon sensors is the 3D technology, where columnar electrodes are etched deep into the silicon bulk. This technology results in a short charge collection distance, which is desirable to limit the adverse consequences of radiation-induced charge trapping, the dominating radiation damage effect at these high fluences. In addition, the 3D design significantly reduces the depletion voltage compared to planar sensor designs. We have developed 3D sensors together with several manufacturers, and will report on simulation, design and processing of the sensors. A large number of 3D sensors were studied in probe-station, lab and test-beam measurements both before and after irradiation to a range of HL-LHC fluences. These results are completed by simulation studies.
A set of different sensors, in particular 3D strip designs, have been connected to LHC readout electronics, and were then tested with an IR-laser system, with a Sr90-beta-source setup and in a beam of minimum-ionising particles at CERN. The results obtained show that 3D silicon detectors have sufficient radiation hardness for the innermost tracking layers. We also found clear evidence of charge multiplication effects in some irradiated 3D sensors. Based on dynamical simulations, we have very strong indications that the charge multiplication observed originates from avalanche multiplication in the high field regions around the columnar electrodes. The charge multiplication results in a significant increase in the charge collection efficiency. A similar effect has been observed in some planar detector designs, however, the high field occurring in the 3D design means that charge multiplication occurs already at comparatively low bias voltages around 200V, whereas significantly more than 1kV is required for multiplication to start in planar detectors.

In our presentation, we will describe and summarise the results from 3D detector measurements, and discuss the maturity of the 3D technology as well as the feasibility to use 3D sensors as inner tracking detectors in the High-Luminosity Upgrades of LHC experiments.

Primary authors : PARZEFALL, Ulrich (University of Freiburg)

Co-authors : BATES, Richard (University of Glasgow) ; PARKES, Chris (University of Glasgow) ; KOEHLER, Michael (University of Freiburg) ; PELLEGRINI, Giulio (Instituto de Microelectronica de Barcelona (CNM-IMB)) ; FLETA, Celeste (Instituto de Microelectronica de Barcelona (CNM-IMB)) ; LOZANO, Manuel (Instituto de Microelectronica de Barcelona (CNM-IMB)) ; BALBUENA, Juan Pablo (Instituto de Microelectronica de Barcelona (CNM-IMB))

Presenter : PARZEFALL, Ulrich (University of Freiburg)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : PARZEFALL, Ulrich

Submitted on Wednesday 30 March 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 08:20
Comments : "Overlap with 249, suggest one talk and one poster"

Abstract ID : 119

The WILLI-EAS detection system for air-shower muon charge ratio measurements

Content :

A new detection system performing coincidence measurements by a calorimeter (WILLI) and a small array of 12 scintillator stations has been installed in NIPNE-HH, Bucharest, Romania. The aim of the system is to investigate the muon charge ratio within extensive air-showers by using the mini-array as trigger for the time sensitive WILLI calorimeter, which is able to reconstruct the muon charge ratio by the different decay times of positive and negative muons. Such experimental studies could provide detailed information on the primary cosmic ray composition at energies around 10^15 eV. Simulation studies and first experimental tests, regarding the performances of the mini-array, as well as the sensitivity to differences in various hadronic interaction models have been performed.

Primary authors : Dr. MITRICA, Bogdan (IFIN-HH)

Co-authors : Dr. BRANCUS, Iliana (IFIN-HH) ; Ms. SAFTOIU, Alexandra (IFIN-HH) ; Mr. PETCU, Mirel (IFIN-HH) ; Prof. SIMA, Octavian (University of Bucharest) ; Prof. REBEL, Heinigerd (KIT) ; Dr. HAUNGS, Andreas (KIT) ; Mr. STANCA, Denis (IFIN-HH) ; Dr. TOMA, Gabriel (IFIN-HH)

Presenter : Dr. MITRICA, Bogdan (IFIN-HH)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : MITRICA, Bogdan

Submitted on Wednesday 30 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:29
Comments : ""

Abstract ID : 120

The development of a mobile detector for measurements of the atmospheric muon flux, using different detection techniques

Content :

A mobile muon detector has been developed to measure cosmic ray muon flux at surface and in underground at different observation levels of Romania. The detector consists of 2 scintillator plates (1 m^2 surface) operated in coincidence. The system is installed on a van car, which gives a high mobility of the detector. Measurements of muon flux at surface and in the underground of Slanic Prahova salt mine have been performed. In this salt mine an underground low - radiation level laboratory has been set-up and the measurements served as testing the underground signals to characterize the mine in comparisons to other possible underground labs. Recently, the detector has been improved by replacing the classic scintillators with new ones using optical fibres and PMTs. Some tests regarding the use of MPPC (Multi-Pixel Photon Counter) photodiodes instead PMTs has been also performed.

Primary authors : Dr. MITRICA, Bogdan (IFIN-HH)

Co-authors : Dr. BRANCUS, Iliana (IFIN-HH) ; Dr. MARGINEANU, Romul (IFIN-HH) ; Ms. SAFTOIU, Alexandra (IFIN-HH) ; Mr. PETCU, Mirel (IFIN-HH) ; Prof. SIMA, Octavian (University of Bucharest) ; Prof. REBEL, Heinigerd (KIT) ; Dr. HAUNGS, Andreas (KIT) ; Mr. STANCA, Denis (IFIN-HH) ; Dr. PETRE, Marian (IFIN-HH) ; Mrs. GOMOIU, Claudia (IFIN-HH) ; Dr. APOSTU, Ana (IFIN-HH) ; Dr. TOMA, Gabriel (IFIN-HH)

Presenter : Dr. MITRICA, Bogdan (IFIN-HH)

Track classification : Experimental Detector Systems

Contribution type : --not specified--

Submitted by : MITRICA, Bogdan

Submitted on Wednesday 30 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:31
Comments : ""

Abstract ID : 121

Overview of the PANDA experiment

Content :

PANDA is a 4π detector designed for studies of reactions induced by antiproton beams on hydrogen as well as on nuclear targets at the Facility for Antiproton and Ion Research (FAIR) at Darmstadt, Germany.

Application of high intensity, phase space cooled antiproton beams with momentum in the range 1.5 to 15 GeV/c will make it possible to conduct high precision measurements in the field of hadron and nuclear physics including the charmonium spectroscopy, search for exotic states, study of the interaction of charm hadrons with the nuclear medium and investigation of double-hypernuclei.

To obtain a good momentum resolution the detector is split into the Target Spectrometer (TS) based on a superconducting solenoid magnet surrounding the interaction region and the Forward Spectrometer (FS) using a large gap dipole magnet for momentum analysis of the forward-going particles.
The interaction point is surrounded by a micro vertex detector optimized for registration of secondary vertices from D and hyperon decays.
For tracking of charged particles in the TS, either a straw tube tracker or a time projection chamber will be used. In the forward direction, it will be supplemented with planar GEM stations and straw tube tracking stations.
Particle identification for charged hadrons (p, pi±, K±) will be accomplished with barrel and disc DIRC detectors covering higher momenta and with a time-of-flight system at lower momenta. For muon identification the magnet yoke in the TS will be instrumented with muon counters and in the FS a muon range system is foreseen.
Energies of electrons and gammas will be measured with a PbWO4 barrel calorimeter in the TS and with a shashlyk calorimeter in the FS.
Due to a high pbar-p interaction rate of 2x10^7 1/s on one side, and diversity of investigated reactions on the other side, a high efficiency and flexibility in the online event selection is required. For this, we plan to use self-triggering detector readout and event selection in programmable electronics and in compute nodes.
In this contribution an overview of the PANDA design and the status of the ongoing detector development is presented.

Primary authors : SMYRSKI, Jerzy (Jagiellonian University)

Co-authors :

Presenter : SMYRSKI, Jerzy (Jagiellonian University)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : SMYRSKI, Jerzy

Submitted on Wednesday 30 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)

Judged by : CATTAI, Ariella
Date : 21 April 2011 22:32
Comments : ""

Abstract ID : 122

Performance of LHCb Silicon Tracker detector in the LHC

Content :

The LHCb experiment is designed to perform
high-precision measurements of CP violation and search for New Physics
using the enormous flux of beauty and charmed hadrons produced at the LHC.
The LHCb detector is a single-arm spectrometer with excellent tracking
and particle identification capabilities. The Silicon Tracker is part of the tracking system and
measures very precisely the particle trajectories coming from the interaction point in the region
of high occupancies around the beam axis. The LHCb Silicon Tracker covers a total sensitive area of about
12 m^2 using silicon micro-strip technology.
This paper reports on the operation and performance of the Silicon Tracker during the Physics data taking at the LHC.

Primary authors : Dr. GALLAS TORREIRA, Abraham Antonio (University of Santiago de Compostela, IGFAE) ; Dr. TOBIN, Mark (University of Zurich)

Co-authors :

Presenter : Dr. TOBIN, Mark (University of Zurich)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : Dr. GALLAS TORREIRA, Abraham Antonio

Submitted on Wednesday 30 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 09:29
Comments : ""

Abstract ID : 123

Alignment of the Muon Spectrometer in ATLAS

Content :

The ATLAS Muon Spectrometer is designed to measure the momentum of a 1 TeV/c muon to an accuracy of 10%. A muon of this momentum will bend less than 500 microns in the toroidal field of ATLAS; therefore, the position of the muon chambers must be known to an accuracy of less than 50 microns. ATLAS uses a combination of two methods in order to achieve such a precise alignment: an optical system and alignment with tracks. There are several analyses ongoing to monitor and validate the alignment which have been quite successful in the first year of LHC operation. This talk will provide a brief overview of the motivation, the building and commissioning of the optical system, the performance, and the validation of the alignment of the Muon Spectrometer.

Primary authors : AEFSKY, Scott Alan (Department of Physics-Brandeis University-Unknown)

Co-authors :

Presenter : AEFSKY, Scott Alan (Department of Physics-Brandeis University-Unknown)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : AEFSKY, Scott Alan

Submitted on Wednesday 30 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Submitted on behalf of the ATLAS Muon Collaboration

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:33
Comments : "short contribution"

Abstract ID : 124

The DIRC Detectors of the PANDA Experiment at FAIR

Content :

The PANDA experiment at FAIR will address fundamental questions of the strong force, explore the structure of the nucleon, investigate Charmonium states, and search for new forms of matter using cooled antiproton beams of unprecedented intensities in the momentum range of 1-15 GeV/c.
Particle identification (PID) will play a crucial role in reaching the physics goals.
The charged PID in the barrel and endcap regions needs thin detectors operating in a strong magnetic field, capable of pion-kaon separation with more than three standard deviations up to 4 GeV/c momentum.
Ring Imaging Cherenkov detectors using the DIRC (Detection of Internally Reflected Cherenkov light) principle are an excellent match to those requirements.
The PANDA experiment will therefore contain two DIRC detectors: the Barrel DIRC, based on the design of the BaBar DIRC with many important improvements, covers the polar angle range from 22 deg to 140 deg, and the Disk DIRC, for polar angles between 5 deg and 22 deg, combines several novel techniques.
Challenges include the design of focusing optics, mitigation of the chromatic dispersion in the fused silica radiator, and selection of sensors capable of single photon detection with better than 100 ps resolution in a 1-1.5 T field at hit rates of up to 2 MHz/cm^2.
We present details of the design of the PANDA DIRC detectors and discuss the performance of barrel and disk DIRC prototypes in particle test beams.

Primary authors : Dr. SCHWIENING, Jochen (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Co-authors :

Presenter : Dr. SCHWIENING, Jochen (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Track classification : Particle Identification

Contribution type : Oral Presentation

Submitted by : SCHWIENING, Joachim

Submitted on Wednesday 30 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

The presentation is on behalf of the PANDA-Cherenkov group.

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : Toru Iijima
Date : 27 April 2011 12:58
Comments : ""

Abstract ID : 125

A global R program on liquid Ar Time Projection Chambers under execution at the University of Bern

Content :

A comprehensive R program on LAr Time Projection Chambers (LAr TPC) is presently being carried on at the University of Bern. Many aspects of the technology are under investigation: HV, purity, calibration, readout, etc.
Furthermore, multi-photon interaction of UV-laser beams with LAr has been successfully addressed bringing to new results.
Possible applications of the LAr TPC technology in the field of homeland security are also being studied.
In the talk we will review the main aspects of our program and the achievements. Emphasis will be given to the largest device in Bern, i.e. the 5 m long ARGONTUBE TPC, meant to prove the feasibility of very long drift in view of future large scale applications of the technique.

Primary authors : MESSINA, Marcello (University of Bern)

Co-authors :

Presenter : MESSINA, Marcello (University of Bern)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : MESSINA, Marcello

Submitted on Wednesday 30 March 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:45
Comments : ""

Abstract ID : 126

Single ion detection for an ultra-sensitive neutrino-less double beta decay search with the Enriched Xenon Observatory

Content :

The next generation neutrino-less double beta decay experiments aim to probe Majorana neutrino masses at or below 10 meV. To reach this sensitivity ton-scale detectors are needed with even lower residual radioactive backgrounds than the best ones operating today or planned for the near future. The Enriched Xenon Observatory (EXO) collaboration is developing a novel strategy for a virtually background-free search for neutrino-less double beta decay of xenon-136. EXO plans to detect individual barium-136 ions resulting from such decays combining optical spectroscopy and ion physics techniques with rare event detector technologies. If proven possible with high efficiency, single ion identification would allow one to eliminate all non-barium producing backgrounds which are the limiting factor for current and planned experiments. The EXO collaboration is actively pursuing barium-tagging strategies for both liquid and gaseous xenon detectors. The progress of such research will be presented and the prospects towards a ton-scale EXO experiment discussed.

Primary authors : Prof. POCAR, Andrea (University of Massachusetts, Amherst)

Co-authors :

Presenter : Prof. POCAR, Andrea (University of Massachusetts, Amherst)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : POCAR, Andrea

Submitted on Wednesday 30 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

My name is provided as a place holder. The EXO collaboration will appoint a speaker and communicate it to the conference organizers.

Best Regards,
Andrea Pocar

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:34
Comments : ""

Abstract ID : 127

R Effort for Plastic Scintillator Based Cosmic Ray Veto System for the Mu2e Experiment

Content :

The proposed Mu2e experiment aims to search for neutrinoless muon to electron conversion with a sensitivity four orders of magnitude better than previous experiments. To achieve this goal, Mu2e needs to obtain a cosmic ray veto efficiency of better than 99.9%. Here we report the preliminary results of recent R efforts for a three-layer plastic scintillator veto system. The results are obtained from the studies of a PMT-based prototype module and single scintillator counter read out by SiPMs.

Primary authors : Dr. OKSUZIAN, Yuri (University of Virginia)

Co-authors :

Presenter : Dr. OKSUZIAN, Yuri (University of Virginia)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : OKSUZIAN, Iuri

Submitted on Wednesday 30 March 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:46
Comments : ""

Abstract ID : 128

Detector technologies for Askaryan radio-pulse neutrino detectors

Content :

The ARA (Askaryan Radio Array) experiment at the South Pole utilizes a variety of technologies new to neutrino physics. Development efforts in broadband antennas, low-noise amplifiers, RF over fiber, pattern recognition triggers, low-power digitizers, and low-temperature capable electronics are ongoing. We report on the direct science impacts of the hardware developments.

Primary authors : DUVERNOIS, Michael (University of Wisconsin)

Co-authors :

Presenter : DUVERNOIS, Michael (University of Wisconsin)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : DUVERNOIS, Michael

Submitted on Wednesday 30 March 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:46
Comments : ""

Abstract ID : 129

Abalone: New concept for low-cost production photon detector

Content :

Photomultiplier tubes offer large photon collection areas and moderate quantum efficiency, but are expensive and hand-crafted items. We present design and initial prototyping work on an alternative technology with an eye towards production logistics. The Abalone design utilizes a custom photocathode and vacuum seal along with a scintillator for photon gain and a Geiger-mode avalanche photodiode readout.

Primary authors : DUVERNOIS, Michael (University of Wisconsin)

Co-authors : FERENC, Daniel (University of California, Davis) ; MONTARULI, Teresa (University of Wisconsin, Madison) ; LORENZ, Eckart (Max Planck) ; BAUDIS, Laura (UZH) ; BRESKIN, Amos (Weizmann)

Presenter : DUVERNOIS, Michael (University of Wisconsin)

Track classification : Photon Detectors

Contribution type : Poster Presentation

Submitted by : DUVERNOIS, Michael

Submitted on Wednesday 30 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:09
Comments : ""

Abstract ID : 130

New Approach to Nuclear Binding Energy in Integrated Nuclear Model

Content :

In this paper, the integrated nuclear model is introduced and a binding energy formula based on this model is presented. The binding energies of most nuclides in this model are compared with available experimental values and also with values from liquid drop model (LDM).

Primary authors : Prof. GHAHRAMANY, Nader (Shiraz university)

Co-authors :

Presenter : Prof. GHAHRAMANY, Nader (Shiraz university)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : --not specified--

Submitted by : LIU, Tiehui Ted

Submitted on Wednesday 30 March 2011

Last modified on : Wednesday 30 March 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 131

Deeper Sampling CMOS Transient Waveform Recording ASICs

Content :

Many applications in collider detector readout and particle astrophysics have adopted CMOS Switched Capacitor Array (SCA), Giga-sample/second transient waveform recording as a means to provide low-cost, highly integrated detector readout. In order to maintain high (100's of MHz) analog bandwidth, these SCAs have typically been limited to less than or equal to a thousand storage cells. However, for applications requiring many microseconds to form a detector trigger, or cases where the physical transit time of a signal across the detector array at the speed of light is 10's or even 100's or microseconds, an alternative is needed. In the BLAB3 and IRS ASIC architectures, a so-called 2-stage transfer mechanism has been adopted. This technique provides a small "sampling" array on the front-end of the ASIC, and buffered signals are then transferred to a much larger analog "storage" array. By this means ~1M storage cells can be accommodated in a standard 0.25um CMOS process, the maximum being set by reticle limits on die size. Two generations of ASICs both with and without input amplifiers have been fabricated and evaluated and the results will be presented.

Primary authors : Prof. VARNER, Gary (University of Hawaii)

Co-authors : Dr. NISHIMURA, Kurtis (University of Hawaii) ; Mr. ANDREW, Matthew (University of Hawaii)

Presenter : Prof. VARNER, Gary (University of Hawaii)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : VARNER, Gary

Submitted on Thursday 31 March 2011

Last modified on : Thursday 21 April 2011

Comments :

On behalf of the Belle-II Particle Identification Detector and Askaryan Radio Array groups.

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:01

Comments : "20 min"

Abstract ID : 132

The Data Acquisition System for the K0TO Detector

Content :

The goal of K0TO experiment at J-Parc is to discover and measure the rate of the rare decay of the neutral KL into a neutral pion, a neutrino and an antineutrino, for which the Standard Model predicts a branching ratio of (2.8+/-0.4)x10E-11.
The experiment is a follow-up to E391 at KEK with a completely redesigned beamline, a new Cesium Iodide calorimeter with increased granularity and reduced shower leakage, and a new readout electronics, trigger and data acquisition system.
The physics requirements are for a pipelined readout and trigger electronics with no deadtime, 14-bit dynamic range on the energy measurement and time resolution of 1 nsec. These requirements are accomplished via a frontend 125 MHz FADC board and a two-tiered trigger electronics.
The FADC board injects the analog differential inputs from up to 16 channels into a 10-pole Gaussian/Bessel low pass filter before digitization. The digitized shaped pulses are stored inside a 4 usec deep
pipeline while awaiting for the trigger decision. A first level trigger compares the time aligned energy sum over the whole calorimeter to a programmable threshold. Upon a first level trigger decision, the data are buffered to a second level trigger which can implement clustering and shape fitting for further trigger rate reduction. The communication between the FADC board and each of the trigger boards is done via 2.5 GBPS optical link. Data accepted by the second level trigger board is read out
via a front panel 1Gb Ethernet port into a 40-node computer cluster through a 48-port network switch using UDP protocol.
The 8 nsec system clock is generated by a Master Control module which supervises the integration of frontend, trigger, readout and external accelerator signals. Control signals are distributed to the whole K0TO data acquisition system either via the VME backplane or a custom-designed Fanout boards.
The pulse shaping circuit on the 125 MHz FADC board is optimized depending on whether it receives analog signals from the about 3000 channel of CsI calorimeter or from the roughly 1000 channels of upstream, downstream and beam hole veto detectors. The harsh background conditions for
some of the veto detector have required the development of a 4-channel 500 MHz version of the FADC board. The trigger electronics for these vetoes detectors, aiming at integrating the timing of the veto signals with the calorimeter energy sum, is under design.
The first K0TO physics run is planned for Spring 2012.

Primary authors : TECCHIO, Monica (University of Michigan)

Co-authors : CAMPBELL, Myron (University of Michigan) ; LI, Shumin (University of Michigan) ; HARABEDIAN, Craig (University of Michigan) ; AMEEL, Jon (University of Michigan) ; MA, Jiasen (University of Chicago) ; WAH, Yau (University of Chicago) ; BOGDAN, Mircea (University of Chicago) ; COMFORT, Joe (Arizona State University) ; MCFARLAND, Duncan (Arizona State University) ; STEINMANN, Angela (Stetson University)

Presenter : TECCHIO, Monica (University of Michigan)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : TECCHIO, Monica

Submitted on Thursday 31 March 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:31
Comments : ""

Abstract ID : 133

Development of Superconducting Tunnel Junction Photon Detector using Hafnium

Content :

We present the development of a Superconducting Tunnel Junction (STJ) detector using Hafnium (Hf) as a photon detector which was designed to search for radiative decay of cosmic background neutrinos. The photon energy spectrum from neutrino radiative decay has a sharp edge at high energy end. To detect this sharp edge, we need a micro-calorimeter of infrared photons with high energy resolution. We have optimized the condition of producing a Hf-STJ detector and observed that a Hf-STJ detector had Josephson current which disappeared by applying a magnetic field.

Primary authors : Prof. KIM, Shin-hong (University of Tsukuba)

Co-authors : Dr. TAKEUCHI, Yuji (University of Tsukuba) ; Mr. TAKEMASA, Ken-ichi (University of Tsukuba) ; Mr. KIUCHI, Kenji (University of Tsukuba) ; Mr. ONJO, Takashi (University of Tsukuba) ; Mr. JEONG, Hyun-sang (University of Tsukuba) ; Mr. KANAI, Shinya (University of Tsukuba) ; Prof. HAZUMI, Masashi (KEK IPNS) ; Prof. IKEDA, Hirokazu (JAXA ISAS)

Presenter : Prof. KIM, Shin-hong (University of Tsukuba)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : KIM, Shin Hong

Submitted on Thursday 31 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:45
Comments : ""

Abstract ID : 134

Instrumentation and calibration of the Super-Kamiokande detector

Content :

The Super-Kamiokande detector is a large imaging water Cherenkov detector with 50 kilotons of pure water viewed by 11,129 20-inch PMT.

Since the observation start in April 1996, Super-Kamiokande has accumulated atmospheric and solar neutrino data to study neutrino oscillations and to search for proton decay and neutrinos from supernovae. Super-Kamiokande has been also used as a far detector of long-baseline experiments K2K and T2K.

To keep the high quality of wide energy range (MeV - TeV) data, intensive detector calibration work has been performed using various calibration sources.
Cosmic-ray muons and their decay electrons are used to calibrate detector energy-scale and to monitor water transparency.
Nitrogen and solid-state lasers are used to calibrate timing response, to monitor light scattering in water and to estimate DAQ availability in the case of a high event rate when nearby supernova occurred.
Xenon lamp and LED are used to monitor stability of PMT gain.
Ni-Cf gamma ray source, D-T neutron source and an electron LINAC are used to calibrate quantum efficiency of PMT and to calibrate energy reconstruction on low energy neutrino.

Instrumentation and performance of the detector and its calibration will be presented. Future prospect of further calibration methods and their application for next generation detector Hyper-Kamiokande will be discussed as well.

Primary authors : Dr. OBAYASHI, Yoshihisa (Kamioka Observatory, ICRR, Univ. of Tokyo)

Co-authors :

Presenter : Dr. OBAYASHI, Yoshihisa (Kamioka Observatory, ICRR, Univ. of Tokyo)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : OBAYASHI, Yoshihisa

Submitted on Thursday 31 March 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:47
Comments : ""

Abstract ID : 135

NA62 spectrometer: a low mass straw tracker

Content :

The NA62 experiment at CERN, aiming at a precision measurement of the ultra-rare decay K+ -> pi+ nu nubar, relies on kinematical rejection up to 10^5 (~10^10 is needed in total). One of the limiting factors to achieve this goal is the multiple scattering in the magnetic spectrometer for kaon decay products; therefore an almost massless (~1.5% X0) straw tracker has been designed to operate in vacuum, to be able to install it inside the decay volume. A vacuum tight prototype was built and tested in 2010: efficiency (~99%), rate capability and single straw resolution (~200um) were verified. The construction of the first chamber started in 2011.

Primary authors : SERGI, Antonino (CERN)

Co-authors :

Presenter : SERGI, Antonino (CERN)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : SERGI, Antonino

Submitted on Thursday 31 March 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 27 April 2011 12:46
Comments : ""

Abstract ID : 136

Introduction of PANDA Data Acquisition System

Content :

PANDA is a general purpose hadron spectrum to be installed in the high energy storage ring of the Future Anti-proton and Ion Research facility-FAIR, in Germany. It employs the high quality cooled anti-proton beam to hit fixed target to do research on strong interaction, weak interaction, exotic states of matter, hadron structure and so on. Due to the rich physics studies with different event selection criteria and very high interaction rate of 2x10^7 /s and data rates of 200 GB/s and more, a hardware-trigger-less data acquisition system with high performance has been proposed.

The data from various sub-detector systems are tagged by a very precise timestamp in Front-end electronics. Event selection based on real time feature extraction, filtering and high level correlations will be executed on ATCA compliant FPGA-based Compute Nodes (CN) in two stages: At the first stage, the dedicated sub-detector information will be processed in the sub module. Some online feature extraction algorithms will be employed to extract particle information like energy, position, momentum and so on. Some kind of particle identification will be done for charged particles. The results from the first stage will be combined together in the second stage to make a preliminary reconstruction for physics events. Then the event selection will be done based on the research topics of PANDA experiment and the result will be sent to the offline PC farm for further processing.

Each CN features 5 Xilinx Virtex-4 FX60 FPGA chips and up to 10 GBytes DDR2 memory. 3Gbps bandwidth per channel and total of 50Gbps connectivity is provided by 8 front panel optical and 13 backplane electrical links using RocketIO ports. Five Gbit Ethernet links are provided for output transmission.

A prototype system on EMC online shower reconstruction has been designed. Some test results from this prototype system will be reported.

Primary authors : Dr. XU, Hao (IHEP,Beijing)

Co-authors : Prof. LIU, Zhen-an (IHEP,Beijing) ; Mr. WANG, Qiang (IHEP,Beijing) ; Prof. KUEHN, Wolfgang (Giessen University) ; Dr. LANGE, Soeren (Giessen University) ; Mr. MING, Liu (Giessen University)

Presenter : Dr. XU, Hao (IHEP,Beijing)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : XU, Hao

Submitted on Thursday 31 March 2011

Last modified on : Friday 22 April 2011

Comments :
For the PANDA Collaboration

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:31
Comments : ""

Abstract ID : 137

Front-end electronics and triggering at the Auger Engineering Radio Array

Content :

Detection of ultra high energy cosmic rays, generating an air shower in the atmosphere of the Earth, is usually performed through the detection of secondary particles at the surface or through the detection of the fluorescence light generated in the sky. The latter has the advantage of providing a longitudinal profile of the shower development, and the disadvantage of a limited uptime of only about 10%.
It is possible to detect the electromagnetic signals of air showers in the MHz regime using relatively cheap detectors. In principle, also this technique provides information on the shower
development through the measured frequency dependence of the signal, and therefore this technique holds the potential to provide high-precision data required to determine airshower parameters. In order to fully utilize this technique technical steps need to be
made: e.g., the discrimination against man-made or atmospheric transient noise. In the Auger Engineering Radio Array (AERA) we perform the R for radio detection taking advantage of the other enhancements of the Pierre Auger Observatory AMIGA and HEAT. We focus on the development of low-noise, low-power digitizers with selftriggering capabilities while a higher level trigger is based on the arrival times of the radio signals at each detector station. The current status and future development of AERA will be described.

Primary authors : Dr. TIMMERMANS, Charles (Nikhef/Radboud University Nijmegen)

Co-authors : AUGER COLLABORATION, Pierre (Observatorio Pierre Auger)

Presenter : Dr. TIMMERMANS, Charles (Nikhef/Radboud University Nijmegen)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : TIMMERMANS, Charles

Submitted on Thursday 31 March 2011

Last modified on : Friday 22 April 2011

Comments :

Dear organizers,

I added the Pierre Auger observatory as a ground based telescope, however I could easily see this presentation fit in some of the other sessions.

I would like to present on behalf of the Pierre Auger collaboration, which I added as a co-author instead of adding a few hundred names

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito

Date : 22 April 2011 21:59
Comments : ""

Abstract ID : 138

The design of the electronics system for small array GEM

Content :

Because of the advantage of GEM(Gas Electron Multiplier), such as high count rate, good time resolution, good position resolution, and adjustable of gain, this kind of detector have been used in many experiments of physics.
In this presentation, the R of the readout electronics system for a GEM with 30x30 pads will be introduced. To reduce complexity, the work of acquiring signals is done in the ASIC of capacitor-switch array and ADC. And all the calculation for the position is finished in one single FPGA.
Another point is the connection between the electronics and the detector. For the mass pad readout system, it is full of challenge. For our system, it is the difficult part of all.

Primary authors : Dr. JIANG, Xiaoshan (IHEP)

Co-authors :

Presenter : Dr. JIANG, Xiaoshan (IHEP)

Track classification : Front-end Electronics

Contribution type : Poster Presentation

Submitted by :

Submitted on Thursday 31 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Poster Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:01
Comments : ""

Abstract ID : 139

CAST micromegas background in the Canfranc Underground Laboratory

Content :

The micromegas group working for CAST is devoting a substantial effort towards a deep understanding of the very low background levels observed in the detectors installed in the experiment which, since the implementation of shielding and the introduction of the microbulk technology, are as low as to ~5×10-6 keV-1s-1cm-2 in the axion energy range. A replica of the CAST set-up has been dedicated to background studies and is currently installed in the Canfranc Underground Laboratory under 2500 m.w.e. in the Spanish Pyrenees. The suppression of cosmic rays allows to upgrade the shielding and learn about the nature of CAST detectors background. The obtaining of a first upper limit <2×10-7 keV-1s-1cm-2 for the intrinsic background of the detector itself will be discussed. This study is also interesting for the application of microbulk micromegas detectors for other Rare Events scenarios different than CAST.

Primary authors : TOMAS ALQUEZAR, Alfredo (Facultad de Ciencias-Universidad de Zaragoza)

Co-authors :

Presenter : TOMAS ALQUEZAR, Alfredo (Facultad de Ciencias-Universidad de Zaragoza)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : TOMAS ALQUEZAR, Alfredo

Submitted on Thursday 31 March 2011

Last modified on : Tuesday 05 April 2011

Comments :

On behalf of CAST micromegas people.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 05 April 2011 05:44
Comments : ""

Abstract ID : 140

MCP-PMT development for Belle-II TOP counter

Content :

We present recent R results for a multiple-anode MCP-PMT being developed for the Belle-II Time Of Propagation (TOP) counter. This detector is a hybrid cherenkov ring imaging and timing detector for particle identification in the barrel region of the upgraded detector. The Belle-II experiment will operate at high event rates and needs to withstand the correspondingly high background environment. MCP-PMTs have demonstrated excellent single photon timing resolution. However, the lifetime of photocathode is a known issue. Recently, we successfully improved the lifetime of a 25mm square-shape MCP-PMT by a factor of ~10, which is adequate for estimates of the nominal Belle-II background rates in the TOP counter. We have also developed a new MCP-PMT with Hamamatsu that adopts a super-bialkali photocathode. Currently a peak quantum efficiency of 28% for 400nm photons has been achieved.

Primary authors : Dr. INAMI, Kenji (Nagoya university)

Co-authors :

Presenter : Dr. INAMI, Kenji (Nagoya university)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : INAMI, Kenji

Submitted on Thursday 31 March 2011

Last modified on : Friday 29 April 2011

Comments :
on behalf of Belle-II PID group

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:46
Comments : ""

Abstract ID : 142

Measurements of the Time Structure of Hadronic Showers in a Scintillator-Tungsten HCAL

Content :

For calorimeter applications requiring precise time stamping, the time structure of hadronic showers in the detector is a crucial issue. This applies in particular to detector concepts for CLIC, where a hadronic calorimeter with tungsten absorbers is being considered to achieve a high level of shower containment while satisfying strict space constraints. The high hadronic background from gamma gamma to hadron processes at CLIC, together with the bunch crossing frequency of 2 GHz requires good time stamping in the detectors. To provide first measurements of the time structure in a highly granular scintillator-tungsten calorimeter, T3B, a dedicated timing experiment, was installed behind the last layer of the CALICE WHCAL prototype, a 30 layer tungsten scintillator calorimeter. T3B consists of 15 small scintillator cells with silicon photomultiplier, read out with fast digitizers over 2.4 us, and provides detailed measurements of the time structure of the signal. The offline data reconstruction performs an automatic gain calibration using noise events recorded between physics triggers and allows the determination of the arrival time of each photon at the photon sensor.
We will discuss the T3B setup, its calibration and data reconstruction, and will report first results of the time structure of the calorimeter response for 10 GeV pions recorded at the CERN PS, confronted with GEANT4 simulations using several physics lists.

Primary authors : Dr. SIMON, Frank (Max-Planck-Institute for Physics, Munich, Germany) ; SOLDNER, Christian (Max-Planck-Institute for Physics, Munich, Germany) ; WEUSTE, Lars (Max-Planck-Institute for Physics, Munich, Germany)

Co-authors :

Presenter : Dr. SIMON, Frank (Max-Planck-Institute for Physics, Munich, Germany)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : Dr. SIMON, Frank

Submitted on Thursday 31 March 2011

Last modified on : Monday 04 April 2011

Comments :

Presentation for the CALICE Collaboration.

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:01
Comments : "New development"

Abstract ID : 143

PMT Light Collection Enhancement for LBNE

Content :

A large (100-300 kton) water Cerenkov detector is one of the technologies under consideration for the far detector of the Long Baseline Neutrino Experiment (LBNE). The significant cost of instrumenting the large detector with photomultiplier tubes restricts the number of PMTs that can be used and hence methods for improving the effective light collection efficiencies of the PMTs are being considered. The three light collection technologies currently under study, wavelength-shifting coatings, reflective cones, and wavelength-shifting plates, will be discussed. Design, simulation, and testing of the devices, as well as potential effects on the experiment physics sensitivity, will be covered.

Primary authors : Prof. BUCHANAN, Norm (Colorado State University)

Co-authors :

Presenter : Prof. BUCHANAN, Norm (Colorado State University)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : BUCHANAN, Norm

Submitted on Thursday 31 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:46
Comments : ""

Abstract ID : 144

A Versatile Link for high-speed, radiation resistant optical transmission in LHC upgrades

Content :

The Versatile Link project is launched to develop a physical layer general purpose optical link with high bandwidth; radiation and magnetic resistance that meets the requirements of LHC upgrade experiments. This paper will present the latest results on system specifications, front-end transceiver prototypes, passive components studies and commercial back-end transceiver tests.

System optical power budgets are specified for single mode (1310nm) and multi-mode (850nm) operations, with target data rate of ~5Gbps and length of 150 meters. Noise and interference penalties are simulated using 10GbE link model and verified by bit error rate measurement on reference links. The available powers are specially constrained by radiation degradation of the front-end receivers. We will report the power budgets for all link variants where at least 1.8 dB safety margins are maintained.

Versatile Transceiver (VTRx), the front-end module to be installed on-detector, is based on commercial small form pluggable (SFP+) package, modified to optimize size and mass, assembled to host qualified laser, PIN diode, special designed driver and amplifier. A set of VTRxs with validated components are prototyped. Lab test results will be presented.

We will also present the radiation test results on front-end components and passive components. The total fluence tests for lasers and PINs are characterized up to 4 x 1015/cm2. SEU tests are performed on PINs and receiver subassembly. Special ASIC is immune to long burst errors and forward error coding is an effective way to suppress short burst errors. Radiation induced absorption in a number of single mode and multi-mode fibers, at -25°C and up to 500 kGy, are measured. High performance candidates are identified.

Commercial off-of-the-shelf parts are examined as back-end transceivers. Compliant tests on 10Gbps SFP+, 4x4 parallel optical engines and 6.25Gbps SNAP 12 transmitter/receivers will be reported.

Primary authors : Dr. XIANG, Annie (Southern Methodist University)

Co-authors : Dr. VASEY, Francois (CERN) ; Dr. TROSKA, Jan (CERN) ; Mr. CHRAMOWICZ, John (FNAL) ; Mr. PROSSER, Alan (FNAL) ; Dr. HUFFMAN, Todd (Oxford University) ; Dr. WEIDBERG, Anthony (Oxford University) ; Dr. GONG, Datao (Southern Methodist University) ; Mr. LIU, Chonghan (Southern Methodist University) ; Dr. LIU, Tiankuan (Southern Methodist University) ; Prof. YE, Jingbo (Southern Methodist University)

Presenter : Dr. XIANG, Annie (Southern Methodist University)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : LIU, Tiankuan

Submitted on Thursday 31 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:02
Comments : "30 min"

Abstract ID : 145

Design and verification of an FPGA based bit error rate tester

Content :

Bit error rate (BER) is a principle measure of data transmission link performance. With the integration of high-speed SERDES inside an FPGA, the embedded solution provides a cheaper alternative to dedicated table top equipment and offers the flexibility of test customization and data analysis. This paper presents a BER tester implementation in the Altera Stratix GX/GT signal integrity development kits. Architecture of the tester is described. Lab test results and field test data analysis are discussed.

The Stratix II GX tester operates up to 6.5 Gbps and the Stratix IV GT tester operates up to 10Gbps, both in 4 duplex channels. The tester deploys a pseudo random bit sequence (PRBS) generator and detector, a transceiver controller, an error FIFO logger and also includes a computer interface for data acquisition and user access. The tester's functionality is validated and performance is characterized in an optical transmission link setup. BER vs. receiver sensitivity is measured to emulate stressed conditions. The Stratix II GX tester is also used in a proton test on custom serializer chips. Both bit flip and bit shift type of errors are recorded and analyzed.

Primary authors : Dr. XIANG, Annie (Southern Methodist University)

Co-authors : Ms. CAO, Tingting (Southern Methodist University) ; Dr. GONG, Datao (Southern Methodist University) ; Mr. LIU, Chonghan (Southern Methodist University) ; Dr. LIU, Tiankuan (Southern Methodist University) ; Prof. YE, Jingbo (Southern Methodist University) ; Dr. HOU, Suen (Institute of Physics, Academia Sinica) ; Dr. TENG, Ping-kun (Institute of Physics, Academia Sinica) ; Mr. SU, Da-shung (Institute of Physics, Academia Sinica)

Presenter : Dr. XIANG, Annie (Southern Methodist University)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : LIU, Tiankuan

Submitted on Thursday 31 March 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:02
Comments : "20 min"

Abstract ID : 146

The Electromagnetic Calorimeter of T2K's Near Detector

Content :

The Near Detector (ND280) of the T2K experiment is instrumented with an almost hermetic segmented Pb-scintillator electromagnetic calorimeter (ECAL), the main purpose of which is the measurement of photons, electrons and other particles escaping the inner detectors. Light produced in scintillator bars is collected by wavelength-shifting fibers and converted into electronic pulses by multi-pixel photon counters (MPPCs). We present here details of the ECAL's design and performance since the beginning of operations at the end of 2009.

Primary authors : Dr. SACCO, Roberto (Queen Mary (QM)-University of London)

Co-authors :

Presenter : Dr. SACCO, Roberto (Queen Mary (QM)-University of London)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : SACCO, Roberto

Submitted on Thursday 31 March 2011

Last modified on : Monday 04 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:02
Comments : "Running experiment, at least before the earthquake"

Abstract ID : 147

The LHCb VELO Upgrade

Content :

With the start-up of the LHC the LHCb experiment has successfully launched its programme towards its goals of discovery and precision measurements in the flavour physics sector. Nominal luminosity running for LHCb was already reached at the end of 2010, and the first phase of this programme is expected to be completed within 5 years of data taking. After this there is an opportunity for LHCb to increase its data taking abilities by an order of magnitude, by running at an increased luminosity and with a more efficient trigger. This upgrade strategy runs independently, but is compatible with, the planned LHC luminosity increases. The performance enhancement will be achieved by modifying the electronics architecture to be able to readout the entire detector at 40 MHz and perform all trigger algorithms in software. One of the implications of this scheme is the need to completely replace the silicon vertex detector of LHCb, or VELO, with new silicon modules with an upgraded ASIC. In addition the new detector must be more radiation hard and more segmented in order to cope with the increased particle flux. As one option a new readout ASIC is being developed, dubbed VELOPix, which is based on the Timepix/Medipix family of chips. We describe the R steps which are currently in place to develop the new chip and the associated upgraded pixel vertex detector. In order to investigate the performance of the sensor and module prototypes, a particle tracking telescope based on the current Timepix chip has been developed. Using the telescope a best resolution for angled tracks of 4 micron was measured with a planar sensor hybrid Timepix device. The performance of this telescope and results from the devices tested will be shown.

Primary authors : Dr. PARKES, Chris (CERN)

Co-authors :

Presenter : Dr. PARKES, Chris (CERN)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : COLLINS, Paula

Submitted on Thursday 31 March 2011

Last modified on : Friday 29 April 2011

Comments :

The submitter of this abstract is not the presenter: if the talk is awarded an excellent candidate will be chosen.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 10:49
Comments : ""

Abstract ID : 148

Operational experience and aging studies of the CDF Run II Silicon Vertex Detector

Content :

The Collider Detector at Fermilab (CDF) pursues a broad physics program at Fermilab's Tevatron proton-antiproton collider. Since its commissioning in early 2001 the CDF Run II detector delivered about 10 fb^{-1} of integrated luminosity of data. CDF has installed 8 layers of silicon microstrip detectors. In this talk will be described the operational challenge encountered over the past 10 years and present detailed detector performance results with emphasis on radiation damage of the silicon sensors.

Primary authors : Dr. DI RUZZA, Benedetto (Fermilab)

Co-authors :

Presenter : Dr. DI RUZZA, Benedetto (Fermilab)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : DI RUZZA, Benedetto

Submitted on Thursday 31 March 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 08:32
Comments : ""

Abstract ID : 149

Design of Punch-Through Protection of Silicon Microstrip Detector against Beam Splash

Content :

For a silicon microstrip detector to be operated in high intensity accelerator experiments, sensor protection against possible beam splash needs to be investigated. We describe a protection based on punch-through mechanism for the p-bulk sensor that is being designed for the Super Large Hadron Collider experiment.

One of the design issues is the p-stop or p-spray required for p-bulk sensors that work as a punch-through blocker. Also a field-plate is important to control the potential where the punch-through occurs.

The effectiveness of the protection was evaluated by injecting high intesity pulsed laser to mimic the splash. The transient signal shapes provide the durability requirements of the readout amplifier and of the AC coupling insulator of the sensor. The results will be reported for the sensors irradiated up to 10<15> cm<-2>.

Primary authors : HARA, Kazuhiko (IPAS, University of Tsukuba)

Co-authors : HAMASAKI, Natsumi (IPAS, University of Tsukuba) ; TAKAHASHI, Yu (IPAS, University of Tsukuba) ; IKEGAMI, Yoichi (IPNS. KEK) ; TAKUBO, Yosuke (IPNS. KEK) ; TERADA, Susumu (IPNS. KEK) ; UNNO, Yoshinobu (IPNS. KEK) ; MISTUI, Shingo (Sokendai)

Presenter : HARA, Kazuhiko (IPAS, University of Tsukuba)

Track classification : Semiconductor Detectors

Contribution type : Poster Presentation

Submitted by : HARA, Kazuhiko

Submitted on Friday 01 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:16
Comments : ""

Abstract ID : 150

Development of gaseous photomutipliers with Micro Pattern Gas Detectors

Content :

In the last few years, considerable effort has been devoted to the development of gaseous photomultiplier tubes (PMTs) with micro-pattern gas detectors (MPGD) which are sensitive to visible light. The potential advantage of such a gaseous PMT is that it can achieve a very large effective area with moderate position and timing resolutions. Besides it can be easily operated under a very high magnetic field (~1.5 Tesla).
Since photon and ion feedbacks cause faster degradation for the bi-alkali photocathode, the maximum achievable gain might be limited at a level 100. Several recent developments, however, have successfully achieved a long term high sensitivity for a photon detection by using hole-type MPGDs such as a gas electron multiplier (GEM) and a glass capillary plate (CP).
We constructed a double Micromegas detector with a bi-alkali photocathode. The gain of this device was studied by measuring the signal currents at the anode, first mesh, second mesh and the photocathode while varying the applied voltage of the first and second meshes. The gain reached 2×10^3 without a large deviation from the exponential curve. However, at a gain above 2×10^3 we observed a rapid gain rise due to secondary effects. In order to develop a gaseous PMT having no substantial secondary effects up to 10^5 with a bi-alkali photocathode we tried some combinations of a hole-type MPGD and a Micromegas.
We developed a hole-type MPGD with Pyrex glass by using a micro-blasting method, which allows the problem-free production of bi-alkali photocathode while a kapton GEM reacts with the photocathode materials. Basic performance tests of the Pyrex CP gas detector were carried out with a gas mixture of Ne (90%) + CF4 (10%) at 1 atm. We successfully obtained a gain of up to 1.5×10^4 and an energy resolution of 23% for 5. 9 keV X-rays.
In the development of gaseous PMTs with less ion-feedbacks we made simulation studies by using Garfield and Maxwell 3D, which can simulates the motion of electrons and ions in MPGDs.
We will present a current status of the development of gaseous PMTs and simulation results.

Primary authors : Mr. MATSUMOTO, Kohei (Tokyo Metropolitan University)

Co-authors : Prof. SUMIYOSHI, Takayuki (Tokyo Metropolitan University) ; Prof. TOKANAI, Fuyuki (Yamagata University) ; Prof. SAKURAI, Hirohisa (Yamagata University) ; Prof. GUNJI, Shuichi (Yamagata University) ; Mr. OKADA, Teruyuki (Hamamatsu Photonics K.K) ; Mr. SUGIYAMA, Hiroyuki (Hamamatsu Photonics K.K)

Presenter : Mr. MATSUMOTO, Kohei (Tokyo Metropolitan University)

Track classification : Gaseous Detectors

Contribution type : Poster Presentation

Submitted by : MATSUMOTO, Kohei

Submitted on Friday 01 April 2011

Last modified on : Tuesday 26 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 26 April 2011 14:43
Comments : ""

Abstract ID : 151

Improved jet clustering algorithm with vertex information for multi-b final states

Content :

In the TeV-scale collider physics, many important final states include 6 or more jets where jet clustering is essential for the event reconstruction.
If many heavy-flavor jets are included in the final states such as Higgs bosons decaying into two b-quarks, the jets can be identified using the vertex information.
Our study with ILC detector full-MC simulation has shown a significant improvement in counting b-hadrons with the new algorithm using vertex information.
This algorithm shall be especially important to measure Higgs self coupling,
which is one of the most important but difficult measurements in ILC.

Primary authors : Dr. SUEHARA, Taikan (The University of Tokyo)

Co-authors : Dr. TANABE, Tomohiko (The University of Tokyo) ; Dr. YAMASHITA, Satoru (The University of Tokyo)

Presenter : Dr. SUEHARA, Taikan (The University of Tokyo)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : SUEHARA, Taikan

Submitted on Friday 01 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:34
Comments : "short contribution"

Abstract ID : 152

The ATLAS Tile Hadronic Calorimeter performance in the LHC collision era

Content :

The Tile Calorimeter (TileCal), the central section of the hadronic calorimeter of the ATLAS experiment, is a key detector component to detect hadrons, jets and taus and to measure the missing transverse energy. Due to the very good muon signal to noise ratio it assists the spectrometer in the identification and reconstruction of muons. TileCal is built of steel and scintillating tiles coupled to optical fibers and read out by photomultipliers. The calorimeter is equipped with systems that allow to monitor and to calibrate each stage of the readout system exploiting different signal sources: laser light, charge injection and a radioactive source. The performance of the calorimeter has been measured and monitored using calibration data, cosmic muons, LHC single beam and collision events. The results reported here assess the performance of the calibration systems, absolute energy scale, the energy and timing uniformity as well as the calorimeter performance with single hadrons. The obtained results demonstrate a good understanding of the detector and prove that its performance is within the design expectations.

Primary authors : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Co-authors :

Presenter : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : DAVIDEK, Tomas

Submitted on Friday 01 April 2011

Last modified on : Monday 04 April 2011

Comments :

This abstract is submitted on behalf of the ATLAS Tile Calorimeter Group by its Speakers Committee member. The presenter will be selected when we know which abstracts are accepted. Since this is an overview talk, it could eventually fit in other track?

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:04
Comments : "Running experiment"

Abstract ID : 153

Laser calibration system for TileCal sub-detector

Content :

TileCal is the central hadronic calorimeter of the ATLAS experiment at LHC. It is a sampling calorimeter using iron as absorber and plastic scintillating tiles as active material. The scintillation light produced by the passage of particles is read by photomultipliers (PMTs). TileCal readout is segmented in around 5000 cells (longitudinally and transversally), each of them being read by two PMTs. Various systems are used to perform the calibration of the data acquisition chain, control its stability and convert the signal of the PMTs into an energy deposit. Amongst the calibration systems, a Laser device is used for the monitoring of the response and stability of the calorimeter at the level of the PMTs. This system sends a controlled light pulse via dedicated clear optical fibre to each of the 9852 PMTs composing the readout. It allows to monitor the stability of the gain of the PMTs, perform the timing adjustment of some parts of the readout electronics, and possibly recover from non-linearity problems occurring at very high energy deposit (saturation effects on the readout electronics). In this talk, we give a description of the Laser system (current hardware and foreseen improvements). The main applications of the Laser system (timing, gain monitoring, and linearity) are then described, and the results obtained during the last years of data taking are presented.

Primary authors : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Co-authors :

Presenter : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : DAVIDEK, Tomas

Submitted on Friday 01 April 2011

Last modified on : Monday 04 April 2011

Comments :

This abstract is submitted on behalf of the ATLAS Tile Calorimeter Group by its Speakers Committee member. The presenter will be selected when we know which abstracts are accepted.

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:05
Comments : "Running experiment"

Abstract ID : 154

Design and performance of the integrator based read-out in Tile Calorimeter of the ATLAS experiment

Content :

TileCal, the central hadronic calorimeter of the ATLAS experiment at the CERN Large Hadron Collider (LHC), is built of steel and scintillating tiles with redundant readout by optical fibers and uses photomultipliers as photodetectors. It provides measurements for hadrons, jets and missing transverse energy. To equalize the response of individual TileCal cells with a precision better than 1% and to monitor the response of each cell over time, a calibration and monitoring system based on a Cesium 137 radioactive source driven through the calorimeter volume by liquid flow has been implemented. This calibration system relies on dedicated readout chain based on slow integrators that read currents from the TileCal photomultipliers averaged over milliseconds during the calibration runs. During the LHC collisions the TileCal integrator based readout provides monitoring of the beam conditions and of the stability of the TileCal optics, including stability of the photomultiplier gains. The work to be presented will focus on the architecture, implementation and performance of the TileCal integrator based readout during the calibration runs and during the LHC collisions.

Primary authors : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Co-authors :

Presenter : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : DAVIDEK, Tomas

Submitted on Friday 01 April 2011

Last modified on : Monday 04 April 2011

Comments :

This abstract is submitted on behalf of the ATLAS Tile Calorimeter Group by its Speakers Committee member. The presenter will be selected when we know which abstracts are accepted.

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:05
Comments : "Running experiment"

Abstract ID : 155

Calibration of the ATLAS hadronic barrel calorimeter TileCal using 2008, 2009 and 2010 cosmic rays data

Content :

The ATLAS iron-scintillator hadronic calorimeter (TileCal) provides precision measurements of jets and missing transverse energy produced in the LHC proton-proton collisions. Results assessing the calorimeter calibration obtained using cosmic ray muons collected in 2008, 2009 and 2010 are presented. The analysis was based on the comparison between experimental and simulated data, and addresses three issues. First the average non-uniformity of the response of the cells within a layer was estimated to be about ±2%. Second, the average response of different layers is found to be not inter-calibrated, considering the sources of error. The largest difference between the responses of two layers is 4%. Finally, the differences between the energy scales of each layer obtained in this analysis and the value set at test beams using electrons was found to range between -3% and +1%. The sources of uncertainties in the response measurements are strongly correlated, and include the uncertainty in the simulation of the muon response. The total error of each layer determinations is 2%. A value of the ratio between the actual value of the energy scale in ATLAS and the value set at test beams was determined to be 0.99±0.03 using all layers measurements and assuming that the mis-calibration is due to some unknown systematic uncertainty.

Primary authors : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Co-authors :

Presenter : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : DAVIDEK, Tomas

Submitted on Friday 01 April 2011

Last modified on : Monday 04 April 2011

Comments :

This abstract is submitted on behalf of the ATLAS Tile Calorimeter Group by its Speakers Committee member. The presenter will be selected when we know which abstracts are accepted.

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:06
Comments : "Running experiment"

Abstract ID : 156

TileCal Optical Multiplexer Board 9U

Content :

TileCal is the hadronic calorimeter of the ATLAS experiment at LHC/CERN. The system contains roughly 10,000 channels of read-out electronics, whose signals are gathered and digitized in the front-end electronics and then transmitted to the counting room through two redundant optical links. Then, the data is received in the back-end system by the Optical Multiplexer Board (OMB) 9U which performs a CRC check to the redundant data to avoid Single Event Upsets errors. A real-time decision is taken on the event-to-event basis to transmit single data to the Read-Out Drivers (RODs) for processing. Due to the low dose level expected during the first years of operations in ATLAS it was decided not to use a redundant system and currently the front-end electronics is directly connected to the RODs. However, the increasing luminosity of the LHC will force to use the redundant read-out and the OMB system will be installed. Moreover, the OMB can be used as a ROD injector to emulate the front-end electronics for ROD software tests during detector maintenance periods taking advantage of its location in the data acquisition chain. First we will give a detailed description of the main components of the board and the different operation modes. Then, the production and qualification tests will be explained including a detailed description of the test-bench, software and validation protocols.

Primary authors : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Co-authors :

Presenter : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Track classification : Trigger and Data Acquisition Systems

Contribution type : --not specified--

Submitted by : DAVIDEK, Tomas

Submitted on Friday 01 April 2011

Last modified on : Friday 22 April 2011

Comments :

This abstract is submitted on behalf of the ATLAS Tile Calorimeter Group by its Speakers Committee member. The presenter will be selected when we know which abstracts are accepted.

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 22 April 2011 20:53
Comments : ""

Abstract ID : 157

On the Challenge of Keeping ATLAS Tile Calorimeter Raw Data

Content :

A new version of the lossless compression algorithm [CHEP'09] is proposed for the reconstruction and transmission of the ATLAS Tile Calorimeter (TileCal) Raw data. It is based on the use of a "standard" pulse shape and allows sending both the raw data and reconstructed quantities like energy and time required to Level 2 trigger during online processing. The closer recorded signal to the "standard" pulse shape assumed by the algorithm, the higher the compression of the data and the faster the algorithm itself. Non-physical or piled-up data which can not be described by any pulse shape can be sent at 72 kHz rate at least. "Reasonable" signals can be sent at 80 kHz rate in the worst case scenario, when all channels simultaneously have very large energy deposits and are significantly out of time. The algorithm does not increase the data flow as compared to the existing approach and shows much more stability in sent fragments sizes. The earlier version which did not require the knowledge of the exact pulse shape was able to fit within the bandwidth limits only. Fitting within the DSP time limits remained an open question and appeared to be a hard task. Having all the raw data available for offline processing will improve the data precision that is currently constraint by the DSP fixed point arithmetic and coarse timing assumptions. Online reconstruction can be used for triggering purposes where precision provided by DSP is adequate. Keeping the raw data makes it possible to recalculate all the signal parameters later using floating point arithmetic, sophisticated signal processing methods, adjusted values and approaches. It is also indispensable for debugging and validation purposes. The algorithm was implemented and studied offline using 7 TeV proton-proton and Heavy Ion collisions data and proved to be able to sustain 100 kHz rate and to fit within the bandwidth and processing time limitations of TileCal read-out system. We will describe the algorithm and highlight some details in the implementation. We will report on testing and validation for Charge Injection calibration runs (where we can test compression in case of "good" signal) and Laser calibration runs (one of the "worst case" scenarios, where all channels contain large signal with 25ns jitter) as well as for 7 TeV Heavy Ions run and for 7 TeV proton-proton collisions.

Primary authors : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Co-authors :

Presenter : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : DAVIDEK, Tomas

Submitted on Friday 01 April 2011

Last modified on : Friday 22 April 2011

Comments :

This abstract is submitted on behalf of the ATLAS Tile Calorimeter Group by its Speakers Committee member. The presenter will be selected once we know which abstracts are accepted.

Status : WITHDRAWN

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)

Judged by : AMERIO, Silvia
Date : 22 April 2011 20:54
Comments : ""

Abstract ID : 158

Implementation and performance of the signal reconstruction in the ATLAS Hadronic Tile Calorimeter

Content :

The Tile Calorimeter (TileCal) for the ATLAS experiment at the CERN Large Hadron Collider (LHC) is currently taking data with proton-proton collisions. The Tile Calorimeter is a sampling calorimeter with steel as absorber and scintillators as active medium. The scintillators are read out by wavelength shifting fibers coupled to photomultiplier tubes (PMT). The analogue signals from the PMTs are amplified, shaped and digitized by sampling the signal every
25 ns. The TileCal front-end electronics allows to read out the signals produced by about 10000 channels measuring energies ranging from ~30 MeV to ~2 TeV.
The read-out system is designed to reconstruct the data in real-time fulfilling the tight time constraint imposed by the ATLAS first level trigger rate (100 kHz). The main component of the read-out system is the Digital Signal Processor (DSP) which, using the Optimal Filtering technique, allows to compute for each channel
the signal amplitude, time and quality factor at the required high rate. A solid knowledge of the signal pulse-shapes and of the timing is fundamental to reach the required accuracy in energy reconstruction. Systematic studies to understand the pulse-shape have been carried out using both electronic calibration signals and data collected in the proton-proton collisions at sqrt{s} = 7 TeV.
After a short overview of the TileCal system we will discuss the implementation of Optimal Filtering signal reconstruction highlighting the constraints imposed by the use of the DSP fixed point arithmetic.
We will report also results on the validation of the implementation of the DSP signal reconstruction and on the overall signal reconstruction performance measured in calibration, single beam and collision events.

Primary authors : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Co-authors :

Presenter : DAVIDEK, Tomas (Institute of Particle and Nuclear Physics)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : DAVIDEK, Tomas

Submitted on Friday 01 April 2011

Last modified on : Friday 22 April 2011

Comments :

This abstract is submitted on behalf of the ATLAS Tile Calorimeter Group by its Speakers Committee member. The presenter will be selected once we know which abstracts are accepted.

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)

Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:03
Comments : ""

Abstract ID : 159

Development of Ring Imaging Cherenkov counter for Belle II experiment at super KEKB

Content :

For the Belle II experiment at the super KEKB, we have been developing a proximity focusing ring imaging Cherenkov (RICH) detector using a silica aerogel as a radiator. This Aerogel RICH counter is designed to be used at the forward endcap region and to have pion/kaon separation with more than 4-sigma deviations at momenta up to 4 GeV/c.
A 144-channel Hybrid Avalanche Photo-Detector (HAPD) which is developed with Hamamatsu Photonics K.K. was adopted as the photon detector for the Aerogel RICH counter, since the HAPD has an excellent single photon detection capability. The pixel size of the HAPD is 5x5 mm^2 , which enables photon detection with a sufficient resolution. We have conducted beam tests in order to evaluate the PID performance for the Aerogel RICH system and confirmed that more than 4-sigma pion/kaon separation is possible.
One of our current worry for the system is a radiation tolerance of the HAPD. Since the Aerogel RICH counter is placed at the endcap region in the Belle II detector, where a neutron dose rate of 10^11 /cm^2/year is expected, a leakage current of APDs in the HAPD may increase according to the neutron irradiation level. Therefore noise from HAPDs is expected to be increased and may deteriorate the PID performance. In order to realize the signal to noise be more than 7 even for 10^12 neutrons/cm^2 (It is equivalent to 10 years operation of Belle II experiment), we have tried to modify the APD's structure and made APDs with a thinner P-layer which is expected to help in reducing the leakage current. Tests of this scheme were made by using the Yayoi nuclear reactor at Tokai, Japan last year. As a result, we actually confirmed effects of thinner P-layer APD.
In this talk, HAPD performance including beam test results will be presented. In addition, our neutron irradiation test using the new sample will be also reported.

Primary authors : Mr. IWATA, Shuichi (Tokyo Metropolitan University)

Co-authors :

Presenter : Mr. IWATA, Shuichi (Tokyo Metropolitan University)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : IWATA, Shuichi

Submitted on Friday 01 April 2011

Last modified on : Friday 29 April 2011

Comments :

On behalf of the Belle-II Aerogel RICH group.

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)

Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:47
Comments : ""

Abstract ID : 160

Design of the ATLAS IBL Readout System

Content :

An Insertable B-Layer is planned for the upgrade of the ATLAS detector and will add a fourth and innermost silicon layer to the existing Pixel detector. 12 million pixels attached to new FE-I4 readout ASICs will require new off-detector electronics which is currently realized with two VME-based boards: a Back Of Crate module
implementing optical I/O functionality and a Readout Driver module for data processing. This paper illustrates the new read-out chain, focusing on the design of new the Readout Driver Card, which, with a fourfold integration with respect to the previous design, builds up the detector data, controls the calibration procedures and interacts via Gigabit links with a novel calibration farm. Future prospects and back compatibility to the existing system are also addressed.

Primary authors : Dr. POLINI, Alessandro (INFN - Bologna)

Co-authors : BRUNI, Graziano (INFN Bologna) ; BRUSCHI, Marco (INFN Bologna) ; DANTONE, Ignazio (INFN Bologna) ; FALCHIERI, Davide (Bologna University) ; DOPKE, Jens (CERN) ; FLICK, Tobias (Fachbereich C Physik, Bergische Universitaet Wuppertal) ; GABRIELLI, Alessandro (Bologna University) ; GROSSE-KNETTER, Joern (II. Physikalisches Institut, Universitaet Goettingen) ; JOSEPH, John (LNBL, Berkeley, U.S.A) ; KRIEGER, Nina (II. Physikalisches Institut, Universitaet Goettingen) ; KUGEL, Andreas (ZITI, LS Informatik V, Heidelberg University, Mannheim,) ; MORETTINI, Paolo (INFN Genova, Italy) ; SCHROER, Nicolai (ZITI, LS Informatik V, Heidelberg University, Mannheim) ; RIZZI, Matteo (INFN Bologna) ; TRAVAGLINI, Riccardo (INFN Bologna) ; ZANNOLI, Samuele (University of Bologna & INFN Bologna) ; ZOCCOLI, Antonio (University of Bologna & INFN Bologna)

Presenter : Dr. POLINI, Alessandro (INFN - Bologna)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : POLINI, Alessandro

Submitted on Friday 01 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:34
Comments : ""

Abstract ID : 161

Advanced pixel sensors and readout electronics based on 3D integration for the SuperB Silicon Vertex Tracker

Content :

The SuperB project was approved in December 2010 and foresees the construction of a high luminosity (> 10^36 cm^-2 s^-1) asymmetric e+e- collider in an Italian site. In the SuperB detector, the Silicon Vertex Tracker (SVT) is based on the BaBar vertex detector layout with an additional innermost layer (Layer0) close to the interaction point, with a radius of about 1.5 cm. This Layer0 has to provide high position resolution (10-15 um in both coordinates), low material budget (< 1% X0), and tolerance to a high background rate (several tens of MHz/cm^2). The baseline design of the SuperB SVT presently adopts the technically conservative solution of using short strip detectors (striplets) in the Layer0. However, the stringent experimental requirements stimulate an R program on low-mass pixel sensors, which is exploring CMOS MAPS technology as well as 3D integration. The ambitious goal is to build a monolithic device with similar electronic functionalities as in hybrid pixel readout chips, such as pixel-level sparsification and time stamping.
This paper presents the status of the R activity that the VIPIX collaboration is carrying out to achieve this goal. The effort is presently focused on the design of two different devices. The first one is a deep N-well active pixel sensor based on the interconnection of two layers fabricated in the same 130 nm CMOS technology. The second one is aimed at the ultimate goal of fabricating a 3D device based on heterogeneous technologies, i.e. a high resistivity sensor layer interconnected to a 2-tier CMOS readout integrated circuit. Both devices include a high performance readout architecture which is able to handle a very large data flow. The paper reviews the technical details concerning how these two different designs may fit the requirements of the SuperB SVT Layer0; the present status of VIPIX developments using 3D integration is also discussed.

Primary authors : RE, Valerio (INFN-Pavia and University of Bergamo)

Co-authors :

Presenter : RE, Valerio (INFN-Pavia and University of Bergamo)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : RE, Valerio

Submitted on Friday 01 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:03

Comments : "30 min"

Abstract ID : 162

Development of a large gaseous xenon detector for neutrino-less double beta decay with the Enriched Xenon Observatory

Content :

The EXO collaboration is searching for neutrinoless double beta decay using isotopically enriched Xenon (136Xe). Currently operating a 200 kg liquid xenon experiment, EXO is also conducting R toward a high pressure xenon gas detector using enriched 136Xe at up to 10 bar. This solution might offer better energy resolution than its liquid xenon counterpart and allow discrimination between single and double electrons, thus suppressing detector background. The high pressure xenon detector would detect primary scintillation light and ionization electrons, a technique known to yield good energy resolution. Achieving superior energy resolution also requires very low concentration of electronegative impurities in the gas and, in turn, reliable and robust purification techniques. Detection of doubly charged Ba++ ions, not possible in liquid xenon, might be possible in the gaseous phase. Ba++ ions could be transported by high electric fields and through a nozzle into a lower pressure detection region where they could be identified via optical spectroscopy in order to discriminate barium-producing signal events from radioactive background. The status of gaseous xenon detector development, design details and construction schedule of a first prototype detector, including its gas handling and purification systems will be presented, along with the illustration of the Ba tagging strategies currently being pursued.

Primary authors : Prof. POCAR, Andrea (University of Massachusetts, Amherst)

Co-authors :

Presenter : Prof. POCAR, Andrea (University of Massachusetts, Amherst)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : POCAR, Andrea

Submitted on Friday 01 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

I am submitting this abstract on behalf of the EXO collaboration. Once (and if) a talk is assigned, we will proceed with identifying the actual speaker.

Best Regards,
Andrea Pocar

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:35

Comments : "Due to time constraints, we propose this as a poster."

Abstract ID : 163

Cryogenic Dark Matter Search Experiment: Status and Plans

Content :

The Cryogenic Dark Matter Search (CDMS) experiment is designed to search for Dark Matter in the form of Weakly Interacting Massive Particles (WIMPs). CDMS deploys semiconductor detectors, based on Ge or Si substrates with ionization and phonon sensors, which provide very effective event-by-event rejection of the dominant electromagnetic backgrounds. The detectors are operated at cryogenic temperatures (50 mK) deep underground at the Soudan Underground Laboratory. I will summarize the latest results obtained by the CDMS II experiment at Soudan. I will also discuss the plans to increase the sensitivity and the total detector mass in the future runs of the SuperCDMS and GEODM experiments.

Primary authors : Prof. MANDIC, Vuk (University of Minnesota)

Co-authors :

Presenter : Prof. MANDIC, Vuk (University of Minnesota)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : MANDIC, Vuk

Submitted on Friday 01 April 2011

Last modified on : Friday 01 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HALL, Jeter
Date : 01 April 2011 22:29
Comments : "CDMS is a leading dark matter experiment and there are certainly challenges in continuing to lead the field. I would like to hear how CDMS is facing those challenges."

Abstract ID : 164

DM-Ice: a direct detection experiment for dark matter at the South Pole

Content :

I will describe DM-Ice, a direct detection dark matter experiment to be deployed at the South Pole co-located with the IceCube/DeepCore Neutrino Telescope. This experiment will use roughly 250 kg of low-background NaI detectors to search for the DAMA/LIBRA annual modulation in the southern hemisphere where many of the environmental backgrounds associated with seasonal variations present in experiments in the northern hemisphere are either reversed in phase or absent altogether. A 15-kg prototype was deployed in December 2010 at the South Pole at the depth of ~2200 m.w.e. as a feasibility study: it is now taking data. I will report on the status of the prototype and the plans for the full-scale experiment.

Primary authors : MARUYAMA, Reina (University of Wisconsin, Madison)

Co-authors :

Presenter : MARUYAMA, Reina (University of Wisconsin, Madison)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : MARUYAMA, Reina

Submitted on Friday 01 April 2011

Last modified on : Friday 01 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HALL, Jeter
Date : 01 April 2011 22:36
Comments : "DM-Ice is an interesting experiment to test the DAMA signal in the southern hemisphere. It would be nice to have this talk with the DAMA talk."

Abstract ID : 165

Construction of high speed, massively parallel, ATCA based Data Acquisition Systems using modular components

Content :

Current generations of HEP Data Acquisition Systems either in production or development are differentiated from DAQ systems used in other disciplines by the significant amounts of data they must both ingest and process, typically at very high rates. In practice this has resulted in the construction of systems that are in fact massively parallel computing systems. They are distinguished from their commercial counterparts by the significantly greater amount of I/O capability required between computational elements as well as the unique and disparate I/O requirements required at their interfaces. Given their unique requirements, traditionally, such systems have been purpose built by individual experiments. However, it has long been recognized that all these systems share a large degree of architectural commonality. SLAC is currently embarked on a research project intended to capture this commonality in a set of generic components which can be used in the construction of arbitrarily sized DAQ systems, tailored to satisfy a variety of different experimental needs. The design and implementation of these components (the RCE and CI) will be described. The RCE is a generic computational building block based on SOC technology that provides arbitrary combinatoric logic, generic computational ability using both embedded CPU and DSP tiles, and many channels of generic, high speed I/O with an Ethernet interface capable of operation from 1-40 Gigabits/second. The embedded processor supports arbitrary operating systems, but comes bundled with the RTEMS Real-Time kernel. RTEMS is an Open Source kernel containing POSIX standard interfaces as well as a full TCP/IP network stack. A full suite of GNU cross-development tools as well as embedded software is provided, allowing the RCE to be easily configured to the specifications of varying applications. The CI is a low latency, Layer-3 compliant, 10G-Ethernet switch connecting together RCEs to form arbitrary computing Clusters. ATCA is an ideal platform to express these components and we describe those features that make its use particularly attractive for this project. As one example, a PICMG 3.8 compliant ATCA Front-Board containing a Cluster of 8 RCEs will be described. The cluster's Ethernet is connected to the Fabric at speeds up to 40 Gigabits/second. While compatible with any ATCA backplane, the board is optimized to take advantage of a full-mesh topology. A shelf with such a backplane, populated with 14 of these boards, would result in a system of 14 fully connected clusters. That system would be capable of absorbing up to 7 Terabits/second of arbitrary input data and providing more than 1 Terabit/second of external Ethernet. 600,000 DMIPS, 20 PetaMACs, and 500 Gigabytes of RAM would be available to process and buffer the data.

Primary authors : THAYER, Gregg (SLAC National Accelerator Laboratory)

Co-authors : CLAUS, Ric (SLAC National Accelerator Laboratory) ; O'GRADY, Chris (SLAC National Accelerator Laboratory) ; HALLER, Gunther (SLAC National Accelerator Laboratory) ; HERBST, Ryan (SLAC National Accelerator Laboratory) ; HUFFER, Michael (SLAC National Accelerator Laboratory) ; PANETTA, Jim (SLAC National Accelerator Laboratory) ; PERAZZO, Amedeo (SLAC National Accelerator Laboratory) ; TETHER, Steve (SLAC National Accelerator Laboratory) ; WEAVER, Matt (SLAC National Accelerator Laboratory)

Presenter : THAYER, Gregg (SLAC National Accelerator Laboratory)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : THAYER, John

Submitted on Friday 01 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:35
Comments : ""

Abstract ID : 166

Water Attenuation Length Measurements

Content :

An instrument to measure the attenuation length of near UV light propagating in ultra-pure water has been constructed at Lawrence Livermore National Laboratory (LLNL). The instrument is an 8-meter long horizontal polypropylene pipe capable of measuring the absolute attenuation length of ultra pure water to within 5%. The instrument was designed to measure the effect of LBNE detector materials on the transparency of pure water and gadolinium doped water. The measurement process includes soaking the materials in both ultra pure water and gadolinium doped for extended periods time and transferring the soaked water into the instrument for absolute attenuation length measurement. We present in this talk the measurement of the instrument uncertainty as well as measurements of the attenuation length degradation rate for pure water.

Primary authors : Dr. OUEDRAOGO, Serge (LLNL)

Co-authors : Dr. DAZELEY, Steven (LLNL) ; Dr. BERNSTEIN, Adam (LLNL)

Presenter : Dr. OUEDRAOGO, Serge (LLNL)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : OUEDRAOGO, Serge

Submitted on Friday 01 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:36
Comments : ""

Abstract ID : 167

DHCAL Response to Positrons and Pions

Content :

As part of the overall program of the CALICE collaboration, a group led by Argonne National Laboratory built a large-size prototype of a Digital Hadron Calorimeter (DHCAL). The DHCAL consists of 51 layers, each with 96 x 96 square cm readout pads. The total number of readout channels exceeds 470,000 in less than 2 m^3 of detector volume and thus enables the measurement of hadronic showers with unprecedented spatial resolution.

The DHCAL underwent extensive testing at the Fermilab Testbeam Facility in October 2010 and January 2011. This talk presents preliminary results from the analysis of both positron and pion events of momenta between 2 and 60 GeV/c.These results are considered to be a first validation of the viability of the DHCAL concept.

Primary authors : BILKI, Burak (University of Iowa)

Co-authors :

Presenter : BILKI, Burak (University of Iowa)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : BILKI, Burak

Submitted on Friday 01 April 2011

Last modified on : Monday 04 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:06
Comments : "New development"

Abstract ID : 168

Development and Characterization of CdZnTe Detectors for Neutrino Physics Research

Content :

CdZnTe crystals contain 9 double beta decay isotopes and can serve as a source and detector at the same time in a search for neutrino-less double beta decay. In particular, 116Cd and 130Te are suitable isotopes in such a search due to their high Q-values. The endpoint of the beta spectra resulting from double-beta decay of these isotopes is well above natural gamma lines which constitute backgrounds to a potential signal. Detectors for neutrino-less double beta decay searches require good energy resolution and effective background rejection. The latter can be realized with position sensitive detectors with particle tracking capabilities. CdZnTe detectors can be operated at room temperature and bear the potential to satisfy the above requirements. We are developing and characterizing the performance of co-planar and pixilated CdZnTe detectors, study their charged particle tracking capabilities and evaluate the use in future neutrino-less double beta decay search experiments. Results from our laboratory measurements will be presented.

Primary authors : KUTTER, Thomas (LSU)

Co-authors : MIYAMOTO, Jun (LSU)

Presenter : KUTTER, Thomas (LSU)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : KUTTER, Thomas

Submitted on Friday 01 April 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:48
Comments : ""

Abstract ID : 169

PTFE reflectance measurements, modeling and simulation for Xenon detectors

Content :

Liquid/gaseous Xenon detectors are extensively used in rare-event searches such as a double beta decay and dark matter experiments [1]. The response of these detectors is strongly dependent on the reflectance of the inner surfaces surrounding the active volume. Maximizing the reflectance of these surfaces is therefore paramount to increase the sensibility of the detector, especially in large detectors where the light is reflected multiple times before being detected.

The leading experiments for dark matter detection (LUX and XENON) and neutrino-less double beta decay (EXO and NEXT) [2] all use polytetrafluoroethylene (PTFE) surrounding the active volume of their detectors. This material was chosen due to its large reflectance, about 100% in the visible spectrum [3]. However, in spite of being already in use in xenon detectors, its optical properties for the Xenon scintillation light (in the VUV, $\lambda \approx 175$ nm) have not been accurately studied.

Here we report on measurements of the reflectance distributions of PTFE for Xenon scintillation light performed with a purposely built angle resolution system [4]. The reflectance distributions thus obtained are described using a physical model comprised of diffuse and specular components[5]. These measurements were performed for different PTFE samples, showing that the reflectance is dependent on the manufacturing process and finishing of the surface -- for the tested samples the hemispherical reflectance varied from 50% to 75% [6]. It is therefore necessary to characterize the reflectance of the specific PTFE used in each detector.

These results were obtained for a gas/PTFE interface. Although no measurements were performed using a liquid-Xenon/PTFE interface, we developed a model to estimate the expected change in reflectance for both the specular and diffuse components when the gas is replaced by the liquid [7]. This allowed us to estimate the hemispherical reflectance in liquid to be roughly 15% larger than in a gaseous interface.

GEANT4 has become the simulation tool of choice for rare event detectors, but the reflectance models available in this package do not agree, in many ways, with our own and other published results. We adapted the reflectance model developed during our measurements so that it can be used directly in GEANT4, and we intend that it becomes part of the standard GEANT4 distribution in the near future.

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[2] F. Sànchez, Nuclear Physics B (Proc. Suppl.) 188 (2009) 71–73
[2] Nuclear Physics B (Proc. Suppl.) 188 (2009) 71–73
[3] V R Weidner, Jack J Hsia, and B Adams Appl. Opt vol,24 (14) pp. 2225-2230 (1985)
[4] C. Silva et al, Nucl. Instrum. Meth. A vol. 580 (1) pp 322-325 (2007)
[5] C. Silva et al, Journal of Applied Physics, vol. 107 (6) p. 064902 (2010)
[6] C. Silva et al, Nucl. Instrum. Meth. A vol. 619 pp. 59-62 (2010)
[7] LB Wolff, JOSAA, Vol.11 (11) pp. 2956-2968 (1994)

Primary authors : Dr. SILVA, Cláudio (LIP Coimbra)

Co-authors : Dr. LINDOTE, Alexandre (LIP Coimbra) ; Prof. PINTO DA CUNHA, José (LIP Coimbra) ; Prof. LOPES, Maria Isabel (LIP Coimbra) ; Dr. SOLOVOV, Vladimir (LIP Coimbra) ; Dr. NEVES, Francisco (LIP Coimbra) ; Prof. CHEPEL, Vitaly (LIP Coimbra) ; Dr. VIVEIROS, Luiz (LIP Coimbra)

Presenter : Dr. SILVA, Cláudio (LIP Coimbra)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : SILVA, Cláudio

Submitted on Friday 01 April 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HOFFMAN, Kara
Date : 11 May 2011 21:48
Comments : ""

Abstract ID : 170

A tracker/trigger design for an upgraded CMS Tracker

Content :

Future high luminosity experiments at the energy frontier will face unprecedented challenges. Filtering of information will be increasingly pushed closer to the sensors to reduce the huge data loads and high data transmission power and cooling mass associated with heavily occupied strip or pixel detectors. This talk describes an R effort directed toward providing a proof of concept for a vertically integrated tracking/trigger system based on the anticipated needs for the CMS Tracker in the second phase of the planned LHC luminosity upgrade (HL-LHC). Technologies which are being considered for a track trigger have wide applicability, including higher electronics density (3D integration), very high speed asynchronous data processing and transmission (pipelined electronics), new sensor/electronics bonding technologies (direct oxide bonding), and techniques to build large area sensor arrays using a combination of edgeless technology and oxide-based wafer-to-wafer bonding by combining 3D technology with new sensor processing technologies.

Primary authors : Dr. SPIEGEL, Leonard (Fermi National Accelerator Laboratory (FNAL))

Co-authors :

Presenter : Dr. SPIEGEL, Leonard (Fermi National Accelerator Laboratory (FNAL))

Track classification : Front-end Electronics ; Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : SPIEGEL, Leonard

Submitted on Saturday 02 April 2011

Last modified on : Saturday 23 April 2011

Comments :

The talk could equally well go in the Trigger and Data Acquisition Systems section.

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed for other tracks (Trigger and Data Acquisition Systems)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:04
Comments : ""

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 23 April 2011 11:59
Comments : ""

Abstract ID : 171

Characterization of 10" and 12" Photomultiplier Tubes for the Long Baseline Neutrino Experiment

Content :

The Long Baseline Neutrino Experiment will study neutrino oscillation and leptonic CP-violation using a high-intensity muon neutrino beam produced at Fermilab and detected in the Homestake mine in South Dakota. The collaboration is evaluating both 100 kton-scale water Cherenkov detectors and 17 kton-scale liquid argon time projection chambers as neutrino detectors. As part of the water Cherenkov design effort, the single photon performance is being evaluated for R7081 10" high quantum efficiency and R11780 12" standard quantum efficiency photomultiplier tubes manufactured by Hamamatsu Photonics. In this talk, we will describe a PMT characterization procedure that uses a triggered low intensity Cherenkov light source, and we will present single photoelectron charge distributions and transit time distributions for both PMT types. We will also describe efforts to statistically model the charge distribution and understand the relation between late pulsing and charge amplification behavior.

Primary authors : Dr. KNAPIK, Robert (University of Pennsylvania) ; LATORRE, Anthony (University of Pennsylvania) ; SHAPIRO, Kevin (University of Pennsylvania) ; Prof. KLEIN, Joshua (University of Pennsylvania) ; Dr. SEIBERT, Stanley (University of Pennsylvania)

Co-authors :

Presenter : Dr. SEIBERT, Stanley (University of Pennsylvania)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : SEIBERT, Stanley

Submitted on Saturday 02 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:07
Comments : ""

Abstract ID : 172

The background discrimination in a high pressure xenon TPC equipped with a Micromegas readout

Content :

The measurement of the neutrinoless mode could give unique information on the mass and the Majorana nature of neutrino. For this kind of experiments, a very good energy resolution in xenon and ultra-low background levels are required, two features that are actually fulfilled by microbulk Micromegas readouts. Signals and backgrounds in a high presure xenon TPC equipped with a pixelized micromegas readouts have been simulated in order to study the background rejection capabilities of this technology. Some discrimination algorithms will be presented and their power rejection factor will be described. Finally, an estimation of the final background level of this possible experiment for different geometries will be discussed.

Primary authors : Mr. IGUAZ GUTIERREZ, Francisco Jose (CEA - Centre d'Etudes de Saclay (CEA))

Co-authors :

Presenter : Mr. IGUAZ GUTIERREZ, Francisco Jose (CEA - Centre d'Etudes de Saclay (CEA))

Track classification : Detectors for neutrino physics

Contribution type : Poster Presentation

Submitted by : IGUAZ GUTIERREZ, Francisco Jose

Submitted on Sunday 03 April 2011

Last modified on : Sunday 03 April 2011

Comments :

Status : WITHDRAWN

Track judgments :

Track : Detectors for neutrino physics

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 173

The “DIRC-like FTOF”: a time-of-flight Cherenkov detector for particle identification at SuperB

Content :

The DIRC-like FTOF detector is a ring imaging Cherenkov counter which uses time-of-flight to identify charged particles (PID). It has been developed to improve PID on the SuperB forward side, a region which is not covered by the main barrel PID detector, the FDIRC. The FTOF prototype was constructed and installed in the SLAC Cosmic Ray Telescope for timing measurements in Fall 2010. A time resolution of about 70~ps/channel was obtained, in agreement with a dedicated simulation of the whole system (detector + MCP-PMT and electronics) which was developed to estimate the different contributions to the single channel time resolution. The new 10~ps 16-channel USB wavecatcher electronics developed by LAL (CNRS/IN2P3) and CEA/IRFU are successfully used in this test experiment at SLAC.

Primary authors : Mr. BURMISTROV, Leonid (LAL)

Co-authors :

Presenter : Mr. BURMISTROV, Leonid (LAL)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : BURMISTROV, Leonid

Submitted on Sunday 03 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:08
Comments : ""

Abstract ID : 174

Total Measurement Calorimetry

Content :

Hadron energy measurement has intrinsic fluctuation due to neutral pion production in the hadron shower. Here we introduce active absorber in the hadronic calorimeter of sandwich type. The active absorber is achieved by using lead glass or similar heavy and transparent materials to have a possibility of detecting the cherenkov lights which indicate the EM shower.
The combination of two active materials will give us information on the neutral pion productions in hadron interaction. Identification of the neutral pion production is expected to have the energy resolution superior than that of the usual calorimeter.
This is applicable to he collimated jet events without separation the particles, like PFA method. This leads more importance at the higher energy jets for the future experiments.
The total measurement idea is different from the dual read out scheme, because of totally active absorber scheme will give less fluctuations the DREAM.
The current activities to use the lead glass and PbF_2 as the active absorber will be discussed and further simulation study to find the neutral pions is covered as well.

Primary authors : Dr. TAKESHITA, Tohru (Shinshu Univ.)

Co-authors :

Presenter : Dr. TAKESHITA, Tohru (Shinshu Univ.)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : Prof. TAKESHITA, Tohru

Submitted on Monday 04 April 2011

Last modified on : Monday 04 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 04 April 2011 18:07
Comments : "New development"

Abstract ID : 175

Study of TOF-PET performance

Content :

We have investigated the timing resolution and spacial resolution of a pair detector which consists of a silicon photon sensor named MPPC and a newly developed fine silicate scintillator name d LFS. The timing resolution was measured to be 96ps in FWHM extracted from the photon detection time difference of two detectors. This indicates significant progress of the development of TOF capability for the PET system is expected. Wheres the spacial resolution is measured to be 1.0mm in FWHM, which is consistent with the size of the scintillator cell of 3mm x 3mm square.
Therefor we expect next generation TOF-PET system can be achieved with 1mm resolution for the very early cancer detection.

Primary authors : Dr. TAKESHITA, Tohru (Shinshu Univ.)

Co-authors :

Presenter : Dr. TAKESHITA, Tohru (Shinshu Univ.)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : Prof. TAKESHITA, Tohru

Submitted on Monday 04 April 2011

Last modified on : Saturday 23 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 23 April 2011 14:26
Comments : ""

Abstract ID : 176

Feasibility Study for an Active 238UF6 Gas Target for Photo-Fission Experiments

Content :

Nuclear fission represents a class of important reactions in heavy nuclei. Fission may occur spontaneously as well as induced by charged particles, neutrons or photons. A detailed microscopic description of the fission process is still lacking, whereas phenomenological parameterizations, e.g. fragment yield and total kinetic energy, have been realized.
A program for studying photon-induced fission of actinide nuclei in the energy region of the fission barrier, has been started at the Darmstadt superconducting linear accelerator S-DALINAC. First experiments were performed using a twin Frisch-grid ionization chamber with a solid target located at the central cathode [1]. For detailed investigations on, e.g. the energy dependence of fission modes [2], the population of super- and hyper-deformed states, the so-called fission isomers, or even the search for parity non-conservation in fission [3], higher luminosities - and hence thicker targets - are needed. However, increasing target thickness reduces mass and angular resolutions. One solution to this problem is an active gas target. The gas of choice is 238UF6, because of its phase transition from solid to gas at 56,4 °C and atmospheric pressure via direct sublimation.
In order to test 238UF6 as an admixture to standard counting gases (e.g. argon) and to study its properties, an ionization chamber was designed and built at the Institut für Kernphysik of Technische Universität Darmstadt.
In a first step the chamber itself was tested with pure argon as counting gas, and the drift velocity as a function of the reduced electric field strength was determined. Then 238UF6 was filled into the chamber in steps of one mass-percent uranium for each measurement, where both signal quality and drift velocity at different admixtures were determined. Present results using mass fractions up to 2 percent of 238U in the counting gas show that the drift velocity increases with 238UF6 content, while overall a good signal quality and energy resolution of the ionization chamber is preserved.

Supported in part by Deutsche Forschungsgemeinschaft through the SFB 634, by the State of Hesse through the LOEWE centre HIC for FAIR, and through the GSI-TU Darmstadt cooperation contract.

[1] A. Göök, M. Chernykh, C. Eckardt, J. Enders, P. Von Neumann-Cosel, A.Oberstedt, S.Oberstedt, A.Richter, Nucl. Phys. A 851 (2011) 1.
[2] U. Brosa, S. Grossman, A. Müller, Phys. Rep. 197 (1990) 167.
[3] V. V. Flambaum and G.F. Gribakin Prog. Part. Nucl. Phys. 35 (1995) 423.

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Presenter : Mr. FREUDENBERGER, Martin (Institut fuer Kernphysik, TU - Darmstadt, Germany)

Track classification : Gaseous Detectors

Contribution type : Poster Presentation

Submitted by : FREUDENBERGER, Martin

Submitted on Monday 04 April 2011

Last modified on : Thursday 14 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : KOBAYASHI, Makoto
Date : 14 April 2011 08:54
Comments : ""

Abstract ID : 177

Verification of focusing system for Time Of Propagation counter

Content :

We present the results of verifing focusing system for Time Of Propagation(TOP) counter.
The TOP counter is a new detector of particle identification(PID) for burrel region of BelleII.
TOP counter is a kind of Ring Imaging Cherenkov counter(RICH) which detect internally reflected Cherenkov light like DIRC.
MCP-PMTs, which are compornent of TOP counter, detect ~20 Cherenkov photons per charged tra'ck , and we can reconstract a ring image from propagation time of detected photon.TOP counter are working as Time Of Flight (TOF) because it has very good time resolution less than 100ps per single photon.
Performance of TOP counter is propotional to the time resolution.Propagated Cherenkov photons have group velocity related to wavelength.It generates fractuation of propagation time approximately 53ps/m.Chromatic dispersion provides serious deterioration of time resolution.
Against this problem, we plan to introduce focusing mirror.Focusing mirror is set at forward part of TOP counter.It focuses Cherenkov light to different channels of MCP-PMT by different wavelength, and so that the deterioration of time resolution is suppressed.
We verified focusing mechanism using 120GeV/c pion beam at CERN.We used prototype of TOP counter which have focusing mirror, and so we could confirm a proof of focusing mechanism.
Time resolutoin improved 147ps to 95ps by using focusing mirror.

Primary authors : Mr. ARITA, Yoshinori (Nagoya-Univ)

Co-authors :

Presenter : Mr. ARITA, Yoshinori (Nagoya-Univ)

Track classification : Particle Identification

Contribution type : Poster Presentation

Submitted by : ARITA, Yoshinori

Submitted on Monday 04 April 2011

Last modified on : Wednesday 27 April 2011

Comments :
on behalf of Belle-II PID group

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Poster Presentation)
Judged by : Toru Iijima
Date : 27 April 2011 12:59
Comments : ""

Abstract ID : 178

Design and studies of micro-strip stacked module prototypes for tracking at S-LHC

Content :

Experience at high luminosity hadrons collider experiments shows that tracking information enhances the trigger rejection capabilities while retaining high efficiency for interesting physics events. The design of a tracking based trigger for Super LHC (S-LHC), the already envisaged high luminosity upgrade of the LHC collider, is an extremely challenging task, and requires the identification of high-momentum particle tracks as a part of the Level 1 Trigger.

Simulation studies show that this can be achieved by correlating hits on two closely spaced silicon strip sensors. The progresses on the design and development of micro-strip stacked prototype modules and the performance of few prototype detectors will be presented. The prototypes have been built with the silicon sensors and electronics used to equip the present CMS Tracker.

Outcome of a simulation study of stacked modules performance will be presented. Preliminary results of a simulated tracker layout equipped with stacked modules are discussed in terms of Pt resolution and triggering capabilities.

The study of real prototypes in terms of signal over noise and tracking performance with cosmic rays and dedicated beam test experiment will also be shown.

Primary authors : Dr. BROCCOLO, Giuseppe (Scuola Normale Superiore & INFN, Pisa)

Co-authors : Dr. BERNARDINI, Jacopo (Scuola Normale Superiore & INFN, Pisa) ; Dr. DELL'ORSO, Roberto (INFN, Pisa) ; Dr. FIORI, Francesco (University & INFN, Pisa) ; Prof. MESSINEO, Alberto (University & INFN, Pisa) ; Dr. PALLA, Fabrizio (INFN, Pisa) ; Dr. PEDRESCHI, Elena (University, Siena & INFN, Pisa)

Presenter : Dr. BROCCOLO, Giuseppe (Scuola Normale Superiore & INFN, Pisa)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : BROCCOLO, Giuseppe

Submitted on Monday 04 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:42
Comments : ""

Abstract ID : 179

Tracking and b-tagging performance with an upgraded CMS pixel detector

Content :

Tracking and identification of jets originating from b quarks (b-tagging) will likely continue to be a key element of many physics analyses at the upgraded HL-LHC where much higher pileup can significantly reduce the performance. An upgrade of the CMS pixel detector proposed for the Phase 1 HL-LHC should enable CMS to maintain the current level of b-tagging performance even in the presence of very high pileup. Results of Monte Carlo simulation studies with an upgrade CMS pixel detector will be presented for tracking and b-tagging performance and compared to that for the current CMS detector.

Primary authors : Dr. JINDAL, Pratima (Purdue University Calumet)

Co-authors :

Presenter : Dr. JINDAL, Pratima (Purdue University Calumet)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : JINDAL, Pratima

Submitted on Monday 04 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:21
Comments : ""

Abstract ID : 180

The Pierre Auger Observatory: challenges at the highest-energy frontier

Content :

The Pierre Auger Observatory explores the highest-energy Universe, through the detection of air showers induced by the most energetic cosmic rays, whose nature and origin remain enigmatic despite decades of study. Tremendous progress is being accomplished in measuring the characteristics of these messengers with unprecedented statistics. Their energy spectra, their arrival directions, and the properties of the cascades they initiate are studied in an attempt to elucidate their nature (mass composition, possibility of gamma-ray or neutrino primaries), provenance and propagation (sources, anisotropies, spectra). The scientific and technical challenges are extreme, and are addressed in a multiplicity of ways, including a program of enhancements to the base design of the Observatory. We will review these challenges, the solutions implemented and under way, and their impact on the rich science harvest reaped by the project.

Primary authors : Prof. COUTU, Stephane (Penn State University)

Co-authors :

Presenter : Prof. COUTU, Stephane (Penn State University)

Track classification : Experimental Detector Systems ; Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : COUTU, Stephane

Submitted on Monday 04 April 2011

Last modified on : Monday 25 April 2011

Comments :

For the Pierre Auger Collaboration

(is there a scheme for adding a Collaboration without specifying all the names as coauthors?)

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 25 April 2011 17:14
Comments : ""

Track : Experimental Detector Systems

Judgment : Proposed for other tracks (Experimental Detector Systems)
Judged by : KUSAKA, Akito
Date : 22 April 2011 22:00
Comments : ""

Abstract ID : 181

The Fermilab Test Beam Facility

Content :

Located at Fermi National Accelerator Laboratory in Batavia, Illinois, the Fermilab Test Beam Facility is a world-class facility devoted to particle detector R The goal of the Fermilab Test Beam Program is to provide flexible, equal and open access to test beams for all detector tests, with relatively low bureaucratic overhead and a guarantee of safety, coordination and oversight.
The facility consists of two versatile beamlines (MTest and MCenter) in which users can test equipment or detectors.
The MTest primary beamline consists of a beam of high energy protons (120 GeV) at moderate intensities (~1-300 kHz). This beam can also be targeted to create secondary, or even tertiary particle beams of energies down to below 1 GeV, consisting of pions, muons, and/or electrons. Recently we have developed a tertiary beamline for the facility, which can reconstruct beam particles with momentum down to 300 MeV/c.
FTBF is currently the only operating test beam facility in the United States, and in 2013 is expected to be the only operating hadrons test beam in the world. The schedule for beam and expected facility expansions will also be discussed.

Primary authors : SOHA, Aria (Fermilab)

Co-authors :

Presenter : SOHA, Aria (Fermilab)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by :

Submitted on Monday 04 April 2011

Last modified on : Thursday 21 April 2011

Comments :

This talk would actually fit in with several of the Track classifications.

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:35
Comments : "short contribution or may be also POSTER"

Abstract ID : 182

Comparison of Digital to Analog Converters in 0.20µum SOI and 0.13µm CMOS process

Content :

Biasing and threshold adjustments are crucial for the correct operation and sensitivity of 3T based pixel detectors. The latest generation of CAP detectors designed at the University of Hawaii addressed the threshold adjustment issue by including an 8-bit R-2R Digital to Analog converter. The DAC is the first designed at UH to be used in a 0.2µm SOI CMOS technology. The DAC has additionally been fabricated in a 0.13µm CMOS technology for characterization and use in digitizers presently being designed. The inclusion of such structure allows comparison between fabrication runs as well as fabrication technologies. Simulations and preliminary results are included, as well as comparisons between fabrication technologies.

Primary authors : COONEY, Michael (University of Hawaii)

Co-authors : RUCKMAN, Larry (University of Hawaii) ; VARNER, Gary (University of Hawaii)

Presenter : COONEY, Michael (University of Hawaii)

Track classification : Front-end Electronics

Contribution type : Poster Presentation

Submitted by : COONEY, Mike

Submitted on Monday 04 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Poster Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:04
Comments : ""

Abstract ID : 183

Continuous Acquisition Pixel 12: Hexagonal Pixels in SOI Technology

Content :

The next generation of vertexing detectors in collider experiments will require order of magnitude increases in readout speed and increased background rates. The CAP12 continues the evolution of a number of binary, 3T based pixel detector related technologies at the University of Hawaii to address readout speed, density requirements, and background rate issues. The CAP12 takes the HIXEL readout method developed at UH and combines it with faster digital logic, column based threshold biasing, and manufactured on a 0.2μm SOI CMOS technology. Pixel size has been reduced to 30μm by 30μm and on die threshold DACs are intended to improve analog performance and biasing. The chip architecture is presented as well as simulations and preliminary results.

Primary authors : COONEY, Michael (University of Hawaii)

Co-authors : Prof. VARNER, Gary (University of Hawaii)

Presenter : COONEY, Michael (University of Hawaii)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : COONEY, Mike

Submitted on Monday 04 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:05
Comments : "20 min"

Abstract ID : 184

Upgrade Design of TileCal Front-end Readout Electronics and Radiation Hardness Studies

Content :

The ATLAS Tile Calorimeter (TileCal) is essential for measuring the energy and direction of hadrons and taus produced in LHC collisions. The TileCal consists of "tiles" of plastic scintillator dispersed in a fine-grained steel matrix . Optical fibers from the tiles are sent to ~10,000 photomultiplier tubes (PMT) and associated readout electronics.
The TileCal front-end analog readout electronics process the signals from ~10,000 PMTs. Signals from each PMT are shaped with a 7-pole passive LC shaper and split it to two channels amplified by a pair of clamping amplifiers with a gain ratio of 32. Incorporated with two 40Msps 12-bit ADCs, the readout electronics provide a combined dynamic range of 17-bits. With this dynamic range, the readout system is capable of measuring the energy deposition in the calorimeter cells from ~220MeV to 1.3TeV with the least signal-to-noise ratio of greater than 20. The digitized data from each PMT are transmitted off-detector optically, where the data are further processed with dedicated electronics to provide trigger logic and data for physics studies.
The sLHC is planned to increase the design luminosity up to 5x1034/sec/cm2. It will be important to upgrade the front-end electronics to cope with the higher radiation levels and to take advantage of the latest technology improvements since the time of the original design. The front-end electronics are required to withstand ~60Krad over their lifetime. As a R project, we are currently using commercially available off-the-shelf integrated circuits with deep-submicron technology to design a prototype analog readout board associated with this upgrade.
We will present the test results of electronics performance and radiation hardness studies for the newly designed TileCal front-end readout electronics at the sLHC.

This will be presented by F. Tang on behalf of the ATLAS Tile Calorimeter Group The Enrico Fermi Institute.

Primary authors : TANG, Fukun (Enrico Fermi Institute - University of Chicago)

Co-authors :

Presenter : TANG, Fukun (Enrico Fermi Institute - University of Chicago)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : TANG, Fukun

Submitted on Monday 04 April 2011

Last modified on : Monday 09 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)

Judged by : ARAI, Yasuo
Date : 21 April 2011 02:05
Comments : "20 min"

Abstract ID : 185

The Next Generation Scintillator-based Electromagnetic Calorimeter Prototype and Beamt Test

Content :

We are studying next generation scintillation detectors for future collider experiments. For precise energy measurement of energetic jets in future experiments, particle flow algorithm with fine granular scintillator strip calorimeter will play an important role. To establish the technology of the calorimeter, we are studying the properties of small plastic scintillator strips with size of (10-5) x 50 x 3 mm, which is a fundamental component of the calorimeter. As a part of this R study, small extruded plastic Scintillator of size 10 x 45 x 3 mm and a tungsten plate with 3.5 mm thick are sampled together to Fabricate a Scintillator base electromagnetic calorimeter prototype. The Prototype has a stack of 30 layers, having dimension of 20 x 20 cm. The Scintillator strips in successive layers aligned in orthogonal to achieve effective 1 x 1 cm segmentation. The total number of channels is 2160 for readout. The scintillation light produced in plastic Scintillator strips enters the wavelength shifting(WLS) fiber placed inside the plastic Scintillator are guided to the sensitive photo detector 1600 pixel MPPC (Multi Pixel Photon Counter) with a sensitive region of 1 x 1 mm^2. The electromagnetic calorimeter performance has been studied with test beam during summer 2008 and 2009 at Fermilab. We have injected 1-30 GeV electron and 60 GeV Pion beams and measured energy resolution and linearity of response toward input energy. In this presentation we will present obtained performance of the calorimeter prototype.

Primary authors : KHAN, Adil (Kyungpook national University)

Co-authors :

Presenter : KHAN, Adil (Kyungpook national University)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : KHAN, Adil

Submitted on Tuesday 05 April 2011

Last modified on : Saturday 09 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 09 April 2011 11:25
Comments : "New development"

Abstract ID : 186

Commissioning and performance of the ATLAS Transition Radiation Tracker with first high energy pp and Pb-Pb collisions at LHC

Content :

The ATLAS Transition Radiation Tracker (TRT) is the outermost of the three sub-systems of the ATLAS Inner Detector at the Large Hadron Collider at CERN. It consists of close to 300000 thin-wall drift tubes (straws) providing on average 30 two-dimensional space points with 0.12-0.15 mm resolution for charged particle tracks with $|\eta| < 2$ and $pT > 0.5$ GeV. Along with continuous tracking, it provides particle identification capability through the detection of transition radiation X-ray photons generated by high velocity particles in the many polymer fibers or films that fill the spaces between the straws. Custom-built analog and digital electronics is optimized to operate as luminosity increases to the LHC design.

In this talk, a review of the commissioning and first operational experience of the TRT detector will be presented. Emphasis will be given to performance studies based on the reconstruction and analysis of LHC collisions. A comparison of the TRT response to two very different center of mass energy collisions (900 GeV and 7000 GeV) will be presented here. In addition, for the first time studies of the response of the TRT detector to the extreme high track density condition occurred during the November 2010 heavy ion LHC running period will be presented here for the first time, giving interesting insight on the expected performance of the TRT gas detector for future LHC proton-proton high luminosity runs. The techniques used are applicable to a wide range of charged particle and soft x-ray detection scenarios.

Primary authors : Mr. BOCCI, Andrea (Duke University)

Co-authors :

Presenter : Mr. BOCCI, Andrea (Duke University)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : BOCCI, Andrea

Submitted on Tuesday 05 April 2011

Last modified on : Wednesday 06 April 2011

Comments :

This presentation will be on behalf of the ATLAS collaboration. The speaker will be selected by an internal committee in case the abstract is accepted.

I select to be a presenter only because the web-form required it, but please take into account this fact.

Best regards
Andrea Bocci (for the ATLAS ID speaker committee)

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 06 April 2011 05:38
Comments : ""

Abstract ID : 187

Readout Electronics for the ATLAS LAr Calorimeter at HL-LHC

Content :

The ATLAS experiment is one of the two general-purpose detector designed to study proton-proton collisions (14 TeV in the center of mass) produced at the Large Hadron Collider (LHC) and to explore the full physics potential of the LHC machine at CERN. The ATLAS Liquid Argon (LAr) calorimeters are high precision, high sensitivity and high granularity detectors designed to provide precision measurements of electrons, photons, jets and missing transverse energy. ATLAS (and its LAr Calorimeters) has been operating and collecting p-p collisions at LHC since 2009.
The on-detector electronics (front-end) part of the current readout electronics of the calorimeters measures the ionization current signals by means of preamplifiers, shapers and digitizers and then transfers the data to the off-detector electronics (back-end) for further elaboration, via optical links. Only the data selected by the level-1 calorimeter trigger system are transferred, achieving a bandwidth reduction to 1.6 Gbps. The analog trigger sum signals are formed on the front-end electronics boards and sent, via copper cables, to the receiver part of the trigger system.
The number of channels in the LAr readout is ~200K. The front-end electronics is composed by 58 electronics crates, housing 1524 signal processing boards (FEBs) plus 300 other electronics boards. Each crate is powered by a radiation tolerant power supply. There are ~ 1600 optical links between the front- end and the back-end system. The back-end electronics consists of 16 crates, 192 Read Out Drivers (ROD). Each ROD receives data from up to 8 FEBs and calculates the energy deposited and the time of the deposition using an optimum filtering algorithm.

The current front-end electronics need to be upgraded to sustain the higher radiation levels and data rates expected at the upgraded LHC machine (HL-LHC), which will have 5 times more luminosity than the LHCin its ultimate configuration. The complexity of the present electronics and the obsolescence of some of components of which it is made, will not allow a partial replacement of the system. A completely new readout architecture scheme is under study and many components are being developed in various R programs of the LAr collaboration group.
The new front-end readout will send data continuously at each bunch crossing through high speed radiation resistant optical links. The data (~100 Gbps for each board) will be processed real-time with the possibility of implementing trigger algorithms for clusters and electron/photon identification at a higher granularity than that which is currently implemented. The new architecture simplifies the system design while keeping many options open, such as pipeline design, shaping, gain setting, etc. Moreover it will eliminate the intrinsic limitation presently existing on Level-1 trigger acceptance.

This talk will cover architectural design aspects of the new electronics as well as some detailed progress on the development of several ASICs needed, e.g. new ADCs and/or new optical links. Preliminary studies with FPGA's to cover the backend functions including part of the Level-1 trigger requirements will also be presented.

Primary authors : Dr. HERVAS, Luis (CERN) ; Dr. MENKE, Sven (MPI Munich) ; Prof. OAKHAM, Gerald (Carleton University)

Co-authors :

Presenter : Dr. HERVAS, Luis (CERN)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : HERVAS, Luis

Submitted on Tuesday 05 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Abstract submitted by the ATLAS LAr Speakers Committee. Speaker to be selected later, once abstract is accepted

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:06
Comments : "30 min"

Abstract ID : 188

Upgrade plans for ATLAS Forward Calorimetry for the HL-LHC

Content :

Even though data taking has just started with the LHC, plans are being developed to operate the machine and its detectors at up to 10 times the original design luminosity. This has an impact on many components of the ATLAS detector, particularly the Forward calorimeter, which is exposed to some of the highest radiation rates in ATLAS.

The FCal detector and its associated components were designed for operation at the maximum LHC luminosity of 1034 cm2s-1. However at the higher luminosities (HL), which are projected for the HL-LHC, operation of the FCal will be compromised. Beam heating in the FCal which is located on a liquid argon filled cryostat could lead to the formation of argon bubbles in the detector, the ionization rate will result in space charge effects that will reduce the signal and the current draw will result in a voltage drop across the HV current limiting resistors. The space charge and ionization rates will result in the FCal becoming insensitive to particles at its inner edge and the insensitive region will grow as the luminosity increases.

There are two possible solutions being considered to maintain FCal operation at HL-LHC, one is a complete replacement of the FCal system. A replacement FCal would have a similar design to the current calorimeter except for additional cooling, lower value HV protection resistors and the use of smaller ionization gaps; as small as 100 microns in the first compartment. There have been a number of recent studies of the effectiveness of small gap FCal style detectors for high luminosity environments. The drawback to the complete replacement of the FCal is the mechanical difficulty of extracting the current detector from its cryostat, relocating the highly radioactive detector and installing a new detector in a limited time window. These concerns led to the development of a second option which is the installation of a small warm calorimeter to be placed in front of the FCal which has been named the Mini-FCal. This addition would reduce the ionization load in the first FCal compartment at small radius by up to a factor of three, which would keep a larger region of the FCal active and reduce the heat load to an acceptable level.

The current concept for the Mini-FCal is a standard parallel plate calorimeter with 12 copper disc absorbers and 11 layers of sensors. The key to the design of the Mini-FCal is the selection of a sensor technology that will produce an adequate signal for a significant number of years at HL-LHC intensities. The first choice for this is the use of diamond detectors due to their inherent radiation resistance. It is anticipated that neutrons will be the major cause of damage to the diamond sensors and the integrated flux of neutrons in the Mini-FCal after 10 years running at the HL-LHC will be up to 5x1017 neutrons/sq cm. Recent irradiation tests carried out by members of the ATLAS LAr group show that these sensors can still operate after irradiation up to these levels although with a large reduction in signal.

The talk will discuss a number of aspects of the upgrade work for ATLAS forward calorimetry and outline the continuing experimental development program.

Primary authors : Dr. HERVAS, Luis (CERN) ; Dr. MENKE, Sven (MPI Munich) ; Prof. OAKHAM, Gerald (Carleton University)

Co-authors :

Presenter : Dr. HERVAS, Luis (CERN)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : HERVAS, Luis

Submitted on Tuesday 05 April 2011

Last modified on : Saturday 09 April 2011

Comments :

Abstract submitted by the ATLAS LAr Speakers Committee. Speaker to be selected later, once abstract is accepted

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)

Judged by :

Date : 09 April 2011 11:26

Comments : "Running experiment"

Abstract ID : 189

Status of the Atlas Liquid Argon Calorimeter and its Performance after one year of LHC operation

Content :

The ATLAS experiment is designed to study the proton-proton collisions produced at the LHC with a centre-of-mass energy of 14 TeV. Liquid argon (LAr) sampling calorimeters are used in ATLAS for all electromagnetic calorimetry covering the pseudorapidity region $\eta<3.2$, as well as for hadronic calorimetry from $\eta=1.4$ to $\eta=4.8$. The calorimeter system consists of an electromagnetic barrel calorimeter and two endcaps with electromagnetic (EMEC), hadronic (HEC) and forward (FCAL) calorimeters. The lead-liquid argon sampling technique with an accordion geometry was chosen for the barrel electromagnetic calorimeter (EMB) and adapted to the endcap (EMEC). This geometry allows a uniform acceptance over the whole azimuthal range without any gap. The hadronic endcap calorimeter (HEC) uses a copper-liquid argon sampling technique with plate geometry and is subdivided into two wheels in depth per end-cap. Finally, the forward calorimeter (FCAL) is composed of three modules featuring cylindrical electrodes with thin liquid argon gaps. The barrel and the two endcaps are housed into three cryostats kept at about 87 K. The different parts of the LAr calorimeter have been installed inside the ATLAS cavern between October 2004 and April 2006.
Since October 2006 the detector has been operated with liquid argon at nominal high voltage, and fully equipped with readout electronics including a LVL1 calorimeter trigger system.
First cosmic runs were recorded and used in various stages of commissioning. Starting in September 2008 beam related events were collected for the first time with single beams circulating in the LHC ring providing first beam-gas interactions and then beam-collimator splash events. The first p-p collisions at 450 GeV per beam were seen in 2009. During 2010 almost 50 pb-1 of p-p collisions have been collected at 7 TeV center-of-mass energy.
During all these stages the LAr calorimeter and its electronics has been operating almost optimally thanks to an intense effort by a large community.
The latest status of the detector as well as problems and solutions addressed during the last years will be presented. The talk will cover aspects of operation of a large detector over a long time period. Selected topics showing the performance of the detector with particles will be shown. Particular emphasis will be placed in measurements dependent on the high quality of the 200K channels of readout electronics and its calibration (e.g. noise, timing precision...), all of which are operating according to design specification.

Primary authors : Dr. HERVAS, Luis (CERN) ; Dr. MENKE, Sven (MPI Munich) ; Prof. OAKHAM, Gerald (Carleton University)

Co-authors :

Presenter : Dr. HERVAS, Luis (CERN)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : HERVAS, Luis

Submitted on Tuesday 05 April 2011

Last modified on : Saturday 09 April 2011

Comments :

Abstract submitted by the ATLAS LAr Speakers Committee. Speaker to be selected later, once abstract is accepted

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 09 April 2011 11:26
Comments : "Running experiment"

Abstract ID : 190

A high speed serializer ASIC for ATLAS Liquid Argon calorimeter upgrade

Content :

The current front-end electronics of the ATLAS Liquid Argon calorimeters need to be upgraded to sustain the higher radiation levels and data rates expected at the upgraded LHC machine (HL-LHC), which will have 5 times more luminosity than the LHC in its ultimate configuration. This upgrade calls for an optical link system of 100 Gbps per front-end board (FEB). A high speed, low power, radiation tolerant serializer is the critical component in this system. In this paper, we present the design and test results of a single channel 16:1 serializer and the design of a double-channel 16:1 serializer. Both designs are based on a commercial 0.25 μm silicon-on-sapphire CMOS technology.

The single channel serializer consists of a serializing unit, a PLL clock generator and a line driver implemented in current mode logic (CML). The serializing unit multiplexes 16 bit parallel LVDS data into 1-bit width serial CMOS data. The serializing unit is composed of a cascade of 2:1 multiplexing circuits based on static D-flip-flops. The total jitter is measured to be 62 ps at bit error rate (BER) of 10-12 at 5 Gbps. Random and deterministic jitters are measured to be 2.6 ps and 33.4 ps, respectively. The serializer can work from 4.0 to 5.7 Gbps with BER less than 10-12. The power consumption is measured to be 463 mW at 5 Gbps. A proton beam test proves that the serializer meets the radiation tolerant requirements of ATLAS.

A double-channel 16:1 serializer is currently under development. A low jitter LC tank PLL is shared by two serializing units to save the power consumption. The critical high speed components, including clock buffer, divider and the last stage of 2:1 multiplexing unit, are implemented with current mode logic. The post-layout simulation results of these components indicate that 8 Gbps per channel is achievable.

Primary authors : Dr. HERVAS, Luis (CERN) ; Dr. MENKE, Sven (MPI Munich) ; Prof. OAKHAM, Gerald (Carleton University)

Co-authors :

Presenter : Dr. HERVAS, Luis (CERN)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : HERVAS, Luis

Submitted on Tuesday 05 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Abstract submitted by the ATLAS LAr Speakers Committee. Speaker to be selected later, once abstract is accepted

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)

Judged by : ARAI, Yasuo
Date : 21 April 2011 02:06
Comments : "20 min"

Abstract ID : 191

Design, Implementation and Performance of the LHCb Online system

Content :

After the first year of serious running of the LHCb experiment it's probably appropriate to report on its performance and also retrospect on the design criteria and implementation of the system.
We will also look forward and present first ideas of the system in view of the planned upgrade of the experiment in 2016 or so.

Primary authors : JOST, Beat (CERN)

Co-authors :

Presenter : JOST, Beat (CERN)

Track classification : Trigger and Data Acquisition Systems

Contribution type : --not specified--

Submitted by : JOST, Beat

Submitted on Tuesday 05 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:38
Comments : ""

Abstract ID : 192

Status and Plans for the Cherenkov Telescope Array

Content :

The last few years have seen stunning results both from ground-based gamma-ray astronomy from H.E.S.S., MAGIC, and VERITAS as the imaging atmospheric Cherenkov technique has matured, and from space since the 2008 launch of the Fermi Gamma-ray Space Telescope. The Cherenkov Telescope Array (CTA) is a global collaboration formed to develop a next-generation ground-based array of imaging atmospheric Cherenkov telescopes with a significant advance in capabilities over current ground- and space-based telescopes. In particular, CTA aims to have a factor of 10 improvement in sensitivity in the core energy range of 100 GeV to some 10's TeV, a threshold energy well below 100 GeV, a factor of 3-5 improvement in angular resolution, and an effective area of at least several square kilometers for energies above 10 TeV. This talk describes the science drivers that motivate CTA, and the technical challenges and advances required to achieve these goals. Giga-sample-per-second front-end electronics based on custom ASICs and a highly integrated modular camera design are under development. Three sizes of telescopes (large, medium, and small, with diameters of roughly 24 m, 9-12 m, and 4-7 m) will be needed to cover this broad energy range. Several designs for the telescopes within CTA are under consideration, including a novel design utilizing Schwarzschild-Couder (SC) optics. The SC design presents challenges in mirror fabrication and alignment, but would allow simultaneously a large field of view (8-10 degrees in diameter) and a small plate scale for the camera, making a fine pixelization (~0.05 degrees/pixel) possible by use of multi-anode photomultiplier tubes.

Primary authors : Dr. HUMENSKY, Brian (University of Chicago / Columbia University)

Co-authors :

Presenter : Dr. HUMENSKY, Brian (University of Chicago / Columbia University)

Track classification : Experimental Detector Systems ; Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : HUMENSKY, Brian

Submitted on Tuesday 05 April 2011

Last modified on : Monday 25 April 2011

Comments :

If it's possible to avoid placing the talk on Sunday the 12th, that would be great - if not, I'll find a way to work around some prior commitments.

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 25 April 2011 17:17
Comments : ""

Track : Experimental Detector Systems

Judgment : Proposed for other tracks (Experimental Detector Systems)
Judged by : KUSAKA, Akito
Date : 22 April 2011 22:01
Comments : ""

Abstract ID : 193

A correlation-based timing calibration and diagnostic technique for fast digitizing ASICs

Content :

A general procedure for precision timing calibration of giga-sample/s waveform digitizing ASICs is presented. These devices are increasingly used in a number of high-energy physics experiments to perform waveform sampling of front-end detector signals. Waveform digitizing ASICs have considerable advantages over traditional TDC/ADC systems, such as high channel density and low power consumption, but have irregularly spaced timing intervals between samples due to process variations at the production level. The procedure presented here exploits the known correlation between nearby samples of a sine wave function to obtain the time difference between them. As only the correlations are studied, the procedure can be performed without knowledge of the phase of the input signal, and converges with smaller data samples than other common techniques. It also serves as a valuable diagnostic tool, allowing a fast, visual, qualitative check of ADC linearity, gain mismatches between sampling cells, and other ADC artifacts. Work is continuing to extend the procedure to fit for timing intervals in the face of such non-idealities.

We present both the algorithm and example calibration results from multiple ASICs. In particular, using the PSEC3 ASIC, we show improvement in timing performance for readout of a stripline MCP-PMT, which serves as a prototype for moving toward large (order m^2) photodetectors. Due to the anode geometry, the calibration technique improves both the timing resolution and the spatial resolution of the device.

Primary authors : Dr. NISHIMURA, Kurtis (University of Hawaii) ; Dr. ROMERO-WOLF, Andres (Jet Propulsion Laboratory)

Co-authors :

Presenter : Dr. NISHIMURA, Kurtis (University of Hawaii)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : NISHIMURA, Kurtis

Submitted on Wednesday 06 April 2011

Last modified on : Thursday 21 April 2011

Comments :

On behalf of the Large-Area Picosecond Photo-Detector (LAPPD) electronics group.

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:07
Comments : "20 min"

Abstract ID : 194

The new frontier of the DATA acquisition using 1 and 10 Gb/s Ethernet links.

Content :

ALICE (A Large Ion Collider Experiment) is the detector system at the LHC (Large Hadron Collider) optimized for the study of heavy-ion collisions. Its main aim is to study the behavior of strongly interacting matter and the quark gluon plasma. Currently all the information sent by the 18 sub-detectors composing ALICE are read out by DATE (ALICE Data Acquisition and Test Environment), the ALICE data acquisition software, using several optical links called DDL (Detector Data Link), each one with a maximum throughput of 200 MB/s. In the last year a commercial transmission link with a throughput of 10 Gb/s has become a reality, with a low price affordable for everyone. The DATE system has been upgraded to also support this technology in addition to the DDL.

This contribution will describe the VHDL firmware of a detector readout board, sending data using the UDP protocol and the changes made to the readout part of DATE software to receive information coming from the 1 or 10 Gb/s Ethernet link.
It will also describe the relevant details of the test firmware and software and will conclude with the results of the performance tests done at CERN using the new set-up.

Primary authors : Dr. COSTA, Filippo (CERN)

Co-authors :

Presenter : Dr. COSTA, Filippo (CERN)

Track classification : Trigger and Data Acquisition Systems

Contribution type : --not specified--

Submitted by : COSTA, Filippo

Submitted on Wednesday 06 April 2011

Last modified on : Friday 22 April 2011

Comments :

Field of interest:
Front-end electronics
Trigger and data acquisition systems

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:41
Comments : ""

Abstract ID : 195

Waveform analysis of SiPM signals with DRS4 board

Content :

We are using DRS4 digital oscilloscope board for time-of-flight (TOF) applications in Fermilab. We developed a model to perform waveform analysis of the DRS4 data taken with silicon photomultipliers. The applications range from Cherenkov TOF system to TOF positron emission tomography. The unified approach allows to achieve high time resolution for signals with width from few to hundreds nanoseconds.

Primary authors : Dr. ZATSERKLYANIY, Andriy (University of Puerto Rico Physics Department-Unknown-Unknown)

Co-authors : Dr. RAMBERG, Erik (Fermilab) ; Dr. RONZHIN, Anatoly (Fermilab)

Presenter : Dr. ZATSERKLYANIY, Andriy (University of Puerto Rico Physics Department-Unknown-Unknown)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : ZATSERKLYANIY, Andriy

Submitted on Wednesday 06 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 29 April 2011 16:42
Comments : ""

Abstract ID : 196

Calibration, operation and performance of the ALICE Silicon Drift Detectors in pp and PbPb collisions

Content :

The two intermediate layers of the ALICE Inner Tracking System (ITS) are instrumented with Silicon Drift Detectors.
The detector calibration and monitoring procedures as well as their performance over almost two years of data taking, both with pp
and PbPb collisions, will be presented.
In particular, the techniques for measuring the drift velocity and its stability over time will be described. The latter, which varies sensitively with the ambient temperature, has to be periodically calibrated with an accuracy in the order of 0.1%, in order to allow the position along the drift axis (perpendicular to the beam) to be determined within the design resolution of about 35 microns.
Owing to their superior resolution (~35 micron) the SDD were used as a reference for ITS detectors alignment along beam direction. The ITS alignment strategy and the results obtained with different sets of data will be shown.
The ITS features also particle identification in the low transverse momentum region (up to 500 MeV for p/K separation and up to 1.2 Gev/c for p/K separation), by measuring the energy loss in the outermost four layers, SDD and Silicon Strip Detectors (SSD). The calibration of the energy loss within each and among all the 260 modules, together with its dependence on the drift distance, were carefully studied. Dedicated Quality Assurance (QA) procedures analyze all acquired physics data and generate a set of plots that allows verifying the uniformity and stability of the SDD key parameters. Data sets tagged as bad by the QA procedures will be excluded from the subsequent physics analysis. The QA procedures guarantee the data quality uniformity, excluding data sets tagged as bad from the following analyses.
The contribution of the SDD to physics analyses which require high resolution on vertex reconstruction and particle identification at low transverse momenta will also be discussed, showing as examples the analysis of identified hadron spectra and the exclusive reconstruction of heavy flavoured hadrons via hadronic decays.

Primary authors : Dr. BEOLE, Stefania (University of Torino and INFN)

Co-authors :

Presenter : Dr. BEOLE, Stefania (University of Torino and INFN)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : BEOLE, Stefania

Submitted on Wednesday 06 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)

Judged by : COLLINS, Paula
Date : 29 April 2011 09:30
Comments : ""

Abstract ID : 197

Performance and Operational Experience of the CDF Luminosity Monitor

Content :

We describe performance of the detector used for luminosity measurements in the CDF experiment in Run 2 at the Tevatron. The detector consists of low-mass gaseous Cherenkov counters with high light yield (about 100 photo-electrons) and monitors the process of inelastic proton-anti-proton scattering. This detector allows for several methods of precise luminosity measurements at peak luminosities of up to 4 \times 10^32 cm^{-2}s^{-1}, which corresponds to an average of 12 proton-anti-proton interactions per bunch crossing. During almost 10 years of the Tevatron Run 2 CDF Luminosity monitor is proved to be very stable and reliable detector and provided luminosity measurements for all physics results from CDF.

Primary authors : SUKHANOV, Alexander (Fermilab)

Co-authors :

Presenter : SUKHANOV, Alexander (Fermilab)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : SUKHANOV, Alexander

Submitted on Wednesday 06 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:27
Comments : ""

Abstract ID : 198

Quality Assurance System for NOvA Detector Module Production

Content :

NOvA is a long-baseline neutrino oscillation experiment that will use the Fermilab NuMI beam and new near and far detectors located at Fermilab and Ash River, Minnesota.

The 15 kiloton far detector consists of 12,028 16m x 1m x 7cm liquid scintillator-filled modules, laminated into 16 m x 16 m blocks. These modules are constructed from PVC plastic extrusions to produce a structure of 32 tubular cells which are outfitted with wavelength shifting fibers. Plastic parts are glued to these extrusions in order to route the sixty-four fiber ends to an optical connector and also to create a liquid-tight seal for the liquid scintillator. Assembly of these modules involves many delicate assembly tasks and custom test equipment. There are stringent leak, light output, and dimensional tolerances on the completed modules. During peak production, the assembly labor force will consist of a crew of approximately 200 part-time student employees, working an average of about twelve hours per week, managed by five full-time employees and two managers.

A comprehensive system has been developed to ensure the quality of the NOvA modules and to make possible the challenging task of managing a large part-time work force with a small management team. Each assembly step is monitored and directed using screen prompts and audio feedback in order to prevent mistakes. Should any problems arise, the data collected will allow us to quickly identify and correct them. Input is provided using wireless bar code scanners and touch screen displays at approximately 50 locations in the factory. These clients communicate over a wireless LAN to application servers. The software is written in Java Enterprise Edition.

Tooling to string the fibers and custom equipment to test the leak integrity, fiber light loss, and flatness of the modules is integrated with the system. The system handles all aspects of the factory operation: assembly tasks, test data collection, storage, and checking, inventory, personnel scheduling and training, machine maintenance and calibration, data backup and synchronization. A web interface provides views of the data. Large format displays throughout the factory provide alarms and dashboards to present relevant information for each location.

An earlier version of the system was used to produce 500 modules for the NOvA near detector. Further development and improvements are in progress as we prepare to assemble the first far detector modules.

Primary authors : Dr. SMITH, Alex (University of Minnesota)

Co-authors :

Presenter : Dr. SMITH, Alex (University of Minnesota)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : SMITH, Alex

Submitted on Wednesday 06 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:36
Comments : ""

Abstract ID : 199

Development of Large Scale Gas Electron Multiplier Chambers

Content :

The High Energy Physics group of the University of Texas at Arlington Physics Department has been developing Gas Electron Multiplier (GEM) detectors for the use as the sensitive gap detector in digital hadron calorimeters (DHCAL) for the future International Linear Collider. In this study, two kinds of prototype GEM detectors have been tested. One has 30x30 cm2 active area double GEM structure with a 3 mm drift gap, a 1 mm transfer gap and a 1 mm induction gap. The other one has two 2x2 cm2 GEM foils in the amplifier stage with a 5 mm drift gap, a 2 mm transfer gap and a 1 mm induction gap. We present characteristics of these detectors obtained using high-energy charged particles, cosmic ray muons and 106Ru and 55Fe radioactive sources. From the 55Fe tests, we observed two well-separated X-ray emission peaks and measured the chamber gain to be over 6500 with a high voltage of 395 V across each GEM electrode. Both the spectra from cosmic rays and the 106Ru fit well to Landau distributions as expected from minimum ionizing particles. We also present the chamber performance after high dosage exposure to radiation as well as the pressure dependence of the gain and correction factors. Finally, we discuss the quality test results of the first set of large scale GEM foils and discuss progress and future plans for constructing large scale (100cmx100cm) GEM detectors.

Primary authors : Prof. YU, Jaehoon (UNIVERSITY OF TEXAS AT ARLINGTON) ; Prof. WHITE, Andrew (UNIVERSITY OF TEXAS AT ARLINGTON) ; Dr. PARK, Seongtae (UNIVERSITY OF TEXAS AT ARLINGTON) ; Mr. BALDELOMAR, Edwin (UNIVERSITY OF TEXAS AT ARLINGTON) ; Dr. SOSEBEE, Mark (UNIVERSITY OF TEXAS AT ARLINGTON) ; Dr. KWANGJUNE, Park (KAERI) ; Mr. TRAN, Nam (UNIVERSITY OF TEXAS AT ARLINGTON)

Co-authors :

Presenter : Prof. YU, Jaehoon (UNIVERSITY OF TEXAS AT ARLINGTON) ; Dr. PARK, Seongtae (UNIVERSITY OF TEXA

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : Prof. YU, Jaehoon

Submitted on Wednesday 06 April 2011

Last modified on : Saturday 09 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 09 April 2011 15:20
Comments : ""

Abstract ID : 200

The Dark Energy Survey Camera (DECam)

Content :

The Dark Energy Survey (DES) is a next generation optical survey aimed at understanding the expansion rate of the universe using four complementary methods: weak gravitational lensing, galaxy cluster counts, baryon acoustic oscillations, and Type Ia supernovae. To perform the survey, the DES Collaboration is building the Dark Energy Camera (DECam), a 3 square degree, 570 Megapixel CCD camera that will be mounted at the prime focus of the Blanco 4-meter telescope at the Cerro Tololo Inter-American Observatory. CCD production has finished, yielding roughly twice the required 62 2kx4k detectors. The construction of DECam is nearly finished. Integration and commissioning on a "telescope simulator" of the major hardware and software components, except for the optics, recently concluded at Fermilab. Final assembly of the optical corrector has started at University College, London. Some components have already been received at CTIO. "First-light" will be in December 2011. This oral presentation will concentrate on the technical challenges involved in building DECam (and how we overcame them), and the present status of the instrument.

Primary authors : Dr. DIEHL, Thomas (Fermilab)

Co-authors :

Presenter : Dr. DIEHL, Thomas (Fermilab)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by :

Submitted on Wednesday 06 April 2011

Last modified on : Thursday 21 April 2011

Comments :

* for the Dark Energy Survey Collaboration

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:35
Comments : ""

Abstract ID : 201

Crystal Calorimetry for the Next Decade

Content :

Crystal calorimeters have traditionally played an important role in precision measurements of electrons and photons in high energy physics experiments. Recent interests in calorimeter technologies extend their applications also to hadrons and jets. Potential applications of a new generation scintillating crystals of high density and high light yield, such as LSO/LYSO, in high energy physics experiments are described. Candidate crystals for a homogeneous hadron calorimeter detector concept are also discussed.

Primary authors : Dr. REN-YUAN, Zhu (California Institute of Technology (CALTECH))

Co-authors :

Presenter : Dr. REN-YUAN, Zhu (California Institute of Technology (CALTECH))

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : Dr. REN-YUAN, Zhu

Submitted on Wednesday 06 April 2011

Last modified on : Saturday 09 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 09 April 2011 11:27
Comments : "New developments"

Abstract ID : 202

The Belle II time-of-propagation counter

Content :

The Belle II detector operating at the SuperKEKB accelerator will utilize the time-of-propagation (TOP) counter as its primary particle identification device in the barrel region. The TOP counter is a compact variant of the detection of internally reflected Cherenkov light (DIRC) technique, which trades the imaging-based performance of a traditional DIRC with fast timing provided by micro-channel plate (MCP) PMTs. In order to read out a large number of such MCP-PMT channels with high precision, an electronics system based on waveform sampling ASICs is being developed. Full waveforms from front-end ASICs are transmitted by fiberoptic links to digital signal processors, which extract the precise charges and times necessary for the final reconstruction. A lower resolution set of timing data is also produced by the front end, collected from all modules, and passed to provide order ~ns event timing to the global trigger. We discuss the general principles of TOP operation and the planned Belle II TOP system, which is expected to provide 4 sigma or better separation of kaons and pions up to momenta of approximately 4 GeV/c.

Primary authors : Dr. NISHIMURA, Kurtis (University of Hawaii)

Co-authors :

Presenter : Dr. NISHIMURA, Kurtis (University of Hawaii)

Track classification : Particle Identification

Contribution type : Oral Presentation

Submitted by : NISHIMURA, Kurtis

Submitted on Thursday 07 April 2011

Last modified on : Wednesday 27 April 2011

Comments :
on behalf of the Belle II Particle Identification Group.

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : Toru Iijima
Date : 27 April 2011 13:00
Comments : ""

Abstract ID : 203

Silicon for High-Luminosity Tracking Detectors - Recent RD50 Results

Content :

In order to harvest the maximum physics potential of the CERN Large Hadron Collider (LHC), it is foreseen to significantly increase the LHC luminosity by upgrading the LHC towards the HL-LHC (High Luminosity LHC). Especially the final upgrade (Phase-II Upgrade) foreseen for 2021 will mean unprecedented radiation levels, exceeding the LHC fluences by roughly an order of magnitude. Due to the radiation damage limitations of the silicon sensors presently used, the physics experiments will require new tracking detectors for HL-LHC operation. All-silicon central trackers are being studied in ATLAS, CMS and LHCb, with extremely radiation hard silicon sensors to be employed on the innermost layers.
Within the CERN RD50 Collaboration, a massive R programme is underway across experimental boundaries to develop silicon sensors with sufficient radiation tolerance. One research topic is to gain a deeper understanding of the connection between the macroscopic sensor properties such as radiation-induced increase of leakage current, doping concentration and trapping, and the microscopic properties at the defect level. We also study sensors made from p-type silicon bulk, which have a superior radiation hardness as they collect electrons instead of holes, exploiting the lower trapping probability of the electrons due to their higher mobility. Another sensor option under investigation is to use silicon produced with the Czochralski-process. The high oxygen content in the Czochralski-Silicon has been shown to have a beneficial influence on some of the effects of radiation damage. A further area of activity is the development of advanced sensor types like 3D silicon detectors designed for the extreme radiation levels expected for the vertexing layers at the HL-LHC. These detectors in general have electrodes in the form of columns etched into the silicon bulk, which provide a shorter distance for charge collection and depletion, which reduces trapping and full depletion voltage. We will present results of several detector technologies and silicon materials at radiation levels corresponding to HL-LHC fluences. Based on these results, we will give recommendations for the silicon detectors to be used at the different radii of tracking systems in the LHC detector upgrades.

Primary authors : PARZEFALL, Ulrich (Freiburg University)

Co-authors :

Presenter : PARZEFALL, Ulrich (Freiburg University)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : PARZEFALL, Ulrich

Submitted on Thursday 07 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

This abstract is submitted by Ulrich Parzefall on behalf of the RD50 Collaboration.
The submission is done under my name for the RD50 speaker's bureau. The actual speaker remains to be chosen by the speaker's bureau in due time.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)

Judged by : COLLINS, Paula

Date : 03 May 2011 08:10

Comments : "This talk is proposed to be accepted as a plenary overview talk in the Exp. Det. Syst semiconductor session."

Abstract ID : 204

R of scCVD diamond Beam Loss Monitors for the LHC at ultra-cold temperatures

Content :

A Beam Loss Monitor for the LHC provides the most accurate results if it is placed as close to the beam pipe as possible, hence within the cold mass of the magnets. For the new series of triplet magnets, the Beam Instrumentation Group seeks a detector concept that provides full functionality at ultra-cold temperatures (1.9 K). A fast response time, excellent radiation hardness, long durability and reliability, good signal to noise ratio, and a broad dynamic range to cope with a losses differing by orders of magnitude are all critical properties. Obvious candidates for the detector material include single-crystal Chemical-Vapour-Deposited (scCVD) diamond and silicon.

A set-up for Transient Current Technique (TCT) measurements for CVD diamonds at ultra-cold temperatures has been put in place in co-operation with RD39 and the CryoLab at CERN. The set-up provides a good vacuum. A He-Gas cooling device allows for temperatures down to 67 K. Am-241 and Ru-106 sources provide ionizing radiation. Broad-band read-out electronics and a current-sensitive amplifier enable measurement of the transient current.

The presented results are crucial for the future operation of diamonds at cryogenic temperatures. We will present results of measurements of the temperature dependence of fundamental diamond quantities such as carrier drift mobility and velocity, total charge yield, lifetime and detrapping time constants, and trapping energy levels. Furthermore, the difference between MIP-signals and α-signals is shown and important results for possible detector operations are derived. A model capable of explaining the data – the plasma effect with associated trapping – will be presented for the first time for scCVD diamonds. Additionally, pulse shape simulations will show the reliability of the model.

Primary authors : Mr. JANSEN, Hendrik (CERN)

Co-authors : Dr. PERNEGGER, Heinz (CERN) ; Prof. WERMES, Norbert (University of Bonn) ; Dr. EREMIN, Vladimir (Ioffe Physical Technical Institute)

Presenter : Mr. JANSEN, Hendrik (CERN)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : Mr. JANSEN, Hendrik

Submitted on Thursday 07 April 2011

Last modified on : Sunday 01 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 25 April 2011 23:15
Comments : ""

Abstract ID : 205

Performance Study of a GPU in Real-Time Applications for HEP Experiments

Content :

Graphical Processing Units (GPUs) have evolved into highly parallel, multi-threaded, multicore powerful processors with high memory bandwidth, driven by the high demand of 3-D graphics. As such, GPUs are used in a variety of intensive computing applications. The combination of highly parallel architecture and high memory bandwidth makes GPUs a potentially promising technology for effective real-time processing for High Energy Physics (HEP) experiments. However, not much is known for their performance in real-time applications that require low latency, such as the trigger for HEP experiments. We will describe our R project with the goal to study the timing performance of GPU technology for possible low latency applications, performing basic operations as well as some more advanced HEP trigger algorithms (such as fast tracking or calorimetric clustering). We will present some preliminary results on timing measurements, comparing the performance of a CPU versus a GPU using NVIDIA's CUDA general purpose parallel computing architecture, carried out at CDF's Level-2 trigger test stand. These studies will provide performance benchmarks for future studies to investigate the potential and limitations of GPUs for future real-time applications in HEP experiments.

Primary authors : KETCHUM, Wesley (University of Chicago) ; LIU, Tiehui (FNAL) ; AMERIO, Silvia (INFN Padova) ; BAUCE, Matteo (University of Padova and INFN) ; CATASTINI, Pierluigi (FNAL) ; HAHN, Kristian (FNAL) ; LUCCHESI, Donatella (University of Padova and INFN) ; URSO, Giorgio (ORMA Software) ; KIM, Young-kee (University of Chicago, FNAL) ; BASTIERI, Denis (University of Padova and INFN)

Co-authors :

Presenter : KETCHUM, Wesley (University of Chicago)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : KETCHUM, Wesley

Submitted on Thursday 07 April 2011

Last modified on : Friday 22 April 2011

Comments :

Changing from poster to oral presentation.

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 16:49
Comments : ""

Abstract ID : 206

Free Space Data L inks for HEP Experiments

Content :

We are developing data links in air, utilizing steering by MEMS mirrors, and an optical feedback path for the control loop. The laser, modulator, and lens systems used are described, as well as two different electronic systems for the steering feedback loop.
This system currently operates at 1 Gb/s, but could be upgraded.
This link works over distances of order meters. Other links for long distances are discussed. Such links might enable one to move communications lasers out of tracking detectors, for reasons such as reliability and power consumption. Some applications for data links in air are described, such as local triggering, data readout and trigger-clock distribution.

Primary authors : Dr. UNDERWOOD, David (HEP, Argonne National Laboratory (ANL))

Co-authors : Dr. STANEK, Robert (HEP, Argonne National Lab) ; Dr. FERNANDO, Waruna (HEP, Argonne National Lab.) ; Mr. DELURGIO, Patrick (HEP, Argonne National Lab.) ; Dr. LOPEZ, Daniel (Center for Nanoscale Materials, Argonne National Lab)

Presenter : Dr. UNDERWOOD, David (HEP, Argonne National Laboratory (ANL))

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : UNDERWOOD, David

Submitted on Thursday 07 April 2011

Last modified on : Monday 09 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 09 May 2011 13:53
Comments : ""

Abstract ID : 207

CMS Web-Based Monitoring

Content :

For large international High Energy Physics experiments, modern web technologies make the online monitoring of detector status, data acquisition status, trigger rates, luminosity, etc., accessible for the collaborators anywhere and anytime. This helps the collaborating experts monitor the status of the experiment, identify the problems, and improve data-taking efficiency. We present the Web-Based Monitoring project of the CMS experiment at the LHC of CERN. The data sources are relational databases and various messaging systems. The project provides a vast amount of in-depth information including real time data, historical trend, and correlations, in a user friendly way.

Primary authors : ZONGRU, Wan (Kansas State University)

Co-authors :

Presenter : ZONGRU, Wan (Kansas State University)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : ZONGRU, Wan

Submitted on Thursday 07 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:43
Comments : ""

Abstract ID : 208

Application of Large Scale Gas Electron Multiplier Technology to Digital Hadron Calorimetry

Content :

The detectors proposed for future e+e- colliders (ILC and CLIC) demand a high level of precision in the measurement of jet energies. Various technologies have been proposed for the active layers of the digital hadron calorimetry to be used in conjunction with the Particle Flow Algorithm (PFA) approach. The High Energy Physics group of the University of Texas at Arlington has been developing Gas Electron Multiplier (GEM) detectors for use as the calorimeter active gap detector. To understand this application of GEMs, two kinds of prototype GEM detectors have been tested. One has 30cmx30 cm active area double GEM structure with a 3 mm drift gap, a 1 mm transfer gap and a 1 mm induction gap. The other one has two 2cmx2 cm GEM foils in the amplifier stage with a 5 mm drift gap, a 2 mm transfer gap and a 1 mm induction gap. We will summarize the results of tests of these prototypes, using cosmic rays and sources, in terms of their applicability to a digital hadron calorimeter system. We will discuss plans for the construction of 1mx1m planes of GEM digital hadron calorimetry to be used as part of a 1m^3 stack to be used in a major test beam study of hadronic showers.

Primary authors : Prof. YU, Jaehoon (UNIVERSITY OF TEXAS AT ARLINGTON) ; Prof. WHITE, Andrew (UNIVERSITY OF TEXAS AT ARLINGTON) ; Dr. PARK, Seongtae (UNIVERSITY OF TEXAS AT ARLINGTON) ; Dr. SOSEBEE, Mark (uNIVERSITY OF TEXAS AT ARLINGTON) ; Dr. PARK, Kwangjune (KAERI) ; Mr. BALDELOMAR, Edwin (uNIVERSITY OF TEXAS AT ARLINGTON) ; Mr. TRAN, Nam (uNIVERSITY OF TEXAS AT ARLINGTON)

Co-authors :

Presenter : Prof. YU, Jaehoon (UNIVERSITY OF TEXAS AT ARLINGTON) ; Prof. WHITE, Andrew (UNIVERSITY OF TEX

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : Prof. YU, Jaehoon

Submitted on Thursday 07 April 2011

Last modified on : Saturday 09 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 09 April 2011 11:27
Comments : "New development"

Abstract ID : 214

Multipurpose Test Structures and Process Characterization using 0.13µm CMOS: The CHAMP ASIC.

Content :

As fabrication processes continue to shrink, more and more electronics are able to be integrated on die for various physics experiments. Due to the increasing number of readout channels and required sensitivity of sensors, more dense and fast ASIC elements are required and the fabrication processes must be well understood. To this end, the University of Hawaii in collaboration with the University of Chicago submitted a test ASIC, the CHAMP, composed of a number of discrete test elements on a 0.13µm CMOS process via CERN. This paper describes the structures submitted by UH and UC. Hawaii designs include high speed flip-flops, voltage controlled ring oscillators, an LVDS receiver, a charge sensitive amplifier, a set of four 64-cell waveform samplers with shared input, an analog storage and comparator structure, as well as a 12-bit DAC. The Chicago designs include voltage controlled delay lines, delay locked loops, voltage controlled ring oscillators, transmission lines, and resistors. Each of the structures will be described, with simulation and test results presented. Each of the structures has important applications in future designs as well as helping to characterize the overall fabrication process.

Primary authors : COONEY, Michael (University of Hawaii) ; Mr. ANDREW, Matt (University of Hawaii) ; Ms. CAI, Wei (University of Hawaii) ; Dr. NISHIMURA, Kurtis (University of Hawaii) ; Mr. RUCKMAN, Larry (University of Hawaii) ; Prof. VARNER, Gary (University of Hawaii) ; Mr. GRABAS, Herve (University of Chicago) ; Mr. OBERLA, Eric (University of Chicago) ; Dr. GENAT, Jean-francois (University of Chicago)

Co-authors :

Presenter : COONEY, Michael (University of Hawaii)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : COONEY, Mike

Submitted on Friday 08 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:07
Comments : "20 min"

Abstract ID : 215

Muon Collider Detector Studies

Content :

A 1.5 TeV Muon Collider is currently being studied by the Muon Accelerator project. Experiments at the muon collider will need to cope with intense backgrounds from decays of the incoming beams. Initial physics and detector studies including muon decay backgrounds are now underway. We report on some of these studies utilizing a "toy" detector, including hit densities in the tracker and vertex detector and well as energy densities and fluctuations in the calorimeter. We also discuss possible detector strategies for coping with the high background and radiation rates.

Primary authors : Dr. LIPTON, Ronald (Fermi National Accelerator Lab. (Fermilab))

Co-authors : Dr. GATTO, Corrado (INFN Lecce) ; DIBENEDETTO, Vito (INFN Lecce) ; Dr. MAZZACANE, Anna (FNAL)

Presenter : DIBENEDETTO, Vito (INFN Lecce)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : Dr. LIPTON, Ronald

Submitted on Friday 08 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:36
Comments : ""

Abstract ID : 216

Probes of fundamental microphysics using intense photon beams

Content :

Laser cavities and interferometers are approaching MW beam power, enabling probes of new microphysics and of space-time itself at mass scales well beyond the TeV scale. I will discuss several applications currently being developed, including 1) a next-generation photon-axion oscillation experiment; 2) the Holometer--an experiment to detect Planck-suppressed space-time uncertainty; and 3) possible probes of zero-point contributions to the vacuum energy.

Primary authors : CHOU, Aaron (Fermilab)

Co-authors :

Presenter : CHOU, Aaron (Fermilab)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : CHOU, Aaron

Submitted on Friday 08 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:32
Comments : ""

Abstract ID : 217

Characterization of prototype silicon microstrip detectors for the CMS Tracker upgrade

Content :

Plans are being made to upgrade the LHC luminosity above the design value of 1034cm-2s-1. At this level the existing silicon microstrip modules (outside of the pixel volumes) will no longer be able to cope with the increased occupancy and long-term radiation damage. The proposed poster outlines an extensive program by the CMS collaboration to identify a suitable replacement for the existing sensors. As part of this effort a large number of wafers have been procured from a leading vendor. These include both 200 μm thick FZ and MCz wafers as well as 150, 100, and 75 μm epitaxially-grown wafers, all with n-bulk and p-bulk versions. A variety of sensor geometries including pixel, long pixel, and strip, with different choices for pitch and implant widths, have been included each wafer. In preparation for irradiating a large number of sensors with protons and neutrons, the sensors are currently being characterized (IV, depletion voltage, breakdown voltage, inter-strip capacitance, signal-to-noise, etc.) in a number of laboratories. This work describes the effort at the Fermi National Accelerator Laboratory, which includes probing of individual sensors, source testing of sensors that have been bonded to CMS hybrids, and a recent study in the Fermilab Beam Test Facility.

Primary authors : LAMICHHANE, Pramod (Department of Physics and Astronomy-College of Science-Wayne Sta)

Co-authors : SPIGEL, Leonard (Fermi National Laboratory) ; KARCHIN, Paul (Wayne State University)

Presenter : LAMICHHANE, Pramod (Department of Physics and Astronomy-College of Science-Wayne Sta)

Track classification : Semiconductor Detectors

Contribution type : Poster Presentation

Submitted by : LAMICHHANE, Pramod

Submitted on Friday 08 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 08:05
Comments : ""

Abstract ID : 218

One year of FOS measurements in CMS experiment at CERN

Content :

Results are presented on the activity carried out by our research group, supported by Optosmart s.r.l. (an italian spin-off company), on the application of Fiber Optic Sensor (FOS) techniques to monitor high-energy physics (HEP) detectors. Assuming that Fiber Bragg Grating sensors (FBGs) radiation hardness has been deeply studied for other field of application, we have applied the FBG technology to the HEP research domain. In present paper we give the experimental evidences of the solid possibility to use such a class of sensors also in HEP detector very complex environmental side conditions. In particular we present more than one year data results of FBG measurements in the Compact Muon Solenoid (CMS) experiment set up at the CERN, where we have monitored temperatures (within CMS core) and strains in different locations by using FBG sensors during the detector operation with the Large Hadron Collider (LHC) collisions and high magnetic field. FOS data and FOS readout system stability and reliability is demonstrated, with continuous 24/24h 7/7d data taking under severe and complex side conditions.

Primary authors : Dr. SZILLASI, Zoltan (ATOMKI, Hungary) ; Dr. BUONTEMPO, Salvatore (Sezione di Napoli (INFN) , Italy) ; BENI, Noemi (ATOMKI, Hungary) ; Prof. GIOVANNI, Breglio (Departmento of Biomedical, Electronic and Telecommunication Egineering, University of Naples Federico II, Via Claudio 21, Napoli, Italy; OptoSmart s.r.l., Via Pontano 61, Napoli, Italy) ; Dr. LAUDATI, Armando (OptoSmart s.r.l., Via Pontano 61, Napoli, Italy) ; Prof. CUSANO, Andrea (Optoelectronic Division-Engineering Department, University of Sannio, Corso Garibaldi 107, Benevento, Italy; OptoSmart s.r.l., Via Pontano 61, Napoli, Italy) ; Dr. GIORDANO, Michele (Institute for Composite and Biomedical Materials (IMCB-CNR), 80055 Portici (NA), Italy; OptoSmart s.r.l., Via Pontano 61, Napoli, Italy) ; Mr. DRUZHKIN, Dmitry (University Antwerpen; Research and Development Institute of Power Engineering (NIKIET), Moscow)

Co-authors :

Presenter : Dr. SZILLASI, Zoltan (ATOMKI, Hungary)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : SZILLASI, Zoltan

Submitted on Friday 08 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:36

Comments : ""

Abstract ID : 219

A 4-Channel Waveform Sampling ASIC using 130nm CMOS technology

Content :

We describe here the development and characterization of PSEC-3, a custom analog and digital integrated circuit designed in the IBM8RF 130 nm process, intended for fast, low-power waveform sampling. As part of the Large-Area Picosecond Photo-Detector (LAPPD) collaboration, this ASIC has been designed for the front-end transmission line readout of large area micro-channel plates (MCP), among other potential applications. With 4 analog input channels, PSEC-3 has achieved sampling rates of 1-17 GSa/s. Analog sampling is performed with a 256-sample switched-capacitor array architecture in which the stored analog values are digitized with an on-chip 2 GHz Wilkinson ADC. Sampling lock is possible with an on-chip delay locked loop (DLL). Readout latency varies from 1.5 us to 17 us depending on the trigger event and number of channels read. The input noise has been measured at 1mV RMS, and power
consumption is less than 20mW per channel. The intrinsic analog bandwidth is presently under evaluation.

Primary authors : OBERLA, Eric (University of Chicago) ; GRABAS, Herve (University of Chicago)

Co-authors : LAPPD ELECTRONICS, Subgroup (UChicago & UHawaii)

Presenter : OBERLA, Eric (University of Chicago) ; GRABAS, Herve (University of Chicago)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : OBERLA, Eric

Submitted on Friday 08 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:08
Comments : "20 min"

Abstract ID : 220

Test of a Digital Hadron Calorimeter (DHCAL) prototype with muons

Content :

We report on the preliminary results of the CALICE Digital Hadron Calorimeter (DHCAL) prototype from test beam with muons, as well as the noise measurement during the test beam. The DHCAL prototype is a sandwich calorimeter, using 38 2cm-thick iron plates as absorbers and Resistive Plate Chambers (RPC) between the absorber plates as the active medium. The calorimeter has extremely fine segmentation, with readout pads of the size of 1x1cm2 in each layer and readout layer by layer. The DHCAL uses a digital readout scheme, which records only hit pattern of showers without knowing the detailed energy deposition within each hit. The prototype was tested at Fermilab Test Beam Facility (FTBF) in October 2010 and January 2011with muons. We present the preliminary results on measuring front-end board alignment, RPC efficiency, hit multiplicity and DHCAL calibration constant, with the muon data. We simulated the muon responses with GEANT4, for particle interaction with the DHCAL, and with RPCsim, a standalone program that simulate the RPC response. We present the current status of the simulation and tuning according to muon data. We also present the preliminary results on DHCAL noise performance.

Primary authors : Dr. XIA, Lei (Argonne National Laboratory)

Co-authors :

Presenter : Dr. XIA, Lei (Argonne National Laboratory)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : XIA, Lei

Submitted on Friday 08 April 2011

Last modified on : Saturday 09 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 09 April 2011 11:28
Comments : "New development"

Abstract ID : 221

Recent Progress in Silica Aerogel Cherenkov Radiator

Content :

We reported on a successful production of hydrophobic silica aerogels with a wide range of refractive index, 1.0026 < n < 1.26 in the previous TIPP09 conference. Since then highly transparent aerogels with high refractive index have been especially developed by a new production method: pin-drying method. This significant progress opens up wide opportunities to employ aerogels in Cherenkov counter. In the coming high energy and nuclear physics experiments at KEK, many groups are considering Cherenkov counters utilizing an aerogel as a radiator and some of them are already in the detailed design stage.

For the Belle II experiment at SuperKEKB, we are developing a proximity-focusing aerogel ring-imaging Cherenkov detector (ARICH) to separate kaons from pions at 1-4 GeV/c in the forward end-cap. We are planning to introduce the most transparent aerogels with n = 1.05-1.06, and large tile production using both the conventional KEK method and the pin-drying method has been tested. Optical quality as well as tile handling for crack-free samples was investigated in detail, and we have obtained hydrophobic aerogels with excellent properties of large size (18*18*2 cm^3), high refractive index (n = 1.05) and high transmission length (over 40 mm).

In addition, a lot of nuclear physics experiments proposed/approved at J-PARC indicated high demands to implement on-line aerogel threshold Cherenkov counters for triggering purpose. For example, E03 (measurement of Xi^- atomic X rays) requires n = 1.12 to trigger positive kaons from protons at 1-2 GeV/c, and E16 upgrade plan shows importance of Cherenkov counter with n = 1.034 for a kaon spectrometer. E27 (search for K^-pp state) also requires n = 1.25 to separate kaons from high momentum protons. Aerogels with n = 1.12 have already manufactured to install a counter by the pin-drying method, and aerogels with n = 1.25 are under test mass production by the same method. Although aerogels with n = 1.034 are produced by the conventional method, the transparency is expected to increase by a recent development.

In the presentation, the development and manufacturing status of these aerogel Cherenkov radiators based on these studies are reported.

Primary authors : Dr. TABATA, Makoto (Japan Aerospace Exploration Agency (JAXA))

Co-authors : Prof. ADACHI, Ichiro (High Energy Accelerator Research Organization (KEK)) ; Prof. KAWAI, Hideyuki (Chiba University) ; Mr. KUBO, Masato (Chiba University) ; Mr. SATO, Takeshi (Chiba University)

Presenter : Dr. TABATA, Makoto (Japan Aerospace Exploration Agency (JAXA))

Track classification : Particle Identification

Contribution type : Oral Presentation

Submitted by : TABATA, Makoto

Submitted on Friday 08 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : Toru Iijima
Date : 27 April 2011 13:00
Comments : ""

Abstract ID : 222

Design, Construction and Testing of the Digital Hadron Calorimeter

Content :

Particle Flow Algorithms (PFAs) have been proposed as a method of improving the jet energy resolution of future colliding beam detectors. PFAs require calorimeters with high granularity to enable three-dimensional imaging of events. The Calorimeter for the Linear Collider Collaboration (CALICE) is developing and testing prototypes of such highly segmented calorimeters. In this context, a large prototype of a Digital Hadron Calorimeter (DHCAL) was developed and constructed by a group led by Argonne National Laboratory. The DHCAL consists of 51 layers, instrumented with Resistive Plate Chambers (RPCs) and interleaved with 2 cm thick steel absorber plates. The RPCs are read out by 1 x 1 cm2 pads with a 1-bit resolution (digital readout). The DHCAL prototype counts approximately 470,000 readout channels. This talk reports on design, construction and commissioning of the DHCAL. An overview of the past and future DHCAL test beam campaigns at Fermilab's FTBF will also be presented.

Primary authors : FRANCIS, Kurt (Argonne National Laboratory)

Co-authors :

Presenter : FRANCIS, Kurt (Argonne National Laboratory)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : FRANCIS, Kurt

Submitted on Saturday 09 April 2011

Last modified on : Monday 11 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 11 April 2011 09:00
Comments : "New development"

Abstract ID : 223

Front End Readout Electronics of the MicroBooNE Experiment

Content :

The MicroBooNE experiment is to build a ~100 ton Liquid Argon (LAr) Time Projection Chamber (TPC) detector that will observe interactions of neutrinos from the on-axis Booster Neutrino Beam and the off-axis NuMI Beam at Fermi National Accelerator Laboratory. The experiment will address the low energy excess observed by the MiniBooNE experiment, measure low energy neutrino cross sections, and serve as the necessary next step in a phased program towards massive Liquid Argon TPC detectors.

The MicroBooNE TPC will have 3 readout wire planes with a total of 8,256 wires/signal channels. All the signals will be pre-amplified, shaped, digitized and pre-processed online before being recorded for offline analysis of a wide variety of physics programs. To optimize the detector performance and signal-to-noise ratio, an analog front end ASIC designed in 180 nm CMOS technology will be deployed and operated in LAr. Pre-amplified and shaped detector signals will be differentially driven to ADC boards operated in the detector hall where signals will be digitized and prepared for online data pre-processing in FPGAs. We present here an overview of the front end readout architecture of the MicroBooNE experiment, describe the development of the front end readout electronics and preliminary test results.

Primary authors : Dr. CHEN, Hucheng (Brookhaven National Laboratory (BNL)-Unknown-Unknown)

Co-authors :

Presenter : Dr. CHEN, Hucheng (Brookhaven National Laboratory (BNL)-Unknown-Unknown)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : CHEN, Hucheng

Submitted on Saturday 09 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:37
Comments : ""

Abstract ID : 224

The radiation tolerance of specific optical fibers for the LHC upgrades

Content :

Optical fibers in the readout system for the LHC upgrades will operate in a harsh radiation environment. The fibers within 12 meters from the front-end detectors are exposed up to 250 kGy(Si) total ionizing dose in 10 year operation life time. In some applications the nearest 2 meters from the front-end are kept in a cold environment near -25 °C. The paper presents the identification of suitable optical fibers for the LHC detector upgrades.

Several optical fibers have been tested to 650 kGy(Si) at room temperature with various dose rates of 60Co gamma rays. Two MM fibers and one SM fiber have been qualified for use in the LHC upgrades for warm operations. Four optical fibers have been tested to 500 kGy(Si) at -25 °C with 27 kGy(Si)/hr 60Co gamma rays. Two SM fibers have been qualified for the LHC upgrades for cold operations. Several optical fibers, including two MM fibers, have been tested up to 11 kGy(Si) at -25 °C with 70 Gy(Si)/hr 60Co gamma rays and exhibited moderate RIA, indicating that all fibers under test are potential candidates for the LHC upgrades for cold operations.

Primary authors : Mr. ABRAMOVITCH, Joshua (Department of Physics, Southern Methodist University (SMU))

Co-authors : Mr. ARVIDSSON, B. (Ericsson Network Technologies AB) ; Mr. DUNN, K. (University of Oxford) ; Dr. GONG, Datao (SMU) ; Prof. HUFFMAN, B.t. (University of Oxford) ; Prof. ISSEVER, C. (University of Oxford) ; Mr. JONES, M. (University of Oxford) ; Ms. KERRIDGE, C. (SMU) ; Dr. KIERSTEAD, J. (Brookhaven National Laboratory) ; Mr. KUYT, G. (Draka Communications) ; Mr. LIU, C. (SMU) ; Dr. LIU, Tiankuan (SMU) ; Mr. TASSIE, N.c. (SMU) ; Mr. POVEY, A. (University of Oxford) ; Mr. REGNIER, E. (Draka Communication) ; Mr. RYDER, N.c. (University of Oxford) ; Prof. WEIDBERG, A.r. (University of Oxford) ; Dr. XIANG, A.c. (SMU) ; Prof. YE, J. (SMU)

Presenter : Mr. ABRAMOVITCH, Joshua (Department of Physics, Southern Methodist University (SMU))

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : LIU, Tiankuan

Submitted on Saturday 09 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Poster Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:08
Comments : ""

Abstract ID : 225

Total Absorption Dual Readout Calorimetry R&D

Content :

This calorimetry R focuses on establishing a proof of concept for totally active hadron calorimetry. The research program involves evaluating the performance of the different crystal and glass samples in combination with different light collection and readout alternatives to optimize simultaneous collection of Cerenkov and scintillation light components for application of the Dual Readout technique to total absorption calorimetry. We performed initial studies in two short test beam phases in April and November 2010 at Fermilab. This talk presents first measurements from these two beam tests.

Primary authors : BILKI, Burak (University of Iowa)

Co-authors :

Presenter : BILKI, Burak (University of Iowa)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : BILKI, Burak

Submitted on Sunday 10 April 2011

Last modified on : Monday 11 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 11 April 2011 09:02
Comments : "New development"

Abstract ID : 226

Study of the ageing properties of construction materials for High Rate Gas Detectors

Content :

In this article we would like to present the study of the ageing properties of construction materials for the Multi Wire proportional Chamber (MWPC). This work is a part of the detector R of the CBM experiment at FAIR. CBM will use several gas detectors at high interaction rates. The construction materials for the production of the detectors have to be chosen properly in order to ensure the operation of the detector over the projected lifetime of the experiment. Deterioration of the detectors´ performance ("ageing") is a serious problem for gas detectors in high rate experiments [1].

An infrastructure has been set up at the GSI detector laboratory to study the ageing properties of the gas filled detectors such as MWPC, GEM etc. In this set-up a standard wire chamber is continuously purged by gas through an out-gassing box at a given flow rate. The box contains the construction materials under investigation, e.g. glues etc. The ageing of wire chambers has been studied by irradiating the chamber with an X-ray generator for a certain interval of time and comparing the pulse height spectra of a 5.9 keV 55Fe X-ray source of that chamber and another reference chamber, connected to the same gas line upstream the out-gassing box. Details of the experimental set-up and the results will be presented.

Primary authors : Mr. ABUHOZA, Alhussain (GSI)

Co-authors : Dr. BISWAS, S. (GSI) ; Dr. FRANKENFELD, U. (GSI) ; Mr. HEHNER, J. (GSI) ; Dr. SCHMIDT, C.j. (GSI) ; Prof. SCHMIDT, H.r. (University of Tübingen)

Presenter : Mr. ABUHOZA, Alhussain (GSI)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : ABUHOZA, Alhussain

Submitted on Sunday 10 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

[1] M. Titiov, "Radiation Damage and Long-term Ageing in Gas Detectors", arXiv:physics/0403055 v1.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 27 April 2011 12:43
Comments : ""

Abstract ID : 227

Experiences with the Hardware-based Muon Alignment Sytems of the Compact Muon Solenoid Detector

Content :

Alignment results are presented from the Hardware-based Muon Alignment Systems of the Compact Muon Solenoid (CMS) detector of the CERN's Large Hadron Collider. Due to the tight spatial confinement and challenging large radiation and high magnetic field environment in the CMS detector, unique alignment systems had to be developed that handle separately the Barrel and the EndCap regions. An another subsystem, called Link, has also been set up to connect these two to the Tracker, therefore anchoring their result to the CMS system of coordinates. The results from the first two years of operation of the system are presented together with a comparison to the photogrammetry and the track based alignment.

Primary authors : BENI, Noemi (Institute of Nuclear Research of the Hungarian Academy of Sciences, Debrecen)

Co-authors :

Presenter : BENI, Noemi (Institute of Nuclear Research of the Hungarian Academy of Sciences, Debrecen)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : BENI, Noemi

Submitted on Sunday 10 April 2011

Last modified on : Thursday 21 April 2011

Comments :

On behalf of CMS Hardware Muon Alignment group

Status : WITHDRAWN

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Poster Presentation)

Judged by : CATTAI, Ariella

Date : 21 April 2011 22:42

Comments : "we shall get another talk from CMS on alignment. If CMS does not submit a more complete talk, I will ask these people to expand this abstract and we may upgrade this to oral presentation"

Abstract ID : 228

Development of large-aperture Hybrid Avalanche Photo-Detector

Content :

We report on the development of a large-aperture Hybrid Avalanche
Photo-Detector (HAPD).We have developed an 8-inch aperture HAPD and its readout system.The HAPD is a photo detector expected to replace the photomultiplier tube (PMT) in next-generation imaging water Cherenkov detectors such as Hyper Kamiokande. HAPD has shown its excellent performances, 7 times better time resolution and 3 times better pulse height resolution, compared to PMT. We will present the recent progress made in all glass HAPD to reduce its production cost, its performances including improved dark count rate, and readout system development.

Primary authors : ABE, Toshinori (University of Tokyo)

Co-authors : AIHARA, Hiroaki (University of Tokyo) ; TANAKA, Manobu (KEK) ; KAWAI, Yoshihiko (Hamamatsu Photonics K.K.) ; KYUSHIMA, Hiroyuki (Hamamatsu Photonics K.K.) ; SUYAMA, Motohiro (Hamamatsu Photonics K.K.)

Presenter : ABE, Toshinori (University of Tokyo)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : Dr. ABE, Toshinori

Submitted on Monday 11 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:47
Comments : ""

Abstract ID : 229

Optical transition Radiation System for ATF2

Content :

In this paper we describe the first measurements performed during fall 2010- begin 2011, software development, realistic simulations and new hardware improvements of a Multi-Optical Transition Radiation System installed in the beam diagnostic section of the Extraction (EXT) line of ATF2, close to the Multi Wire Scanner System. 2D emittance measurements are done with success and the system is being used normally for coupling correction. Realistic beam simulations have been made and they have been compared with the measurements. A 4D emittance procedure will be implemented and some measurements have been performed. A double optical system including a demagnifier lens to improve the beam finding procedure has been designed and will be implemented in a future.
A systematic measurement campaign will take place by the recovering of ATF operations due to the 2011 Tohoku Earthquake, then a comparison with wire scanners can be done. This will be a definitive test of the OTR as a beam emittance diagnostic device, which will give the ability to have a fast beam emittance measurement with high statistics, giving a low error and a good understanding of emittance jitter.

Primary authors : Dr. FAUS-GOLFE, Angeles (Instituto de Fisica Corpuscular (IFIC) UV-CSIC)

Co-authors :

Presenter : Dr. FAUS-GOLFE, Angeles (Instituto de Fisica Corpuscular (IFIC) UV-CSIC)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : FAUS-GOLFE, Angeles

Submitted on Monday 11 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:27
Comments : ""

Abstract ID : 230

The beam background at SuperKEKB/Belle-II

Content :

The Belle experiment, operated at the asymmetric electron-positron collider KEKB,
had accumulated a data samle with an integrated luminosity of more than 1 at^{-1}
before the shutdown in June 2010.
We have started upgrading both the accelerator and detector, SuperKEKB and Belle-II,
to achieve the target luminosity of 8x10^35 cm^{-2}s^{-1}.

With the increased luminosity, the beam background will also increase.
We will present the estimation of beam background at SuperKEKB and the development of Machine-Detector Interface (MDI) design, to cope with the increased background and protect Belle-II detector.

Primary authors : Dr. NAKAYAMA, Hiroyuki (KEK)

Co-authors : Mr. NAKANO, Hiroshi (Tohoku Univ.)

Presenter : Dr. NAKAYAMA, Hiroyuki (KEK)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : NAKAYAMA, Hiroyuki

Submitted on Monday 11 April 2011

Last modified on : Friday 22 April 2011

Comments :

I might be unable to attend the conference,
depending on the budgetary situation of our institute.

In that case, the presenter might be changed to Mr.Nakano,
and we would like to have a poster presentation.

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:27
Comments : ""

Abstract ID : 231

Construction and Test of a Prototype Chamber for the Upgrade of the ATLAS Muon Spectrometer

Content :

The muon spectrometer of the ATLAS detector at the Large Hadron Collider (LHC) is exposed to high background rates of neutrons and γ-rays. Upgrading the LHC towards up to five times the design luminosity of 1e34 cm-2s-1 necessitates the replacement of muon tracking and trigger detectors in the region with the highest radiation background in order to avoid deterioration of the muon detection efficiency and momentum resolution.

Based on the standard ATLAS muon precision (MDT) chambers, consisting of 6 or 8 layers of aluminum drift tubes with 30 mm outer diameter, faster tracking chambers using drift tubes with 15 mm diameter have been developed for the critical end-cap regions of the spectrometer. With the shorter maximum drift time of 200 ns, compared to about 700 ns now and the smaller tube cross section, the background occupancy is reduced by a factor of 7. At the same time the excellent spatial resolution of 40 μm per chamber is retained up to very high counting rates. A larger number of drift tube layers in the same detector volume offers improved redundancy and pattern recognition efficiency.

A full-sized prototype chamber consisting of 1152 tubes arranged in 2x8 layers and covering an area of 1 m^2 has been built to validate the assembly procedure and to test the detector performance. We present results of measurements at high γ radiation rates at the CERN Gamma Irradiation Facility (GIF) and with high momentum muons at the H8 beam line at CERN. Measurements of the response of the drift tubes to highly ionizing particles (neutrons and protons) will also be discussed.

Primary authors : SCHWEGLER, Philipp (Max-Planck-Institut für Physik)

Co-authors : BITTNER, Bernhard (Max-Planck-Institut für Physik) ; DUBBERT, Jörg (Max-Planck-Institut für Physik) ; KROHA, Hubert (Max-Planck-Institut für Physik) ; VON LOEBEN, Jörg (Max-Planck-Institut für Physik)

Presenter : SCHWEGLER, Philipp (Max-Planck-Institut für Physik)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : V. LOEBEN, Jörg

Submitted on Monday 11 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)

Judged by : KOBAYASHI, Makoto
Date : 27 April 2011 12:43
Comments : ""

Abstract ID : 232

R on detector of next generation for the Proton Computed Tomography

Content :

This talk presents the design and latest test results of a first proton CT scanner currently under test at Loma Linda University Medical Center in Loma Linda, CA in collaboration with Northern Illinois University. With 18 CsI crystals and 8 planes of silicon strip X and Y detectors, we reached a data acquisition rate of almost 200 kHz which is our projected limit. The first reconstructed images of a phantom target will be presented and discussed. The results of these tests demonstrate that a new generation pCT scanner is necessary for clinical operation. In order to reconstruct an image with 1% density resolution for head size phantoms, our current setup would require about an 8 hour scan time. Clinical scan times for pCT irradiation should not exceed 10 minutes, typical for traditional X-ray CT scanners. In addition, the detector area (9 x 18 cm) of the current tracker is too small for a full head scan.

To meet such demanding time constraints, we proposed a scintillator based pCT detector. A scintillating fiber detector tracker with fiber pitch of ~1 mm and a proton range detector with 3 mm scintillating plates are currently under development at Northern Illinois University. The design of the optical readout system which utilizes Silicon Photomultipliers (SiPM) for both detector subsystems will be presented. The first light yield measurements of the detector elements illuminated with a 250 MeV proton beam will also be reported.

Primary authors : Mr. RYKALIN, Victor (Northern Illinois University)

Co-authors : Mr. HURLEY, Ford (LLUMC) ; Dr. COUTRACON, George (NIU) ; Dr. SCHULTE, Reinhard (LLUMC) ; Dr. BASHKIROV, Vladimir (LLUMC) ; Dr. SADROZINSKI, Hartmut (UCSC)

Presenter : Mr. RYKALIN, Victor (Northern Illinois University)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : RYKALIN, Victor

Submitted on Monday 11 April 2011

Last modified on : Saturday 23 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 23 April 2011 14:28
Comments : ""

Abstract ID : 233

Realization and Test of the Engineering Prototype of the CALICE Tile Hadron Calorimeter

Content :

The CALICE collaboration is currently developing an engineering prototype of an analog hadron calorimeter for a future linear collider detector. It is based on scintillating tiles that are individually read out by silicon photomultipliers. The prototype will contain about 2500 detector channels, which corresponds to one calorimeter layer and aims at demonstrating the feasibility of building a detector with fully integrated front-end electronics. The SiPM signals are read out by the SPIROC chip, which is an auto-triggered, bi-gain, 36-channel ASIC developed to measure the charge from one to 2000 photoelectrons and the time with a 100 ps accurate TDC. The concept and engineering status of the calorimeter prototype, the different subcomponents, the DAQ system, the functionality of the SPIROC, as well as results from the DESY test setups are reported here.

Primary authors : Dr. TERWORT, Mark (DESY)

Co-authors :

Presenter : Dr. TERWORT, Mark (DESY)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : TERWORT, Mark

Submitted on Monday 11 April 2011

Last modified on : Tuesday 12 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 12 April 2011 12:51
Comments : "New development"

Abstract ID : 234

Performance and calibration of CASTOR calorimeter at CMS.

Content :

CASTOR (Centauro And Strange Object Research) is a Cerenkov quartz-tungsten sampling calorimeter installed in the very forward region of the CMS experiment covering the pseudorapidity range of −5.2 to −6.6. The location of CASTOR and current geometry of the shielding imply operation under relatively high radiation dose and magnetic field. Except for very particular regions, the calorimeter read-out with fine mesh PMTs demonstrates good performance under these rough conditions.

First steps in the relative calibration of CASTOR is done using beam halo muons. To obtain relevant data, a dedicated CASTOR trigger was developed and activated during beam injections and ramp-ups. The triggered events correspond to an isolated particle penetrating the calorimeter along the beam axis. Analysis of the obtained spectra provides relative response to a muon per an individual read-out channel.

Primary authors : KUZNETSOVA, Ekaterina (Deutsches Elektronen Synchrotron (DESY))

Co-authors :

Presenter : KUZNETSOVA, Ekaterina (Deutsches Elektronen Synchrotron (DESY))

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : KUZNETSOVA, Ekaterina

Submitted on Monday 11 April 2011

Last modified on : Tuesday 12 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 12 April 2011 12:52
Comments : "Running experiment"

Abstract ID : 235

Data Acquisition System of the MicroBooNE Experiment

Content :

The MicroBooNE experiment is based on a liquid argon Time Projection Chamber (TPC) which will be exposed simultaneously to the Booster and NuMI neutrino beams at Fermilab. Neutrino beam events will be triggered using a set of photomultipliers (PMT) immersed in the liquid argon. The trigger, readout and data organization of the MicroBooNE electronics will be described. It is based on ten crates of electronics each read by a PC, followed by an additional event building PC. In addition the electronics and data acquisition will continuously acquire and record TPC and PMT data and store it in a cyclic one hour buffer at a rate of 50MB/sec per PC in order to be able to identify potential supernova neutrino interactions.

Primary authors : CHI, Cheng-yi (Columbia university)

Co-authors :

Presenter : CHI, Cheng-yi (Columbia university)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : CHI, Cheng-yi

Submitted on Monday 11 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 22 April 2011 20:56
Comments : ""

Abstract ID : 236

Low Noise readout techniques for Charge Coupled Devices (CCD)

Content :

Scientific CCDs have applications in astronomy, astrophysics and particle physics. Although CCDs main application is as high quality photo-sensors, some of these silicon devices have enough thickness and mass and are excellent detectors for direct dark matter search and other particle and nuclear physics applications. A key benefit of these CCDs is their low noise which allow them to detect few eV of energy. For astronomy a low noise CCD system will benefit spectroscopy measurements. In order to use their full potential readout systems with noise performances around or below 1 electron are needed. This paper reports on the R that has led to readout systems with that level of performance.

Primary authors : Dr. CANCELO, Gustavo (Fermilab)

Co-authors : Dr. ESTRADA, Juan (Fermilab) ; Mr. MORONI, Guillermo (Fermilab) ; Dr. DIEHL, Thomas (Fermilab) ; Mr. TREPTOW, Keneth (Fermilab) ; Mr. ZMUDA, Ted (Fermilab)

Presenter : Dr. CANCELO, Gustavo (Fermilab)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : CANCELO, Gustavo

Submitted on Monday 11 April 2011

Last modified on : Wednesday 04 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 04 May 2011 14:32
Comments : ""

Abstract ID : 237

Water Cherenkov Detector Event Scan And NuE Appearance Sensitivity Study For LBNE

Content :

Water Cherenkov (WC) and Liquid Argon (LAr) are two options under
consideration for the far detector (FD) of the LBNE experiment. To make a choice, one of the issues is the FD's sensitivity to the NuE-appearance which involves the detection efficiency of the signal, NuE-CC, and the background, NC events. The proposed WC sensitivity is largely based upon the Super-Kaminokande (SK) experience. However, the SK reconstruction algorithm is not optimized for the LBNE energies, especially in the 1.5--5 GeV region covering the first oscillation maximum.

At the current stage of LBNE project, we are using event scanning as a tool to understand the various background processes to electron neutrinos. The status of WC scan effort comprising 2000 NuE-CC and 10,000 NC simulated events will be presented.

Primary authors : Mr. DUYANG, Hongyue (University of South Carolina)

Co-authors : Mr. SVENSON, Andrew (University of South Carolina) ; Mr. ALION, Tyler (University of South Carolina) ; Dr. GUPTA, Pooja (UC Davis) ; Dr. MISHRA, Sanjib (University of South Carolina)

Presenter : Mr. DUYANG, Hongyue (University of South Carolina)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : DUYANG, Hongyue

Submitted on Monday 11 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:37
Comments : ""

Abstract ID : 238

Online Determination of the LHC Luminous Region with the ATLAS High Level Trigger

Content :

During stable-beams operations of the LHC, the ATLAS High Level Trigger (HLT) offers the fastest and most precise online measurement available of the position, size and orientation of the luminous region at the interaction point. Taking advantage of the high rate of triggered events, a dedicated algorithm is executed on the HLT processor farm of several hundred nodes that uses tracks registered in the silicon detectors to reconstruct event vertices. The distribution of these vertices is aggregated across the farm and its shape is extracted through fits every 60 seconds. A correction is applied online to adjust for the intrinsic vertex resolution by examining the displacement of split vertices. The location, widths and tilts of the luminosity distribution are fed back to the LHC operators in real time. The transverse luminous centroid mirrors variations in the IP orbit, while its position along the beam axis is sensitive to the relative RF phase of the two beams. The time evolution of the luminous width tracks the emittance growth over the course of a fill. The HLT measurements can be correlated with data from machine instrumentation such as beam-position monitors, wire scanners and synchrotron-light monitors. Beginning in 2011, the HLT beam spot measurement also started reconstructing the parameters of each individual filled bunch. This gives rise to a study of single-bunch distributions and opens a window to understanding dynamical features such as electron-cloud effects. We will briefly describe how the measurement is performed and discuss the results and observations of the luminous region parameters and their time evolution during the high luminosity running in 2011.

Primary authors : BARTOLDUS, Rainer (SLAC)

Co-authors : SU, Dong (SLAC) ; STRAUSS, Emanuel (SLAC) ; COGAN, Josh (SLAC) ; MILLER, David (SLAC)

Presenter : BARTOLDUS, Rainer (SLAC)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : BARTOLDUS, Rainer

Submitted on Monday 11 April 2011

Last modified on : Friday 22 April 2011

Comments :

On behalf of the ATLAS TDAQ collaboration.

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:28

Comments : ""

Abstract ID : 239

Performance of a Large-Area Triple-GEM Detector in a Particle Beam

Content :

A multi-institutional collaboration is investigating the possibility of enhancing muon tracking and triggering capabilities in the small-angle region 1.6 < |eta| < 2.1 of the CMS experiment at the LHC by instrumenting the end-cap muon system with large-area GEM detectors. A first trapezoidal prototype triple-GEM detector of size 1 m × 0.5 m was built and operated successfully in a test beam at CERN in October 2010. Front-end readout boards utilizing the “VFAT” chip are mounted in a regular array directly on the chambers. High voltage is provided by a compact divider board implemented with surface mount components. A tracker equipped with small GEM detectors was used to precisely measure the hit position in the large-area detector. A spatial resolution of 290 μm was measured in a region with average strip pitch of 1.1 mm, and ~98% hit efficiency was achieved at full operating voltage. Construction of two additional prototype chambers allowing faster timing and plans for testing these this summer in beams and with 3T magnetic field will be described.

Primary authors : Prof. KARCHIN, Paul Edmund (Department of Physics and Astronomy-College of Science-Wayne Sta)

Co-authors :

Presenter : Prof. KARCHIN, Paul Edmund (Department of Physics and Astronomy-College of Science-Wayne Sta)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : KARCHIN, Paul Edmund

Submitted on Monday 11 April 2011

Last modified on : Thursday 14 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 14 April 2011 09:05
Comments : ""

Abstract ID : 240

Measuring polarization of proton beams with silicon detectors at RHIC (BNL)

Content :

At the Relativistic Heavy Ion Collider (RHIC) the measurements of the proton beam polarization are carried out by polarimeters whose operation is based on the detection of recoil products from proton-proton (pp) and proton-Carbon (pC) elastic scattering. The pp polarimeter with a highly polarized hydrogen jet target provides an absolute scale for the polarization measurement; while the pC polarimeter is capable of providing a quick feedback on the beam intensity and polarization profiles. In the latter ultra thin carbon targets are quickly moved through the beam to measure profiles in horizontal and vertical directions.

In addition to providing the RHIC experiments with polarization numbers, the polarimeters also offer an essential knowledge of the analyzing power A_N in the kinematic region where the electromagnetic force is comparable in strength with the nuclear one (the Coulomb Nuclear Interference region).

For the 2011 run the readout system of the pC polarimeter has been upgraded to cope with the increased beam intensity. We discuss the energy calibration and losses in the dead layer of the silicon detectors. We also report on the performance and stability of the silicon detectors in the harsh environment.

Primary authors : SMIRNOV, Dmitri (BNL)

Co-authors :

Presenter : SMIRNOV, Dmitri (BNL)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : SMIRNOV, Dmitri

Submitted on Monday 11 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:29
Comments : ""

Abstract ID : 241

Using Nanotubes to store Particles for future use in Particle Accelerators

Content :

Nanotubes may have Fermi Energy Levels located on the interior walls of the tube in such a way that they are effectively on the interior of the tube. This unusual location of the Fermi Levels may offer a Quantum Mechanical explaination for Capillary Action both in small nanotube application and in larger tubes for a General Theory of Capillary Action based on Fermi Levels rather than a vague theory based on partial charges in fluids as is widely accepted at the present time. The Fermi Level theory may allow for the Storage of Antimatter, Electrons, and exotic matter in the interior of the nanotube in Phonon type orbitals, as the exotic matter is effectively traveling in the hollow space in the the nanotube, yet is in a weak Fermi level type of "orbit" that keeps the matter and antimatter seperate. This could also be used as a detection device as particles could breach these orbital and allow the exotic material inside to react.

Primary authors : Dr. KRISKE, Richard (University of Minnesota)

Co-authors :

Presenter : Dr. KRISKE, Richard (University of Minnesota)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : KRISKE, Richard

Submitted on Monday 11 April 2011

Last modified on : Friday 06 May 2011

Comments :

Status : PROPOSED TO REJECT

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to reject
Judged by : AMERIO, Silvia
Date : 06 May 2011 21:31
Comments : "Paula's comment: our suggestion is to reject this abstract, unfortunately. There are not
enough details given to really judge if it is of scientific merit."

Abstract ID : 242

Recent developments of HEP pixel detector readout chips

Content :

We cover development of readout integrated circuits for hybrid pixel particle physics detectors. We compare the 250nm feature size chips in the presently operating ATLAS and CMS experiments with the current state of the art in 130nm feature size represented by the FE-I4 chip that will be used to add a new beam pipe layer for the ATLAS experiment in 2013 and the upgrade options of the CMS pixel readout chip. We discuss array and pixel size, analog performance, readout architecture, power consumption, power distribution options and radiation hardness. Finally, we present recent work in 65nm feature size as a means to continue the evolution of readout chip technology towards smaller feature size, higher rate, and lower power.

Primary authors : Dr. CAMINADA, Lea Michaela (LBNL)

Co-authors :

Presenter : Dr. CAMINADA, Lea Michaela (LBNL)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : CAMINADA, Lea Michaela

Submitted on Tuesday 12 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:09
Comments : "30 min"

Abstract ID : 243

Fast Neutron Induced Nuclear Counter Effect in Hamamatsu Silicon PIN Diodes and APDs

Content :

Neutron induced nuclear counter effect in Hamamatsu silicon PIN diodes and APDs was measured by irradiating fast neutrons from a pair of Cf-252 sources directly to these devices. It was found that the entire kinetic energy of these neutrons may be converted into electron signals in these devices, leading to anomalous signals of up to a few million electrons in a single isolated calorimeter readout channel. Signals of such amplitude represent equivalent energy of several hundred GeV and a few GeV for PWO and LSO/LYSO crystals respectively assuming the corresponding light yields of 4 and 800 p.e./MeV. The overall rate of the neutron induced nuclear counter effect in APDs is found to be more than an order of magnitude less than that in PIN diodes. Increasing the APD gain was also found to reduce the neutron induced nuclear counter effect. An intelligent front-end chip capable of selecting un-contaminated signal is proposed to eliminate completely the nuclear counter effect without significant cost increase.

Primary authors : Dr. ZHANG, Liyuan (California Institute of Technology)

Co-authors : Dr. MAO, Rihua (California Institute of Technology) ; Dr. ZHU, Ren-yuan (California Institute of Technology)

Presenter : Dr. ZHANG, Liyuan (California Institute of Technology)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : ZHANG, Liyuan

Submitted on Tuesday 12 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

While this talk is literally in 'Semiconductor Detectors', it may also fit in 'Photon Detectors' in terms of application.

Status : WITHDRAWN

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 10:07
Comments : ""

Abstract ID : 244

CMS Hadronic EndCap Calorimeter Upgrade R Studies

Content :

Due to an expected increase in radiation damage in LHC, we propose to transform CMS Hadronic EndCap calorimeters to radiation hard quartz plate calorimeters. Quartz is proved to be radiation hard by the radiation damage tests with electron, proton, neutron and gamma beams. However, the light produced in quartz comes from Cerenkov process, which yields drastically fewer photons than scintillation. To increase the light collection efficiency we pursue two separate methods: First method; is to use wavelength shifting (WLS) fibers, which have been shown to collect efficiently the Cerenkov light generated in quartz plates. A quartz plate calorimeter prototype with WLS fibers has been constructed and tested at CERN to show that this method is feasible. Second proposed solution is to treat the quartz plates with radiation hard wavelength shifters, p-terphenyl, doped zinc oxide, or doped CdS. Another calorimeter prototype has been constructed with p-terphenyl deposited quartz plates, and showed superior calorimeter capabilities.
Here, the test beam, bench tests as well as the Geant4 simulation results of these calorimeter prototypes are reported. We also outline the future directions on these possible upgrade scenarios for the CMS HE calorimeter.

Primary authors : Dr. AKGUN, Ugur (University of Iowa)

Co-authors : Prof. ONEL, Yasar (University of Iowa)

Presenter : Dr. AKGUN, Ugur (University of Iowa) ; Prof. ONEL, Yasar (University of Iowa)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : AKGUN, Ugur

Submitted on Tuesday 12 April 2011

Last modified on : Tuesday 12 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 12 April 2011 12:52
Comments : "New development"

Abstract ID : 245

Radiation Damage Studies and Operation of the D0 Luminosity Monitor

Content :

The D0 Luminosity Monitor (LM) employs scintillating wedges with photomultiplier tube readout to detect particles from inelastic collisions in p-pbar interactions at the Fermilab Tevatron Collider. The LM provides the luminosity measurement used for normalization in D0 physics results. In the course of normal Tevatron operations these scintillators accrue significant radiation damage. Operating parameters are monitored and adjusted to compensate for this degradation, and the scintillators are periodically replaced to facilitate stable performance. Results from radiation damage studies to the scintillator as well as the stability of the luminosity measurement will be presented.

Primary authors : Ms. PREWITT, Michelle (Rice University) ; Dr. ORDUNA, Jesus (Rice University)

Co-authors : D0, Luminosity Group (D0)

Presenter : Dr. ORDUNA, Jesus (Rice University)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Poster Presentation

Submitted by : PREWITT, Michelle

Submitted on Tuesday 12 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:30
Comments : "Changed presentation style to oral"

Abstract ID : 246

Radio propagation environment analysis for neutrino radio detection in salt mines

Content :

Neutrinos cannot be directly detected, but they can be indirectly observed through their interactions with ordinary matter in which secondary particles are created. A neutrino detector is a complex system in which the electromagnetic field from secondaries is measured, in a huge volume instrumented with antennas. From the characteristics of the field one can derive the properties of the initial neutrino.
"DETection of COSmic rays using new technologies" (DETCOS) is a Romanian national project that investigates the possibility of constructing a radio Askaryan neutrino observatory in a Romanian salt mine. We consider a detection strategy based on coherent radio Cherenkov emission from neutrino-induced showers produced in current charged interactions.
Many aspects are considered, such as: the effect that the dielectric medium has on the amplitude of radio signal; how the pulse couples to a realistic receiver; behavior of the key instrument – i.e. the radio antenna; the signal-to-noise ratio (SNR). Another critical aspect to be taken into consideration is the random triggering rate. The detailed detector description, optimization and expected performance will be also presented.

Primary authors : Mrs. BADESCU, Alina (POLITEHNICA University of Bucharest)

Co-authors : Prof. PETRESCU, Teodor (UPB) ; Prof. FRATU, Octavian (UPB) ; Mrs. SAFTOIU, Alexandra (IFIN-HH) ; Dr. BRANCUS, Iliana (IFIN-HH) ; Dr. MITRICA, Bogdan (IFIN-HH) ; Prof. SIMA, Octavian (UB) ; Prof. LAZANU, Ion (UB) ; Prof. HALUNGA, Simona (UPB) ; Prof. TOMA, Gabriel (IFIN-HH)

Presenter : Mrs. BADESCU, Alina (POLITEHNICA University of Bucharest)

Track classification : Detectors for neutrino physics

Contribution type : Poster Presentation

Submitted by : BADESCU, Alina

Submitted on Tuesday 12 April 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:49
Comments : ""

Abstract ID : 247

Study of a solution with COTS for the LHCb calorimeter upgrade

Content :

Since the end of the commissioning of LHCb in 2009 the detector has proven to work nicely even in high pile-up conditions and by the end of 2010 nominal instantaneous luminosity was reached. Data taking is expected to continue for 5 more years, aiming to accumulate an integrated luminosity of 5fb-1. Even if new physics is discovered at that time, it will be difficult to
characterize it and it would be more profitable to upgrade the detector. The foreseen long shutdown offers an opportunity to upgrade the detector .
As expressed in the Letter of Intend for the LHCb upgrade [1] the main objective of this enhancement is to have a 40MHz readout electronics to allow the use of a more flexible and efficient software-based triggering system. Moreover, after the shutdown, the instantaneous luminosity at the LHCb interaction point is expected to be multiplied by 5. From the point of view of the LHCb calorimeter changing the readout implies a change of the electronic boards. Also because of the luminosity increase and in order to preserve the photomultiplier's life expectancy, its gain will be reduced by a factor of 5. This has to be compensated in the front-end electronics, imposing new constraints in the performance of input analog electronics. New analog and digital electronics are being developed to solve these problems. In the analog part ASIC and Commercial Off The Shelf (COTS) solutions are under study. A suitable COTS design needs amplification before analog processing, forcing the clipping to be done in the front-end cards. A compact solution with differential amplifiers and delay lines will be shown as well as the status of prototypes and some results.

[1] LHCb Collaboration, Letter of Intent for the LHCb Upgrade, CERN-LHCC-2011-001 ; LHCC-I-018; CERN (2011)

Primary authors : PERRET, Pascal (Universite Blaise Pascal de Clermont-Ferrand II)

Co-authors :

Presenter : PERRET, Pascal (Universite Blaise Pascal de Clermont-Ferrand II)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : PERRET, Pascal

Submitted on Tuesday 12 April 2011

Last modified on : Thursday 21 April 2011

Comments :
on behalf LHCb

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Poster Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:09
Comments : ""

Abstract ID : 248

Time Calibration of the ANTARES Neutrino Telescope

Content :

The ANTARES deep-sea neutrino telescope comprises a three-dimensional array of photomultipliers to detect the Cherenkov light induced by upgoing relativistic charged particles originating from neutrino interactions in the vicinity of the detector. It was completed in May 2008 and is taking data smoothly since then. The large scattering length of light in the deep sea allows for an angular resolution of a few tenths of a degree for neutrino energies exceeding 10 TeV. In order to achieve this optimal performance, the
time calibration procedures should ensure a relative time calibration between the photomultipliers at the level of about 1ns.
The time calibration is performed through different system/procedures: an on-shore calibration in a dark room, the echo-based clock system, the internal LEDs, the Optical Beacons nd the potassium-40 present in the water. In this presentation, the methods developed to attain the needed level of precision and the results obtained with the data taken in-situ will be shown.

Primary authors : Dr. EMANUELE, Umberto (IFIC)

Co-authors :

Presenter : Dr. EMANUELE, Umberto (IFIC)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : EMANUELE, Umberto

Submitted on Tuesday 12 April 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:49
Comments : ""

Abstract ID : 249

3D pixel devices; design, production and characterisation in test beams

Content :

The Large Hadron collider (LHC) will under go a luminosity upgrade to the High-Luminosity-LHC (HL-LHC). This will result in an order of magnitude increase in radiation levels experienced by the silicon sensors of the experiments' tracking and vertex detector systems. The development of ultra-radiation hard silicon sensors, capable of withstanding particle fluences beyond 10E16 1 MeV Neutron-equivalent per cm2, is therefore required for the innermost tracking layers.
Three-Dimensional (3D) silicon sensors offer potential advantages over standard planar sensors for radiation hardness. The 3D sensors have columnar electrodes etched through the silicon bulk which are spaced at a pitch less than the thickness of the substrate this electrode structure greatly reduces the charge collection distance over that of a planar device which results in significantly less charge trapping, the major concern for heavily irradiated silicon sensors. The reduced electrode spacing also significantly reduces the operational voltage required over that of planar sensors and therefore reduces the power dissipation of the sensor. The detector structure, however, may introduce inefficiencies due to the columnar electrodes and low field regions which are present throughout the device if it is not fully depleted. The fabrication process is also more complex and therefore yields maybe an issue. 3D sensors are being fabricated at a number of manufactures; here we concentrate on devices from CNM, Barcelona.
A large number of 3D sensors have been fabricated and characterised electrically and as pixel detectors in the lab and at test-beams, both before and after irradiation to a range of fluences up to the maximum expected for tracking detectors of the experiments at the HL-LHC.
We report on the significant progress in the fabrication of 3D detectors at CNM over the past 5 years. The latest designs of pixel sensors from CNM will be shown; including in-pixel bias structures and slim edge technology incorporating the 3D guard structure. The simulation of the electrical field in the edge structures is discussed along with electrical measurements that demonstrate its functionality. The plans for device structures for future pixel production runs will be discussed.
Simulations of the electric field inside the detector and the charge collection from minimum ionizing particles are shown for different bias conditions and fluence ranges.
The possible inefficiencies in the device are probed y studying variations in the response across a unit pixel cell in a 55um pitch 3D pixel sensor bump bonded to TimePix and MediPix2 readout ASICS in test-beam. Two complementary characterisation techniques are discussed: the first uses a custom built TimePix based telescope and a 120 GeV pion beam from the SPS at CERN; the second employs a novel technique to illuminate the sensor with a micro-focused synchrotron X-ray beam at the Diamond Light Source UK. The response from pixel detectors before irradiation and after an irradiation to 1E16 1 MeV Neutron-Equivalent per cm2 are shown. For a pion beam incident perpendicular to the sensor plane an overall pixel efficiency of 93.0 ± 0.5% is measured before irradiation. After a 10O rotation of the device the effect of the columnar region becomes negligible and the overall efficiency rises to 99.8 ± 0.5%. The double-sided 3D sensor shows significantly reduced charge sharing to neighbouring pixels compared to the planar device. The charge sharing results obtained from the X-ray beam study of the 3D sensor are shown to agree with a simple simulation in which charge diffusion is neglected, therefore confirming that the charger diffusion inside the device dose not widen the collected charge cloud as expected for the 3D geometry. The devices tested are found to be compatible with having a region in which no charge is collected centred on the electrode columns of a radius 7.6±0.6μm. Charge collection above and below the columnar electrodes in the 3D sensor is observed.
The paper shows the significant progress made in the 3D technology with the fabrication of pixel detectors suitable for HL-LHC experiments being demonstrated. The electrical characteristics of the device are shown and are well understood. The response of the detector to minimum ionizing particles is understood through electrical simulations and test beam measurements.

Primary authors : Dr. BATES, Richard (Department of Physics and Astronomy)

Co-authors : Dr. PARKES, Chris (Department of Physics and Astronomy) ; Dr. PELLEGRINI, Giulio (CNM, Barcelona) ; Dr. PARZEFALL, Ulrich (Universität Freiburg) ; Mr. KOEHLER, Michael

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Presenter : Dr. BATES, Richard (Department of Physics and Astronomy)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : BATES, Richard

Submitted on Tuesday 12 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 08:20
Comments : "Overlap with 118, suggest one talk and one poster"

Abstract ID : 250

Detector Systems at CLIC

Content :

The Compact Linear Collider CLIC is designed to deliver e+e- collisions at a center of mass energy of up to 3 TeV. The detector systems at this collider have to provide highly efficient tracking and excellent jet energy resolution and hermeticity for multi-TeV final states with multiple jets and leptons. In addition, the detector systems have to be capable of distinguishing physics events from large beam-induced background at a crossing frequency of 2 GHz. Like for the detector concepts at the ILC, CLIC detectors are based on event reconstruction using particle flow algorithms. The two detector concepts for the ILC, ILD and SID, were adapted for CLIC using calorimeters with dense absorbers limiting leakage through increased compactness, as well as modified forward and vertex detector geometries and precise time stamping to cope with increased background levels. The overall detector concepts for CLIC will be presented. Emphasis will be put on the main detector and engineering challenges, such as: the ultra-thin vertex detector with high resolution and fast time-stamping, hadronic calorimetry using tungsten absorbers, and event reconstruction techniques related to particle-flow analysis and beam background suppression.

Primary authors : Dr. SIMON, Frank (Max-Planck-Institute for Physics, Munich, Germany)

Co-authors :

Presenter : Dr. SIMON, Frank (Max-Planck-Institute for Physics, Munich, Germany)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : Dr. SIMON, Frank

Submitted on Tuesday 12 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Invited overview talk on CLIC detector concepts.

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:44
Comments : ""

Abstract ID : 251

A two level trigger system for the ICARUS LAr-TPC

Content :

The ICARUS-T600 detector at LNGS laboratory is the largest Liquid Argon TPC (LAr-TPC) operating in an underground laboratory. Its calorimetric resolution and topology reconstruction capabilities permit a wide physics program, which goes from nucleon decay to the study of the oscillation on CNGS neutrino beam. Atmospheric as well as solar neutrinos are also a case of study. The events collected differ both for energy deposition (ranging from tens of MeV to tens of GeV) and for topology. To get a fully-efficient detection of the interesting events it is thus necessary to exploit all available sources in the trigger system: the scintillation light, the charge signal on wires and the timing information (for CNGS-related events). The scintillation light is used both as global trigger signal and time of origin of the event, to get a complete 3D reconstruction of the event. The charge signal is used to select regions of interest (RoI), and to generate local triggers for low energy events. Finally the timing information is used to generate a trigger at each CNGS extraction; the events triggered this way are then selected by a second level software trigger, that searches for any charge deposition in the event. A full efficiency and a rejection factor better than one per mil have been reached with this kind of trigger.

Primary authors : Mr. DEQUAL, Daniele (Università degli studi di Padova)

Co-authors :

Presenter : Mr. DEQUAL, Daniele (Università degli studi di Padova)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : DEQUAL, Daniele

Submitted on Tuesday 12 April 2011

Last modified on : Monday 09 May 2011

Comments :

Daniele Dequal on behalf of the ICARUS collaboration

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 09 May 2011 13:53
Comments : ""

Abstract ID : 252

A Streaming Data Acquisition System for Mu2e

Content :

Mu2e is a proposed high-sensitivity muon to electron conversion experiment at Fermilab. The Tracker and Calorimeter together produce an estimated 100 GBytes/sec of zero-suppressed data. With continuous readout (no front-end trigger), the off-detector data rate will be similar to that of the CMS and Atlas detectors. The Mu2e DAQ architecture is based on a single custom component which functions as a readout concentrator, event builder and data pre-processor with a throughput of approximately 5 GBytes/sec per channel. This bandwidth is made feasible by improvements in current networking and processing technology.

Primary authors : Mr. BOWDEN, Mark (FNAL)

Co-authors : Mr. BIERY, Kurt (FNAL) ; Mr. RIVERA, Ryan (FNAL)

Presenter : Mr. BOWDEN, Mark (FNAL)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Poster Presentation

Submitted by : Mr. BOWDEN, Mark

Submitted on Tuesday 12 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:39
Comments : ""

Abstract ID : 253

Integration-Level Testing of Sub-Nanosecond Microchannel Plate Detectors for Use in Time-Of-Flight HEP Applications

Content :

Microchannel plate photomultiplier tubes (MCP-PMTs) are compact imaging detectors, capable of micron-level spatial imaging and timing measurements with resolutions well below 10 picoseconds. The Large Area Picosecond Photodetector Collaboration (LAPPD) is developing techniques for fabricating 20cm-square, thin planar glass-body MCP-PMTs at costs comparable to traditional PMTs. A major component of the project is a cross divisional effort at Argonne National Laboratory (ANL) and University of Chicago to fabricate and characterize the amplification and read-out stages of these MCP detectors. The gain structures are made by coating passive, porous glass substrates with high secondary electron yield (SEY) materials using atomic layer deposition (ALD), a well-established industrial batch process. Transmission-line readout with waveform sampling on both ends of each line allows the efficient coverage of large areas while main- taining excellent time and space resolution. Individual channel plates made by this process have already demonstrated gains larger than 10^5 and promising time resolving capabilities. Work between the High Energy Physics Division and the Advanced Photon Source at Argonne has produced an advanced channel- plate testing facility for studying the time response of MCPs using a pulsed laser capable of sub-picosecond pulses. The MCPs are tested in stacks of one or two plates with a simple photocathode and coupled to a microstripline anode board. These measurements will guide the systems-level optimization of LAPPD detectors and the development of reconstruction algorithms. Predictions made by the LAPPD simulations group based on material properties measured by the characterization group are compared with these tests to help further our understanding of MCP performance.

Primary authors : Dr. WETSTEIN, Matthew (Argonne National Laboratory)

Co-authors :

Presenter : Dr. WETSTEIN, Matthew (Argonne National Laboratory)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : WETSTEIN, Matthew

Submitted on Tuesday 12 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted

Date : 29 April 2011 15:48
Comments : ""

Abstract ID : 254

Developments toward a High Resolution Next-Generation Water Cherenkov Neutrino Detector

Content :

We present Monte Carlo studies of the impact of enhanced coverage, improved spatial and time-resolutions, and quantum efficiency on track reconstruction and particle identification in water Cherenkov counters. We discuss some of the reconstruction challenges and potential directions for an experimental water cherenkov program built around MCP-based photodetectors.

Primary authors : WETSTEIN, Matthew (Argonne National Laboratory)

Co-authors :

Presenter : WETSTEIN, Matthew (Argonne National Laboratory)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : WETSTEIN, Matthew

Submitted on Tuesday 12 April 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:50
Comments : ""

Abstract ID : 256

Composition and thickness dependence of electron-induced secondary electron yield for MgO and Al2O3 from atomic layer deposition

Content :

This work is a part of the Large-Area Picosecond Photo-Detector collaboration (LAPPD, http://psec.uchicago.edu/), which is focused on the development of the next generation photon-to-electron converters using novel materials synthesis approaches to obtaining desired functionality. Large-area micro-channel plates are being developed for this effort using more affordable micro-porous glass, as opposed to the original lead-glass. Using atomic layer deposition (ALD), these plates are functionalized with the conformal coatings of materials with enhanced secondary electron yield (SEY). The characterization of two candidate electron amplifying materials, MgO and Al2O3, has been performed, aimed at determining how surface chemical composition, electronic structure, and film thickness affect the SEY. The extensive data found in literature on a given material from different experiments show significant variation that is most likely influenced by the experimental apparatus, as well as by sample preparation and handling. In an attempt to shed more light on this subject, we have assembled an ultra-high vacuum system containing X-ray and ultraviolet photoelectron spectrometers (XPS and UPS, respectively), and a low energy electron diffraction (LEED) module for SEY measurements. The LEED module, which combines electron source and collector, can be used for characterization of samples crystallography, and elemental composition by Auger electron spectroscopy (AES) in smaller areas than XPS.

Primary authors : Dr. JOKELA, Slade (Argonne National Laboratory)

Co-authors : Dr. ELAM, Jeffrey (Argonne National Laboratory) ; Dr. MANE, Anil (Argonne National Laboratory) ; Dr. PENG, Qing (Argonne National Laboratory) ; Dr. VERYOVKIN, Igor (Argonne National Laboratory) ; Dr. ZINOVEV, Alexander (Argonne National Laboratory)

Presenter : Dr. JOKELA, Slade (Argonne National Laboratory)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : JOKELA, Slade

Submitted on Tuesday 12 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:48

Comments : ""

Abstract ID : 257

Characterization of the QUartz Photon Intensifying Detector (QUPID)

Content :

The sensitivity of the current generation of Noble Liquid Dark Matter detectors is limited by background events originating from radioactivity in the detector materials, especially from the photomultiplier tubes. In this talk, I will present the QUartz Photon Intensifying Detector (QUPID), a novel concept for a new style of photodetector based on the design of Hybrid APDs and made nearly entirely out of radiopure quartz. The radioactivity of the QUPID is at least an order of magnitude lower than conventional phototubes. By using QUPIDs, future noble liquid detectors will have drastically lower background levels, corresponding to much better sensitivities for dark matter detection. The Hybrid APD design also provides very high linearity, single photon counting, and good time response. I will discuss the development and testing of the QUPID, specifically for use in liquid xenon, along with the detection of xenon scintillation light by the QUPID.

Primary authors : Mr. TEYMOURIAN, Artin (UCLA)

Co-authors :

Presenter : Mr. TEYMOURIAN, Artin (UCLA)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : TEYMOURIAN, Artin

Submitted on Tuesday 12 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:48
Comments : ""

Abstract ID : 261

Detectors for studying the charge-exchange (p,n) reaction with rare-isotope beams with neutron time-of-flight technique

Content :

Intense rare-isotope beams provided by next-generation accelerator facilities such as FRIB will bring many opportunities to address forefront scientific questions in a wide variety of studies in nuclear structure and matter, nuclear astrophysics, and fundamental symmetries. To maximize the outcome from the facilities, experimental techniques involving new detector technologies are needed. Detection of neutrons will be a key ingredient for a variety of programs. One important program is the study of the charge-exchange (p,n) reaction with rare-isotope beams. From the energy and momenta of neutrons, the excitation-energy spectra can be extracted through a missing mass calculation. Experimentally, neutrons which have low energies typically from a few hundred keV to a few MeV must be detected with a good efficiency and be momentum-analyzed by employing the neutron time-of-flight technique with good time resolution. Therefore, we have developed a low-energy neutron detector array (LENDA) by optimizing the design so that low-energy neutrons, typically from 150 keV to 4 MeV, can be detected with a good efficiency (~ 20 – 30%), good timing resolution (~500 ps) as well as good angular resolution (~2 degrees). We have confirmed the feasibility of this experimental method for the first time by performing the 1H(56Ni,56Cu)n reaction at 110 MeV/u in inverse kinematics at NSCL, Michigan State University. The detectors used in conjunction with LENDA are also important; for obtaining an accurate time reference of neutron TOF, a thin diamond detector with a good time resolution (a few tens ps) and a good efficiency (>~95%) was placed in the path of the 56Ni beam. The (p,n) reaction channel was separated from other reaction channels by identifying beam-residue particles with the S800 magnetic spectrometer. A new LH2 target was developed and used as a proton target. This experiment focused on the extraction of transition strengths of importance for electron-captures in type Ia and II supernovae. In general, (p,n) reactions are an important tool for studying spin-isospin modes, with application for nuclear structures, astrophysics, neutrino physics, and equation of state. This experiment is an important step forward in these studies. The analysis of the experimental data shows optimizations/improvements that can be made in the detector, setup, and DAQ.

Primary authors : SASANO, Masaki (NSCL, Michigan State University)

Co-authors : AUSTIN, Sam M. (National Superconducting Cyclotron Laboratory, Michigan State University) ; BAZIN, Daniel (National Superconducting Cyclotron Laboratory, Michigan State University) ; FERRANTE, Nicholas (Ursinus College) ; CANNON, Steven (National Superconducting Cyclotron Laboratory, Michigan State University) ; MEHARCHAND, Rhiannon (National Superconducting Cyclotron Laboratory, Michigan State University) ; MONTES, Fernando (National Superconducting Cyclotron Laboratory, Michigan State University) ; PALLARDY, Jessica (Ursinus College) ; PERDIKAKIS, Georgios (National Superconducting Cyclotron Laboratory, Michigan State University) ; PRINKE, Amanda (National Superconducting Cyclotron Laboratory, Michigan State University) ; RILEY, Lew (Ursinus College) ; ADREAS, Stolz (National Superconducting Cyclotron Laboratory, Michigan State University) ; AUMANN, Thomas (GSI) ; UHER, Leshawna (National Superconducting Cyclotron Laboratory, Michigan State University) ; HITT, George W. (Khalifa University) ; ZEGERS, Remco G. T. (National Superconducting Cyclotron Laboratory, Michigan State University) ; SAKAI, Hideyuki (RIKEN) ; YAKO, Kentaro (University of Tokyo) ; COLE, Arthur (Kalamazoo college) ; CAESAR, Christoph (GSI) ; GUESS, Carol (University of Massachusetts Lowell)

Presenter : SASANO, Masaki (NSCL, Michigan State University)

Track classification : Particle Identification

Contribution type : Oral Presentation

Submitted by : SASANO, Masaki

Submitted on Tuesday 12 April 2011

Last modified on : Thursday 14 April 2011

Comments :

Status : WITHDRAWN

Track judgments :

Track : Particle Identification

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 262

Simulation of a Triple-GEM detector for a potential CMS muon tracking and trigger upgrade

Content :

The forward region of the RPC muon system of the CMS experiment at the LHC is not instrumented at present. A multi-institutional collaboration is investigating the possibility of enhancing muon tracking and triggering capabilities in the region 1.6 < eta < 2.1 by instrumenting the end-cap muon system with large-area Triple-GEM detectors. These Micropattern Gaseous Detectors are an appealing option for such a future upgrade because of their good
spatial resolution, high rate capability, and radiation hardness. The availability of highly integrated ampli cation and readout electronics would allow for the design of a system with channel
densities comparable to that of modern silicon detectors. We present studies of a Triple-GEM detector simulated using ANSYS (FEM package) and GARFIELD for various electric field con gurations and gas mixtures, such as Ar/CO2/CF4 and Ar/CO2, and in the presence of a
3T magnetic eld. The result on many key parameters such as gas gain, drift velocities are described. Good agreement with measurements of the LHCb Triple-GEM performance is observed. Preliminary simulation studies of muon reconstruction and trigger performance of the
envisaged muon upgrade in the CMS high-eta region are also presented.

Primary authors : Dr. MOULIK, Tania (Department of Physics - National Inst. of Science Education and Research)

Co-authors :

Presenter : Dr. MOULIK, Tania (Department of Physics - National Inst. of Science Education and Research)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : MOULIK, Tania

Submitted on Wednesday 13 April 2011

Last modified on : Thursday 14 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 14 April 2011 09:06
Comments : ""

Abstract ID : 263

Electron Tracking Compton Camera with Balloon Borne Experiment for Celestial and Terrestrial MeV gamma-ray Observations in the North Pole

Content :

High energy gamma-ray astronomy has become a very promising field. On the other hand, in MeV region, there still remain many unobserved interesting celestial objects such as black holes and Gamma-ray Bursts. To explore this energy range, we have developed Electron Tracking Compton Camera (ETCC) consisting of a gaseous Time projection Chamber (TPC) based on the micro pixel gas counter (μ-PIC) and fine Scintillator pixel array. By measuring the 3D-track of a recoil electron in TPC, ETCC can measure the direction of incident gamma-rays photon by photon with a 3str wide field of view, and provides both a good background rejection and an angular resolution of ~1degree at 1MeV (FWHM). ETCC with a 1x1x0.5m size will be a good candidate for wide band measurement on 0.1-100MeV gamma rays by single detector. Our final goal is the all-sly survey with several ten times better sensitivities of COMPTEL between 100keV to 100MeV using above large ETCC in space. We already carried out the observation of celestial sub-MeV gamma rays using with a small ETCC with a balloon (Sub-MeV gamma ray Imaging Loaded-on-balloon Experiment: SMILE-I) in 2006, and successfully obtained diffuse cosmic and atmosphere gamma rays. Now we are constructing a medium ETCC with a 30 cm cubic for the next balloon experiment to catch gamma-rays from the Crab, GRB and terrestrial gamma-ray burst occurred in the North Pole (SMILE-II). Terrestrial gamma-ray bursts are generated by relativistic electron precipitation accelerated along the terrestrial magnetic field. Long duration flight (2weeks) around the North Pole is planned in 2013 using this SMILE-II.
Here I will mention about the design concept and performance of the ETCC using SMILE-II. Also results on the measurement of the angular resolution for the pair creation mode in 10-20MeV region using the ETCC is presented

Primary authors : Prof. TANIMORI, Toru (Dept. of Physics, Kyoto University)

Co-authors : Mr. IWAKI, Satoru (Dept. of Physics, Kyoto University) ; Dr. KABUKI, Shigeto (Dept. of Physics, Kyoto University) ; Dr. KISHIMOTO, Yuji (Dept. of Physics, Kyoto University) ; Dr. KUBO, Hidetoshi (Dept. of Physics, Kyoto University) ; KUROSAW, Shunsuke (Dept. of Physics, Kyoto University) ; Mr. SAWANO, Tatsuya (Dept. of Physics, Kyoto University) ; Dr. TAKADA, Atsushi (Research Institute for Sustainable Humanosphere, Kyoto University) ; Dr. UENO, Kazuki (Dept. of Physics, Kyoto University) ; Mr. MATSUOKA, Yoshihiro (Dept. of Physics, Kyoto University) ; Dr. MIUCHI, Kentaro (Dept. of Physics, Kyoto University) ; Mr. NAKAMURA, Kiseki (Dept. of Physics, Kyoto University) ; Dr. PARKER, Joseph (Dept. of Physics, Kyoto University) ; Mr. TANIUE, Kojiro (Dept. of Physics, Kyoto University) ; Mr. AONO, Masashiro (Dept. of Physics, Kyoto University)

Presenter : Prof. TANIMORI, Toru (Dept. of Physics, Kyoto University)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : TANIMORI, Toru

Submitted on Wednesday 13 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 22 April 2011 22:02
Comments : ""

Abstract ID : 264

Development of Micro tracking TPC using a Micro Gas Pixel Chamber (□PIC), and Application to time resolved Neutron Imaging Detector

Content :

We have developed a 2-D micro pattern gas detector based on printed board circuit technology (PCB), named Micro Pixel gas Chamber (□PIC). Using the □PIC, a micro Time Projection Chamber (□-TPC) and its readout system were developed, which can measure the successive positions of the track of charged particles in a 400 □m pitch like a using only X and Y strips readout method. Then |~500 readouts are only needed for 65000 pixels in the 10x10cm □PIC. Its readout system consists of only amplifier and discriminator LSIs and FPGAs, and measures not only the hit strip address but also the both rising and falling times of the pulse, which enables to obtain the relative pulse height of each hit pixel. Thus, this □TPC is quite simple, but it nevertheless gives a fine 3D-track image including dE/dx along the track like a bubble or cloud chamber. Now three size of m-PIC are commercially available; 10x10cm, 20x20cm, and 30x30cm. Already □-TPCs using □PIC with above readout system are being applied in several fields such as a Target chamber catching tracks of the fine fragments from nuclei in the nuclear beam experiment and the radiation monitor in the spacecraft in Japan.
In Kyoto University, using this □TPC technology, following researches are being carried out such as an electron tracking Compton camera (ETCC) for MeV Gamma-ray imaging, a Dark matter wind detector, and time resolved Neutron Imaging detector. In particular, Neutron Imaging detector measures the tracks and Bragg curves of the decay of 3He absorbing a thermal neutron. Using Bragg curve information, decay products of 3H and proton are perfectly defined in the □-TPC, and hence the good position resolution of less 200 □m are obtained with a 1 □second time resolution for each neutron. This detector has already been operated in the J-PARC pulsed neutron source as an time resolved imaging detector with a MHz counting rate.
Here I will mention on the detailed performance of the □-PIC and □-TPC using above application to pulsed neutron imaging.

Primary authors : Prof. TANIMORI, Toru (Dept. of Physics, Kyoto University)

Co-authors : Dr. KUBO, Hidetoshi (Dept. of Physics, Kyoto University) ; Dr. MIUCHI, Kentaro (Dept. of Physics, Kyoto University) ; Dr. KABUKI, Shigeto (Dept. of Physics, Kyoto University) ; Dr. TAKADA, Atsushi (Research Institute for Sustainable Humanosphere, Kyoto University) ; Dr. KISHIMOTO, Yuji (Dept. of Physics, Kyoto University) ; Dr. UENO, Kazuki (Dept. of Physics, Kyoto University) ; Dr. PARKER, Joseph (Dept. of Physics, Kyoto University) ; Dr. KUROSAWA, Shunsuke (Dept. of Physics, Kyoto University) ; Mr. IWAKI, Satoru (Dept. of Physics, Kyoto University) ; Mr. SAWANO, Tatsuya (Dept. of Physics, Kyoto University) ; Mr. NAKAMURA, Kiseki (Dept. of Physics, Kyoto University) ; Mr. HIGASHI, Napki (Dept. of Physics, Kyoto University) ; Mr. TANIUE, Kojiro (Dept. of Physics, Kyoto University) ; Mr. AONO, Masashiro (Dept. of Physics, Kyoto University) ; Mr. MATSUOKA, Yoshihiro (Dept. of Physics, Kyoto University)

Presenter : Prof. TANIMORI, Toru (Dept. of Physics, Kyoto University)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : TANIMORI, Toru

Submitted on Wednesday 13 April 2011

Last modified on : Thursday 14 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 14 April 2011 08:48
Comments : ""

Abstract ID : 265

Development of InP solid state detector and liquid scintilator containig metal complex for measurement of pp/7Be solar neutrinos and neutrinoless double beta decay

Content :

A large volume radiation detectors using a semi-insulating Indium Phosphide (InP) photodiode has been developed for measurement of pp/7Be solar neutrunos. This detector was desined to measure both electron emitted from neutrino capture of 115In and scintillation light from liquid xenon interacted by gammas emitted by excited state of 115Sn. For another possibility for pp/7Be experiment and the neutrinoless double beta deay, we have also developed an organic liquid scintillaor which contains 8-quinolinolate indium and zirconium complexe, respectively. Here we report the performance of InP detector and the gamma-ray-induced luminescence of metal complexes as liquid scintillator.

Primary authors : Prof. FUKUDA, Yoshiyuki (Miyagi University of Education)

Co-authors : Prof. MORIYAMA, Shigetala (Institute for Cosmic Ray Research, Univ of Tokyo)

Presenter : Prof. FUKUDA, Yoshiyuki (Miyagi University of Education)

Track classification : Detectors for neutrino physics

Contribution type : Poster Presentation

Submitted by : FUKUDA, Yoshiyuki

Submitted on Wednesday 13 April 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:50
Comments : ""

Abstract ID : 266

Upgrade of the ALICE Detector

Content :

The ALICE experiment is optimized for heavy ion collisions and takes data in proton-proton collisions to obtain comparison data and to study specific measurements exploiting particular detector features like the low pT cut-off and the particle identification capabilities. The LHC shutdown foreseen for 2017/18 will allow to address the upgrade of several sub-detectors, in especial the inner tracking system (ITS), the installation of a new forward calorimeter (FOCAL), the extension of the muon spectrometer (MFT, muon forward tracker) and the installation of a detector with enhanced particle identification (VHMPID). An increased rate capability of the largest detector in ALICE, the time projection chamber (TPC), is also under investigation. An additional detector in the forward regions that will enhance the capabilities for diffractive physics (AD, ALICE Diffractive) is also under study. Furthermore, it is foreseen to improve the data acquisition and high level trigger systems (DAQ & HLT) to achieve more bandwidth and to use more sophisticated and complex triggers. Currently the collaboration is studying the different detector upgrade proposals and prepares a global upgrade plan. This contribution will present the different upgrade projects under study for the ALIC experiment.

Primary authors : Dr. RIEDLER, Petra (CERN)

Co-authors :

Presenter : Dr. RIEDLER, Petra (CERN)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : RIEDLER, Petra

Submitted on Wednesday 13 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:44
Comments : ""

Abstract ID : 267

Trigger induced mechanical resonance of gating wires in the multi-wire proportional chambers of the ALICE-TPC

Content :

The need of applying large electrical potential differences between thin long wires imposes some of the tightest requirements in the design of modern multi-wire proportional chambers (MWPCs) [1] and similar in Geiger-Müller-like tubes. Relatively high stretching forces are needed to ensure a stable equilibrium of the wire positions [2]. Moreover the sensitivity to (random) event-related excitations due to ionisation has to be considered carefully as the latter may lead to oscillations and deterioration of the signal [3, 4].

When used for the read-out of time projection chambers (TPCs), and in particular when they are operated in a high flux environment, a special layer of "gating" wires may be added to MWPCs in order to screen their amplification region whenever the detector is not triggered. This is achieved by applying different potential configurations to these wires: they can either be held at a potential that makes them transparent to drift-electrons ("open" state) or be configured to intercept them ("close" state).

This trigger-induced variation of electrical potential leads to a phenomenon recently observed at the ALICE-TPC: albeit the residual forces are rather small (about 1 uN/cm) they may give rise to sizeable (order of 10 um) resonant oscillations of the wires. The oscillations resemble themselves as a systematic pick-up signal, reaching amplitudes comparable to those of minimum ionising particles. We isolate this signal and give a model description for its creation.

We conclude our study with an exhaustive series of laboratory measurements carried out at an opened chamber that is exposed to a microscope.

References

[1] J. Dieperink, K. Kleinknecht, P. Steffen, J. Steinberger, T. Trippe, and F. Vannucci, "Construction problems with large proportional wire chambers." CERN NP Internal Report 69-28, 1969.
[2] T. Trippe, "Minimum tension requirement for Charpak chamber wires." CERN NP Internal Report 69-18, 1969.
[3] I. R. Boyko, G. A. Chelkov, V. I. Dodonov, M. A. Ignatenko, and M. Y. Nikolenko, "Vibra- tion of signal wires in wire detectors under irradiation," Nucl. Instr. Meth. A, vol. 367, no. 1-3, pp. 321-325, 1995.
[4] M. Anderson, J. Godlewski, A. Romaniouk, S. Sutchkov, and V. Tikhomirov, "Studies of wire vibrations in TRT straw tubes." ATL-INDET-2000-018, 2000.

Primary authors : Mr. HORN, Christian J. (Technische Universität Wien) ; Mr. MAGER, Magnus (CERN) ; Dr. MUSA, Luciano (CERN) ; Ms. RICHERT, Tuva (Lund University)

Co-authors :

Presenter : Mr. MAGER, Magnus (CERN)

Track classification : Gaseous Detectors

Contribution type : Poster Presentation

Submitted by : MAGER, Magnus

Submitted on Wednesday 13 April 2011

Last modified on : Wednesday 13 April 2011

Comments :

The poster would be presented on behalf of the ALICE-TPC collaboration from which the final presenter will be chosen.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : KOBAYASHI, Makoto
Date : 13 April 2011 09:51
Comments : ""

Abstract ID : 268

CALICE silicon-tungsten ECAL

Content :

Highly granular calorimetry promises to lead to major advances in the precision of measurements at future colliders.
An ultra-granular electromagnetic calorimeter based on silicon sensor readout is being developed within the CALICE collaboration. A first prototype has already been tested in particle beams, and has shown the expected performance. The focus is now on the development of technologies to enable the transition to a full scale detector, including reducing the required power budget, realistic supporting structures with minimised dead areas, and the industrialisation of its construction.

Primary authors : JEANS, Daniel (LLR - École Polytechnique) ; CORNAT, Rémi (LLR - École polytechnique)

Co-authors :

Presenter : CORNAT, Rémi (LLR - École polytechnique)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : JEANS, Daniel

Submitted on Wednesday 13 April 2011

Last modified on : Friday 15 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 15 April 2011 12:50
Comments : "New development"

Abstract ID : 269

Neutron background predictions and measurement at ATF2 beamline.

Content :

In electron machines, neutrons near the interaction region are dominantly produced by photonuclear processes in electromagnetic showers initiated by lost particles in dense materials. The photonuclear cross-section and the high multiplicity of low-energy photons make the low-energy regime vastly dominating this neutron production. ATF2, operating at 1.3 GeV, offers most of the phase space to assess the widely used Geant4 toolkit with this respect. The experiment beam dump is used to mimic the above mentioned high density region : the flux of neutron is initiated by the electron beam showering in the dump; which then scatters up to exiting the dump. The measurement of the time dependent flux is sensitive to both the neutron production and transport. Measurements of neutron fluxes performed with plastic and CsI scintillator will presented. They will be compared to a Geant4 simulation of the setup. The simulation makes use of rare event simulation techniques to boost the simulated flux exiting the beam dump. Results will be discussed.

Primary authors : Dr. GULER, Hayg (LLR/Ecole Polytechnique, France)

Co-authors :

Presenter : Dr. GULER, Hayg (LLR/Ecole Polytechnique, France)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : GULER, Hayg

Submitted on Wednesday 13 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:30
Comments : ""

Abstract ID : 270

The T2K Pi Zero Detector

Content :

The T2K (Tokai-to-Kamioka) experiment is a long-baseline neutrino oscillation experiment located in Japan that utilizes an intense off-axis beam of muon neutrinos incident on the Super-Kamiokande detector. A near detector located 280 m from the beam origin characterizes the beam energy and composition before the neutrinos travel the 295 km to Super-Kamiokande. One of the subdetectors comprising the near detector is the Pi-Zero Detector (P0D), a plastic-scintillator based detector that has been optimized for the detection of π^0 mesons produced in neutrino interactions. A description of the P0D, as well as its performance over the first T2K run period will be presented.

Primary authors : Prof. BUCHANAN, Norm (Colorado State University)

Co-authors :

Presenter : Prof. BUCHANAN, Norm (Colorado State University)

Track classification : Experimental Detector Systems ; Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : BUCHANAN, Norm

Submitted on Wednesday 13 April 2011

Last modified on : Monday 25 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed for other tracks (Detectors for neutrino physics)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:45
Comments : ""

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 25 April 2011 14:04
Comments : ""

Abstract ID : 271

Development of high speed, radiation hard CMOS monolithic pixels for high resolution Transmission Electron Microscopy

Content :

CMOS monolithic active pixel sensors have been established in recent years as the technology of choice for new generation digital imaging systems for Transmission Electron Microscopy. With respect to conventional, optically-coupled CCD-based cameras, the advantages of this technology lie on one side in the possibility for direct detection with single electron sensitivity, which greatly benefits the sensor Detective Quantum Efficiency (DQE); on the other side, the thin sensitive layer and consequently reduced electron scattering, coupled with micrometer-level pixel sizes achievable with deep-submicron fabrication processes, dramatically improve spatial resolution through an enhancement of the Modulation Transfer Function (MTF) up to large spatial frequencies. Readout rates of several hundred frames per second (fps) are possible even for large area (megapixel scale) sensors, whose layout can be optimized to achieve a superior radiation tolerance and thus ensure a long device lifetime. This was recently demonstrated, in an effort driven by the Transmission Electron Aberration-corrected Microscope (TEAM) project [1] at the LBNL National Center for Electron Microscopy, with the development and commissioning of a 400 fps, 1-megapixel sensor manufactured in a 0.35 μm CMOS process on a 9.5 μm pixel pitch [2]. The search for higher spatial resolution and radiation hardness, without compromising readout speed, prompted us to evaluate finer feature size processes. Through the design and testing of a prototype sensor manufactured in a 0.18 μm CMOS process, we identified an architecture for a 5 μm pitch pixel that demonstrated radiation hardness to 300 keV electron doses close to 100 Mrad [3]. This ultimately led to the development of a 16-megapixel, 400 fps readout, reticle scale CMOS imager which is currently being commissioned in a commercial digital camera system. The presentation will review this development, and introduce our search for a next generation architecture through the evaluation of a recently manufactured prototype sensor implementing novel variants for the pixel architecture and layout. Sensor detection and imaging performances, as characterized with electrons of energies in the range of interest to TEM (80-300 keV) will be reported and evaluated comparatively with the present state-of-the-art architecture.

Primary authors : Dr. CONTARATO, Devis (Lawrence Berkeley National Laboratory) ; DENES, Peter (Lawrence Berkeley National Laboratory) ; DOERING, Dionisio (Lawrence Berkeley National Laboratory) ; JOSEPH, John (Lawrence Berkeley National Laboratory) ; KRIEGER, Brad (Lawrence Berkeley National Laboratory)

Co-authors :

Presenter : Dr. CONTARATO, Devis (Lawrence Berkeley National Laboratory)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : Dr. CONTARATO, Devis

Submitted on Wednesday 13 April 2011

Last modified on : Monday 25 April 2011

Comments :

References

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Aberration-Corrected Electron Microscope with 0.5-Å Information Limit", Microscopy and Microanalysis 14, 469-477 (2008).
[2] M. Battaglia et al., "Characterisation of a CMOS active pixel sensor for use in the TEAM microscope", Nuclear Instruments and Methods A 622 (2010) 669.
[3] D. Contarato et al., "Direct detection in Transmission Electron Microscopy with a 5 µm pitch CMOS pixel sensor", Nuclear Instruments and Methods A 635 (2011) 69.

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 25 April 2011 17:58
Comments : ""

Abstract ID : 272

The Colorado High-resolution Echelle Stellar Spectrograph (CHESS) design and status.

Content :

I present a new far-ultraviolet echelle spectrograph which should provide resolving power greater than any currently existing far-ultraviolet instrument. We are using new gratings, detectors, and coatings that allow substantial advances in performance. I will present the current status of the design, and discuss known challenges and our plans to resolve them. While the design purpose of this instrument is for observations of nearby hot stars, the technologies we incorporate will allow for advances relevant to observation subjects from protoplanetary disks to the intergalactic medium. Incorporating such a spectrograph into a future, long-duration mission will make new high-quality observations possible and enhance our understanding of astrophysical plasmas.

Primary authors : Dr. BEASLEY, Matthew (University of Colorado at Boulder)

Co-authors : Dr. FRANCE, Kevin (University of Colorado at Boulder) ; Dr. BURGH, Eric (University of Colorado at Boulder) ; Prof. GREEN, James (University of Colorado at Boulder)

Presenter : Dr. BEASLEY, Matthew (University of Colorado at Boulder)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : BEASLEY, Matthew

Submitted on Wednesday 13 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 22 April 2011 22:08
Comments : ""

Abstract ID : 273

Construction of a technological semi-digital hadronic calorimeter

Content :

The Calice collaboration is building a technological prototype of a new kind of high-granularity hadronic calorimeter using large GRPCs read out with a semi-digital power-gated electronics. The prototype of 1 cubic meter intends to confirm the results obtained with the calice digital HCAL and address the integration problems to be met in the ILC future experiments.

The prototype will be made of more than 40 detectors and their embedded electronics assembled in a stainless steel cassettes. The cassettes will be inserted in a self-supporting and non magnetic mechanical structure. Services are conceived to mimic as much as possible those of the future experiments.
A new acquisition system is also to be used in the new prototype. It will allow higher acquisition rate.
Validation tests of the different construction steps will be presented and results obtained with the constructed units will be shown as well as the preparation of test beams.

Primary authors : Prof. LAKTINEH, Imad (ipn LYON)

Co-authors :

Presenter : Prof. LAKTINEH, Imad (ipn LYON)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : Prof. LAKTINEH, Imad

Submitted on Wednesday 13 April 2011

Last modified on : Friday 15 April 2011

Comments :

This will be presnted on behalf of the sdhcal group of the CALICE collaboration

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 15 April 2011 12:50
Comments : "New development"

Abstract ID : 274

Development of large and very thin GRPCs with new resistive coating and new gas distribution scheme

Content :

The IPNL group has developed a new kind of GRPCs to be used in future high energy experiments. The GRPCs are very thin and large (1m2). New resistive coating products were used to ensure good homogeneity and lower pad multiplicity of these chambers to be read out by 1cm2 pads.
A new gas-distribution scheme was also developed and intended to reduce the gas consumption by improving the gas circulation in the chamber.

The results obtained in beam tests at CERN and on cosmic rays benches show that the new detectors are highly efficient and homogenous. Larger chambers can be envisaged using the same technique is presently under investigation with new electronics readout scheme

Primary authors : Prof. LAKTINEH, Imad (ipn LYON)

Co-authors : Dr. LUMB, Nick (ipn Lyon) ; Mr. KIEFFER, Robert (ipn Lyon) ; Mr. IANIGRO, Jeanchristophe (ipn Lyon) ; Dr. MIRABITO, Laurent (ipn Lyon) ; Mr. SCHIRRA, Florent (ipnl Lyon) ; Dr. COMBARET, Christophe (ipn Lyon) ; Mr. EYNARD, Alexis (ipn Lyon) ; Dr. CAPONETTO, Luigi (ipn Lyon)

Presenter : Prof. LAKTINEH, Imad (ipn LYON) ; Dr. LUMB, Nick (ipn Lyon) ; Mr. KIEFFER, Robert (ipn Lyon) ; Dr. MIRAB

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : Prof. LAKTINEH, Imad

Submitted on Wednesday 13 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 27 April 2011 12:48
Comments : ""

Abstract ID : 275

System implications of the different powering distributions for the ATLAS Upgrade silicon tracker

Content :

The inner tracker of the present ATLAS detector has been designed and developed to function in the environment of the present Large Hadron Collider (LHC). At the next-generation tracking detector proposed for the High Luminosity LHC (HL-LHC), the so-called ATLAS Upgrade, the particle densities and radiation levels will be higher by as much as a factor of ten. The new detectors must be faster, more highly segmented, cover more area, be more resistant to radiation, and require much greater power delivery to the front-end systems. At the same time, they cannot introduce excess material which could undermine performance. For those reasons, the inner tracker of the ATLAS detector must be redesigned and rebuilt completely.

The design of the ATLAS Upgrade tracker has already been defined. It consists of several layers of silicon particle detectors. The most internal layers will be constituted by silicon pixel sensors, and the external layers will be constituted of silicon “short” (~2.5 cm) and “long” (~10 cm) strip sensors. In response to the needs of the strip region for the upgraded tracker, highly modular structures are being studied and developed, called "staves" for the central region (barrel) and “petals” for the forward regions (end-caps). These structures integrate large numbers of sensors and readout electronics (integrated in circuit units called “hybrids”), with precision light weight mechanical elements and cooling structures, and will conform the strips region of the ATLAS upgraded tracker.

The powering scheme used to power the stave and petal modules must address a dramatic decrease in cables and services materials, due to the material budget and the minimal space available for additional services in the upgraded tracker. Two different powering distributions have been proposed for the stave and petal hybrids, hosting the readout and control electronics, and are currently under development by several groups of the ATLAS Upgrade collaboration. One of the options is based on DC-DC conversion, in which one ASIC performs a step-down high voltage conversion of a factor of 4-6 for each hybrid of a stave/petal module, delivering lower voltage, higher currents to the front-end electronics. An additional second-step voltage conversion is also considered in the readout chips. The other proposed scheme is based on serial powering, in which all the hybrids of each stave/petal module are powered in series. The (constant) current of the serial power chain is determined by the current required for each single hybrid, and the voltage is equal to the total voltage required by a single hybrid multiplied by the number of hybrids in the serial chain.

This work consists of a comparison between both powering schemes from the point of view of a stave/petal system. Numerous variables have been taken into account for this study, such as total power dissipation and power efficiency, system reliability and protection, cooling needs, noise performances, impact on the material budget of the tracker, and services needs and re-usability. The study points out the work performed so far concerning the system issues previously mentioned, as well as the advantages, drawbacks, and potential issues of each powering option.

Primary authors : Dr. DIEZ-CORNELL, Sergio (Lawrence Berkeley National Laboratory (LBNL)) ; Dr. HABER, Carl (Lawrence Berkeley National Laboratory (LBNL))

Co-authors :

Presenter : Dr. DIEZ-CORNELL, Sergio (Lawrence Berkeley National Laboratory (LBNL))

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : Dr. DIEZ-CORNELL, Sergio

Submitted on Wednesday 13 April 2011

Last modified on : Friday 29 April 2011

Comments :

I could only choose one track classification: semiconductor detectors. Experimental Detector Systems would also work. Whatever you consider best.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:22
Comments : ""

Abstract ID : 276

Electro-optic Detector for Charged Particle Tracking

Content :

We present a new detector technology, an electro-optic detector that can be used for charged particle tracking for future particle detectors. This detector measures the position of charged particles when they interact with an electro-optic crystal such as KH2PO4 (KDP) through a change in the index of refraction caused by the linear Pockels' effect. Specifically, charged particles create a local change in an electric field inside of the crystal due to the creation of electron-hole pairs through ionization and proportionally, a change in the index of refraction. This change in refractive index can be measured by probing the crystal with laser light through a cross-polarized analyzer. Laser photons whose polarization has been changed due to the radiation induced index change in the crystal can then be detected remotely by a photo-detector. The electro-optic detector has many potential advantages over current detectors such as: a wireless readout system, particle positions are measured by laser photons which propagate to a detector instead of collecting charge within a material, and the signal strength is dependent on the external probe laser, which can be user adjusted. Here, we will present experimental results showing the timing and signal size of detection for muons and gammas interacting in the crystal.

This work is funded by the DOE/NNSA Office of Nonproliferation Research & Development, Special Nuclear Material Movement / Radiation Sensing Program. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Primary authors : SADLER, Lorraine (Sandia National Laboratories) ; BRUBAKER, Erik (Sandia National Laboratories)

Co-authors : BISSON, Scott (Sandia National Laboratories) ; HOOPS, Alex (Sandia National Laboratories) ; MARLEAU, Peter (Sandia National Laboratories) ; NEEL, Wiley (Sandia National Laboratories) ; SHIMIZU, David (Sandia National Laboratories) ; STRECKER, Kevin (Sandia National Laboratories)

Presenter : BRUBAKER, Erik (Sandia National Laboratories)

Track classification : Semiconductor Detectors

Contribution type : Poster Presentation

Submitted by : BRUBAKER, Erik Matthews

Submitted on Wednesday 13 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Feel free to recategorize this submission--I didn't think it really fit into any of the given "tracks"!

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)

Judged by : COLLINS, Paula
Date : 03 May 2011 10:08
Comments : ""

Abstract ID : 277

Antineutrino Detectors for a High-Precision Measurement of theta13 at Daya Bay

Content :

The Daya Bay reactor neutrino experiment is designed to measure the last unknown neutrino mixing angle theta_13 with a sensitivity of sin^22theta_13<0.01. The experiment will use eight identical liquid scintillator detectors with 20-ton target mass installed at three underground sites to measure the flux and spectrum of reactor antineutrinos from the Daya Bay nuclear power plant and search for subdominant neutrino oscillation. Control of the relative detector systematics to <0.4% is critical for the experiment's sensitivity. We will describe the design, construction, and performance of the Daya Bay antineutrino detectors.

Primary authors : Prof. HEEGER, Karsten (University of Wisconsin)

Co-authors :

Presenter : Prof. HEEGER, Karsten (University of Wisconsin)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : HEEGER, Karsten

Submitted on Thursday 14 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:37
Comments : ""

Abstract ID : 278

Development of Multi-gap Resistive Plate Chamber for Medical Imaging

Content :

All over the world, mainly scintillator-based detectors are being used for PET Imaging. Due to the high cost of the existing systems, extensive R is being performed to find an alternative detector. Multi-gap Resistive Plate Chamber (MRPC) with time resolution ~ tens of pico-seconds is considered to be a good alternative [1, 2]. In this work we present the development of Bakelite and glass-based MRPC systems for their applications in PET imaging.

MRPC is a gas filled detector made of highly resistive (bulk resistivity ~ 1011-1012 Ω cm, e.g. bakelite, glass) electrodes consisting of several small gas gaps (10 to 100 gaps of 0.2 mm to 1 mm width) and operates at atmospheric pressure [3]. Smaller and larger number of gaps improves the time resolution. In MRPC, the total gas volume is divided into a number of small gaps with equal width by inserting intermediate resistive plates with bulk resistivity ~ 1011-1012 Ω cm between the two outermost resistive plates.

A 20 cm × 20 cm MRPC prototype with four 0.6 mm gap has been fabricated with 1.6 mm thick P-120 grade bakelite sheets and tested in a cosmic ray test bench [4, 5] in the streamer mode with a gas mixture of argon, iso-butane and tetra-fluroethane (R-134a) in 55/7.5/37.5 volume mixing ratio [7]. Silicone coating has been applied over all the inner surfaces to make the surface smooth [4].

In this study the efficiency, counting rate, leakage current and time resolution of the module have been measured. The efficiency plateau above 95% has been obtained with the time resolution ~ 2 ns.

One glass MRPCs of 20cm x 14cm dimension, having six gaps each of 200 μm width has been fabricated and tested in avalanche mode with a gas mixture of Freon/iso-butane/SF6 in 95/4.5/0.5 mixing ratio. The efficiency of ~ 90% and time resolution ~ 450 ps had been achieved.

Methods of fabrication of all the prototype MRPCs, mode of operation and the test results will be presented.

Primary authors : Mr. BANERJEE, Arnab (VECC)

Co-authors :

Presenter : Mr. BANERJEE, Arnab (VECC)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : BANERJEE, Arnab

Submitted on Thursday 14 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 25 April 2011 20:32
Comments : ""

Abstract ID : 279

Operational Experience with ATF2 Beam Diagnostics

Content :

The aim of the ATF2 test accelerator at KEK, Japan is to demonstrate the feasibility of the compact, local-chromaticity correction style of final focus system (FFS) optics envisioned for the next generation of energy frontier lepton linear colliders (such as ILC or CLIC.) It also serves as a test bed for ILC/CLIC related diagnostic devices.
The magnetic optics employed in the ATF2 FFS has extraordinarily tight tolerances: the sensitivity of the focused beam size to both small errors in relative magnetic field strength (typically of order 1e-4 and down to 1e-6 in the case of the final doublet) and position and rotation errors in the installation (typically a few 10's of micro-metres, 100 micro-radians) lead to challenging problems in the commissioning and tuning of the system. One has to rely on complicated tuning procedures to recover beam size from fabrication and installation 'errors'.
Simulations show that, in principal, the system can be tuned to provide a vertical waist with the expected 37nm vertical waist size. The achievement of this tuning requires a lot of high-performance diagnostic devices working well and with high reliability. The beam tuning algorithms developed also require a high degree of automation, leading to a complex integration of various diagnostics into cross-system feedback controls etc.
Some of the specific diagnostic systems required for tuning are discussed from the point of view of machine tuning, e.g. High-resolution cavity BPMs used for accurate orbit steering and feedback and for beam-based alignment. Multiple OTR systems used for fast online emittance measurements. High-precision and high-stability power supplies used for the FFS magnets. Precision mover systems used for magnet control, dealing with slow ground-motion-induced orbit drift and low-dispersion orbit establishment. A pair of special-purpose high-resolution cavity BPMs with demonstrated resolution <10 nano-metres are being developed with a goal of achieving ~<2 nano-metre position readback at the vertical beam waist.

Primary authors : Dr. WHITE, Glen (SLAC)

Co-authors :

Presenter : Dr. WHITE, Glen (SLAC)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : WHITE, Glen

Submitted on Thursday 14 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:31
Comments : ""

Abstract ID : 280

Detectors for the South Pole Telescope

Content :

The South Pole Telescope (SPT) is a 10-m mm/sub-mm telescope at the Amundsen-Scott South Pole Station. It's primary science goals consist of a galaxy cluster survey for understanding Dark Energy and probing the physics of Inflation through the CMB polarization. Both science goals require exceptional sensitivity requiring focal planes with many optical elements. The focal planes of the SPT utilizes Transition Edge Sensor (TES) bolometers to build arrays of nearly 1000 detectors. In this talk, I will present the TES bolometer technology for both the first SPT focal plane and its upcoming upgrade to a polarization sensitive array.

Primary authors : Dr. CHANG, Clarence (University of Chicago)

Co-authors : Dr. CARLSTROM, John (University of Chicago)

Presenter : Dr. CHANG, Clarence (University of Chicago)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : CHANG, Clarence

Submitted on Thursday 14 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:33
Comments : ""

Abstract ID : 281

QUPID readout system and operation in Noble Liquid

Content :

Dark Matter direct detection requires extremely low background environment. Achieving the lowest possible contamination from the photodetectors is one of the most relevant challenge for such a background free measurements. For this purpose UCLA in collaboration with Hamamatsu Photonics has invented a novel photodetector concept called QUPID (Quartz Photon Intensifying Detector), based on the Hybrid APD and entirely made of radiopure quartz.
Next generation of DM detectors - as DarkSide50, XENON1T, MAX and XAX - could widely benefit by employing the QUPIDs, pushing down the background contamination - by at least one order of magnitude than standard PhotoMultiplier - and making possible a dramatic increase in the sensitivity.
We present the QUPID system for Nobel Gas in development by UCLA with other collaborations, as FNAL, UZH and Columbia. The electronics and the readout (from the HV/LV to the Preamplifier and its DAQ) play a fundamental role in the design of Noble Liquid detector and must fulfill the low contamination requirement while keeping at the same time the clearness of the low signals coming from the photodetectors. Particularly at UCLA we are building a 7+7 QUPID setup to be operated in Noble Gas/Liquid and we show the ongoing activities and the steps achieved.

Primary authors : Dr. BELTRAME, Paolo (on behalf of the UCLA group)

Co-authors :

Presenter : Dr. BELTRAME, Paolo (on behalf of the UCLA group)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : BELTRAME, Paolo

Submitted on Thursday 14 April 2011

Last modified on : Wednesday 11 May 2011

Comments :

If the abstract is not accepted for oral presentation, we would like to submit the same as poster

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HOFFMAN, Kara
Date : 11 May 2011 21:49
Comments : ""

Abstract ID : 282

High Resolution X-ray Imaging Sensor with SOI CMOS Technology

Content :

A monolithic pixel detector with a 0.2 um fully-depleted Silicon-On-Insulator (SOI) CMOS technology, called SOIPIX, is now being developed. These are utilizing thick handle wafer of SOI structure as a radiation sensor to detect charged particles and X-ray. Therefore, SOIPIX can be applied to the high-energy experiments, astrophysics, medical imaging and so on.
One of the detectors, called INTPIX4, is 10.3 x 15.5 mm in size having 512 x 832 (~426 k) pixels each 17 um square. It has integration type pixels and implements a correlated double sampling (CDS) circuit in each pixel to suppress the reset noise. It has 13 analog outputs. The stored signals can be read out from them in parallel. The thickness of the sensor is 260 um. Recently, we succeeded to process very high resistivity (~10 k Ohm•cm) FZ-SOI wafer instead of CZ-SOI wafer previously used. We could achieve full depletion of the sensor with relatively low apply voltage.
As a result of the experiments, we succeeded in the acquisition of a high resolution image with X-ray by back-illuminated. The chart pattern of 25 line pairs / mm (20 um) was clearly obtained in exposure time of several msec at room temperature. More detailed results including gain and energy resolution will be presented.

Primary authors : Mr. TAKEDA, Ayaki (SOKENDAI)

Co-authors : Prof. ARAI, Yasuo (KEK/IPNS) ; Dr. MIYOSHI, Toshinobu (KEK/IPNS) ; Dr. ICHIMIYA, Ryo (KEK/IPNS) ; Ms. IKEMOTO, Yukiko (KEK/IPNS)

Presenter : Mr. TAKEDA, Ayaki (SOKENDAI)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : TAKEDA, Ayaki

Submitted on Thursday 14 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 09:56
Comments : ""

Abstract ID : 283

An advanced monolithic CMOS Image Sensor with 50 ns timing resolution and in pixel time-stamp storage

Content :

The PImMS Sensor is an event triggered time-stamp storing CMOS image sensor designed primarily for Time Of Flight (TOF) Mass Spectrometry. The device features a 72 by 72 pixel array with less than 50 ns timing resolution and 4 registers per pixel for 12-bit time-stamp storage. The multiple registers and high temporal resolution allow the detection of all incident mass peaks within each measurement period without the need to gate or exclude certain masses, increasing throughput. By combining traditional TOF Mass Spectrometry techniques with a 2D pixelated detector it is possible to extract addition information about the spatial position or the velocity of the ions when generated.
The sensor has been designed and fabricated in the INMAPS 0.18 μm process which was developed for the International Linear Collider. This allows for the inclusion of over 600 transistors of full CMOS electronic circuits within the pixel without significantly affecting the detection efficiency of the monolithic sensor architecture.
We will present an overview of the device design and features, measurements of device performance and results from the Mass Spectrometry application. Further applications for the sensor will also be described.

Primary authors : Mr. CLARK, Andy (STFC Rutherford Appleton Laboratory)

Co-authors : Prof. BROUARD, Mark (University of Oxford) ; Mr. CROOKS, Jamie (STFC Rutherford Appleton Laboratory) ; Ms. HILL, Laura (University of Oxford) ; Mr. JOHN, Jaya John (University of Oxford) ; Dr. NOMEROTSKI, Andrei (University of Oxford) ; Mr. SLATER, Craig (University of Oxford) ; Dr. TURCHETTA, Renato (STFC Rutherford Appleton Laboratory) ; Dr. VALLANCE, Claire (University of Oxford) ; Dr. WILMAN, Edward (University of Oxford) ; Mr. YUEN, Weihao (University of Oxford)

Presenter : Mr. CLARK, Andy (STFC Rutherford Appleton Laboratory)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : CLARK, Andy

Submitted on Thursday 14 April 2011

Last modified on : Monday 25 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 25 April 2011 17:59
Comments : ""

Abstract ID : 284

Processing of First AA and pp Collisions in the ALICE High Level Trigger

Content :

ALICE (A Large Ion Collider Experiment) is a dedicated heavy ion experiment at the Large Hadron Collider (LHC) of CERN. In order to reduce the amount of data written to mass storage a High Level Trigger (HLT) completely analyses every event triggered by the preceding trigger stages to be able to select only the most promising events for storage. In addition to this event selection the HLT is also used to provide reconstructed events for a live online display in the main ALICE control room as well as online data compression. The HLT is a Linux cluster consisting of more than 200 nodes with 8-24 CPU cores and 16 to 48 GB RAM each. In addition to these processing capabilities the HLT can also make use of FPGA co-processing in its front-end receiver cards, even before the data from the detector enters a computer's memory and 35 nVidia graphics cards which can perform online tracking. These capabilities are in particular important for the large amounts of data encountered during the heavy ion collisions, e.g. like in the first heavy ion period at the end of 2010. All HLT software reconstruction is embedded into ALICE's offline data analysis framework for testing and verification. Some parts of the HLT processing software even directly use offline software for online analysis. Other parts are highly optimized for most efficient online running like the TPC tracking which shows speed improvements compared to its offline equivalent of a factor of more than 3 (pp) and 8 (heavy ion) respectively. We will present experiences from the previous running since the first LHC collisions, in particular of the first heavy ion collisions, as well as the current configuration and setup of the HLT for the 2011 running period.

Primary authors : Dr. STEINBECK, Timm Morten (FIAS - Institute for Computer Science-Johann-Wolfgang-Goethe Uni)

Co-authors :

Presenter : Dr. STEINBECK, Timm Morten (FIAS - Institute for Computer Science-Johann-Wolfgang-Goethe Uni)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : STEINBECK, Timm Morten

Submitted on Thursday 14 April 2011

Last modified on : Friday 22 April 2011

Comments :
for the ALICE HLT Collaboration

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:00
Comments : ""

Abstract ID : 285

Tracking and vertexing performance of the ATLAS Inner Detector at the LHC

Content :

The ATLAS experiment at the LHC is equipped with a charged particle tracking system, the Inner Detector, built on three subdetectors, which provide high precision measurements made from a fine detector granularity. The Pixel and microstrip (SCT) subdetectors, which use the silicon technology, are complemented with the Transition Radiation Tracker.
In this talk, the performance of the track reconstruction of the ATLAS Inner Detector in terms of tracking efficiency and track parameter resolution is presented, using data taken at center-of-mass energy of 7 TeV. The reconstruction of known particle decays is an important tool to understand the track and vertex reconstruction and particle identification capabilities of the ATLAS Inner Detector. Several different particle decays such as Kshort, Lambda, D*, K* etc. have been reconstructed and their properties compared to MC predictions. Different approaches for primary vertex reconstruction are compared in terms of their reconstruction efficiency and capability to identify events with several pile up collisions.

(Abstract submitted by the ATLAS Inner Detector Speaker Committee.
The speaker will be defined later)

Primary authors : Dr. TRONCON, Clara (Milano INFN & University)

Co-authors :

Presenter : Dr. TRONCON, Clara (Milano INFN & University)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : TRONCON, Clara

Submitted on Thursday 14 April 2011

Last modified on : Tuesday 03 May 2011

Comments :
(Abstract submitted by the ATLAS Inner Detector Speaker Committee.
The speaker will be defined later)

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 09:09
Comments : ""

Abstract ID : 286

Offline calibrations and performance of the ATLAS Pixel Detector

Content :

The ATLAS Pixel Detector is the innermost detector of the ATLAS experiment at the Large Hadron Collider at CERN. It consists of 1744 silicon sensors equipped with approximately 80 M electronic channels, providing typically three measurement points with high resolution for particles emerging from the beam-interaction region, thus allowing to measure particle tracks and secondary vertices with very high precision.
In this talk the performance reached by the Pixel Detector with LHC collision data will be presented, with particular attention to its spatial resolution, efficiency, particle identification properties and the Lorentz angle measurement.
Offline calibration procedures and optimization techniques will b discussed in detail.

Primary authors : Dr. TRONCON, Clara (Milano INFN & University)

Co-authors :

Presenter : Dr. TRONCON, Clara (Milano INFN & University)

Track classification : Semiconductor Detectors

Contribution type : --not specified--

Submitted by : TRONCON, Clara

Submitted on Thursday 14 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

This abstract is submitted by the ATLAS Inner Detector Speakers Committee. The speaker will be defined later.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 10:08
Comments : ""

Abstract ID : 287

Liquid xenon gamma-ray calorimeter for the MEG experiment

Content :

The MEG experiment, which searches for a lepton flavor violating muon decay, mu -> e gamma, to explore new physcis like supersymmetric grand unification, has started physics run since 2008 at Paul Scherrer Institute, Switzerland. Its innovative detector system, which consists of a 900 liter liquid xenon scintillation photon detector with 846 2inch photomultiplier tubes and a positron spectrometer with a superconducting magnet, drift chamber, and timing counter, enables orders of magnitude better sensitivity than previous experiments.

The liquid xenon gamma-ray detector is a crucial component for our experiment in order to reduce the accidental background and to achieve our goal of sensitivity.
Several purification methods including gaseous and liquid phase have been done to increase the scintillation light yield, and various calibration and monitoring methods to evaluate the detector performance have been tried and established.
The current performance of the liquid xenon detector for physics analysis and some future prospects are described here as well as the calibration and monitoring methods.

Primary authors : Dr. IWAMOTO, Toshiyuki (The University of Tokyo)

Co-authors :

Presenter : Dr. IWAMOTO, Toshiyuki (The University of Tokyo)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : IWAMOTO, Toshiyuki

Submitted on Thursday 14 April 2011

Last modified on : Friday 15 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 15 April 2011 12:51
Comments : "running experiment"

Abstract ID : 288

The Dark Energy Survey Camera (DECam) Readout Electronics

Content :

The Dark Energy Survey (DES) makes use of a new camera, the Dark Energy Camera (DECam). DECam is a 570 Megapixel CCD camera covering a 3 square degree field and will be installed in the Blanco 4M telescope at Cerro Tololo Inter-American Observatory (CTIO). The camera is presently undergoing final testing at Fermi National Accelerator Laboratory and will be ready for observations in the fall of 2011. The focal plane is 1 meter in diameter and will make use of 62 red-sensitive 2kx4k fully depleted Charge-Coupled Devices (CCDs), as well as 12 2kx2k CCDs used for guiding, alignment and focus. The data acquisition system has been designed to read out images in 17 seconds with less than 15 e^- rms noise. This poster will describe the readout system.

Primary authors : SHAW, Theresa (FNAL)

Co-authors : BALLESTER, Otger (IFAE) ; CARDIEL-SAS, Laia (IFAE) ; CASTILLA, Javier (CIEMAT) ; CHAPPA, Steven (FNAL) ; DE VICENTE, Juan (CIEMAT) ; HOLM, Scott (FNAL) ; HUFFMAN, Dave (FNAL) ; KOZLOVSKY, Mark (FNAL) ; MARTINEZ, Gustavo (CIEMAT) ; MOORE, Todd (University of Illinois-UC) ; OLSEN, Jamieson (FNAL) ; SIMAITIS, Vaidas (University of Illinois-UC) ; STUERMER, Walter (FNAL)

Presenter : SHAW, Theresa (FNAL)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Poster Presentation

Submitted by : SHAW, Theresa

Submitted on Thursday 14 April 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 11 May 2011 14:30
Comments : ""

Abstract ID : 289

ADC System with On-board Demodulation for QUIET-II Experiment

Content :

The Q/U Imaging ExperimenT (QUIET) is designed to measure the
B-mode in cosmic microwave background (CMB) polarization, which is
smoking-gun evidence for the inflationary universe.
Since the B-mode signal is so faint (nK orders),
a large detector array is required.
Using a 500-element HEMT-based polarimeter array,
QUIET-II plans to search for the B-mode at the Atacama desert in Chile,
about 5,000 m above sea level.
To handle the large number of analog signals from the polarimeters
(500-elements x 4ch = 2,000 signals) on the telescope mount
where space is quite limited,
ADC system composed of high density and scalable electronics is a key issue.
We developed 64ch VME-6U-size Analog-to-Digital Converter (ADC)
boards with a high resolution (18 bits), sufficient sampling speed
(800 kS/s) and digital demodulation functionality.
The demodulation of the amplitude-modulated signals from the
polarimeters provides Stokes Q and U parameters, simultaneously.
All demodulated signals are averaged with a frequency of 50 Hz to reduce the data size.
The demodulation and averaging algorithms are implemented in a
FPGA on the ADC board.
To obtain the high scalability,
data are transferred via not the VME protocol, but the TCP protocol implemented in the same FPGA.
In this talk we will present the design and test results of the ADC system.

Primary authors : ISHIDOSHIRO, Koji (KEK)

Co-authors : NAGAI, Makoto (KEK) ; HIGUCHI, Takeo (KEK) ; IKENO, Masahiro (KEK) ; HASEGAWA, Masaya (KEK) ; HAZUMI, Masashi (KEK) ; TANAKA, Manobu (KEK) ; TAJIMA, Osamu (KEK) ; UCHIDA, Tomohisa (KEK)

Presenter : ISHIDOSHIRO, Koji (KEK)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : ISHIDOSHIRO, Koji

Submitted on Thursday 14 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:39
Comments : ""

Abstract ID : 290

Performance of the ALICE Time Projection Chamber

Content :

The Time Projection Chamber of the ALICE experiment has been operated successfully since the CERN Large Hadron Collider started to provide collisions in November 2009. More than 1 billion physics events have been read out from the TPC with pp collisions (mainly at a center of mass energy of 7TeV), and about 75 million with Pb-Pb collisions at 2.76TeV per nucleon pair (in November 2010). We describe briefly the challenges in designing and operating a Time Projection Chamber for heavy-ion collisions and report on the performance of the detector, in particular on readout speed, momentum resolution and particle identification capability.

Primary authors : Dr. LIPPMANN, Christian (Research Division and ExtreMe Matter Institute EMMI, GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany)

Co-authors :

Presenter : Dr. LIPPMANN, Christian (Research Division and ExtreMe Matter Institute EMMI, GSI Helmholtzzentrum für Schw

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : LIPPMANN, Christian

Submitted on Thursday 14 April 2011

Last modified on : Thursday 14 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 14 April 2011 16:31
Comments : ""

Abstract ID : 291

WArP R: Demonstration and comparison of photomultiplier tubes operation at liquid Argon Temperature

Content :

A new generation, high Quantum Efficiency 3" photomultiplier tube (PMT) for cryogenic applications at liquid Argon temperature (LAr, T=87 K) has been recently developed by Hamamatsu Photonics (Mod. R11065). This issue is of interest in particular for direct Dark Matter searches with detectors adopting liquified Argon as nuclear targets for WIMP interactions and read-out of the corresponding scintillation light signals from nuclear recoil in the medium. Improvements in detector sensitivity down to low recoil energy thresholds can be primarily achieved by using these new PMTs with enhanced quantum efficiency.
Within the on-going R activity of the WArP Collaboration (WIMP Argon Program at the INFN GranSasso Lab), a first set of R11065 PMTs has been subject to a series of tests aiming at their characterization in reference working conditions. These were obtained by operating the PMTs immersed in the liquid and optically coupled to LAr cells of various size. A comparison of the R11065 Hamamatsu PMT with a former generation of cryogenic PMT (currently in use with the WArP-100 detector), has been also carried out with the two PMTs simultaneously operated and viewing a common LAr volume. From these tests the superior performances of the Hamamatsu PMT have been clearly demonstrated, showing that this new type of PMT is very well suited for experimental applications, in particular for new direct Dark Matter searches with LAr-based experiments.

Primary authors : Dr. SEGRETO, Ettore (INFN) ; Prof. CAVANNA, Flavio (Università degli studi di L'Aquila) ; Dr. SZELC, Andrzej (Yale University) ; Dr. CANCI, Nicola (INFN) ; Dr. ACCIARRI, Roberto (Università degli studi di L'Aquila)

Co-authors :

Presenter : Dr. SEGRETO, Ettore (INFN)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : SEGRETO, Ettore

Submitted on Thursday 14 April 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HOFFMAN, Kara
Date : 11 May 2011 21:51
Comments : ""

Abstract ID : 292

Applications of Emerging Parallel Optical Link Technology to High Energy Physics Experiments

Content :

Modern particle detectors depend upon optical fiber links to deliver event data to upstream trigger and data processing systems. Future detector systems can benefit from the development of dense arrangements of high speed optical links emerging from the telecommunications and storage area network market segments. These links support data transfers in each direction at rates up to 120 Gbps in packages that minimize or even eliminate edge connector requirements. Emerging products include a class of devices known as optical engines which permit assembly of the optical transceivers in close proximity to the electrical interfaces of ASICs and FPGAs which handle the data in parallel electrical format. Such assemblies will reduce required printed circuit board area and minimize electromagnetic interference and susceptibility. We will present test results of some of these parallel components and report on the development of pluggable FPGA Mezzanine Cards equipped with optical engines to provide to collaborators on the Versatile Link Common Project for the HI-LHC at CERN.

Primary authors : Mr. PROSSER, Alan (Fermilab)

Co-authors :

Presenter : Mr. PROSSER, Alan (Fermilab)

Track classification : Trigger and Data Acquisition Systems

Contribution type : --not specified--

Submitted by : Mr. PROSSER, Alan

Submitted on Thursday 14 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:44
Comments : ""

Abstract ID : 296

Kinetic Inductance Detectors for X-ray Spectroscopy

Content :

The lack of efficient x-ray detectors is often the main factor limiting the effective use of ever more powerful synchrotron light sources. Spectroscopic X-ray detectors are used for a wide variety of synchrotron experiments including X-ray micro/nano-probes and X-ray absorption spectroscopy for biology and geophysical applications. The current state-of-art spectroscopic X-ray detectors are semiconductor devices, and their energy resolutions are approaching their theoretical limit of about 100eV at 6 keV. We describe a detector research and development program to develop the next-generation of high-resolution spectroscopic X-ray detectors using superconducting Microwave Kinetic Inductance Detectors (MKIDs). With a required energy per charge carrier four orders of magnitude smaller than that of Si, superconducting detectors offer two orders of magnitude increase in energy resolution. In addition, MKIDs can be optimized for detection of photons ranging in energy from hard X-ray to IR.

Primary authors : Dr. CECIL, Thomas (Argonne National Laboratory) ; Dr. MICELI, Antonino (Argonne National Laboratory)

Co-authors : Mrs. GADES, Lisa (Argonne National Laboratory) ; Dr. DATESMAN, Aaron (US Department of Energy) ; Dr. QUARANTA, Orlando (Argonne National Laboratory) ; Dr. YEFREMENKO, Volodymyr (Argonne National Laboratory) ; Dr. NOVOSAD, Valentyn (Argonne National Laboratory) ; Dr. MAZIN, Ben (University of California Santa Barbara)

Presenter : Dr. CECIL, Thomas (Argonne National Laboratory)

Track classification : Photon Detectors

Contribution type : Poster Presentation

Submitted by : CECIL, Thomas

Submitted on Thursday 14 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 29 April 2011 16:38
Comments : ""

Abstract ID : 297

Some work on Liquid Argon at Fermilab :

Content :

Liquid argon is an attractive target medium for both dark matter and neutrino detectors. The work done at Fermilab to understand and address the issues of producing and maintaining Argon with the purity needed for long electron drift-lifetime will be described.

W. Jaskierny, C. Kendziora, S.Pordes, R.L. Schmitt, E. Skup, T. Tope:
Fermilab

Primary authors : PORDES, Stephen (Fermilab)

Co-authors : TOPE, T. (Fermilab) ; KENDZIORA, C (Fermilab) ; SCHMITT, R. L. (Fermilab) ; TANG, Z. (Fermilab) ; SKUP, E. (Fermilab) ; JASKIERNY, W (Fermilab)

Presenter : PORDES, Stephen (Fermilab)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : PORDES, Stephen

Submitted on Thursday 14 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:39
Comments : ""

Abstract ID : 298

Experience with the Time Projection Chambers for the T2K Near Detectors

Content :

The Near Detector at 280m (ND280) has been operating for over a year in the Tokai to Kamioka (T2K) neutrino beam. The detector is designed to provide a good knowledge of the neutrino beam before the neutrinos oscillate, including measuring the backgrounds and their energy dependence. An important feature of ND280 is the tracker which consists of two active scintillator-bar target systems sandwiched between three large time projection chambers (TPCs), and surrounded by calorimeters and a large dipole magnet for charged particle tracking. Novel features of the TPCs are the rectangular construction from composite panels, the bulk micromegas detectors for gas amplification, electronics readout based on a new ASIC, and the photoelectron calibration system. This talk will review the design, operation and performance of the TPCs as deduced from measurements with particle beams, cosmic rays, and the photoelectron calibration system.

Primary authors : JAMIESON, Blair (University of British Columbia)

Co-authors :

Presenter : JAMIESON, Blair (University of British Columbia)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : JAMIESON, Blair

Submitted on Thursday 14 April 2011

Last modified on : Friday 15 April 2011

Comments :

Dean Karlen has asked me to represent the T2K TPC presentation requested by the session organizers on gaseous detectors.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 15 April 2011 05:44
Comments : ""

Abstract ID : 299

Mechanical design of the PHENIX VTX and FVTX vertex detectors

Content :

An ambitious physics program now seems possible with the addition of two new vertex detectors to the PHENIX experiment at the RHIC
accelerator at Brookhaven National Laboratory. The VTX barrel
detector consists of two inner layers of AC-coupled pixel detectors surrounding the Beryllium beam-pipe, followed by two layers of DC-coupled single sided strip-pixel detectors, the VTX detector is currently installed into PHENIX. The second phase will see the installation of Forward Vertex detectors (FVTX) at the ends, these detectors consist of 4 hermetic layers of Silicon wedges with AC-coupled mini-strips spaced on 75 micron pitch in the radial direction. This talk will focus on the mechanical design and
construction of both of these detectors along with the critical use
of a 3D-CAD program to verify their integration with the overall
experiment. The VTX and FVTX detector design made use of carbon fiber technology for both the detector ladder "staves" as well as the overall support structure, because of its stability and strength to mass ratio. Using this type of material is becoming a standard in high precision tracking detectors in order to reduce their overall radiation length. Both detectors make use of a single phase cooling system using 3M NOVEC-7200 flourocarbon.

Primary authors : Mr. SONDHEIM, Walter (Los Alamos National Laboratory)

Co-authors :

Presenter : Mr. SONDHEIM, Walter (Los Alamos National Laboratory)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : SONDHEIM, Walter

Submitted on Thursday 14 April 2011

Last modified on : Friday 29 April 2011

Comments :

This talk will present information on the mechanical design for the vertex detector system as well as its integration into the overall PHENIX detector at RHIC. It will not focus on the characteristics of the Silicon sensors themselves, instead combining three differnt types of Silicon sensors in one detector system.
If you have any questions please feel free to contact me at Los Alamos.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:14
Comments : ""

Abstract ID : 300

An Application of Micro-channel plate photomultiplier tube to Positron Emission Tomography

Content :

We are exploring the large area flat panel (8"x8") micro-channel plate photomultiplier tube (MCP PMT) under development for an application to positron emission tomography (PET) instrumentation.A high speed waveform sampling with transmission-lines was adopted to achieve fast timing and efficient signal read-out from MCP PMT.As a demonstration of the concept,detector modules were built using 2"x2" Photonis Planacon MCP PMTs (XP85022) and prototype transmission-line boards. The signals from MCP PMT through transmission-line were sampled by DRS4 evaluation boards (PSI) running at 5 GS sampling. LYSO crystals were optically coupled on the surface of MCP PMT and exposed to Na22 source.Preliminary results from experiments show ~14% (FWHM) of energy resolution at 511 keV and ~350 ps (FWHM) for coincidence time resolution.3 mm (FWHM) of resolution was measured for the position along the transmission-line by using time difference. The detail of the study will presented.

Primary authors : Dr. KIM, Heejong (University of Chicago)

Co-authors : Dr. KAO, Chien-min (University of Chicago) ; Dr. FRISCH, Henry (University of Chicago) ; TANG, Fukun (University of Chicago) ; Dr. CHEN, Chin-tu (University of Chicago)

Presenter : Dr. KIM, Heejong (University of Chicago)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : KIM, Heejong

Submitted on Thursday 14 April 2011

Last modified on : Monday 25 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 25 April 2011 18:00
Comments : ""

Abstract ID : 301

Silicon sensor technologies for ATLAS IBL upgrade

Content :

New pixel sensors are currently under development for ATLAS Upgrades. The first upgrade stage will consist in the construction of a new pixel layer that will be installed in the detector during the 2013 LHC shutdown. The new layer (Insertable-B-Layer, IBL) will be inserted between the inner most layer of the current pixel detector and the beam pipe at a radius of 3.2cm. The expected high radiation levels require the use of radiation hard technology for both the front-end chip and the sensor.
Two different pixel sensor technologies are envisaged for the IBL. The sensor choice will occur in July 2011.
One option is developed by the ATLAS Planar Pixel Sensor (PPS) Collaboration and is based on classical n-in-n planar silicon sensors which have been used for the ATLAS Pixel detector. For the IBL, two changes were required: The thickness was reduced from 250 um to 200 um to improve the radiation hardness. In addition, so-called "slim edges" were designed to reduce the inactive edge of the sensors from 1100 um to only 250 um which is important as shingling of modules will not be possible for IBL.
The other option is developed by the ATLAS 3D Collaboration. 3D silicon technology is an innovative combination of VSLI and MEMS (Micro-Electro-Mechanical-Systems) where electrodes are fabricated inside the silicon bulk instead of being implanted on the wafer surface. Two layouts have been developed: one with electrodes penetrating entirely the wafer thickness and with active edges (full-3D) and one with no active edges with electrodes do not necessarily penetrating the entire thickness (partial-3D). For IBL only the later design is considered.
An overview of the 3D and PPS sensor technologies with particular emphasis on irradiation and beam tests for the IBL qualification will be presented.

Primary authors : Dr. GRENIER, Philippe (SLAC)

Co-authors : Dr. WEINGARTEN, Jens (University of Goettingen) ; Dr. LA ROSA, Alessandro (Wisconsin Univ. and CERN)

Presenter : Dr. GRENIER, Philippe (SLAC)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : GRENIER, Philippe

Submitted on Thursday 14 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 09:58
Comments : ""

Abstract ID : 302

A Particle Flow Algorithm for a future high energy linear collider

Content :

Particle Flow Algorithms (PFAs) will be central to physics analysis at a future Linear Collider. The two most advanced detector designs, ILD and SiD, both use PFAs to achieve the necessary jet energy resolution. The SiD letter-of-intent was validated using a PFA developed primarily by an Iowa-SLAC collaboration. This algorithm is now being completely redesigned and re-optimized for higher collider energies. We will report on the performance of this new and improved algorithm.

Primary authors : MALLIK, Usha (Physics and Astronomy Department-University of Iowa)

Co-authors : Dr. ZAIDAN, Remi (Physics and Astronomy Department- University of Iowa) ; Dr. HALLADJIAN, Garabed (Physics and Astronomy Department- University of Iowa) ; Dr. CHARLES, Mat (University of Oxford) ; Dr. CASSELL, Ron (SLAC National Lab)

Presenter : MALLIK, Usha (Physics and Astronomy Department-University of Iowa)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : MALLIK, Usha

Submitted on Thursday 14 April 2011

Last modified on : Saturday 16 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 16 April 2011 12:29
Comments : "New development"

Abstract ID : 303

Design and construction of a cylindrical GEM detector as Inner Tracker device at KLOE-2

Content :

We report on the design and construction of a triple-GEM detector as a new Inner Tracker (IT) for the KLOE-2 experiment at the Frascati Phi-factory. This is the first GEM detector equipping an experiment on a e+e- machine, where, besides the outstanding rate capability already exploited on the hadron machines, we fruitfully take advantage of the unique lightness of such technology, of utmost importance to limit the multiple scattering of low-momentum tracks in KLOE.

The IT is composed of four tracking layers, each providing an independent 2-dimensional space point. Each layer is a fully cylindrical triple-GEM detector with the five electrodes (cathode, three GEM and anode/readout) constructed by using cylindrical molds and sealed with a vacuum bag technique.

The front-end electronics is based on the GASTONE ASIC, specifically developed for this detector, a charge amplifier with digital output integrating 64 channels in one single chip.

After three years of R, including a new GEM manufacturing procedure tuned within the RD51 Collaboration, the construction of the first layer has started, with the aim of completing the detector by middle of 2012.

We report on the R achievements, including the construction process, the results of two beam-tests with prototype detectors, and the present realization status of the final detector and electronics.

Primary authors : Mr. DOMENICI, Danilo (Laboratori Nazionali di Frascati (LNF))

Co-authors :

Presenter : Mr. DOMENICI, Danilo (Laboratori Nazionali di Frascati (LNF))

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : DOMENICI, Danilo

Submitted on Thursday 14 April 2011

Last modified on : Friday 15 April 2011

Comments :

On behalf of the KLOE-2 IT sub-detector group

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 15 April 2011 05:58
Comments : ""

Abstract ID : 304

WArP R: Neutron to Gamma Pulse Shape Discrimination in Liquid Argon Detectors with HQE PMTs

Content :

A high Light Yield Liquid Argon chamber has been radiated with an AmBe source to test the possible separation signal-to-background obtainable in a Dark Matter Liquid Argon based detector.
Apart from the standard nuclear recoil and electron events, from neutron elastic interactions and gamma conversions respectively, an intermediate population has been observed which is attributed to inelastic neutron scatters on Argon nuclei.
Taking account of these events results in determining the recoil-like to electron-like primary pulse shape separation.
The results of this recent study as well as from a previous study with a chamber with a lower Light Yield will be presented.

Primary authors : Dr. CANCI, Nicola (INFN-LNGS) ; Prof. CAVANNA, Flavio (L'Aquila University) ; Dr. SEGRETO, Ettore (INFN-LNGS) ; Dr. SZELC, Andrzej (Yale University) ; Dr. ACCIARRI, Roberto (L'Aquila University)

Co-authors :

Presenter : Dr. CANCI, Nicola (INFN-LNGS)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : CANCI, Nicola

Submitted on Thursday 14 April 2011

Last modified on : Thursday 14 April 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Dark Matter Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 305

Test of a new Fast Waveform Digitizer for PMT signal read-out from liquid Argon Dark Matter detectors

Content :

A new generation Waveform Digitizer board as been recently made available on the market by CAEN.
The new board CAEN V1751 with 8 Channel per board, dynamic range extended to 10-bit, 1 GS/s Flash ADC Waveform Digitizer (or 4-channel, 10 bit, 2 GS/s Flash ADC Waveform Digitizer - Dual Edge Sampling mode) with threshold and Auto-Trigger capabilities provides an ideal (relatively low-cost) solution for reading signals from liquid Argon detectors for Dark Matter search equipped with array of PMTs for the detection of the scintillation light.
The board was extensively used in real experimental conditions to test its usefulness for possible future uses and to compare it with a state of the art digital oscilloscope.
As results, PMT Signal sampling at 1 or 2 GS/s is appropriate for the reconstruction of the fast component of the signal scintillation in Argon (characteristic time of about 4 ns) and the extended dynamic range allows for the detection of signals in the range of energy of specific interest without need of scale change. The bandwidth is adequate and the intrinsic noise is very low.

Primary authors : Dr. CANCI, Nicola (INFN-LNGS) ; Dr. SZELC, Andrzej (Yale University) ; Prof. CAVANNA, Flavio (L'Aquila University) ; Dr. SEGRETO, Ettore (INFN-LNGS) ; Dr. ACCIARRI, Roberto (L'Aquila University)

Co-authors :

Presenter : Dr. SZELC, Andrzej (Yale University)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : CANCI, Nicola

Submitted on Thursday 14 April 2011

Last modified on : Friday 15 April 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Dark Matter Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 306

Sensor Studies for SLHC Using CMS Pixel-Based Telescope

Content :

At the SLHC, after 2500 pb-1 of data, the expected maximum fluence for the pixel region (<20 cm) will be 2.5E16 cm-2. To cope with this unprecedented radiation environment, there has been a worldwide effort to find possible solutions for vertex and tracking detectors at the SLHC. A variety of solutions have been pursued. These include diamond sensors, 3D sensors, MCZ planar silicon detectors made from MCZ wafers, epitaxial, p-type silicon wafers, and thin silicon detectors. Using the Fermilab Test Beam Facility (FTBF), we have carried out a number of beam tests to study these various sensors. The idea is to compare the performance of this wide variety of technologies in the test beam before and after irradiation. To do so, we use a CMS pixel-based telescope which has been built and installed at the FTBF to provide the reference beam tracks. Our program of studies include the charge collection efficiency of the irradiated and unirradiated devices, and the spatial resolution as a function of the track incident angle. We will present some of the preliminary results in this paper.

Primary authors : Dr. UPLEGGER, Lorenzo (Fermilab) ; Mr. RIVERA, Ryan (Fermilab) ; Dr. KWAN, Simon (Fermilab)

Co-authors :

Presenter : Dr. UPLEGGER, Lorenzo (Fermilab)

Track classification : Experimental Detector Systems ; Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by :

Submitted on Thursday 14 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed for other tracks (Semiconductor Detectors)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:46
Comments : ""

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:20
Comments : ""

Abstract ID : 307

CMS Pixel Telescope Addition to T-980 Bent Crystal Collimation Experiment at the Tevatron

Content :

An enhancement to the T-980 bent crystal collimation experiment at the Tevatron has been completed. The enhancement was the installation of a pixel telescope inside the vacuum-sealed beam pipe of the Tevatron. The telescope is comprised of six CMS PSI46 pixel plaquettes, arranged as three stations of horizontal and vertical planes, with the CAPTAN system for data acquisition and control. The purpose of the pixel telescope is to measure beam profiles produced by bent crystals under various conditions. The telescope electronics inside the beam pipe initially were not adequately shielded from the image current of the passing beam. A new shielding approach was devised and installed, which resolved the problem. The noise issues encountered and the mitigating techniques are presented herein, as well as some preliminary results from the telescope.

Primary authors : Mr. RIVERA, Ryan (Fermilab)

Co-authors :

Presenter : Mr. RIVERA, Ryan (Fermilab)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by :

Submitted on Thursday 14 April 2011

Last modified on : Friday 06 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 10:09
Comments : ""

Abstract ID : 308

The cryogenic performances of specific optical and electrical components for a liquid argon time projection chamber

Content :

A Liquid Argon Time Projection Chamber (LArTPC) has been proposed as a potential far site detector of long baseline neutrino experiment (LBNE). A cold front-end electronics scheme, in which preamplifiers, shapers, analog to digital converters, digital memories, data multiplexers, and cable drivers operates in liquid argon is under development. In this paper we present the cryogenic performance study of specific optical and electrical components for a LArTPC.

The data rate out of a LArTPC highly depends on where the LArTPC is located. The data rate of a LArTPC at 800 feet underground is low enough to be handled electrically. We have tested an LVDS driver with 20-meter CAT5E twisted-pair cables. The electrical link works up to 1 gigabit per second at liquid nitrogen temperature (77 K), exceeding the data rate requirement

If the LArTPC is not located in deep underground, the data rate will be so high that we have to use optical data links. A 16:1 serializer Application Specific Integrated Circuit (ASIC) fabricated in a commercial 0.25-micrometer Silicon-on-Sapphire CMOS technology, three types of laser diodes, and multimode and single mode optical fibers and optical connectors have been tested. All components continue to function at 77 K.

The multiplexer and the digital memory can be implemented in a field programmable gate array (FPGA). Two FPGAs have been tested and both function properly at 77 K.

A variety of commercial resistors and capacitors, which are necessary component in printed circuit boards, have been tested at 77 K. Resistance of almost all types resistors except carbon composition and capacitance of tantalum electrolytic capacitors, C0G/NP0 ceramic capacitors, specific types of film capacitors, and mica capacitors changes little.

Primary authors : Dr. LIU, Tiankuan (Southern Methodist University, on behalf of the LBNE collaboration)

Co-authors : Dr. GONG, Datao (Southern Methodist University (SMU)) ; Dr. HOU, Suen (Institute of Physics, Academia Sinica (IPAS)) ; Mr. LIU, Chonghan (SMU) ; Mr. SU, Da-shung (IPAS) ; Dr. TENG, Ping-kun (IPAS) ; Dr. XIANG, Annie C. (SMU) ; Dr. YE, Jingbo (SMU)

Presenter : Dr. LIU, Tiankuan (Southern Methodist University, on behalf of the LBNE collaboration)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : LIU, Tiankuan

Submitted on Thursday 14 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:10
Comments : "20 min"

Abstract ID : 313

SiPMs with Bulk Integrated Quench Resistors - Future Perspectives

Content :

Recent years a tremendous development in the field of Silicon photomultipliers (SiPMs) has been persuaded. Several companies offer commercialized products that can be already used as a modern replacement of conventional photmultiplier tubes. We have proposed and demonstrated functionality of a new concept for SiPMs in which the quench resistor is integrated into a bulk bellow the sensitive region (SiMPl concept). SiMPL devices with an unobstructed entrance window are attractive for many applications. Since the first results of the prototype production were very encouraging we continued to explore possible further developments for our devices. Our technology offers the possibility for the construction of pixel tracking detectors with excellent time resolution and low power dissipation using 3D integration technologies to add a signal processing layer to the SiPM matrix. Such devices are of high interest for future lepton colliders, and will also be applicable in other environments. Additionally if signal processing layer is integrated from the back side of the sensor, light sensitive device with digital output and very high fill factor can be made. This paper will discuss these two concepts.

Primary authors : Dr. NINKOVIC, Jelena (Max PlanckInstitute for Physics)

Co-authors : ANDRICEK, Ladislav (Max Planck Institute for Physics Semiconductor Laboratory) ; MOSER, Hans Guenther (Max Planck Institute for Physics Semiconductor Laboratory) ; RICHTER, Rainer (Max Planck Institute for Physics Semiconductor Laboratory)

Presenter : Dr. NINKOVIC, Jelena (Max PlanckInstitute for Physics)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : NINKOVIC, Jelena

Submitted on Thursday 14 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:49
Comments : ""

Abstract ID : 321

Detector Powering in the 21st Century: Why stay stuck with the Good old 20th Century methods?

Content :

Future detectors are envisioned with large granularity but we have a power delivery problem unless we fill the detector volume with copper conductors.
LHC detector electronics is powered by transporting direct current over distances of 30 to 150 meters. This is how Thomas Alva Edison lighted his light bulb. For example, CMS ECAL uses 50 kiloamps at 2.5 volts, supplied over a cable with a transmission efficiency of only 40%. The transmission loss becomes waste heat in the detector that has to be removed. We have been exploring methods to transmit the DC power at higher voltage (low current), reducing to the final low voltage (high current) using DC-DC converters. These converters must operate in high magnetic fields and high radiation levels. This requires rad hard components and non-magnetic (air core) inductors.

We have found that in CMOS circuits, the thickness for the gate oxide is the necessary condition for the radiation hardness. Some of the commercial DC-DC converters are radiation tolerant. A 5 nm thick gate oxide can operate at 3 volts; this can be increased to 15 volts by LDMOS process. For the past couple of years, we have been evaluating Gallium Nitride devices and these are very radiation hard. Converters in this technology are capable of higher conversion efficiency. There is work going on to produce higher speed drivers for the GaN power stage. An efficiency of higher then 90% is achievable for 48 v to 1 v converters. We have also developed spiral air core inductors that have been tested to 7T fields. There is much work needed to study trade off between efficiency, frequency and mass.

Primary authors : Dr. DHAWAN, Satish (Yale University)

Co-authors :

Presenter : Dr. DHAWAN, Satish (Yale University)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : Dr. DHAWAN, Satish

Submitted on Thursday 14 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:47
Comments : "short talk"

Abstract ID : 325

Invited talk: "The History of the Silicon Vertex Trigger of CDF"

Content :

The CDF Silicon Vertex Trigger (SVT) at the Fermilab Tevatron is a hardware based fast track finding device designed to detect secondary vertices from heavy flavor decays in real time. The SVT was conceived in 1990, was commissioned in 2001, is still operating as part of the CDF Level 2 trigger and has allowed CDF to collect a very large sample of hadronic decays of Charm and Beauty mesons and barions and perform important measurements otherwise impossible at a hadron collider. In this talk I will go over the history of the SVT, from conception to commissioning and successful operation. I will try to highlight the motivations, the sweat and tears, the hard choices we had to make and the risks we had to take to bring this very ambitious project to success, hoping this may help the younger generations of experimental physicists to learn what it takes to innovate and make an impact on science.

Primary authors : Dr. RISTORI, Luciano (INFN, Pisa)

Co-authors :

Presenter : Dr. RISTORI, Luciano (INFN, Pisa)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Thursday 14 April 2011

Last modified on : Friday 22 April 2011

Comments :
submitted for Luciano by Ted Liu.

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:36
Comments : ""

Abstract ID : 328

"Beam Spot Finding in Real Time at CDF and Beyond"

Content :

In the CDF experiment at the Tevatron Collider, the 3D position and size of the beam spot is monitored in real time with a precision of order one micron and with a latency of less than one minute. This is necessary for the correct operation of the Silicon Vertex Trigger and is accomplished with a mix of off-the-shelf processors and specialized hardware. Monitoring the 3D position of the luminous region in real time may also be important for machine operation, especially in the early commissioning phases of a new accelerator. In this talk I will describe how this is done in CDF, present some new ideas, and discuss the possible extension of these techniques to the much more demanding environment of the LHC and other future high luminosity machines.

Primary authors : RISTORI, Luciano (INFN, Pisa)

Co-authors :

Presenter : RISTORI, Luciano (INFN, Pisa)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Thursday 14 April 2011

Last modified on : Friday 22 April 2011

Comments :
submitted for Luciano by Ted Liu.

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:31
Comments : ""

Abstract ID : 329

A new concept to use 3D vertical integration technology for fast pattern recognition

Content :

Hardware-based pattern recognition for fast triggering on particle tracks has been successfully used in high-energy physics experiments for some time. The CDF Silicon Vertex Trigger (SVT) at the Fermilab Tevatron is an excellent example. The method used there, developed in the 1990's, is based on algorithms that use a massively parallel associative memory architecture to identify patterns efficiently at high speed. However, due to much higher occupancy and event rates at the LHC, and the fact that the LHC detectors have a much larger number of channels in their tracking detectors, there is an enormous challenge in implementing fast pattern recognition for a track trigger, requiring about three orders of magnitude more associative memory patterns than what was used in the original CDF SVT. Scaling of current technologies is unlikely to satisfy the scientific needs of the future, and investments in transformational new technologies need to be made.

In this paper, we will discuss a new concept of using the emerging 3D vertical integration technology to significantly advance the state-of-the-art for fast pattern recognition within and outside HEP. Adding a "third" dimension to the signal processing chain, as compared to the two-dimensional nature of printed circuit boards, Field Programmable Gate Arrays (FPGAs), etc., opens up the possibility for new architectures that could dramatically enhance pattern recognition capability. While our focus here is on the Energy Frontier (e.g. the LHC), the approach may have applications in experiments in the Intensity Frontier and the Cosmic Frontier as well as other scientific and medical projects.

A generic R proposal [1] based on this new concept, with a few institutions involved, has recently been submitted to DOE with the goal to design and perform the ASIC engineering necessary to realize a prototype device. The progress of this R project will be reported in the future. Here we will only focus on the concept of this new approach.

Reference [1]: Development of 3D Vertically Integrated Pattern Recognition Associative Memory (VIPRAM), FERMILAB-TM-2493-CMS-E-PPD-TD.
http://hep.uchicago.edu/~thliu/projects/VIPRAM/VIPRAM_DOE_LAB11-438-V2-submit.pdf

Primary authors : Dr. LIU, Tiehui Ted (Fermilab)

Co-authors : Dr. DEPTUCH, Grzegorz (Fermilab) ; Dr. HOFF, Jim (Fermilab) ; Dr. YAREMA, Ray (Fermilab)

Presenter : Dr. LIU, Tiehui Ted (Fermilab)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Thursday 14 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:32
Comments : ""

Abstract ID : 340

A RICH Detector for CLAS12 Spectrometer

Content :

The upgrade of the Jefferson Lab accelerator to 12 GeV electron beam energy, combined with that of the CEBAF Large Acceptance Spectrometer (CLAS12) located in Hall B, will provide the unique combination of wide kinematical coverage, high beam intensity (luminosity), high energy, high polarization, and advanced detection capabilities required to study Quantum Chromodynamics (QCD) in greater details. A Ring Imaging Cherenkov (RICH) will greatly enhance CLAS12 particle identification capabilities by providing clean separation between pions, kaons and protons over a momentum range from 2 to 10 GeV/c. A detailed simulation of a preliminary design of the RICH detector for CLAS12 using GEANT-4 Monte-Carlo will be presented. A reconstruction algorithm based on a likelihood approach will be discussed.

Primary authors : Dr. EL ALAOUI, Ahmed (Argonne National Laboratory)

Co-authors : Dr. BALTZELL, Nathan (Argonne National Laboratory) ; Dr. CISBANI, Evaristo (ISS and INFN Roma) ; Dr. CONTALBRIGO, Marco (INFN Ferrara) ; Dr. HAFIDI, Kawtar (Argonne National Laboratory) ; Mr. HARISSON, Nathan (University of Connecticut) ; Dr. PAPPALARDO, Luciano (INFN Ferrara) ; Dr. ROSSI, Patrizia (INFN Frascati) ; Dr. UNGARO, Maurizio (University of Connecticut)

Presenter : Dr. EL ALAOUI, Ahmed (Argonne National Laboratory)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : EL ALAOUI, Ahmed

Submitted on Thursday 14 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:49
Comments : ""

Abstract ID : 341

Studies of the injector performance of the Silicon Drift Detector for ALICE experiment

Content :

The Inner Tracking System (ITS) of the ALICE experiment at LHC uses high precision Silicon Drift Detectors (SDD) in two of the six cylindrical layers. Detector drift speed is significantly influenced by variations in ambient temperature.
The drift velocity is determined by measuring the drift time of electrons injected at fixed known locations of the sensor volume by means of dedicated MOS devices (injectors).
For each SDD module, 99 injection points are implemented in each drift region,which are distributed along 3 lines located at different distances from the collection anodes, thus allowing measuring the drift speed in 33 positions along the anode axis.
Special calibration runs (injector run) are performed periodically (every 12 hours) during the physics data taking, in order to monitor the drift speed and store the resulting values in the database containing the detector calibration parameters that are used for the offline reconstruction.

We report the results of a study aimed at characterizing the time needed to stabilize the detector temperature and to have the injectors working with full efficiency. The study was carried out in 2010 and is based on the analyses of a series of dedicated data taking runs, which were taken every few minutes, while turning on and off the detector, for a period of two days.

Primary authors : Dr. KUSHPIL, Svetlana (Nuclear Physics Institute)

Co-authors :

Presenter : Dr. KUSHPIL, Svetlana (Nuclear Physics Institute)

Track classification : Semiconductor Detectors

Contribution type : Poster Presentation

Submitted by : KUSHPIL, Svetlana

Submitted on Thursday 14 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 10:09
Comments : ""

Abstract ID : 342

New improved Sum-Trigger system for the MAGIC telescopes

Content :

In 2007 a prototype of a new analog Sum-Trigger was installed in the MAGIC I telescope, which allowed to lower the trigger threshold from 55 GeV down to 25 GeV and led to the detection of pulsed Gamma radiation from the Crab pulsar.
To eliminate the need for manual tuning and intensive maintenance demanded by that first prototype, a new setup with fully automatic calibration was designed recently. The key element of the new circuit is a novel, continuously variable analog delay line that enables the temporal equalization of the signals from the camera photo sensors, which is crucial for the reduction of false triggers from background signals.
A further improvement is the much larger trigger area consisting of a fully revised configuration of overlapping summing patches.
The new system will be installed on both telescopes, MAGIC I and II, enabling stereo observation in Sum-Trigger mode. This will significantly improve observation in the very low energy regime of 20 to 100 GeV, which is essential in particular for detailed pulsar studies, as well as the detection of high-redshift AGNs and distant GRB events.

Primary authors : Mr. HAEFNER, Dennis (Max-Planck-Institute for Physics) ; Dr. SCHWEIZER, Thomas (Max-Planck-Institute for Physics) ; Mr. DAZZI, Francesco (INFN Padova, University of Udine) ; Mr. CORTI, Daniele (INFN Padova)

Co-authors : Dr. SHAYDUK, Maxim (Max-Planck-Institute for Physics) ; Mr. GIAVITTO, Gianluca (IFAE Barcelona) ; Dr. MIRZOYAN, Razmik (Max-Planck-Institute for Physics) ; Prof. TESHIMA, Masahiro (Max-Planck-Institute for Physics) ; Dr. LORENZ, Eckart (Max-Planck-Institute for Physics)

Presenter : Mr. HAEFNER, Dennis (Max-Planck-Institute for Physics)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : HAEFNER, Dennis

Submitted on Thursday 14 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:39
Comments : ""

Abstract ID : 343

Instrumented Shielding for Muon Collider Detectors

Content :

The challenges for detectors at a Muon Collider come from decay products of muons within the collider ring. Earlier designs have featured massive shielding cones in the forward regions to reduce these backgrounds into a detector, creating detector dead zone and limiting the physics potential. Updated muon collider designs that entail lower IP emittances can deliver the same luminosity with fewer muons/bunch. Recent innovations in detector technology can allow for the detector to extend further into the forward region. Here we consider an additional route to improve muon collider performance by instrumentation within the predominantly tungsten forward shielding to extract additional physics information.

Primary authors : Dr. CUMMINGS, Mary Anne (Muons, Inc.)

Co-authors : Dr. KAHN, Stephen (Muons, Inc.)

Presenter : Dr. CUMMINGS, Mary Anne (Muons, Inc.)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Poster Presentation

Submitted by : CUMMINGS, Mary Anne

Submitted on Thursday 14 April 2011

Last modified on : Friday 22 April 2011

Comments :

Could be an oral presentation

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:32
Comments : "changed presentation style to oral"

Abstract ID : 344

Gas-Filled Calorimeter for High Intensity Beam Environments

Content :

We describe a novel gas-Cherenkov calorimeter, which detects Cherenkov light showers emitted in an array of thin metal tubes or channels filled with gas. The materials are not vulnerable to radiation damage, and the detector is inherently fast and able to operate in high rate environments. Future accelerators such as the ILC and a muon collider will need fast, radiation-tolerant detectors for monitoring beams and beam halos, and detectors are needed that can operate in the presence of high particle rates. Such detectors will also be useful for high rate environments at upgraded facilities such as RHIC, CEBAF II, and at Fermilab's Project X.

Primary authors : ABRAMS, Robert (Muons, Inc.)

Co-authors : ANKENBRANDT, Charles (Muons, Inc.) ; FLANAGAN, Gene (Muons, Inc.) ; KAHN, Steven (Muons, Inc.) ; NOTANI, Masahiro (Muons, Inc.) ; HAUPTMAN, John (Iowa State University)

Presenter : ABRAMS, Robert (Muons, Inc.)

Track classification : Calorimetry

Contribution type : Poster Presentation

Submitted by : ABRAMS, Robert

Submitted on Thursday 14 April 2011

Last modified on : Friday 15 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Poster Presentation)
Judged by :
Date : 15 April 2011 12:53
Comments : "new development"

Abstract ID : 345

Applications of Fast Time-of-Flight Detectors

Content :

The next-generation of fast time-of-flight detectors, with expected time resolutions ≤ 10 ps and space resolutions ≤ 1 mm, are attractive in many fields, including particle and nuclear physics, medical and industrial applications. We will show how precise timing and space resolution can be used to improve muon cooling measurements for muon collider studies, TOF spectrometry, and particle identification in collider detectors. Results of simulation studies will be presented.

Primary authors : ABRAMS, Robert (Muons, Inc.)

Co-authors : ANKENBRANDT, Charles (Muons, Inc.) ; FLANAGAN, Gene (Muons, Inc.) ; KAHN, Steven (Muons, Inc) ; NOTANI, Masahiro (Muons, Inc.) ; FRISCH, Henry (University of Chicago)

Presenter : ABRAMS, Robert (Muons, Inc.)

Track classification : Particle Identification

Contribution type : --not specified--

Submitted by : ABRAMS, Robert

Submitted on Thursday 14 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Particle Identification

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 03 May 2011 14:41
Comments : ""

Abstract ID : 346

Radon Emanation Bench, A PNNL Underground Counting Capability

Content :

As minimum detectable activities in ultra low background (ULB) counting continue to decrease, the work needed to reduce backgrounds increases. Increasingly these backgrounds are attributable to the detector's material composition. The most significant of these detector contaminants are found in Uranium and Thorium decay chains.

Many low density materials are challenging to assay by gamma spectroscopy, due to the limited mass that can be brought near a detector, but are often good candidates for assay via the isolation of the radon gas emanating from the material.

Preparing for the completion of PNNLs shallow underground clean room and counting facility, researchers at the lab seized an opportunity to develop and demonstrate an ultra-low-level material assay/screening capability.

Leveraging prior work on DOE funded projects and updating concepts found in research literature an apparatus was built. Gas samples from permeable and semi-permeable detector materials were collected and purified for counting in PNNLs ULB proportional counters. The final goal being to develop a sample purification process and a suite of materials best suited for improved detector design. These improvements in turn will lead to greater detection sensitivity, benefiting many fields including dark matter and double beta decay research. Similar measurements will be used to perform low level environmental sampling and assay.

Primary authors : Mr. DAY, Anthony R (Pacific Northwest National Laboratory)

Co-authors : Dr. AALSETH, Craig (Pacific Northwest National Laboratory) ; Dr. BONICALZI, Ricco (Pacific Northwest National Laboratory) ; Mr. HUBBARD, Charles (Pacific Northwest National Laboratory) ; Dr. KEILLOR, Martin (Pacific Northwest National Laboratory) ; Dr. KEPHART, Jeremy (Pacific Northwest National Laboratory) ; Mr. LITKE, Kevin (Pacific Northwest National Laboratory) ; Mrs. MENDEZ, Jennifer (Pacific Northwest National Laboratory) ; Mr. SCHROM, Brian (Pacific Northwest National Laboratory) ; Dr. SEIFERT, Allen (Pacific Northwest National Laboratory) ; Mr. SUAREZ, Reynold (Pacific Northwest National Laboratory) ; Mr. OVERMAN, Cory (Pacific Northwest National Laboratory)

Presenter : Mr. DAY, Anthony R (Pacific Northwest National Laboratory)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Poster Presentation

Submitted by : DAY, Anthony R

Submitted on Thursday 14 April 2011

Last modified on : Saturday 23 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Poster Presentation)
Judged by : CHEN, Chin-Tu
Date : 23 April 2011 14:27
Comments : ""

Abstract ID : 347

Calibration System with Cryogenically-Cooled Loads for QUIET-II Detector

Content :

The Q/U Imaging Experiment (QUIET) is an experimental program to make very sensitive measurement of the Cosmic Microwave Background (CMB) polarization from the ground. The primary goal of QUIET is to detect the degree-scale B-modes induced by primordial gravitational waves, which is a "smoking gun" signature of inflation. Using an array with more than several hundreds of polarization detectors is essential to discover the faint B-modes signal. We are preparing for the second phase of QUIET with 500 detectors, following its first phase observation for establishing the techniques as well as searching for the B-modes in one of world best sensitivities.

For the precise measurement with such a large detector array, understanding the performance of the detectors "in the laboratory", i.e. before starting the field observation, is essential. This requires an artificial polarization source, and we developed a novel calibration system with Cryogenically-Cooled blackbody absorbers. The advantages of this system over other conventional calibrators are (1) it can generate a well-characterized polarization signal under the similar radiation condition to the actual observation and (2) it allows us to calibrate both the total power and the polarization response simultaneously. These advantages make it possible to characterize the detectors in the laboratory.

We present the design and principle of the system, and demonstrate its use with the QUIET-I detector.

Primary authors : Dr. HASEGAWA, Masaya (KEK)

Co-authors : Prof. TAJIMA, Osamu (KEK) ; Dr. CHINONE, Yuji (KEK) ; Prof. HAZUMI, Masashi (KEK) ; Dr. ISHIDOSHIRO, Koji (KEK) ; Dr. NAGAI, Makoto (KEK)

Presenter : Dr. HASEGAWA, Masaya (KEK)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : HASEGAWA, Masaya

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:40
Comments : ""

Abstract ID : 348

Progress in Development of a Monolithic Active Pixel Detectorfor X-ray Astronomy with SOI CMOS Technology

Content :

The standard detector in X-ray Astronomy is CCD (charge coupled device) at the moment because of the remarkable imaging capability (~20 um pixel) and energy resolution at the fano limit (FWHM~135 eV@ 6keV). However, the time resolution of CCD is poor (~1 Hz); this limits the observation of bright X-ray sources such as black holes. Thus, we have been developing a novel monolithic active pixel sensor having a good time resolution (~100 kHz) with the Silicon-On-Insulator (SOI) CMOS technology. We introduce the first prototype device, "XRPIX1", and its performance.
The detector has the format of 32 x 32 and the pixel size of 30 um x 30 um. Each pixel has the CDS (Correlated Double Sampling) circuit for noise reduction and the trigger function for signal detection. We confirmed that the CDS and the trigger functions work properly. We achieved the energy resolution of 260 eV (FWHM) at 8 keV in a single-pixel readout mode in which the multi-sampling digital filer is applicable to eliminate the readout noise. We identified the noise sources in the readout circuit, and evaluated them quantitatively. The results are fed back to the design of a next prototype device. The thickness of the depletion layer is ~140 um. We also report the details of the other X-ray performances including the gain and the noise in the pixel-by-pixel readout mode.

Primary authors : Mr. NAKASHIMA, Shinya (Kyoto University)

Co-authors : Mr. RYU, Syukyo (Kyoto University) ; Dr. TSURU, Takeshi (Kyoto University) ; Dr. ARAI, Yasuo (KEK/IPNS) ; Mr. TAKEDA, Ayaki (SOKENDAI) ; Mr. MIYOSHI, Toshinobu (KEK/IPNS) ; Mr. ICHIMIYA, Ryo (KEK/IPNS) ; Ms. IKEMOTO, Yukiko (KEK/IPNS) ; Mr. IMAMURA, Toshifumi (A-R-Tec Corp.) ; Mr. OHMOTO, Takafumi (A-R-Tec Corp.) ; Mr. IWATA, Atsushi (A-R-Tec Corp.)

Presenter : Mr. NAKASHIMA, Shinya (Kyoto University)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by :

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:41
Comments : ""

Abstract ID : 349

Optimum Design of Cq integrated Silicon Photomultipliers for TOF-PET Application

Content :

Recently, there has been great interest on the development of Silicon Photomultipliers (SiPM) to use in MR compatible PET detectors as well as high energy physics, neutron physics, and bioluminescence. The characteristics of SiPM such as its compactness, low operating bias, high gain, fast timing characteristics, and non-sensitivity to magnetic field.
Dynamic range and PDE (Photon Detection Efficiency) are trade-off relation because dynamic range is proportional to the number of micro-pixels in a SiPM pixel. So the optimum micro-pixels for PET detectors coupled with LYSO was calculated with TCAD modeling in order to increase the energy resolution at 511 keV while having enough dynamic range at 511keV energy ranges.
To use SiPMs in TOF-PET, timing resolution has to be more improved. Coincidence timing resolution of PET detectors depends on pulse shapes which are the convolution of intrinsic rise and decay time of scintillation crystals and single photon pulse of geiger mode APD in a SiPM pixel. A large fraction of current in the single photon pulse causes poor timing performance, so timing performance can be improved by increasing the fraction of initial current in single photon pulse. To do this, a quenching capacitor (Cq) parallel to the quenching resistor (Rq) was added because Cq is a fast current path in the beginning of avalanche.
In this study, SiPMs were fabricated on 4.5 um thick epitaxial wafers in the NNFC (National Nano Fab Center) CMOS process line. Metal-Insulator-Metal (MIM) capacitors were integrated with 2 metal layers fabrication process.
The single photon pulse shape of Cq integrated SiPMs was analyzed and compared to normal SiPMs. And the timing resolution, energy resolution at 511 keV, and dynamic range were measured with fabricated devices.

Primary authors : Mr. LEE, Chaehun (KAIST)

Co-authors : Dr. SUL, Woo Suk (NNFC) ; Mr. KIM, Huoungtaek (KAIST) ; Mr. KIM, Chankyu (KAIST) ; Mr. BAE, Jun Hyung (KAIST) ; Mr. YOO, Hyunjun (KAIST) ; Prof. CHO, Gyuseong (KAIST)

Presenter : Mr. LEE, Chaehun (KAIST)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Poster Presentation

Submitted by : LEE, Chae Hun

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

To improve the timing performance of PET detectors based on SiPM photo-sensor and LYSO crystal, the ratio of amplitude to rise time of PET detector signals has to increase. The number of micro-pixels of a SiPM pixel and PDE were optimized to increase the amplitude, and Cq capacitors were integrated for faster rise time. Cq effects on single photon pulse was experimentally analyzed and compared to modeling.

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Poster Presentation)
Judged by : CHEN, Chin-Tu
Date : 25 April 2011 16:45
Comments : ""

Abstract ID : 350

Recent progress of the pixel detectors R based on the SOI technology

Content :

We are developing monolithic pixel detectors with a 0.2 um silicon-on-insulator (SOI) CMOS technology. The substrate layer is high-resistivity silicon, and works as a radiation sensor having p-n junctions. The SOI layer is 40 nm silicon, where readout electronics is implemented. There is a buried oxide layer between these silicon layers. This structure is ideal for a monolithic pixel detector. The SOI pixel detectors are useful in various research fields, such as high-energy physics, X-ray material analysis, astrophysics and medical sciences. Czochralski (CZ) silicon is used as a starting material for the detector fabrication. In such a case, the registivity of the substrate after the fabrication is about 700 ohm-cm. We have recently introduced Float Zone (FZ-) SOI wafers for the fabrication. As a result, the resistivity increased and therefore the detectors worked at near full depletion below the breakdown voltage. In this talk, we will report an overview of the detector design and features, and measurements of performance with red laser, X-ray and charged partcles. We will also compare FZ- with CZ- SOI pixel detectors for the performance. This work was realized within the SOIPIX collaboration.

Primary authors : Dr. MIYOSHI, Toshinobu (KEK)

Co-authors : Prof. ARAI, Yasuo (KEK) ; Mr. FUJITA, Youichi (KEK) ; Dr. HARA, Kazuhiko (Univ. of Tsukuba) ; Dr. ICHIMIYA, Ryo (KEK) ; Dr. IKEGAMI, Yoichi (KEK) ; Ms. IKEMOTO, Yukiko (KEK) ; Mr. KASAI, Hiroki (OKI SEMICONDUCTOR MIYAGI Co., Ltd.) ; Mr. KATSURAYAMA, Hironori (Tohoku Univ.) ; Mr. KOHRIKI, Takashi (KEK) ; Mr. OKIHARA, Masao (OKI SEMICONDUCTOR MIYAGI Co., Ltd.) ; Mr. ONO, Yoshimasa (Tohoku Univ.) ; Dr. ONUKI, Yoshiyuki (Tohoku Univ.) ; Mr. SHINSHO, Kohei (Univ. of Tsukuba) ; Mr. TAKEDA, Ayaki (KEK) ; Mr. TAUCHI, Kazuya (KEK) ; Dr. TSUBOYAMA, Toru (KEK) ; Prof. UNNO, Yoshinobu (KEK)

Presenter : Dr. MIYOSHI, Toshinobu (KEK)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : MIYOSHI, Toshinobu

Submitted on Friday 15 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 09:57
Comments : ""

Abstract ID : 351

Microwave detection of cosmic ray air showers at the Pierre Auger Observatory, an R effort

Content :

Microwave emission from ultra-high energy cosmic ray (UHECR) air showers presents the possibility of developing a novel detection technique. This new technique possesses the advantage of the fluorescence detection technique - the reconstruction of the longitudinal shower profile - combined with a 100% duty cycle, minimal atmospheric attenuation and the use of low cost commercial equipment. Placing prototype detectors at the Auger site provides for coincidence detection of air showers using established methods, ultimately assessing the feasibility of detecting air showers with microwave emission. Two complementary techniques are currently being pursued at the Pierre Auger Observatory. MIDAS (Microwave Detection of Air Showers), AMBER (Air-shower Microwave Bremsstrahlung Experimental Radiometer), and FDWAVE are prototypes for large imaging dish antennas. EASIER (Extensive Air Shower Identification using Electron Radiometer), the second technique, utilizes horn antennas located on each Auger Surface Detector station for detection of microwave emission. MIDAS is a self-triggering system while AMBER, FDWAVE and EASIER use the trigger from the Auger detectors to record the microwave emission. The development status and future plans for these measurements will be reported.

Primary authors : WILLIAMS, Christopher (University of Chicago)

Co-authors :

Presenter : WILLIAMS, Christopher (University of Chicago)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : WILLIAMS, Christopher

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

for the Pierre Auger Collaboration should be listed in the co-author field

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:41
Comments : ""

Abstract ID : 352

Development of two-dimensional gaseous detector for energy-selective neutron radiography

Content :

The energy-selective neutron radiography is a new field to study fine structure of heavy material using pulse neutron sources. In order to perform such radiography, two-dimensional position and precise temporal measurement are essential. Therefore, we are developing a gaseous neutron detector with a gas electron multiplier (GEM). For neutron detection, aluminum cathode surface is coated with boron-10. Two GEM foils are stacked in a chamber for the gas amplification. An anode plate with two-dimensional strips (0.8 mm pitch) is mounted for the readout. A compact readout system with new ASIC and FPGA is developed for the high data transfer. The beam test was carried out with the pulse neutron sources. The results will be presented in the conference.

Primary authors : UNO, Shoji (KEK, Tsukuba)

Co-authors : UCHIDA, Tomohisa (KEK, Tsukuba) ; SHOJI, Masayoshi (The graduate University for Advance Studies, Tsukuba)

Presenter : UNO, Shoji (KEK, Tsukuba)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : UNO, Shoji

Submitted on Friday 15 April 2011

Last modified on : Friday 15 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 15 April 2011 07:26
Comments : ""

Abstract ID : 353

A Pulse Shaping and Digitizing System with Subnanosecond Timing Resolution

Content :

A relatively inexpensive pulse shaping and digitizing system is developed. It has a dynamic range of 14 bit, and it measures time of scintillation pulses with a precision of a few hundred picoseconds. It works at high rate environment with good resolving power on pile-up pulses. These features are made possible by using a Bessel filter and a digitizer with a moderate sampling speed. The system also has online data processing and high data throughput capabilities to cope with high readout rate in high energy physics and other areas. Zero dead time is achieved. I will report on the performance of the system.

Primary authors : MA, Jiasen (The University of Chicago) ; WAH, Yau (The University of Chicago) ; BOGDAN, Mircea (The University of Chicago)

Co-authors :

Presenter : MA, Jiasen (The University of Chicago)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : MA, Jiasen

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Poster Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:10
Comments : ""

Abstract ID : 354

NuMI Primary Beam Monitoring

Content :

The Fermilab Main Injector has been delivering a 120 GeV proton beam to the MI neutrino experiments for some years. The beam intensity, position and size have been monitored using toroids, beam position monitors, and SEMs. The beam position has been controlled using the BPM system. The SEM closest to the target has been exposed to more thatn 1E21 protons. Ti and C wire SEMs are being tested.
The performance of these devices, including the precison of beam position measurements comparing the SEM and BPM systems will be discussed.

Primary authors : JENSEN, Douglas (Fermilab)

Co-authors : BREIGEL, Charlie (Fermilab) ; HEIKKINEN, Dallas S (Fermilab) ; IBRAHIM, M. A. (Fermilab) ; MCCLURE, Craig (Fermilab) ; PRIETO, Peter (Fermilab) ; PURCELL-TAYLOR, Linda Sue (Fermilab) ; SCHOO, Daniel (Fermilab) ; TASSOTTO, Gianni (Fermilab)

Presenter : JENSEN, Douglas (Fermilab)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : --not specified--

Submitted by : JENSEN, Douglas

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:32
Comments : ""

Abstract ID : 355

HIPPO, a Flexible Front-End Signal Processor for High-Speed Image Sensor Readout

Content :

The High-Speed Image Pre-Processor with Oversampling (HIPPO) is a prototype image sensor readout integrated circuit designed for both high performance and enhanced flexibility. HIPPO's initial target application is the instrumentation of bufferless, column-parallel, soft x-ray Charge-Coupled Device (CCD) image sensors operating at column rates up to 10 MHz, enabling 10,000 frames-per-second video rates. HIPPO's architecture is flexible and allows design tradeoffs between speed, accuracy, and area. This architectural flexibility will enable the fast development of related image sensor and particle detector readout ICs based on HIPPO technology. HIPPO is implemented in 65 nm CMOS and contains 16 readout channels, each comprising a charge amplifier, a dual-slope correlated double sampler, a sample-and-hold, a 12-bit, 80 MS/s Pipelined ADC (one ADC for every 4 channels), and a 480 Mb/s output serializer.

HIPPO achieves 35 e- read noise at 10,000 fps for a 1 Mpixel sensor, improving to 25 e- at 5000 fps. HIPPO implements oversampling to allow the user to select a point on the power/performance curve based on operational requirements. HIPPO's charge-domain input obviates the source follower amplifier used in most CCDs and enables the implementation of a fully column-parallel CCD architecture. HIPPO was also specifically designed to be adaptable in both the sequencing of its operations and in its ability to accommodate input rates potentially varying over an order of magnitude.

Primary authors : Dr. GRACE, Carl (Lawrence Berkeley National Laboratory)

Co-authors : Mr. GNANI, Dario (Lawrence Berkeley National Laboratory) ; Mr. WALDER, Jean-pierre (Lawrence Berkeley National Laboratory) ; Mr. ZHENG, Bob (Lawrence Berkeley National Laboratory)

Presenter : Dr. GRACE, Carl (Lawrence Berkeley National Laboratory)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : GRACE, Carl

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:11
Comments : "20 min"

Abstract ID : 356

An ANL developed TES bolometer for measuring CMB polarization

Content :

Superconducting Transition Edge Sensor (TES) bolometer is a sensitive receiver at millimeter wavelengths. A TES operated with negative electro-thermal feedback has a fast response time and a noise level below the photon counting noise. Together with multiplexed readouts and appropriate optical coupling, TES bolometers have the desired properties to conduct sensitive observations of the Cosmic Microwave Background (CMB) radiation. The frontier of CMB research is to detect or constrain CMB B-mode polarization induced by inflationary gravitational waves at the very beginning of the universe. We report on an Argonne National Lab developed absorber-coupled TES bolometric polarimeter, consisting of a PdAu dipole-like absorber and a Mo/Au bi-layer TES on a suspended silicon nitride membrane. The electromagnetic design of the polarization sensitive absorbers, the heat transport modeling of the detector, the thermal response of the TES, and the micro-fabrication processes are presented. We also report the results of laboratory testing of prototype detectors, and compare with theoretical expectations.

Primary authors : Dr. WANG, Gensheng (Argonne National Laboratory)

Co-authors : Dr. YEFREMENKO, Volodymyr (Argonne National Laboratory) ; Dr. NOVOSAD, Valentyn (Argonne National Laboratory) ; CHANG, Clarence (The University of Chicago) ; CARLSTROM, John (The University of Chicago)

Presenter : Dr. WANG, Gensheng (Argonne National Laboratory)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Poster Presentation

Submitted by : WANG, Gensheng

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:42
Comments : ""

Abstract ID : 357

The Front-end Electronics for the Daya Bay Reactor Neutrino Experiment

Content :

The Daya Bay Reactor Neutrino Experiment will consist of seventeen separate detector subsystems distributed in three underground experimental halls. There will be eight PMT based anti-neutrino detectors (ADs), six water-Cherenkov detectors, and three RPC detector subsystems. Each detector will be read out using an independent VME crate. The PMT front-end electronics (FEE) board will be used to read out the ADs and the water Cherenkov detectors. The RPC detector readout includes Front-end Cards (FEC) connected to a VME Read Out Module (ROM) through a number of Read Out Transceiver (ROT) modules. A detailed design along with current status of the front-end electronics will be presented.

Primary authors : Prof. WANG, Zheng (Institute of High Energy Physics, Chinese Academy of Sciences)

Co-authors :

Presenter : Prof. WANG, Zheng (Institute of High Energy Physics, Chinese Academy of Sciences)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : Prof. WANG, Zheng

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :
on behalf of Daya Bay Collaboration

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:11
Comments : "20 min"

Abstract ID : 358

Developments of Aluminum Superconducting Tunnel Junction (STJ) detectors for millimeter wave and particle detections

Content :

We present our recent developments of Aluminum Superconducting
Tunnel Junction (STJ) detectors for millimeter wave and particle detections.

In an attempt to understand the mechanism of inflation in the early universe,
we focus on observing the B-mode polarization pattern of the CMB.
The pattern is known to carry information on the primordial gravitational wave
which was generated during the inflation period.
For the CMB B-mode observation, we need about 2,000 detectors capable of detecting millimeter wave.
In order to remove obstructive foregrounds, a wide frequency range of 50 to 230 GHz is necessary.
One of the detectors to satisfy the requirements is an antenna coupled Al STJ detector.
The detector makes use of either the direct Cooper pair breaking or photon assisted tunneling effect,
and, in principle, is capable of covering a frequency range greater than 40GHz.
We are newly developing antenna coupled microstrip STJ detectors.
Utilizing the microstrip STJs makes it much easier to match the impedance with the antenna
compared with the parallel STJs widely used by the past experiments.

We are also fabricating Al STJ detectors that
detect phonons generated in the substrate to which the energies are
deposited by particles such as alpha, beta, X-ray and photon.
The detectors are able to measure the deposited energies with
the energy resolution five times better than the semiconductor detectors.
The advantages of using STJs through phonons in the substrate
instead of the TES calorimeters are that the STJ response is fast (~2us) and
that the substrate can cover a large detection area.
We have successfully detected alpha particles with the pure 7um diameter Al STJs on
a 250x250um^2 Al pad fabricated on a Si substrate.

Primary authors : Dr. ISHINO, Hirokazu (Okayama University)

Co-authors : Dr. MIMA, Satoru (Okayama University) ; Dr. HATTORI, Kaori (Okayama University) ; Dr. KIBAYASHI, Atsuko (Okayama University) ; Prof. HAZUMI, Masashi (High Energy Accelerator Research Organization (KEK)) ; Dr. MITSUHIRO, Yoshida (High Energy Accelerator Research Organization (KEK)) ; Dr. SATO, Nobuaki (High Energy Accelerator Research Organization (KEK)) ; Mr. WATANABE, Hiroki (High Energy Accelerator Research Organization (KEK)) ; Prof. NOGUCHI, Takashi (National Astronomical Observatory of Japan)

Presenter : Dr. ISHINO, Hirokazu (Okayama University)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Poster Presentation

Submitted by : Dr. ISHINO, Hirokazu

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:42
Comments : ""

Abstract ID : 359

The DRIFT Dark Matter Search

Content :

The Directional Recoil Identification From Tracks (DRIFT) detector is a 1 m^3 scale negative ion TPC operating in the Boulby Mine in England. DRIFT is one of only a few dark matter experiments that has sensitivity to the directionality signature expected from dark matter particles due to our motion through the galaxy. We will review the DRIFT technology and its directional capabilities, and present recent results on spin dependent limits for the WIMP-proton cross-section.
Our primary background are from low-energy nuclear recoil events due to radon progeny plated out on the detector's wire central cathode. In the past year we have installed a new thin-film central cathode, which has resulted in a dramatic background reduction in the current data being taken underground. We have also developed additional background rejection techniques that are being tested and show promise. We will describe our background rejection work and summarize our plans for the future, which include a scale-up to a larger detector.

Primary authors : Prof. LOOMBA, Dinesh (University of New Mexico)

Co-authors :

Presenter : Prof. LOOMBA, Dinesh (University of New Mexico)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : LOOMBA, Dinesh

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :
This will be an overview talk for DRIFT.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors
Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 27 April 2011 22:13
Comments : ""

Abstract ID : 360

UV Sensitive SiPMs of Very High PDE and Very Low X-talk

Content :

The collaboration MEPhI-Max Plank Institute for Physics (Munich)for about ten years is developing SiPMs for the needs of the MAGIC and EUSO astro-particle physics experiments. The aim was to develop UV sensitive very high Photon Detection Efficiency (PDE) devices, substantially exceeding that of the classical photo multiplier tubes (PMT). For achieving very high PDE one needs to operate SiPM under the highest Geiger efficiency, i.e. one needs to apply a high over-voltage to the sensors. This means operating SiPM under very high gain. As a consequence one will have a very high-level of cross-talk (X-talk). We simulated and tested several recipes of X-talk suppression in many experimental batches of devices. Together with isolating trenches and the second p-n junction, creating a potential barrier against the charge from the bulk, also special implantation profiles and layers were used for suppressing the adverse effect. We have produced several tens of wafers of 18 different variations of SiPM. Below we report on the excellent properties of some selected types of SiPM of 1x1mm² and of 3x3mm² sizes. The 1x1mm² SiPMs show a PDE of ~ 45 % in the near UV - blue wavelength range. The cross-talk level is below 3.5 % and the dark rate is below 800 kHz at room temperature. Simultaneously we have measured excellent timing properties (see Fig.3), a time resolution of ~ 200ps has been measured for 3x3 mm² SiPMs. One of the most outstanding features of the novel devices is the extremely low level of temperature sensitivity of the gain, amounting to 0.5 %/°C (Fig.2). This is more than one order of magnitude lower compared to existing commercial devices. In this report we want to dwell on the measured parameter values for different type sensors, that are on the way of becoming ideal low light level sensor.

Primary authors : Dr. MIRZOYAN, Razmik (Max-Planck-Institute for Physics)

Co-authors : Prof. DOLGOSHEIN, Boris (Moscow Engineering and Physics Institute) ; POPOVA, Elena (Moscow Engineering and Physics Institute) ; Prof. TESHIMA, Masahiro (Max-Planck-Institute for Physics) ; BUZHAN, Pavel (Moscow Engineering and Physics Institute)

Presenter : Dr. MIRZOYAN, Razmik (Max-Planck-Institute for Physics)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : MIRZOYAN, Razmik

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:50
Comments : ""

Abstract ID : 361

The LHCb upgrade

Content :

The LHCb experiment is designed to perform high-precision measurements of CP violation and search for New Physics using the enormous flux of beauty and charmed hadrons produced at the LHC.
The LHCb detector is a single-arm spectrometer with excellent tracking
and particle identification capabilities. The operation and the results obtained from the data collected in 2010 demonstrate that the detector is robust and functioning very well. In the next years, LHCb will measure a large number of interesting channels in heavy flavor decays. However, the limit of 1 fb^{-1} of data per year cannot be overcome without improving the detector. An upgraded spectrometer with a 40 MHz readout and a much more flexible software-based triggering system will increase the data rate as well as the efficiency specially in the hadronic
channels, widening our physics scope beyond that of heavy flavor. Here, the different possibilities under study for the different detectors are reviewed as well as the ongoing R\ activities.

Primary authors : Dr. GALLAS TORREIRA, Abraham Antonio (University of Santiago de Compostela, IGFAE)

Co-authors :

Presenter : Dr. GALLAS TORREIRA, Abraham Antonio (University of Santiago de Compostela, IGFAE)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : Dr. GALLAS TORREIRA, Abraham Antonio

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:49
Comments : ""

Abstract ID : 362

Improved PMTs for the Cherenkov Telescope Array

Content :

The Cherenkov Telescope Array (CTA) is planned as a next generation ground-based large instrument for astrophysics by means of very high energy γ-rays. The CTA core is based on the MAGIC, the H.E.S.S. and the VERITAS collaborations. Also, a large number of astrophysicists from European institutions, large teams from Japan and USA have joined the CTA. The aim of CTA is to build an array of ~100 imaging telescopes of three sizes (small: ~(4 – 6)m, middle: ~12m and large: ~(17 – 23)m class). These shall provide ~10 times higher sensitivity compared to the current generation of telescopes. The telescopes will use imaging cameras consisting of ~ 1500-3000 PMT channels. We have set up a PMT development program with Hamamatsu (Japan) and Electron Tube Enterprises (England) aiming to produce 1.5" PMTs of optimised parameters for the CTA project.
Very encouraging improved parameters have been obtained from manufacturers in a time scale of 1-2 years but, for example, the level of after-pulsing still needs to be reduced. For the CTA cameras we need PMTs with an afterpulsing level of 0.02 % for the threshold of ≥ 4 ph.e.. The newest PMTs show an after-pulsing level that is rather close to the requirements of CTA. Together with it they show an average peak QE of ~34 %. The Monte Carlo simulations performed by Hamamatsu show a ph.e. collection efficiency of ≥ 95 % for wavelengths in the red part of the spectrum. For shorter wavelengths the collection efficiency is somewhat degrading, this is still under study. The Electron Tubes (ET) Enterprises have chosen their 1.5' hemi-spherical PMT ET 9117B as the starting point for parameter improvements. While most parameters of this PMT could satisfy the needs of CTA they still have to improve the QE of these tubes. We expect that after this also ET Enterprises can produce good PMTs for the CTA project. We want to report about the above development work.

Primary authors : MIRZOYAN, Razmik (Max-Planck-Institute for Physics)

Co-authors :

Presenter : MIRZOYAN, Razmik (Max-Planck-Institute for Physics)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : MIRZOYAN, Razmik

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

This talk will be presented from the name of the Focal Plane Instrumentation Working Group of the CTA Collaboration.

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:51

Comments : ""

Abstract ID : 363

Readout electronics for Hyper Suprime-Cam

Content :

Hyper Suprime-Cam (HSC) is a 1 Giga pixel CCD camera for a wide-field galaxy survey at the Subaru 8-m telescope. It will be mounted on the prime focus of the Subaru telescope and is scheduled to receive its first light in 2011. The primary science goals include a measurement of the equation of state parameter of dark energy based on the weak lensing survey over ~2,000 square degrees. HSC has 1.5-degree-diameter field of view, 7 times larger than that of its predecessor Suprime-Cam. It consists of a large corrector lens system and a focal plane equipped with 116 pieces of 2k x 4k fully depleted CCDs. Combined with the superb image quality and large aperture of Subaru telescope, the survey using HSC can cover a cosmological volume and reach the limiting magnitude of at least one magnitude fainter than the other surveys conducted using 4-m class telescopes.
The readout electronics of HSC consist of two parts: one is the analog front-end electronics (FEE) and the other is the digital back-end Electronics (BEE). The FEE is placed in a vacuum dewar together with the CCDs, and processes the analog CCD signal into 16-bit digital data. The BEE is small and light enough to be integrated into the camera unit, and employs three links of Gigabit Ethernet to readout a 2.3-GByte single exposure within 10 seconds at fast readout operation. We present the overview of HSC and describe its readout electronics including the detail of BEE.

Primary authors : Mr. MIYATAKE, Hironao (University of Tokyo)

Co-authors : Prof. AIHARA, Hiroaki (University of Tokyo) ; Mr. FUJIMORI, Hiroki (University of Tokyo) ; Mr. MINEO, Sogo (University of Tokyo) ; Prof. MIYAZAKI, Satoshi (National Astronomical Observatory of Japan) ; Dr. NAKAYA, Hidehiko (National Astronomical Observatory of Japan) ; Dr. UCHIDA, Tomohisa (High Energy Accelerator Research Organization)

Presenter : Mr. MIYATAKE, Hironao (University of Tokyo)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : MIYATAKE, Hironao

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:43
Comments : ""

Abstract ID : 364

A concept for power cycling the electronics of CALICE-AHCAL with the train structure of ILC

Content :

Calorimeters, like CALICE-AHCAL, aiming for particle flow algorithms need a high granularity readout in all three dimensions. That requires electronics to be integrated into the detector volume with 1000 channel/square-meter. To keep the mechanics easy and homogeneous the heat should be conducted just by the steel of the absorber layers. Therefore a heat production of 40micro-watt per channel is requested. It can only be reached by switching the current sources in the readout ASIC's off for 99% of the time, when no bunches are delivered by ILC. The electronics design will keep the high frequency components of the switched currents locally by adequate design of the PCB and local discrete capacitors. At the end of each readout layer more space is available to stabilize the voltage, place more and larger capacitors and install circuits for filtering. This electronics is supplied by long cables from instruments located in the electronics rooms of the experiment. With the charge storage at the layers and galvanic isolation of the supply instruments it will be reached, that on the cables currents and voltages varies only with low frequencies, so that the disturbance to other subdetectors is minimized.

The talk will describe the impacts and proposed solutions for all stages of the chain from the detector in the active volume to the external supply-units. Simulation and first measurements will demonstrate parameters reached by that concept.

Primary authors : Dr. GOETTLICHER, Peter (Deutsches Elektronen Synchrotron (DESY))

Co-authors :

Presenter : Dr. GOETTLICHER, Peter (Deutsches Elektronen Synchrotron (DESY))

Track classification : Calorimetry ; Front-end Electronics

Contribution type : Oral Presentation

Submitted by : GOETTLICHER, Peter

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

If oral presentation is not adviced, the presentation can be alos made as poster.

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed for other tracks (Front-end Electronics)
Judged by :
Date : 20 April 2011 17:58
Comments : ""

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:26
Comments : "20 min"

Abstract ID : 365

Development of New Data Acquisition System for Nearby Supernova Bursts at Super-Kamiokande

Content :

Super-Kamiokande (SK), a 50-kiloton water Cherenkov detector, is one of the most sensitive neutrino detectors. SK can be used also for supernova observations by detecting neutrinos generated at supernova. In order to improve the performance of the detector for supernovae, we are developing two new features, one for recording all information within one minute and the other for recording calorimetrical information for nearby supernovae.

The current SK data acquisition (DAQ) system reads out all the photomultiplier tube (PMT) hits, including the dark noise, and applies software trigger to select events to record. Therefore, the PMT hits caused by very low energy events below the threshold are not stored. Since supernova burst is a very rare phenomenon and details of the burst mechanism are not known yet, all possible data should be recorded without any bias in the trigger system. To accomplish this, we are adding a new feature to the DAQ system to record all the PMT hit information before and after the burst occurs for about one minute.

The neutrino burst from a supernova farther than about 1300 light years can be recorded without loss of data by the current DAQ system. However, if a supernova burst occurred within a few hundreds of light years, the neutrino event rate can be more than 30 MHz and the system can record only about 20% of the events. To overcome this inefficiency, we are developing a new DAQ system that can handle such high-rate neutrino events. This new DAQ system records the number of hit PMTs so that we can count the neutrinos and obtain a time profile of the number of neutrinos emitted at the supernova.

We will present the implementation of these improvements and show the results of the tests with the prototype.

Primary authors : Dr. TOMURA, Tomonobu (Kamioka Observatory, ICRR. University of Tokyo)

Co-authors : Prof. HAYATO, Yoshinari (Kamioka Observatory, ICRR. University of Tokyo) ; Dr. IKENO, Masahiro (High Energy Accelerator Research Organization (KEK)) ; Prof. NAKAHATA, Masayuki (Kamioka Observatory, ICRR. University of Tokyo) ; Dr. NAKAYAMA, Shoei (Kamioka Observatory, ICRR. University of Tokyo) ; Dr. OBAYASHI, Yoshihisa (Kamioka Observatory, ICRR. University of Tokyo) ; Dr. OKUMURA, Kimihiro (RCCN, ICRR. University of Tokyo) ; Prof. SHIOZAWA, Masato (Kamioka Observatory, ICRR. University of Tokyo) ; Prof. SUZUKI, Soh Y. (High Energy Accelerator Research Organization (KEK)) ; Dr. UCHIDA, Tomohisa (High Energy Accelerator Research Organization (KEK)) ; Dr. YAMADA, Satoru (RCNS. Tohoku University) ; Mr. YOKOZAWA, Takaaki (Kamioka Observatory, ICRR. University of Tokyo)

Presenter : Dr. TOMURA, Tomonobu (Kamioka Observatory, ICRR. University of Tokyo)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : TOMURA, Tomonobu

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:44
Comments : ""

Abstract ID : 366

Single module test of a Micromegas TPC Large Prototype

Content :

The International Large Detector (ILD) concept for the ILC plans to use a Time Projection Chamber (TPC) with Micro-Pattern Gas Detector (MPGD) readouts as its central tracking. A Micromegas readout module has been tested with a large ILC-TPC prototype operating within the EUDET facility at DESY. Measurements carried out within a 1T magnetic field, as well as with no magnetic field, allowed for the measurement of the transverse spatial resolution. A preliminary point resolution of 60 microns extrapolated at zero drift distance was obtained with the MPGD readout concept of charge spreading with a resistive anode. The homogeneity of the detector and possible distortions have also been studied. A plan in progress to fully cover the large prototype with 7 modules with integrated electronics will also be presented.
(this talk is on behalf of the LCTPC collaboration)

Primary authors : COLAS, Paul (Saclay)

Co-authors :

Presenter : COLAS, Paul (Saclay)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : , Colas, P.

Submitted on Friday 15 April 2011

Last modified on : Friday 15 April 2011

Comments :

This supersedes the Abstract with the same title submitted as a test of the procedure.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 15 April 2011 10:11
Comments : ""

Abstract ID : 367

The ICARUS T600 detector at LNGS underground laboratory

Content :

ICARUS (Imaging Cosmic And Rare Underground Signals) is the the largest Liquid Argon Time Projection Chamber (LAr-TPC) in the world (containing ~600 tons of LAr) addressed to the study of "rare events" and, among these, neutrino interactions.
Installed in the Gran Sasso National Laboratory (INFN-LNGS, Italy), ICARUS started working gradually since May 27th of the last year, collecting data both from the cosmic rays able to reach the depths of the laboratory and from neutrino interactions from the CNGS beam.
The detector, providing a completely uniform imaging and calorimetry with a high accuracy on massive volumes, allows to reconstruct in real time neutrino and cosmic interactions, measuring the full kinematics of the identified particles.
The ICARUS technology can be considered as a milestone towards the realization of next generation of massive detectors (~tens of ktons) for neutrino and rare event physics.
The detection technique principle will be illustrated;
detector main features and performances will be described, with particular emphasis on cryogenics and LAr purity; examples of neutrino events reconstruction will be shown.

Primary authors : Dr. CANCI, Nicola (INFN-LNGS) ; Dr. VIGNOLI, Chiara (INFN-LNGS)

Co-authors :

Presenter : Dr. CANCI, Nicola (INFN-LNGS) ; Dr. VIGNOLI, Chiara (INFN-LNGS)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : CANCI, Nicola

Submitted on Friday 15 April 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:52
Comments : ""

Abstract ID : 368

The RD51 Collaboration for the Development of Micro-Pattern Gas Detectors

Content :

Modern photolithographic technology has enabled a series of inventions of novel Micro-Pattern Gas Detectors (MPGD), in particular the Gas electron Multiplier (GEM), the Micro-Mesh Gaseous Structure (Micromegas), and other micro pattern devices, which offer the potential to develop new gaseous detectors with unprecedented spatial resolution, high rate capability, large sensitive area, operational stability and radiation hardness.
The RD51 collaboration advances technological development
of the large area MPGDs and associated electronic-readout systems, for applications in basic and applied research. This talk will highlight the main achievements in the field of micro-pattern gas detectors and review common projects under development in the framework of the RD51 collaboration.

Primary authors : Prof. WHITE, Andrew (University of Texas at Arlington)

Co-authors :

Presenter : Prof. WHITE, Andrew (University of Texas at Arlington)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : WHITE, Andrew

Submitted on Friday 15 April 2011

Last modified on : Friday 15 April 2011

Comments :

This abstract is submitted on behalf of the RD51 Collaboration, representing 75 institutions engaged in the development of advanced Micro-Pattern Gas Detectors.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 15 April 2011 10:12
Comments : ""

Abstract ID : 369

The TDCpix readout ASIC: a 75 ps resolution timing front-end for the Gigatracker of the NA62 experiment

Content :

NA62 is a new experiment at CERN Super Proton Synchrotron aiming at measuring ultra rare kaon decays.
The Gigatracker (GTK) detector shall combine performing on-beam tracking of individual particles with an excellent time resolution of 150 ps rms.
The peak flow of particles crossing the detector modules reaches 40 MHz/cm^2 for a total rate of about 1 GHz.
A hybrid silicon pixel detector is being developed to meet these requirements.

Our team is designing the final pixel chip for the NA62 GTK.
The TDCpix chip will feature 1800 square pixels of 300x300 um^2 arranged in a matrix of 45 rows x 40 columns.
Bump-bonded to the pixel sensor it shall perform time stamping of particle hits with a timing accuracy better than 200 ps rms and with a dead time below 1%.

The chosen architecture provides full separation of the sensitive analog amplifiers of the pixel matrix from the noisy digital circuits of the Time to Digital Converters (TDCs) and of the readout blocks.
Discriminated hit signals from each pixel are transmitted to the end of column region.
An array of TDCs is implemented at the bottom of the pixel array.
The TDCs operate by latching the fine time codes generated by Delay Locked Loops (DLL) and have a nominal time bin of ~100 ps.
Time stamp and time-over-threshold are recorded for each discriminated hit and the correction of the discriminator's time-walk is performed off-detector.
Data are continuously transmitted on four 2.4 Gb/s serial output links.

A prototype ASIC including the key components of this architecture has been manufactured.
The achievement of specification figures such as a time resolution of the processing chain of 75 ps rms as well as charged particle time stamping with a resolution below 200 ps rms were demonstrated experimentally.

This contribution will focus on the development and the design of the final TDCpix chip.
A description of the on-going design will be given, presenting and discussing the lessons we learned and the challenges that we are still facing.
The ongoing R effort provided an understanding of some of the constraints limiting the charged particle timing resolution that can be achieved with hybrid planar silicon pixels.
Considerations and results on these aspects will be presented lastly.

Primary authors : Dr. AGLIERI RINELLA, Gianluca (CERN, European Organization for Nuclear Research)

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Presenter : Dr. AGLIERI RINELLA, Gianluca (CERN, European Organization for Nuclear Research)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : Dr. AGLIERI RINELLA, Gianluca

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

An abstract for a talk on the NA62 Gigatracker has been submitted by our group to the "Semiconductor detector" session.
This abstract is for a focus talk on the design of the front-end pixel chip.
Announcement of this opportunity was made by session co-convener Jean-Pierre Walder to Pierre Jarron who is among the authors.

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : ARAI, Yasuo
Date : 21 April 2011 02:25
Comments : "20 min"

Abstract ID : 370

Applications and imaging techniques of a Si/CdTe Compton gamma-ray camera

Content :

A Compton camera is a gamma-ray imager which works in sub-MeV/MeV energy band. Up to the present, all-sky monitor COMPTEL onboard NASA's CGRO satellite has been only successful Compton camera for practical use. It consists of an upper array of liquid scintillation detectors and a lower array of NaI scintillation detectors with separation by a distance of 1.5 meter. The COMPTEL was a great contributor in high energy astrophysics, but, such massive and 1.5 ton class system is not suitable for other applications. Moreover, the lower detection threshold was limited to 750 keV due to the high threshold of 50 keV at the upper liquid scintillators. For the next generation of Compton camera, it seems to be definitely required to compress imaging system and improve the detection threshold to advance into potential gamma-ray imaging fields such as molecular imaging, nuclear medicine and security.

Our group has been developed a novel Compton camera which consists of Si and CdTe semiconductor detectors. Original technologies of low noise double-sided silicon strip and CdTe pixel devices and dedicated low-noise analog ASICs allow tracking low energy gamma-ray with energy of several tens keV. We focus on the our developments of Si and CdTe semiconductor detectors and its application to medical imaging with a prototype camera in this presentation. The experimental results of imaging multiple radiopharmaceuticals injected into a living mouse is reported. Unlike astrophysical observation, the targets are located at very near-field with a distance of a few cm from the camera. By adopting near-field back-projection algorithm verified by phantom experiments, the accumulations of both Iodinated (131-I, 364 keV) methylnorcholestenol into a thyroid and adrenals and 85-Sr (514 keV) into skull, spine, lumbar and femur are clearly identified.

In addition to the near-field imaging, we discuss the detection capability of radioisotopes which distribute in relatively large site with a scale of 10 to 100 meter by using the informations from multiple camera configuration. Such middle range imaging technique is expected to contribute to security and non-destructive inspection by monitoring hot spots inside buildings or containers.

Primary authors : Dr. TAKEDA, Shin'ichiro (RIKEN and ISAS/JAXA)

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Presenter : Dr. TAKEDA, Shin'ichiro (RIKEN and ISAS/JAXA)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : TAKEDA, Shin'ichiro

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:19
Comments : ""

Abstract ID : 371

The GANDALF Multi-Channel Time-to-Digital Converter (TDC)

Content :

The GANDALF 6U-VME64x/VXS module [1,2] has been designed to cope with a variety of readout tasks in high energy and nuclear physics experiments. The exchangeable mezzanine cards allow an employment of the system in very different applications such as analog-to-digital or time-to-digital conversions, coincidence matrix formation, fast pattern recognition or fast trigger generation.
Based on this platform, we present a 128-channel TDC which is implemented in a single Xilinx Virtex-5 FPGA using a shifted-clock sampling method. In this concept each input signal is continuously sampled by eight flip-flops with equidistant phase-shifted clocks. Predictable placement of the logic components and uniform routing inside the FPGA fabric is a particular challenge of this design. We present measurement results for the time resolution, the nonlinearity and the rate capability of the TDC readout system.
This project is supported by BMBF and EU FP7.

[1] S. Bartknecht et al., “Development of a 1 GS/s high-resolution sampling ADC system,” Nucl. Instr. and Meth. A, vol. 623, pp. 507-509, 2010.
[2] S. Bartknecht et al., “Development and Performance Verification of the GANDALF High-Resolution Transient Recorder System,” accepted for publication in IEEE Trans. Nucl. Sci.

Primary authors : SCHOPFERER, Sebastian (Physikalisches Institut der Universität Freiburg)

Co-authors : BüCHELE, Maximilian (Physikalisches Institut der Universität Freiburg) ; FISCHER, Horst (Physikalisches Institut der Universität Freiburg) ; HERRMANN, Florian (Physikalisches Institut der Universität Freiburg) ; KöNIGSMANN, Kay (Physikalisches Institut der Universität Freiburg) ; SCHILL, Christian (Physikalisches Institut der Universität Freiburg)

Presenter : SCHOPFERER, Sebastian (Physikalisches Institut der Universität Freiburg)

Track classification : Trigger and Data Acquisition Systems

Contribution type : --not specified--

Submitted by : SCHOPFERER, Sebastian

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:41
Comments : ""

Abstract ID : 372

GET: a Generic Electronic system for TPCs for nuclear physics experiments°

Content :

In experiments with radioactive beams from heavy ions facilities it is shown that active targets and TPCs experimental methods are versatile and effective means to study nuclear spectroscopy (ref. 1). The principle advantages are good resolution, versatility and high luminosity for the detection for low energy recoils. To address the needs of the nuclear physics community (ACTAR (GANIL), AT-TPC (NSCL) , SAMURAÏ-TPC (RIKEN), MINOS (IRFU)), we are in the process of developing a financed (ANR, NSF) Generic Electronic system for TPCs (GET) to cover small to medium sized instrumentation (64 to 32k channels).

GET specifications cover a relatively wide charge dynamic ranges and 4 level numeric trigger for pulse shape recording with event rate of up to 1 kHz. The system architecture includes frontend boards, AsAd, housing, four 64-channel ASICs, AGET and ADCs together with built-in power supply monitoring, calibration, synchronization and inspection features controlled by an FPGA.

Each AGET channel includes a test pulser input, a charge sensitive preamplifier, a shaper, a leading edge discriminator and a 512-cell analog memory, SCA. The gain, polarity, shaping time and threshold can be programmed individually for each channel by slow-control, SC. Use of external preamplifier and shaper instead of the internal ones is integrated. Shaped signals are continuously sampled (1-100Mhz) and written onto the circular SCA, which are read by an external 12/14bit 25MHz ADC under request. The readout of the SCA can be selective (programmable time window, and selected on only hit channels). Outside this readout phase the same ADC also codes the multiplicity information constructed from the discriminator outputs to give Level-1. Level-0 is an external trigger. Level-2 is an event form recognition trigger preceding the SCA coding and issues a calculated read pattern.

Four AsAds data and control are connected onto a COncentration BOard, CoBo, employing a FPGA+fast memory. CoBos are housed in a modified microTCA (xTCA compatible) along with the FPGA based trigger MUTANT (MCH1) and 10Gb switch (MCH2). Two further racks containing MUTANTs in a slave mode will run a total of 32k channels. A CPU farm performs the event building, level-3 trigger and data registering under NARVAL (Ref.2). Residing on CoBo is the SC dispatching, data reduction, time stamping and set in generic based firmware. An evolved SC database under ORACLE is operational. Production of the modules is previewed in 2012. We will present results of the prototype GET system-I.

References

1. M.Caamano et al., Phys. Rev. Lett. 99, 062502 (2007), C. Monrozeau
et al, Phys. Rev. Lett. 100, 042501 (2008), C.E. Demonchy et al., Nucl. Instrum. Meth. A583, 341 (2007)
2. X. Grave http://informatique.in2p3.fr/?q=user/22
° GET Project is supported by L'Agence nationale de la recherché, France

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Presenter : Dr. POLLACCO, Emanuel (CEA Saclay)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : POLLACCO, Emanuel

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:44
Comments : ""

Abstract ID : 373

Calibration and performance of the ATLAS Level-1 Calorimeter Trigger with LHC collision data

Content :

The ATLAS Level-1 Calorimeter Trigger is one of the main elements of the first stage of event selection for the ATLAS experiment at the LHC. The input stage consists of a mixed analogue/digital component taking trigger sums from the ATLAS calorimeters. This stage determines the energies sent to the algorithmic trigger logic. The complete processing chain is performed in a digital, pipelined system, where programmable algorithms are performed in parallel with a fixed latency of 2us. The real-time output consists of counts of high-pt physics objects (jets, electron/photon and tau candidates) and global energy triggers.

While the trigger system has been operational from time of the very first LHC data, the final tuning of timing and calibration had to wait for the higher luminosity proton-proton collision data delivered by LHC in 2010. Many configurable parameters had to be optimized in order to obtain the ultimate performance of system in terms of bunch-crossing identification and energy resolution. The behaviour of the system was also studied in detail to understand unusual signals, and improve their response.

An analysis of the current status of the calorimeter trigger hardware will be presented, along with the methods used to achieve these results via increasingly precise calibrations.

Primary authors : HILLIER, Stephen (University of Birmingham)

Co-authors :

Presenter : HILLIER, Stephen (University of Birmingham)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : HILLIER, Stephen

Submitted on Friday 15 April 2011

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Comments :

Stephen Hillier will not be the primary author author or presenter, but the exact allocation of the paper has yet to be decided.

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:20
Comments : ""

Abstract ID : 374

New semiconductor 2D position-sensitive detector

Content :

We present a novel semiconductor 2D position-sensitive detector based on planar technology of single-sided microstrips. The device is a microstrip sensor with implants covered by a resistive material. Position information along the strip direction is obtained by means of the resistive charge division method. A SPICE model of the detectors was developed and prototype sensors were produced. They were tested with laser beam, radioactive source and in the 120 GeV/c pion line at the SPS testbeam area. These detectors work coupled to standard readout electronics. Spatial resolution along the strip length better than 100 mum has been
measured for a signal to noise ratio of 15/1. Further tests with very recent second prototypes will also be presented.

Primary authors : Mrs. MUNOZ SANCHEZ, Francisca (IFCA - Instituto de Fisica de Cantabria-Consejo Sup. de Investig)

Co-authors : Mrs. BASSIGNANA, Daniela (CNM-IMB-CSIC) ; Mr. LOZANO, Manuel (CNM-IMB-CSIC) ; Mr. PELLEGRINI, Giulio (CNM-IMB-CSIC) ; Mr. QUIRION, David (CNM-IMB-CSIC) ; Mr. FERNANDEZ, Marcos (IFCA - Instituto de Fisica de Cantabria-Consejo Sup. de Investig) ; Mr. JARAMILLO, Richard (IFCA - Instituto de Fisica de Cantabria-Consejo Sup. de Investig) ; Mr. VILA, Ivan (IFCA - Instituto de Fisica de Cantabria-Consejo Sup. de Investig)

Presenter : Mrs. MUNOZ SANCHEZ, Francisca (IFCA - Instituto de Fisica de Cantabria-Consejo Sup. de Investig)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : MUNOZ SANCHEZ, Francisca

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:17
Comments : ""

Abstract ID : 375

Analysis of data recorded by the GEM-LCTPC

Content :

The LCTPC-collaboration studies the technical aspects of a TPC with MPGD readout structures for a detector at a future Linear Collider such as the ILC or CLIC. For this a test facility with a 1 Tesla magnet and a large prototype TPC was set up at DESY. An analysis of data taken in 2010 at the DESY test beam T24, using this TPC equipped with a two layer GEM system, has been performed. Three GEM modules, out of maximum seven, were used in a geometry that allowed the recording of tracks, which traversed the full radial distance (about 60 cm track length) of the TPC. More than 7000 pads, of size 1.1 x 5.26 mm2, were read out by a modified version of the ALTRO-electronics, used in the ALICE experiment, containing the programmable charge sensitive preamplifier PCA16. The sampling rate was 20 MHz. The main purpose of the measurements was to study the performance of the GEM system and to determine the resolution in space and momentum. Straight tracks, taken with zero magnetic field, were used for mechnanical alignment of the modules using the Millipede method, which however suffered from the non-existing external silicon detectors as reference. An inhomogeneous electric field in the gas amplification system, the magnitude of which was dependent on the impact position of the beam, also had to be corrected for. Tracks recorded with a magnetic field were fitted to a second order polynomial in the transverse plane and analysed with the same method to account for the E x B distortions. After all corrections had been done the residuals in all cases are nicely clustered around zero along the full length of a track. The final results obtained are $\sigma r\varphi = 0.0613 \pm 0.0006$ mm and $\sigma z = 0.259 \pm 0.002$ mm, respectively, both extrapolated to zero drift distance. These values are consistent with the final goal of the ILD.

Primary authors : Dr. JONSSON, Leif (hep.lu.se)

Co-authors :

Presenter : Dr. JONSSON, Leif (hep.lu.se)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Friday 15 April 2011

Last modified on : Friday 15 April 2011

Comments :

submitted for Leif Jonsson (LCTPC-collaboration) by Ted Liu.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 15 April 2011 13:28
Comments : ""

Abstract ID : 376

Assembly and Installation of the Daya Bay Antineutrino Assembly and Installation of the Daya Bay Antineutrino Detectors

Content :

The Daya Bay antineutrino detectors are formed from large, 3 and 4 meter, cylindrical acrylic vessels surrounded by phototubes and an outer stainless steel containment vessel. When filled with liquids the inner detector components are completely inaccessible. The shipping and handling of these fragile, large acrylic vessels has been challenging, as has the establishment of common quality assurance requirements and installation schedules. The assembly sequence is highly structured with survey and leak checking measurements at each assembly step to ensure that assembled detector meets requirements. The assembly and installation of the first pair of Daya Bay antineutrino detectors will be presented.

Primary authors : Dr. BAND, Henry (University of Wisconsin)

Co-authors :

Presenter : Dr. BAND, Henry (University of Wisconsin)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : BAND, Henry

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:38
Comments : ""

Abstract ID : 377

CMOS Monolithic Active Pixel Sensors for vertexing, tracking and calorimetry

Content :

Future high energy detectors will require unprecedented energy and position resolutions. Two CMOS Monolithic Active Pixel Sensors (MAPS), TPAC and FORTIS, have been designed to study the issues involved in achieving these.

One application is to use MAPS as the active layer of a sampling electromagnetic calorimeter, allowing high granularity calorimeter systems which can utilise particle flow techniques. The TPAC sensors were developed to study this application. They were the first to use a new "INMAPS" technology and have demonstrated a significantly improved MIP efficiency compared to standard MAPS pixels. The sensors have been tested at CERN and DESY for their response to positrons, pions and electromagnetic showers. TPAC sensors have also been irradiated to investigate their radiation hardness for use in vertexing. Results on these tests will be presented.

The FORTIS sensor has been developed to explore the possiblity of four-transistor pixel structures for low-noise performance. These could be used for both tracking and calorimetry applications. During beam tests at CERN and DESY a signal/noise ratio greater than 100 has been achieved.

Primary authors : Mr. PRICE, Tony (University of Birmingham, SPiDeR)

Co-authors :

Presenter : Mr. PRICE, Tony (University of Birmingham, SPiDeR)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : PRICE, Tony

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Presented by Tony Price on behalf of the SPiDeR Collaboration

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:14
Comments : ""

Abstract ID : 378

The Beam Conditions and Radiation Monitoring System of CMS - Description and Performance of Subsystems

Content :

The Beam Conditions and Radiation Monitoring System, BRM, is installed in CMS to protect the detector and to provide feedback to LHC on beam conditions. It is composed of several sub-systems that measure the radiation level close to or inside all sub-detectors, monitor the beam halo conditions with different time resolution. Thus it supports beam tuning and warns CMS in case of adverse beam conditions. BRM data are taken and analysed independently of the central CMS data acquisition They are displayed in both control rooms, CMS as well as LHC.

This paper shortly describes the existing system and discusses results and experience gained. It will especially focus on BCM1F, which was designed for fast flux monitoring and measuring bunch-by-bunch both beam halo and collision products. Installed inside the pixel volume close to the beam-pipe in two planes with 4 modules each (1.8 m away from the IP on both sides), it uses single-crystal CVD diamond sensors and radiation hard front-end electronics. Since November 2009 BCM1F has been recording data from beam halo, beam losses, proton-proton and lead-lead collisions and it became an invaluable tool in the everyday CMS operation. A characterization of the system on the basis of data collected during LHC operation is presented.

Primary authors : Dr. LANGE, Wolfgang (Deutsches Elektronen Synchrotron (DESY))

Co-authors : BRM COLLABORATION, All (CERN and DESY)

Presenter : Dr. LANGE, Wolfgang (Deutsches Elektronen Synchrotron (DESY))

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : LANGE, Wolfgang

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

This abstract was sent today due to the deadline. It is subject to minor modifications and it will be completed with a correct list of co-authors. - Wolfgang Lange

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:32
Comments : ""

Abstract ID : 379

Current Status of Nanometer Beam Size Monitor for ATF2

Content :

The Accelerator Test Facility 2 (ATF2) is an extension of the ATF beamline extraction featuring an ILC-type final focus system. Among the project`s major purposes is establishment of hardware and beam handling technologies aimed at transverse focusing of ATF`s electron beams to below 40nm in the vertical. A laser-interferometer type high resolution beam size monitor named the "Shintake Monitor" is installed at ATF2`s virtual interaction point plays a crucial role in achieving this aim. A laser interference fringe is formed by crossing two coherent laser rays. This functions as an interaction target for probing the electron beam. Beam size sensitivity of the monitor depends on the pitch of the interference fringe, and maximizes at about one fifth of the pitch. The Shintake Monitor at ATF2 is designed to be capable of easuring beam sizes ranging from 6 microns down to 20 nm in vertical. A vertical beam size of approximately 300 nm has been measured at May 2010 run. For the most recent run, owing to switching beam optics back to nominal, BG levels rose about 10 times from May. Shintake Monitor had been proven in May to fulfill expectations provided BG is low. However with high BG, its accuracy decreased, which makes low S/N a major concern. In this paper, we describe the design and current status of the monitor.

Primary authors : Mr. YAMAGUCHI, Yohei (The University of Tokyo)

Co-authors : Mr. OROKU, Masahiro (The University of Tokyo) ; Ms. YAN, Jacqueline (The University of Tokyo) ; Dr. KAMIYA, Yoshio (International Center for Elementary Particle Physics) ; Prof. KOMAMIYA, Sachio (The University of Tokyo) ; Mr. YAMANAKA, Takashi (The University of Tokyo) ; Dr. SUEHARA, Taikan (International Center for Elementary Particle Physics) ; Dr. OKUGI, Toshiyuki (KEK) ; Prof. TERUNUMA, Nobuhiro (KEK) ; Prof. TAUCHI, Toshiaki (KEK) ; Dr. ARAKI, Sakae (KEK) ; Prof. URAKAWA, Junji (KEK)

Presenter : Mr. YAMAGUCHI, Yohei (The University of Tokyo)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : YAMAGUCHI, Yohei

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:33
Comments : ""

Abstract ID : 380

Development of Micro Pixel Chamber for ATLAS upgrade

Content :

The Micro Pixel Chamber (mu-PIC) is now developing as a one of candidate for endcap muon system of the ATLAS detector upgrading in LHC experiment. The mu-PIC is one of micro pattern gaseous detector, and it doesn't have floating structure, such as wire, mesh nor foil. This detector can be only made by printed-circuit-board (PCB) technology, which is commonly available in commercially and suited for mass production. The results of the operation tests under high flux neutrons, those are similar condition at the ATLAS cavern, will be reported. Also new development of the mu-PIC using resistive materials as electrodes will be reported, which is expected not to make a damage on the electrodes in case of discharge sparks.

Primary authors : Dr. OCHI, Atsuhiko (Kobe University)

Co-authors : Dr. YASUHIRO, Homma (Kobe University) ; Mr. HIDETOSHI, Komai (Kobe University)

Presenter : Dr. OCHI, Atsuhiko (Kobe University)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : Dr. OCHI, Atsuhiko

Submitted on Friday 15 April 2011

Last modified on : Friday 15 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 15 April 2011 20:44
Comments : ""

Abstract ID : 381

Development of THGEM-based photon detectors for the upgrade of COMPASS RICH-1

Content :

For the future upgrade of COMPASS RICH-1 an R project was started to develop a gaseous detector of single UV photons, able to stably operate at high gain and high rate, and to provide good time resolution and insensitivity to magnetic field.
The detector is based on the use of THGEMs, arranged in a multilayer architecture, where the first layer is coated with a CsI film and acts as a reflective photocathode.
The response of single layer THGEMs with various geometries and different conditions has been extensively studied.
Photon detector prototypes were built, tested in laboratory and operated during test beam runs at CERN.
Efficient detection of Cherenkov photons has been obtained, with stable operation in the test beam environment; the typical gain is about 100,000 and the time resolution is better than 10 ns.
The motivations for the COMPASS RICH-1 upgrade will be presented and the status of the R program will be discussed together with the challenges related to the construction of large area THGEM-based photon detectors to be used on RICH counters.

Primary authors : Dr. TESSAROTTO, Fulvio (INFN, Sezione di Trieste - Universita & INFN, Trieste)

Co-authors :

Presenter : Dr. TESSAROTTO, Fulvio (INFN, Sezione di Trieste - Universita & INFN, Trieste)

Track classification : Particle Identification ; Photon Detectors

Contribution type : Oral Presentation

Submitted by : TESSAROTTO, Fulvio

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

This talk could be alternatively hosted in the Photon Detectors session or in the Gaseous Detectors one.

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed for other tracks (Photon Detectors)
Judged by : Toru Iijima
Date : 27 April 2011 13:03
Comments : "The contents are focused on the development of Thick GEM. I think it is worth for oral presentation if any time slots are available."

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 27 April 2011 15:44
Comments : ""

Abstract ID : 382

The Liquid Argon Purity Demonstrator

Content :

We are constructing a 30 ton liquid argon (LAr) vessel at Fermilab to test whether sufficient purity can be achieved from a non-evacuated environment for electron drift lifetimes of 2.5 m. There are two phases to the experiment. In the first phase, we will consider the initial purification by exchanging several vessel volumes of clean, warm argon gas to push out ambient air and to dry out the vessel surfaces. The gas will be recirculated through a filtration system to achieve less than 50 ppm oxygen contamination. When this purity is achieved, the vessel will be cooled and filled with LAr. In the second phase, candidate materials for use in time projection chambers will be placed in the vessel to determine if electron drift lifetimes can be maintained. We will will study the temperature and oxygen concentrations at various depths in the vessel over time and compare the results to models for scalability to larger volumes. We will also study the number of LAr volume exchanges and the exchange rate needed to maintain nominal purity. Our poster describes the vessel, the instrumentation and installation methods, and summarizes the current status of the experiment.

Primary authors : PAHLKA, Benton (Fermilab)

Co-authors :

Presenter : PAHLKA, Benton (Fermilab)

Track classification : Detectors for neutrino physics

Contribution type : Poster Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Friday 15 April 2011

Last modified on : Sunday 24 April 2011

Comments :

submitted for Benton Pahlka and Chad Johnson, by Ted Liu.

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:52
Comments : ""

Abstract ID : 383

Optical Photon Transport in Plastic Scintillator

Content :

We have constructed a GEANT4-based detailed model of photon transport in plastic scintillator blocks and wavelength-shifting fibers and have used it to study the performance and light collection of several scintillator-based detectors. The central feature of the model is accounting for the spectral properties of all materials such as reflectivity, refractive index, absorption lengths, and photodetector quantum efficiency. It also accounts for wavelength-shifting absorption and emission from the wavelength shifter as well as its fluorescent quantum yield. We have validated the model by comparing simulations and measurements for the double beta decay experiment NEMO-3, the neutrino oscillation experiments MINOS, NOνA, and MINERνA as well as several benchtop measurements. The simulations accurately reproduce measurements of the scintillator uniformity and light collection. In this poster, we discuss details of the model and the comparison of measurements and simulations. We show that the agreement is improved if wavelength-dependent properties of the calorimeter are taken into account and use the model to optimize the light collection for the SuperNEMO calorimeter as well as for the future neutrino oscillation experiment TASD.

Primary authors : Dr. PAHLKA, Benton (Fermilab)

Co-authors :

Presenter : Dr. PAHLKA, Benton (Fermilab)

Track classification : Detectors for neutrino physics

Contribution type : Poster Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Friday 15 April 2011

Last modified on : Sunday 24 April 2011

Comments :
submitted for Benton Pahlka, by Ted Liu.

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:52
Comments : ""

Abstract ID : 384

High gain hybrid photomultipliers based on solid state p-n junctions in Geiger mode and their use in astroparticle physics.

Content :

In astroparticle physics photomultiplier tubes play a crucial role in the detection of fundamental physical processes. After about one century of standard technology (photocathode and dynode electron multiplication chain), the recent strong development of modern silicon devices has brought to maturity a new generation of photodetectors based on an innovative, high-quality, cost effective technology.
In particular the most promising development in this field is represented by the rapidly emerging CMOS p-n Geiger-mode avalanche photodiode technology (G-APD or SiPM), that will allow the detection of high-speed single photons response with high gain and linearity.
Most applications will require collection of light from even larger surfaces or volumes, so it is necessary to increase the active surfaces and the angular covertures of SiPMs while keeping high sensitivities.
The main purpose of this research is, therefore, to offer an attractive response to overcome this problem. The idea is to realize an hybrid detector (Vacuum Silicon PhotoMulTiplier,VSiPMT), where the dynodes structure of a classical Vacuum PhotoMultiplier Tube (VPMT) is replaced by an array of G-APDs, which collects the photoelectrons emitted by a photocathode and acts as an electron multiplier.
As a possible future development, the exploitation of the full fill factor of a front illuminated SiPM, in which quenching resistors and electric contacts are integrated in the bulk, could allow the full geometrical efficiency of a SiPM used as an amplifying element. In this way this hybrid PMT will result equivalent to those already existing manufactured with APD (gain 102), but with a gain comparable to the standard PMTs (106-107).
Such an amplifier would be free of such intrinsic limitations of classic photomultipliers as: limited linearity due to high gain, no capability for precise photon counting, complexity of construction, sensitivity to magnetic fields and faults in cryogenic environments.
On the other hand it would present several attractive features such as: small size, low cost, high gain, high efficiency, absence of an external voltage divider, no power consumption, weakened dependence on magnetic fields.

Primary authors : Dr. VIVOLO, Daniele (INFN)

Co-authors :

Presenter : Dr. VIVOLO, Daniele (INFN)

Track classification : Photon Detectors

Contribution type : --not specified--

Submitted by : VIVOLO, Daniele

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 29 April 2011 16:44
Comments : ""

Abstract ID : 385

Development of a TPC for an ILC Detector

Content :

The ILD concept, one of two proposed detector concepts for the planned International Linear Collider (ILC), foresees a Time Projection Chamber (TPC) as the main tracking detector. Precision physics measurements at the ILC require a very accurate momentum resolution of 9x10-5/GeV/c in the TPC at a magnetic field of 3.5T and a very efficient pattern recognition. In addition, the TPC -barrel as well as endcaps- must be build with very low material to enable precise measurements in the highly granular calorimeter located behind the TPC allowing for an efficient usage of particle flow methods in the reconstruction.

The LCTPC (Linear Collider TPC) collaboration pursues R to develop
such a TPC based on the best state-of-the-art technology. After tests with smaller prototypes, current studies focus on studies using a large prototype with a diameter of 750mm and a length of 600mm. This prototype can accommodate seven read-out modules of a size comparable to the ones that would be used in the final TPC. Several prototypes of modules using Micromegas or GEM structures as gas amplification exist. They have been tested with electron beam at the EUDET facility at DESY in a 1T magnet.
Besides the traditional pad read-out, a pixel read-out based on the
TimePix chip is studied in these tests with up to 8 TimePix chips on a board. The challenges range from the construction of very lightweight, but geometrically precise fieldcage and endcaps to the development of self-supporting gas amplification structures covering large areas with minimal dead space and minimal material budget. The current status and future plans of the R will be presented.

Primary authors : DIENER, Ralf (DESY)

Co-authors :

Presenter : DIENER, Ralf (DESY)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : DIENER, Ralf

Submitted on Friday 15 April 2011

Last modified on : Friday 15 April 2011

Comments :

Presentation on behalf of the LCTPC collaboration.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 15 April 2011 19:16
Comments : ""

Abstract ID : 386

Software and Hardware R for CMS Trigger and Readout Upgrades

Content :

This paper describes two aspects of the current R programme towards upgrades of the CMS trigger and detector readout systems. We show that the adoption of modern hardware and software components, in non-traditional architectures, can bring improvements in cost, reliability and flexibility.

Firstly, as the CMS experiment moves away from VME-based electronics to telecoms-oriented architectures such as ATCA and μTCA, a new mechanism is needed to configure, control, and perform local DAQ functions for upgraded trigger and readout hardware. We present the "IPbus" protocol, and a supporting suite of firmware and software modules, that provides such a mechanism. The IPbus suite allows simple, highly-scalable control and readout of hardware via packets sent over gigabit Ethernet. The software also includes user-facing APIs to replace the existing VME Hardware Access Library (HAL) currently in use within the CMS experiment.

Secondly, we propose a novel approach to the upgrade of the CMS L1 calorimeter trigger: a time-multiplexed trigger system. This system comprises nodes responsible for processing all data in a given bunch-crossing, replacing the existing conventional architecture of several parallel nodes that process regional data in parallel. This architecture is enabled by the latest generation of FPGAs with substantial IO capabilities, radically reduces the data-sharing necessary in conventional trigger designs, and brings the possibility of new trigger algorithms that can examine detector data in a more holistic manner.

Primary authors : Dr. FRAZIER, Robert (University of Bristol)

Co-authors : Dr. ILES, Greg (Imperial College, London) ; Dr. NEWBOLD, Dave (University of Bristol) ; Dr. ROSE, Andrew (Imperial College, London)

Presenter : Dr. FRAZIER, Robert (University of Bristol)

Track classification : Trigger and Data Acquisition Systems

Contribution type : --not specified--

Submitted by : FRAZIER, Robert

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:25
Comments : ""

Abstract ID : 387

The Hanohano neutrino detector and ongoing R&D

Content :

The Hanohano neutrino detector is a deep sea module that can be submerged to the ocean floor far away from surface radiation. Its Physics goals are the study of geo-neutrino to probe the isotope source of the 45 TW of heat driving all of geodynamic process in the earth, enhanced studies of neutrino oscillation from reactors through variable distance observations, and as an observatory for astro-physical neutrino sources. Nuclear surveillance of unknown nuclear reactors can be a key mission for a mobile neutrino detector that is also under consideration. The Hanohano detector details will be presented and a summary of the ongoing research and development at the University of Hawaii for neutrino direction detection development reviewed.

Primary authors : Dr. SOLOMEY, Nickolas (Wichita State University)

Co-authors :

Presenter : Dr. SOLOMEY, Nickolas (Wichita State University)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : Dr. SOLOMEY, Nickolas

Submitted on Friday 15 April 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:53
Comments : ""

Abstract ID : 388

Light concentrators for Silicon Photomultipliers

Content :

Photosensitive devices represent a key solution for several current and future categories of experiments in which light detection can be considered the main channel of observation for physical phenomena. The process of increasing the experimental sensitivity above the current limits is steering the development of experiments whose sizes should greatly exceed the dimensions of the largest today's installations. In such a large scale of apparatus, no other option remains than using natural media as radiators: the atmosphere, deep packs of ice, water, big volume portions of sea, liquid gases often in tanks at cryogenic temperatures. In these (transparent) media, charged particles, originating from the interactions or decays of primary particles, radiate Cherenkov or fluorescence light, which is then detected by photosensitive devices.
In these fields of applications, the relatively new Silicon Photomultipliers (SiPM) based on the limited Geiger-mode avalanche (generally G-APD, Geiger Avalanche Photons Detectors), are starting to be extensively studied in view of their future utilization. Nevertheless they suffer of generally a limited sensitive surface currently between 1 to 9mm2: intrinsic noise depends linearly with the surface, so quadratically with the dimensions and can reach undesired thresholds.
A solution to increase SiPM optical performances can be using Optical Concentrators with the correct refraction index, characteristic and geometry in order to improve the aperture angle of view of the device. The use several SiPM of small, say, acceptable intrinsic dimensions (i.e. 3x3 mm2 4x4 mm2) arranged in a matrix-shaped array and equipped of light concentrators to form a sort of "gem" sensitive to light. A correct electronic equipment could transform such a "gem" into a modular and flexible light detector applicable in several situations. Indeed larger surface detector can be realized using a matrix of G-APD pixels by focusing the light to sensitive area of single SiPM. Such a layout, in which the dead area between the sensitive surfaces of the individual detector may be taken care of, is very promising for application in field of modern imaging Cherenkov detector.

Primary authors : Dr. MOLLO, Carlos Maximiliano (INFN)

Co-authors :

Presenter : Dr. MOLLO, Carlos Maximiliano (INFN)

Track classification : Photon Detectors

Contribution type : --not specified--

Submitted by : MOLLO, Carlos Maximiliano

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 29 April 2011 16:44
Comments : ""

Abstract ID : 389

The CHarged ANTIcounter for the NA62 experiment at CERN

Content :

The NA62 experiment at CERN aims at the very challenging task of measuring with 10% relative error the Branching Ratio of the ultrarare decay of the K+ into pi+ neutrino and antineutrino, which is expected to occur only in about 8 out of 10^11 kaon decays. This will be achieved by means of an intense hadron beam, an accurate kinematical reconstruction and a redundant veto system for identifying and suppressing all spurious events. In particular, beam induced background, caused by inelastic interactions of the hadron beam with the Si based detector which measures kaon momentum (the so called Gigatracker, GTK) can mimic the signal in case only one pion is detected downstream. To suppress this background we have designed the so called CHarged ANTIcounter (CHANTI) i.e. a series of six guard rings, to be operated in vacuum, and covering a wide angular region downstream the last GTK station. CHANTI must have time resolution below 1 ns, must be highly efficient in detecting charged particles and must cope with rates which in the inner part can be some kHz/cm^2. We have adopted a solution based on triangularly shaped scintillator bars coupled with fast wavelength shifting fibers and individually read by means of Silicon Photomultipliers (SiPM). The full scale prototype of one ring has been built and tested using a prototype front end board which allows fast amplification and individual channel fine bias setting with O(mV) resolution and 0.1% stability. We show first results on the response of the detector to minimum ionizing particles as well as on its time resolution, which are well in line with the specifications.

Primary authors : AMBROSINO, Fabio (Universita & degli Studi di Napoli "Federico II"; e Sezione INFN, Napoli)

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Presenter : AMBROSINO, Fabio (Universita & degli Studi di Napoli "Federico II"; e Sezione INFN, Napoli)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : AMBROSINO, Fabio

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:03
Comments : ""

Abstract ID : 390

slic: A Geant4-based full detector response simulation program

Content :

As the complexity and resolution of particle detectors increase, the need for detailed simulation of the experimental setup also increases. Designing experiments requires efficient tools to simulate detector response and optimize the cost-benefit ratio for design options. We have developed efficient and flexible tools for detailed physics and detector response simulation which builds on the power of the Geant4 toolkit but frees the end user from any C++ coding. The primary goal has been to develop a software toolkit and computing infrastructure to allow physicists from universities and labs to quickly and easily contribute to detector design without requiring either coding expertise or experience with Geant4.

Geant4 is the de facto high-energy physics standard for simulating the interaction of particles with fields and materials. However, the end user is required to write their own C++ program, and the learning curve for setting up the detector geometry and defining sensitive elements and readout can be quite daunting. We have developed the Geant4-based detector simulation program, slic, which employs generic IO formats as well as a textual detector description. Extending the pure geometric capabilities of GDML, LCDD enables fields, regions, sensitive detector readout elements, etc. to be fully described at runtime using an xml file. We provide executable programs for Windows, Mac OSX and Linux, allowing physicists to design detectors and study their response within minutes.

We present the architecture as well as the implementation for several candidate ILC detector designs, demonstrating both the flexibility and the power of the system. We then present some examples of the potential of this tool to application domains outside of HEP.

Primary authors : GRAF, Norman (SLAC)

Co-authors :

Presenter : GRAF, Norman (SLAC)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : GRAF, Norman

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:50
Comments : "short & merged with 395"

Abstract ID : 391

Search for neutrinoless double beta decay with the NEMO-3 detector and R for SuperNEMO

Content :

The NEMO-3 (Neutrino Ettore Majorana Observatory) experiment, located in the Modane Underground Laboratory, searches for neutrinoless double beta decay. The experiment has been taking data since 2003 with seven double beta isotopes and completed data acquisition in late 2010. Two neutrino double beta decay results for the main isotopes (7 kg of 100Mo and 1 kg of 82Se), new results for 150Nd and 130Te, as well as results for 96Zr, 48Ca, and 116Cd are presented. NEMO-3 uses a unique technique that allows for the in situ measurement of background contamination. No evidence for neutrinoless double beta decay has been found to date. The data are also interpreted in terms of alternative models such as weak right-handed currents and Majoron emission. In this talk, I will discuss the measurements made with NEMO-3 and discuss the status, research and design of the next generation experiment, SuperNEMO.

Primary authors : PAHLKA, Benton (Fermilab) ; PAHLKA, Benton (The University of Texas at Austin)

Co-authors :

Presenter : PAHLKA, Benton (Fermilab)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Friday 15 April 2011

Last modified on : Sunday 24 April 2011

Comments :

submitted for Benton Pahlka by Ted Liu. add another email address of Benton.

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:53
Comments : ""

Abstract ID : 392

Depleted Argon from Underground Sources

Content :

Argon is a powerful scintillator and an excellent medium for detection of ionization. Its high discrimination power against minimum ionization tracks, in favor of selection of nuclear recoils, makes it an attractive medium for direct detection of WIMP dark matter. However, cosmogenic 39Ar contamination in atmospheric argon limits the size of liquid argon dark matter detectors due to pile-up. The cosmic ray shielding by the earth means that Argon from deep underground is depleted in 39Ar. In Cortez Colorado a CO2 well has been discovered to contain approximately 500ppm of argon as a contamination in the CO2. In order to produce argon for dark matter detectors we first concentrate the argon locally to 3-5% in an Ar, N2, and He mixture, from the CO2 through chromatographic gas separation. The N2 and He will be removed by continuous cryogenic distillation in the Cryogenic Distillation Column recently built at Fermilab. In this talk we will discuss the entire extraction and purification process; with emphasis on the recent commissioning and initial performance of the cryogenic distillation column purification.

Primary authors : Dr. BACK, Henning (Princeton University)

Co-authors : Prof. ALTON, Andrew (Augustana College) ; Prof. CALAPRICE, Frank (Princeton University) ; Prof. GALBIATI, Cristiano (Princeton University) ; Mr. GORETTI, Augusto (Princeton University) ; Mr. KENDZIORA, Cary (Fermi National Accelerator Laboratory) ; Mr. LOER, Ben (Princeton University) ; Mr. MONTANARI, David (Fermi National Accelerator Laboratory) ; Mr. MOSTEIRO, Pablo (Princeton University) ; Dr. PORDES, Stephen (Fermi National Accelerator Laboratory)

Presenter : Dr. BACK, Henning (Princeton University)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : BACK, Henning

Submitted on Friday 15 April 2011

Last modified on : Friday 15 April 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Dark Matter Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 393

Luminometer for the future International Linear Collider - simulation and beam test results

Content :

LumiCal will be the luminosity calorimeter for the proposed International Large Detector of the International Linear Collider (ILC). The ILC physics program requires the integrated luminosity to be measured with a relative precision on the order of 10e-3, or 10e-4 when running in GigaZ mode. Luminosity will be determined by counting Bhabha scattering events coincident in the two calorimeter modules placed symmetrically on opposite sides of the interaction point. To meet these goals, the total energy resolution of the calorimeter must be better than 1.5% at high energies. LumiCal has been designed as a 30-layer sampling calorimeter with tungsten as the passive material and silicon as the active material. Monte Carlo simulation using the Geant4 software framework has been used to identify design elements which adversely impact energy resolution and correct for them without loss of statistics. Secondly, prototypes of the sensors and electronics have been evaluated during beam tests, the results of which are also presented here.

Primary authors : Mr. AGUILAR, Jonathan (AGH University of Science and Technology) ; Dr. PAWLIK, Bogdan (Institute for Nuclear Physics - Polish Academy of Science (IFJ-PAN))

Co-authors : Mr. KULIS, Szymon (AGH-UST) ; Prof. ZAWIEJSKI, Leszek (IFJ-PAN) ; Mr. KIELAR, Eryk (IFJ-PAN) ; Mr. WIERBA, Wojciech (IFJ-PAN) ; Mr. CHRZąSZCZ, Marcin (IFJ-PAN)

Presenter : Mr. AGUILAR, Jonathan (AGH University of Science and Technology)

Track classification : Calorimetry

Contribution type : --not specified--

Submitted by : AGUILAR, Jonathan

Submitted on Friday 15 April 2011

Last modified on : Wednesday 20 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Poster Presentation)
Judged by :
Date : 20 April 2011 17:58
Comments : "New development"

Abstract ID : 394

Radiation Damage to D0 Silicon Microstrip Detector

Content :

A Silicon Microstrip Tracker (SMT) has been operating at the D0 Run II experiment at the Fermilab Tevatron collider since 2001. The silicon sensor leakage currents, full depletion voltages as well as signal to noise ratio are monitored for radiation damage. During this monitoring process a bulk carrier-type reversal was observed in the inner layers of silicon sensors. The lifetime of the SMT is primarily constrained by the maximum bias voltage that can be applied to the double-sided sensors without local avalanches around the edges of sensor implants. Sensitivity of such avalanches to magnetic field was observed and investigated. Studies were also performed on the impact of humidity on the avalanches to explore the possibility to increase the maximum bias voltage. We discuss the results of each of the above-mentioned studies in this presentation.

Primary authors : Dr. YE, Zhenyu (Fermi National Accelerator Lab)

Co-authors :

Presenter : Dr. YE, Zhenyu (Fermi National Accelerator Lab)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : YE, Zhenyu

Submitted on Friday 15 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

On behalf of the D0 Silicon Group

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 10:13
Comments : ""

Abstract ID : 395

org.lcsim: A Java-based event reconstruction framework

Content :

Maximizing the physics performance of detectors being designed for the International Linear Collide (ILC), while remaining sensitive to cost constraints, requires a powerful, efficient, and flexible simulation, reconstruction and analysis environment to study the capabilities of a large number of different detector designs. The preparation of letters of intent for the ILC involved the detailed study of dozens of detector options, layouts and readout technologies; the final physics benchmarking studies required the reconstruction and analysis of hundreds of millions of events.

We describe the Java-based software toolkit (org.lcsim) which was used for full event reconstruction and analysis. The components are fully modular and are available for tasks from digitization of tracking detector signals through to cluster finding, pattern recognition, track-fitting, calorimeter clustering, individual particle reconstruction, jet-finding, and analysis. The detector is defined by the same xml input files used for the detector
response simulation, ensuring the simulation and reconstruction geometries are always commensurate by construction. We discuss the architecture as well as the performance.

This toolkit has been used primarily for the characterization of the ILC Silicon Detector Concept. It therefore features packages which allow very sophisticated simulations of the response of silicon detectors to the passage of charged particles. The sensor classes allow very detailed descriptions of charge carrier movement in silicon detectors, e.g. one can list the collecting, absorbing and reflecting regions, properties of silicon (doping, mobility, diffusion length and so on), and electric and magnetic fields (including TCAD maps). After the charge carriers are generated and collected, the electronics simulation processes this charge into digital signals. We have defined an interface to specify how any such simulation should communicate with other parts of package. Since details of signal processing are very sensor specific, it is anticipated that any sensor option will have its own class handling such processing, but we have implemented a number of readout technologies of interest to the ILC detectors, such as CCDs and active pixel devices. Common to all the specific electronics simulation are the addition of electronics noise, propagation of the signal to readout, thresholding, and digitization of the
signal. The final output is then a list of electronics channels with their corresponding ADC counts, and optionally the time for the signal, replicating the readout from a real detector.

In addition to the ILC LOI studies, we describe the use of the org.lcsim software at CERN for CLIC studies, its application to the ATLAS tracker upgrade, dual readout crystal calorimeter detector R at Fermilab, and detector design for proposed “heavy photon” experiments at JLAB.

Primary authors : GRAF, Norman (SLAC)

Co-authors :

Presenter : GRAF, Norman (SLAC)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : GRAF, Norman

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:51
Comments : "short & merged with 390"

Abstract ID : 396

Fluorescence Efficiency and Visible Re-emission Spectrum of Tetraphenyl Butadiene Films at Extreme Ultraviolet Wavelengths

Content :

A large number of current and future experiments in neutrino and dark matter detection use the scintillation light from noble elements as a mechanism for measuring energy deposition. The scintillation light from these elements is produced in the extreme ultraviolet (EUV) range, from 60 - 200 nm. Currently, the most practical technique for observing light at these wavelengths is to surround the scintillation volume with a thin film of Tetraphenyl Butadiene (TPB) to act as a fluor. The TPB film absorbs EUV photons and reemits visible photons, detectable with a variety of commercial photosensors. Here we present a measurement of the re-emission spectrum of TPB films when illuminated with 128, 160, 175, and 250 nm light. We also measure the fluorescence efficiency as a function of incident wavelength from 120 to 250 nm.

Primary authors : Dr. GEHMAN, Victor (Los Alamos National Laboraotory) ; Dr. SEIBERT, Stanley (University of Pennsylvania)

Co-authors : Dr. RIELAGE, Keith (Los Alamos National Laboratory) ; Dr. HIME, Andrew (Los Alamos National Laboratory) ; Dr. SUN, Yongchen (University of South Dakota) ; Dr. MEI, Dongming (University of South Dakota) ; Mr. MAASSEN, Joel (Dakota State University) ; Mr. MOORE, Daniel (Dakota State University)

Presenter : Dr. GEHMAN, Victor (Los Alamos National Laboraotory)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : GEHMAN, Victor

Submitted on Friday 15 April 2011

Last modified on : Friday 15 April 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Dark Matter Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 397

A fast precision tracking trigger with RPCs for high luminosity LHC upgrade

Content :

Muon triggering at the s-LHC luminosity imposes very strict requirements on the trigger detectors concerning not only the rate capability but also to the tracking accuracy. Indeed an accurate 3D tracking allows both to define a sharp threshold in the muon transverse momentum and to efficiently reject the low energy uncorrelated background.
Moreover in order to be used for the first trigger level, this tracking must also be very fast.
We propose here a new trigger idea based on a very fast multi channel front end circuit, capable of selecting the maximum charge deposition among the input channels.
This circuit fully exploits the sub-ns / sub-mm RPCs space-time resolution, while keeping the overall electronics complexity and cost at low level with respect to other more conventional schemes.

Primary authors : Dr. CARDARELLI, Roberto (INFN Roma "Tor Vergata") ; Dr. SANTONICO, Rinaldo (INFN and University of Roma "Tor Vergata") ; Dr. AIELLI, Giulio (INFN and University of Roma "Tor Vergata") ; Dr. LIBERTI, Barbara (INFN Roma "Tor Vergata")

Co-authors :

Presenter : Dr. CARDARELLI, Roberto (INFN Roma "Tor Vergata")

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : AIELLI, Giulio

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:37
Comments : ""

Abstract ID : 398

Polarization as a Tool in Calorimetry

Content :

We show that the signals from a high-Z scintillating crystal (BSO) can be separated into a scintillation and a Cherenkov component by making use of the fact that the latter component is polarized. These studies will be summarized in view of the possible application of such crystals in dual-readout systems and wider application of polarization in calorimetry.

Primary authors : Prof. AKCHURIN, Nural (TTU)

Co-authors :

Presenter : Prof. AKCHURIN, Nural (TTU)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : AKCHURIN, Nural

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

This work is a part of DREAM collaboration.

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 21 April 2011 09:10
Comments : "New development"

Abstract ID : 399

The use of Gaseous Electron Multiplying detectors on suborbital X-ray rocket payloads

Content :

The use of suborbital rocket payloads to perform intriguing science in only 5 minutes continuously requires the use of new and innovative technologies. High resolution X-ray spectroscopy necessitates large collecting areas and large fields of view to achieve adequate countrates in this short amount of time. One method of increasing the signal is to use large format detectors. Stitching together an array of solid state devices would be scientifically optimal, but budgetary constraints preclude this possibility. We have found that large formats can be practically achieved using gaseous electron multiplying (GEM) detectors. In this talk I will summarize the scientific goal of the suborbital rocket missions, how the GEM detectors contribute to the realization of this goal, recent flight results obtained from these payloads, and future mission goals.

Primary authors : Prof. MCENTAFFER, Randall (University of Iowa)

Co-authors : Dr. OAKLEY, Phillip (University of Colorado) ; Prof. CASH, Webster (University of Colorado)

Presenter : Prof. MCENTAFFER, Randall (University of Iowa)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : MCENTAFFER, Randall

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:44
Comments : ""

Abstract ID : 400

A new solid state tracking detector: Electron Emission Membranes and a MEMS made vacuum electron multiplier

Content :

When a minimum ionizing particle crosses an aluminium foil, at least one low energy electron is emitted, at the crossing point, in about 6 percent of the cases. With low work function materials (ceramics, or CsI, diamond), this probability may be much higher. Since only the skin of the foil participates, the efficiency to emitat least one electron can be increased by surface enlargement (meandering,fractalizing). In addition, a strong electric electric field may enhance the electron emission efficiency. We intend to develop membranes with an electron efficiency of 50 - 99 percent.

For multiplying the single electrons we intend to develop a MEMS made multiplier,
in vacuum, to be applied on a pixel chip. The multiplier consists of a stack of some 5 ultra thin (15 - 200 nm) thick membranes of a suitable material (strong, low work function, high-resistivity) like diamond, Si-rich SiNitride. An incoming electron, accelerated up to ~ 200 eV will cause electrons to be emitted from the back side of a membrane after its impact at the front side. Such a membrane may have a 'secondary electron' yield of up to 10. With ~5 membranes, sufficient gain is achieved in order to activate the pixel circuitry. Due to the very small source capacitance at the pixel input pad, a good time resolution is possible. The spatial
resolution is only limited by the pixel size.

Instead of applying an Electron Emission Membrane, the electron multiplier could be combined with a classical photocathode of a photomultiplier. This results in the Timed Photon Counter (TiPC or Tipsy). This is a photomultiplier, but with a superior position and time resolution per photon (10 microns, 10 ps resp.), thin and planar, and capable to operate in magnetic fields. With Tipsy, instant 3D photos can be made by a time-of-flight measurement.

Primary authors : VAN DER GRAAF, Harry (NIKHEF)

Co-authors :

Presenter : VAN DER GRAAF, Harry (NIKHEF)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : VAN DER GRAAF, Harry

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

These are just ideas, but if they prove to work than the impact is substantial

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)

Judged by : CATTAI, Ariella
Date : 21 April 2011 22:52
Comments : "Review"

Abstract ID : 401

Transverse Beam Shape Measurements of Intense Proton Beams using Optical Transition Radiation

Content :

A number of particle physics experiments are being proposed as part of the Department of Energy HEP Intensity Frontier. Many of these experiments will utilize megawatt level proton beams onto targets to form secondary beams such as muons, kaons and neutrinos. These experiments require transverse size measurements of the incident proton beam onto target for each beam spill. Because of the high power levels most beam intercepting profiling techniques will not work at full beam intensity. The possibility of utilizing optical transition radiation (OTR) from the final beamline vacuum window for beam profiling is shown. Also presented are measurements of OTR beam profiling measurements for the FNAL NuMI beamline.

Primary authors : Dr. SCARPINE, Victor (FNAL)

Co-authors :

Presenter : Dr. SCARPINE, Victor (FNAL)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : --not specified--

Submitted by : Dr. SCARPINE, Victor

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:33
Comments : ""

Abstract ID : 402

Rejection of Backgrounds in the DMTPC Dark Matter Search Using Charge Signals

Content :

The Dark Matter Time Projection Chamber (DMTPC) experiment uses a time projection chamber filled with low pressure CF4 gas to detect the direction of WIMP-induced nuclear recoils. Recoils from WIMPs in the galactic dark matter halo are expected to have a directional signal distinct from all known backgrounds. Recent work has been done to develop instrumentation to read out both the scintillation and charge signals from the TPC. This talk will describe the charge readout systems of the DMTPC detector and will discuss their performance in identifying nuclear recoils and rejecting gamma and electron backgrounds.

Primary authors : Mr. LOPEZ, Jeremy (Massachusetts Institute of Technology)

Co-authors :

Presenter : Mr. LOPEZ, Jeremy (Massachusetts Institute of Technology)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : LOPEZ, Jeremy

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

For the DMTPC Collaboration.

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 27 April 2011 22:14
Comments : ""

Abstract ID : 403

The Dark Energy Camera (DECam) integration tests on telescope simulator

Content :

The Dark Energy Survey (DES) is a next generation optical survey aimed at measuring the expansion history of the universe using four probes: weak gravitational lensing, galaxy cluster counts, baryon acoustic oscillations, and Type Ia supernovae. To perform the survey, the DES Collaboration is building the Dark Energy Camera (DECam), a 3 square degree, 570 Megapixel CCD camera which will be mounted at the Blanco 4-meter telescope at the Cerro Tololo Inter-American Observatory. DES will survey 5000 square-degrees of the southern galactic cap in 5 filters (g, r, i, z, Y). DECam will be comprised of 74 250 micron thick fully depleted CCDs: 62 2k x 4k CCDs for imaging and 12 2k x 2k CCDs for guiding and focus. Construction of DECam is nearing completion. In order to verify that the camera meets technical specifications for DES and to reduce the time required to commission the instrument, we have constructed a full sized telescope simulator and performed full system testing and integration prior to shipping. To complete this comprehensive test phase we have simulated a DES observing run in which we have collected 4 nights worth of data. We report on the results of these unique tests performed for the DECam and its impact on the experiment's progress.

Primary authors : Dr. SOARES-SANTOS, Marcelle (Fermilab) ; Dr. ESTRADA, Juan (Fermilab) ; Dr. HONSCHEID, Klaus (Ohio State University) ; Dr. WESTER, William (Fermilab) ; Dr. HAO, Jiangang (Fermilab) ; Dr. BUCKLEY-GEER, Elizabeth (Fermilab) ; Dr. DIEHL, H. Thomas (Fermilab) ; Dr. FLAUGHER, Brenna (Fermilab) ; Dr. KARLINGER, Inga (University of Illinois at Urbana Champaign) ; WALTON, Josiah (University of Illinois at Urbana Champaign) ; CEASE, Herman (Fermilab) ; KUK, Kevin (Fermilab) ; TAHLER, John (University of Illinois at Urbana Champaign) ; STUERMER, Walter (Fermilab) ; MERRIT, Wyatt (Fermilab) ; NEILSEN, Eric (Fermilab) ; LIN, Huan (Fermilab) ; KUEHN, Kyler (Argonne National Lab) ; KUHLMANN, Steve (Argonne National Lab) ; ANNIS, James (Fermilab) ; YANNY, Brian (Fermilab) ; FINLEY, David (Fermilab) ; FRIEMAN, Joshua (Fermilab)

Co-authors :

Presenter : Dr. SOARES-SANTOS, Marcelle (Fermilab)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : SOARES-SANTOS, Marcelle

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

For the Dark Energy Survey Collaboration.

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:46
Comments : ""

Abstract ID : 404

Beam Profile Monitor Instrumentation in the Fermilab M-Test Beam

Content :

The profile monitor instrumentation for the M Test beam includes a suite of types each suited for a range of beam fluxes and energies. The types of detectors and the description of the characteristics of each will be discussed including experimental types using scintillating plastic fibers for ultra-low fluxes.

Primary authors : Mr. SCHOO, Daniel (Fermilab)

Co-authors : Mr. TASSOTTO, Gianni (Fermilab) ; Ms. PURCELL-TAYLOR, Linda (Fermilab)

Presenter : Mr. SCHOO, Daniel (Fermilab)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : SCHOO, Daniel

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:33
Comments : ""

Abstract ID : 405

High-Resolution Photon Counting Detector using Solid-State Photomultipliers

Content :

There is a strong interest in photon counting detectors for applications in the medical, biological and materials research. To meet this interest, we are developing a novel high-spatial resolution photon counting detector capable of detecting low energy gamma rays using solid-state photomultipliers (SSPM). SSPMs are used as gamma ray detectors by coupling them to scintillators, where the lower detection energy limit is set by the dark noise of the SSPM and brightness of the scintillator. This limit can be lowered by using a bright scintillator and minimizing the light loss in the interface. To achieve this, we have developed a method of depositing scintillators directly on SSPMs and similar detectors. This concept has been verified by vapor deposition of CsI:Tl on SSPMs. The CsI:Tl is grown on the SSPM surface as densely packed, highly oriented, microcolumnar crystals, which channels the scintillation light towards the SSPM to give excellent sub-pixel resolution. The microcolumnar structure eliminates the need for pixelating the scintillator, thereby increasing the detector sensitivity and simultaneously reducing processing costs.
Commercially available SSPMs from SensL Technologies were used in this study. The SSPMs were 3.0x3.0 mm2 in individual package and also in a 4x4 arrays. Using our technique we were successful in directly depositing a very uniform 750 ⊠m thick layer CsI:Tl on these SSPMs. The SSPMs tolerated the deposition process and the dark noise of the SSPMs was unchanged. The fabricated detectors were imaged using a scanning electron micrograph, which showed highly oriented microcolumnar structure orthogonal to the SSPM face. The performance characteristics of the detector in terms of position sensitivity, energy resolution, timing characteristics and signal to noise ratio were studied and will be reported. The significant result so far is that the photopeak can be realized for a wide range of energies including Am-241 (60 keV) and Co-57 (129 keV).

Primary authors : SABET, Hamid (Radiation Monitoring Devices Inc.)

Co-authors : PREKAS, Georgios (Radiation Monitoring Devices Inc.) ; BREEN, Matthew (Radiation Monitoring Devices Inc.) ; BHANDARI, Harish B. (Radiation Monitoring Devices Inc.) ; DERDERIAN, Greg (Radiation Monitoring Devices Inc.) ; ROBERTSON, Rob (Radiation Monitoring Devices Inc.) ; KUDROLLI, Haris (Radiation Monitoring Devices Inc.) ; NAGARKAR, Vivek V. (Radiation Monitoring Devices Inc.)

Presenter : SABET, Hamid (Radiation Monitoring Devices Inc.)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : SABET, Hamid

Submitted on Friday 15 April 2011

Last modified on : Monday 25 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)

Judged by : CHEN, Chin-Tu
Date : 25 April 2011 18:01
Comments : ""

Abstract ID : 406

Accurate Measurement of Velocity and Acceleration of Seismic Vibrations near Nuclear Power Plants

Content :

In spite of all prerequisite geoligical study based precautions, the sites of nuclear power plants are also susceptible to seismic vibrations and their consequent effects. The effect of the ongoing nuclear tragedy in Japan caused by an earthquake and its consequent tsunami on March 11, 2011 is currently beyond contemplations. It has led to a rethinking on nuclear power stations by various governments around the world. Therefore, the prediction of location and time of large earthquakes has regained a great importance. The earth crust is made up of several wide, thin and rigid plates like blocks which are in constant motion with respect to each other. A series of vibrations on the earth surface are produced by the generation of elastic seismic waves due to sudden rupture within the plates during the release of accumulated strain energy. The range of frequency of seismic vibrations is from 0 to10 Hz. However the variation in magnitude, velocity and acceleration of these vibrations is very fast. The response of existing or conventional methods of measurement is very slow, which is of the order of tens of seconds. A systematic and high resolution measurement of velocity and acceleration of these vibrations are useful to interpret the pattern of waves and their anomalies more accurately, which are useful for the prediction of an earthquake. In the proposed technique, a fast rotating magnetic field (RMF) is used to measure the velocity and acceleration of seismic vibrations in the millisecond range. The broad spectrum of pulses within one second gives all possible values of instantaneous velocity and instantaneous acceleration of the seismic vibrations. The spectrum of pulses in millisecond range is used to measure the pattern of fore shocks to predict the time and location of large earthquakes very accurately. The proposed measurement scheme is successfully tested and the overall performance is recorded at dynamic conditions.

SUMMARY

The heavy disaster and destruction from the earthquakes are common. The earthquake of Japan on March 11, 2011 has raised alarm worldwide regarding nuclear power generation. The earth quake in Haiti on Jan 12, 2010 had killed more than 230,000 people. The earth quake of Sumatra on December 26, 2004 (Tsunami) killed more than 300,000 people in 11 countries. Therefore the prediction of location and time of large earthquakes has regained a great importance. The measurement of velocity and acceleration of seismic vibrations helps the prediction of earthquakes based on fore shocks. As the resolution of measurement of seismic vibrations is of the order of tens of seconds, the existing techniques are slow and less accurate, hence these methods do not give high resolution (less than one second) data for better prediction.

A number of methods for the measurement of seismic vibrations have been reported in the literature [1-4]. In the proposed technique, for the measurement of displacement, velocity and acceleration of seismic vibrations, a synchro is used whose rotor is attached with the vibrating system. The three-phase stator winding of the synchro, S is energized by a signal of 50 Hz from a stable arbitrary function generator. This signal is supplied to a centre-tapped transformer and the output of transformer is applied to a single-phase to three-phase conversion system consisting an RC network to generate a balanced three-phase, 50 Hz voltages. These three voltages are attenuated to a low value (about 100 mV), before feeding into three audio power amplifiers. The outputs of these three amplifiers are in turn applied to the stator winding of synchro, S to produce a sinusoidal signal Vr, fr in rotor winding. This waveform Vr, fr is then applied to a zero crossing detector (ZCD) of very high slew rate, to give a rectangular wave of 5 volts. As long as the vibrating system is stationary, the speed of rotor of synchro, S is zero. The synchro acts as a transformer. So the frequency fr of Vr of rotor circuit is equal to fs of Vs of stator circuit. The signal Vr is now applied to a ZCD to produce a rectangular waveform VR. The positive going transition (PGT) of signal VR with a positive width of 10 ms is used to trigger a one shot mono-stable multivibrator (OS). It produces a pulse with stable positive width (Q) and its complement (Q´). The signal Q´ from OS with VR is fed to a NAND gate. The output of NAND gate remains high as the positive width of signal VR is equal to negative width of Q´. As the rotor of the synchro moves an infinitesimal distance (one tenth of a radian per second) back and forth, due to its attachment with the vibrating body (mass), the RMF revolves in the air gap at a very fast speed of 3000 rpm. This infinitesimal angular movement of rotor of synchro, S generates an emf, Vr of frequency, fr in the rotor circuit. Therefore, a pulse with negative width appears within 10 ms, for every instantaneous change in the velocity of seismic vibrations. A wide spectrum (with variations) of velocity and acceleration of vibrations is observed and recorded by DSO. It shows a

significant variation, even within one second, which is normally not sensed and recorded by the conventional seismic vibration measurement systems. The spectrum of one second is provides all possible instantaneous velocity and acceleration of seismic vibrations with 10 ms resolution. Hence the measurement for the pattern of fore shocks becomes very fast and accurate for the prediction of time and location large earthquakes very accurately.
To realize the seismic vibrations, a stepper motor is interfaced with a microprocessor. The microprocessor is programmed to vibrate the stepper motor to generate the vibrations similar to the seismic vibrations. The stepper motor is coupled to the rotor of a synchro, S. As long as the stepper motor is stationary, the rotor of synchro, S is also stationary. The vibrations generated by the stepper motor are transmitted to the rotor of synchro S. The vibratiions of known velocity takes place in both clock wise and anti-clock wise directions. Accordingly the frequency of rotor voltage changes and a pulse train of variable pulse-widthis recorded which corresponds to the seismic vibrations. It gives complete information for displacement, velocity and acceleration. The resolution of the recorded pulses of the pulse train (spectrum) is less thal 10 ms.

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[2] T. Bleier and F. Freund, 2005. “Earthquake alarm,” IEEE Spectr., vol. 42, no. 12, pp. 22–27, Dec. 2005.
[3] R. Rupakhety, and R. Sigbjornsson, “A note on the L’Aquila earthquake of April 6, 2009: Permanent ground displacements obtained from strong-motion accelerograms,” Journal of Soil Dynamics and Earthquake Engineering, vol. 30, pp. 215–220, 2010.
[4] P. Mandal, “Crustal shear-wave splitting in the epicentral zone of the 2001 Mw 7.7 Bhuj earthquake, Gujarat, India,” Journal of Geodynamics, vol. 47, pp. 246–258, 2009.

Primary authors : Mr. SYED, Javed Arif (A.M.U., Aligarh)

Co-authors : Mr. ., Imdadullah (A.M.U., Aligarh)

Presenter : Mr. SYED, Javed Arif (A.M.U., Aligarh)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : ARIF, Syed

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

I want to attend this conference to improve my research work by sharing ideas with the researchers from all over the globe. As our paper is based on the measurement of velocity of seismic vibrations near nuclear power stations, the work may be useful for the prediction of earth quakes to prevent heavy destruction. If there is any slot available than I request you to kindly consider this paper.

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:35
Comments : "Accept the abstract, even though it is a bit out of context. Seismic vibrations however are very relevant for the LC final focus!"

Abstract ID : 407

MicroBooNE and the Road to Large Liquid Argon Neutrino Detectors

Content :

Liquid Argon Time Projection Chambers (LArTPC's) provide a promising technology for multi-kiloton scale detectors aiming to address--among other pressing particle physics questions--short and long baseline electron (anti)neutrino appearance. MicroBooNE, a 170 ton LArTPC under construction, is the next necessary step in a phased R effort toward construction and stable operation of larger-scale LArTPC's. This development effort also leans heavily on the ArgoNeuT and LAr1 LArTPC R experiments at Fermilab. In addition to advancing the LArTPC technology, these projects also provide unique physics opportunities. For example, MicroBooNE will be located in the Booster Neutrino Beamline at Fermilab, at $\sim$470 m from neutrino production. Thus, in
addition to measuring a suite of low energy neutrino cross sections on argon, MicroBooNE will investigate the anomalous low energy excess seen by the MiniBooNE experiment. Furthermore, the neutrino beam energy and relatively short baseline provide MicroBooNE with sensitivity to high-$\Deltam^2$ neutrino oscillations. This talk will present the MicroBooNE detector and its physics reach in detail, and explore the physics potential of a dedicated near-future neutrino oscillation program at the Booster Neutrino Beamline, which would
maximize the physics output of the Fermilab LArTPC R projects.

Primary authors : KARAGIORGI, Georgia (Columbia University)

Co-authors :

Presenter : KARAGIORGI, Georgia (Columbia University)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : KARAGIORGI, Georgia

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:39
Comments : "We propose this as a poster."

Abstract ID : 408

Detector Backgrounds at Muon Colliders

Content :

Physics goals of a Muon Collider (MC) can only be reached with appropriate design of the ring, interaction region (IR), high-field superconducting magnets, machine-detector interface (MDI) and detector. All - under demanding requirements, arising from the short muon lifetime, relatively large values of the transverse
emittance and momentum spread, unprecedented dynamic heat loads (0.5-1 kW/m) and background particle rates in collider detector. Results of the most recent realistic simulation studies are presented for a 1.5-TeV MC. It is shown that an appropriately designed IR and MDI with sophisticated shielding in the detector
has a potential to substantially suppress the background rates in the MC detector. The background levels for sub-detectors are compared to those expected at the LHC and CLIC at the nominal luminosity.

Primary authors : Dr. MOKHOV, Nikolai (FERMILAB)

Co-authors :

Presenter : Dr. MOKHOV, Nikolai (FERMILAB)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : MOKHOV, Nikolai

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

This talk is also related to the Machine Detector Interface and Beam Instrumentation track.

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:54
Comments : "short talk"

Abstract ID : 409

ILCroot tracker and vertex detector response to MARS simulation of the beam background in the muon collider

Content :

Results from a simulation of the background for a muon collider, and
the response of a silicon tracking detector to this background are
presented. The background due to decays of the 750 GeV mu+ and mu- beams was simulated using the MARS program, which included the infrastructure of the beam line elements near the detector and the 10 degree nozzle that shields the detector from this background.
The ILCroot framework, along with the GEANT4 program, was used to simulate the response of the tracker and vertex silicon detectors to the muon-decay background remaining after the shielding nozzle. Results include the hit distributions in these detectors and the fractions of species-specific background particles producing these hits.

Primary authors : Dr. TERENTIEV, Nikolai (CMU)

Co-authors : MOKHOV, Nikolai (Fermilab) ; STRIGANOV, Sergei (Fermilab) ; GATTO, Corrado (INFN) ; MAZZACANE, Anna (Fermilab) ; DI BENEDETTO, Vito (INFN)

Presenter : Dr. TERENTIEV, Nikolai (CMU)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : MOKHOV, Nikolai

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

This talk is also related to the Machine Detector Interface
and Beam Instrumentation track.

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:54
Comments : "short talk"

Abstract ID : 410

A Demonstration of Light guides for Light Detection in Liquid Argon TPCs

Content :

Liquid Argon (LAr) Time Projection Chambers (TPCs) are a developing technology that are becoming a popular choice for neutrino and dark matter experiments due to the low cost of the LAr as a target material and the high signal efficiency and background rejection that these detectors can achieve. When excited by a passing charged particle created in a neutrino interaction, argon produces scintillation light at 128nm. There are currently several types of systems in place for detecting this light. Most involve shifting the light using tetraphenyl butadiene (TPB), resulting in visible light which is detected by a PMT.

I will discuss our work on a new system under development for light detection in LAr which uses acrylic lightguides. The lightguides are coated with a thin film consisting of TPB embedded in polystyrene. This system could provide a solution to some of the issues we face in scaling existing systems for a larger future LAr detector. Though we are only in the preliminary stages of this R, we have shown that the results are already sufficient for triggering.

Primary authors : Ms. IGNARRA, Christina (MIT)

Co-authors : Mr. BUGEL, Leonard (MIT) ; Prof. CONRAD, Janet (MIT) ; Mr. JONES, Benjamin (MIT) ; Dr. KATORI, Teppei (MIT) ; Ms. SMIDT, Tess (MIT) ; Dr. TANAKA, Hide (BNL)

Presenter : Ms. IGNARRA, Christina (MIT)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : IGNARRA, Christina

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:39
Comments : ""

Abstract ID : 411

Development of imaging MCP detector readout electronics, using the NINO and HPTDC ASICs

Content :

The requirements of high energy, high luminosity particle accelerators, particularly the Large Hadron Collider at CERN, has driven the development of a range of Application Specific Integrated Circuits (ASICs) able to cope with extremely high event rates and data throughput, while maintaining picosecond timing resolution in the region of 10-100 ps incorporated in a high channel density design. The University of Leicester and Photek Ltd. have been collaborating on using two of these CERN developed ASICs, the NINO amplifier/discriminator and High Performance Time to Digital Convertor (HPTDC), for readout of multi-channel and imaging MCP detectors, taking advantage of the ~25 ps resolution of these ASICS combined.

These ASICs are being used for the development of three different microchannel plate (MCP) based imaging detectors. The HiContent and IR-PICS tubes are multiple-anode detectors, with 8x8 pixels^2 and 32x32 pixels^2 respectively, with integrated readout electronics based on the HPTDC and NINO combination. The Capacitive Division Image Readout (C-DIR) detector adopts a charge sharing technique to achieve a moderate position resolution of the order of 100x100 pixels^2 with a time resolution of ~25 ps, and a maximum rate of 10MHz limited by MCP count rate saturation. Measurements of the detector's performance will be presented, with a discussion of our experience utilising ASICs designed for high energy physics for alternative applications.

Primary authors : Mr. CONNEELY, Thomas (University of Leicester) ; Dr. LAPINGTON, Jon (University of Leicester)

Co-authors : Dr. MILNES, James (Photek LTD)

Presenter : Mr. CONNEELY, Thomas (University of Leicester)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : CONNEELY, Thomas

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 29 April 2011 16:45
Comments : ""

Abstract ID : 412

Membrane cryostat technology and prototyping program towards kton scale Neutrino detectors

Content :

Membrane cryostat technology is commonly used for Liquified Natural Gas (LNG) ships and storage vessels. It it a robust, economical design with a proven service record. The Long Baseline Neutrino Experiment is proposing to use a membrane cryostat design for two 20 kton liquid argon (LAr) time projection chamber (TPC) neutrino detectors. The membrane technology and prototyping program will be described.

Primary authors : Mr. RUCINSKI, Russell (Fermilab)

Co-authors : Mr. BALLER, Bruce (Fermilab) ; Mrs. FLEMING, Bonnie (Fermilab)

Presenter : Mr. RUCINSKI, Russell (Fermilab)

Track classification : Detectors for neutrino physics

Contribution type : --not specified--

Submitted by : RUCINSKI, Russell

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:40
Comments : ""

Abstract ID : 413

Development and Characterization of the Acrylic Target Vessels for the Daya Bay $\overline{\nu}_e$ Detectors

Content :

The Daya Bay Reactor Neutrino Experiment is being built to precisely measure the value of the neutrino mixing parameter $sin^2(2\theta_{13})$ to a sensitivity of 0.01 by comparing the relative flux of antineutrinos from reactor cores with antineutrino detectors at near and far distances. In an effort to control detector systematics to $<$0.4\%, detectors were designed to be as identical as possible. Extensive quality assurance measurements and simulation studies have been carried out to determine the expected level of similarity in physics response between detectors. We will discuss the design, fabrication, transportation, assembly, and quality assurance measurements for the detectors' acrylic target vessels, which contain the scintillating target region of the detector while maintaining optical clarity, mechanical stability, and low radioactivity. Mechanical, optical, radioactivity, compatibility and temperature- and UV-stability measurements carried out on the UVT acrylics, which are utilized in many past, current, and future neutrino and dark matter experiments, will also be recounted.

Primary authors : Mr. LITTLEJOHN, Bryce (University of Wisconsin - Madison)

Co-authors :

Presenter : Mr. LITTLEJOHN, Bryce (University of Wisconsin - Madison)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : LITTLEJOHN, Bryce

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

This talk is about R on the Daya Bay acrylic vessels, and R on acrylic, which is also relevant to dark matter detector instrumentation.

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:40
Comments : "We propose this as a poster."

Abstract ID : 414

Development of Wireless Data and Power Transfer Techniques for Large Instrumentation Systems

Content :

In several areas of scientific research the size and complexity of the detectors have become exceedingly large. For example, detectors in Nuclear and Elementary Particle Physics have dimensions of order 10-100 meters and contain thousands to millions of readout channels. One of the most significant challenges in building large detector systems is the cabling infrastructure for data communication and electrical power. In some cases, the electronics are in a remote location or an environment that makes it difficult or impossible to use copper-based infrastructure. Wireless techniques have the potential to alleviate these problems. With the development of low-power mobile devices with integrated wireless technologies and new energy storage and conversion technologies, the wireless state-of-the-art is now viable for large instrumentation systems. The data throughput necessary for individual or small numbers of channels is already readily achievable with commercial hardware. The challenge for large instrumentation systems is transferring data from thousands or millions of readout channels over a limited frequency spectrum.
The goal of this project is to develop a photomultiplier tube (PMT) based detector that transfers data wirelessly and ultimately is powered wirelessly, including the high voltage necessary for the PMT. Phase one of this project is the development of a low power dead-timeless front-end data acquisition system using standard 802.11n wireless and Ethernet technology for data transfer. Phase 2 of the project, presumably the greatest challenge, is the development of wireless power transfer sufficient to power the front-end electronics and Cockroft-Walton high voltage power supply. The beneficiaries and customers of this project are scientific communities, including high energy physics, homeland security, and others who use detection devices in remote areas without Lab infrastructure. Details on project goals, progress, and performance of the prototype system under development will be shown.

Primary authors : Dr. DJURCIC, Zelimir (Argonne National Laboratory)

Co-authors : Dr. D'AGOSTINO, Michelangelo (Argonne National Laboratory) ; Mr. DRAKE, Gary (Argonne National Laboratory) ; Mr. DE LURGIO, Patrick (Argonne National Laboratory)

Presenter : Dr. DJURCIC, Zelimir (Argonne National Laboratory) ; Dr. D'AGOSTINO, Michelangelo (Argonne National Labora

Track classification : Trigger and Data Acquisition Systems

Contribution type : Poster Presentation

Submitted by :

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

The material could be tracked into the following categories as well:
Detectors for neutrino physics,
Experimental Detector Systems,

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 22 April 2011 20:57
Comments : ""

Abstract ID : 416

Search for tau-neutrino interactions in the OPERA hybrid detector

Content :

The OPERA neutrino detector in the underground Gran Sasso Laboratory is designed to detect muon-neutrino to tau-neutrino oscillations in direct appearance mode. The hybrid apparatus, consisting of an emulsion/lead target complemented by electronic detectors, is placed in the long-baseline CERN to Gran Sasso neutrino beam (CNGS), 730 km away from the muon-neutrino source, and is taking data since 2008.
The experimental setup and associated facilities used to extract data recorded in the emulsion are described, together with the special procedures developed to locate precisely the interactions and detect short decay topologies. Progress in assessing efficiencies and background will be discussed with the presentation of first results.

Primary authors : PESSARD, Henri (LAPP-IN2P3-CNRS)

Co-authors :

Presenter : PESSARD, Henri (LAPP-IN2P3-CNRS)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : PESSARD, Henri

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

This abstract is submitted by the OPERA Speakers Bureau. The actual presenter of the OPERA talk will be specified in the following days.

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:41
Comments : ""

Abstract ID : 417

Performance Characteristics of Gieger Photodiodes for the Next Generation of CMOS Solid-State Photomultipliers

Content :

Due to high magnetic fields and high radiation fields, many high-energy physics experiments replace photomultiplier tubes with solid-state photomultipliers (SSPM) coupled to scintillation detectors. Existing SSPMs use a large feature size CMOS process to maximum the silicon die area for the lowest-cost solution. The structures available in a specific commercial CMOS process defines, and may limit, the optimum performance characteristics of SSPM devices fabricated with the process. As new goals for future high-energy physics experiments, such as those at the Large Hadron Collider (LHC), require improved nuclear detection capabilities, a high-performance SSPM detector technology with improved optical and noise characteristics, timing, dynamic range, and radiation hardness will be developed.

As the SSPM is fabricated from an array of Geiger photodiodes (GPD), the initial design of a next generation of SSPMs consists of improving the GPD element. We have designed, fabricated and evaluated a number of prototype Geiger photodiodes in a small feature size CMOS technology. Some of these devices show a significant improvement in detection efficiency and dark current when compared to existing technology. We see overall improvement in quantum efficiency and enhancement in light detection below 400 nm. The diodes also show an improvement in the dark count rate with values measured on the order of Hz for a 30 μm × 30 μm device, when compared to kHz for previous devices of similar sizes. The signal-to-noise ratio has improved by at least a factor of ten in comparison to the previous Geiger photodiodes. These results will be presented along with measurements and a model that quantifies the expected device performance for a potential SSPM, which will include estimates of after pulsing, cross talk, dark count rate, and detection efficiency.

Primary authors : Dr. JOHNSON, Erik B (Radiation Monitoring Devices)

Co-authors : Dr. CHEN, Xiao Jie (Radiation Monitoring Devices) ; Dr. STAPELS, Christopher (Radiation Monitoring Devices) ; Dr. WHITNEY, Chad (Radiation Monitoring Devices) ; Mr. RINES, Rich (Radiation Monitoring Devices) ; Dr. CHRISTIAN, James (Radiation Monitoring Devices)

Presenter : Dr. JOHNSON, Erik B (Radiation Monitoring Devices)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : JOHNSON, Erik

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Poster Presentation)

Judged by : AMERIO, Silvia
Date : 29 April 2011 16:46
Comments : ""

Abstract ID : 418

Instrument Development for Liquid Xenon Dark Matter Searches: An Atom Trap Trace Analysis System to Measure Ultra-low Krypton Contamination in Xenon

Content :

The XENON dark matter experiments search for low-energy elastic scatters of Weakly Interacting Massive Particles off of Xe nuclei. For Xe targets and other noble liquids used in rare process searches, Kr contamination contributes background events through the beta decay of long-lived radioactive ^{85}Kr. To achieve the sensitivity required of the next generation of dark matter detectors, the Kr contamination must be reduced to the part per trillion (ppt) level. We have developed and are currently testing a device to count single Kr atoms using the Atom Trap Trace Analysis (ATTA) method. Measurements of Kr in Xe at the ppt level are made possible by cooling and trapping metastable Kr with magneto-optical techniques, and detecting their laser fluorescence with a sensitive photodetector. Since Ar and Kr have similar wavelengths, the cold-atom apparatus has been initially tested with Ar to avoid contamination. Results from tests with Ar will be presented.

Primary authors : APRILE, Elena (Columbia University) ; ALLRED, Claire (Columbia University) ; GOETZKE, Luke (Columbia University) ; YOON, Tae-hyun (Columbia University) ; ZELEVINSKY, Tanya (Columbia University)

Co-authors :

Presenter : GOETZKE, Luke (Columbia University)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : GOETZKE, Luke

Submitted on Friday 15 April 2011

Last modified on : Friday 15 April 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Dark Matter Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 419

Upgrade Plans for VERITAS

Content :

The VERITAS array, consisting of four 12m diameter Cherenkov telescopes, has been observing the Northern sky in VHE gamma-rays (E>100 GeV) for four years with high sensitivity (1% Crab Nebula flux in ~25 hours), and excellent energy and angular resolution. Exciting new results on a variety of VHE gamma-ray sources, both galactic and extra-galactic, have been obtained. Technical developments and Monte Carlo simulation results suggest that substantial further improvements to the array performance are possible. Here we present details of the planned update of the VERITAS focal plane instrumentation and trigger electronics.

Primary authors : Dr. ZITZER, Ben (Argonne National Laboratory)

Co-authors :

Presenter : Dr. ZITZER, Ben (Argonne National Laboratory)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : DEMARTEAU, Marcel

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:46
Comments : ""

Abstract ID : 420

Accelerator Backgrounds in a Muon Collider

Content :

Muon colliders are considered to be an important future energy frontier accelerator. It is possible to build a large muon collider as a circular machine, even at multi-TeV energies, due to the greatly reduced synchrotron radiation expected from muons. In addition to the same physics processes present in an electron collider, a muon collider will have the potential to produce s-channel resonances such as the various Higgs states at an enhanced rate. For a muon collider with 750 GeV/c μ+μ− with 2×1012 μ per bunch we would expect 8.6×105 muon decays per meter for the two beams. The energetic electrons from muon decays will produce detector backgrounds that can affect the physics. These backgrounds include electrons from muon decays, synchrotron radiation from the decay electrons, hadrons produced by photo-nuclear interactions, coherent and incoherent beam-beam pair production and Bethe-Heitler muon production. In this paper we will discuss these processes and calculate particle fluxes into the detector volume from these background processes.

Primary authors : Dr. KAHN, Stephen (Muons, Inc.)

Co-authors : CUMMINGS, Mary Anne (Muons, Inc.)

Presenter : Dr. KAHN, Stephen (Muons, Inc.)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Poster Presentation

Submitted by : CUMMINGS, Mary Anne

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Would be willing to give an oral presentation...

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:36
Comments : "changed to oral presentation style"

Abstract ID : 421

Bump bonding development for a Si-W calorimeter

Content :

The SiD collaboration is developing a Si-W electromagnetic calorimeter for the ILC. This will be a highly segmented sampling calorimeter composed of tungsten absorber and silicon readout layers. The readout gap will have a thickness of <1 mm, which poses challenges for instrumenting the silicon wafers. Progress on various bump bonding techniques and flex cable fabrication will be presented.

Primary authors : Prof. TRIPATHI, Mani (University of California (UCD))

Co-authors :

Presenter : Prof. TRIPATHI, Mani (University of California (UCD))

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : Prof. TRIPATHI, Mani

Submitted on Friday 15 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 10:09
Comments : ""

Abstract ID : 422

Designs of Large Liquid Argon TPCs --- from MicroBooNE to LBNE LAr40

Content :

Liquid argon time projection chamber (LArTPC) is a unique technology well suited for large scale detectors of neutrinos and other rare processes. Its combination of millimeter scale 3D precision particle tracking and calorimetry with good dE/dx resolution provide excellent efficiency of particle identification and background rejection.

MicroBooNE is a LArTPC about to enter its final design phase and is scheduled for construction next year. Its active volume contains 86 ton of LAr. It has a 2.6m drift distance, 8256 sense wires on 3 planes connected to cold CMOS front-end electronics. Most of the TPC design features improve upon existing tried and true techniques.

The LAr40 is one of the two far detector options under consideration for the Long Baseline Neutrino Experiment (LBNE). Its conceptual design has 40 kton active liquid argon mass, to be installed underground at a moderate depth. Due to its large scale, and underground siting, great emphasis was placed on the detector cost and reliability. The LAr40 consists of two 20 kton detectors in one underground cavern. A modular TPC design within a single cryostat is the key to achieve these goals. Each detector is constructed from an array of TPC sense wire and electronics modules reading out 120 ton active mass each. Cold electronics with multiplexed readout is integrated with each sense wire module. Innovative concepts enable the modules to be tiled with minimal dead space.

An overview of both detectors will be presented. Key features of both TPC designs will be described in detail.

Primary authors : Dr. YU, Bo (Brookhaven National Laboratory)

Co-authors :

Presenter : Dr. YU, Bo (Brookhaven National Laboratory)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : YU, Bo

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:41
Comments : ""

Abstract ID : 423

Large area transmission mode NEA GaAs photocathodes for sub-400nm wavelength operation

Content :

GaAs has long been used as a photocathode material for its good quantum efficiency in the near infrared (IR) spectral range. Its narrow band gap, the direct transition, the availability of high quality substrates and growth methods has made GaAs cathodes the golden standard in night-vision applications and other important IR-detection systems.
We focus our interest to tune the wavelength response of this classical IR-cathode to the optical and UV range, especially the wavelength range around 400nm. The specifics of GaAs band structure result in strong optical absorption in the frequency range of interest. Nevertheless, standard GaAs photocathodes perform poorly in the sub-400nm wavelength range. These limitations can be overcome by a two-step approach: 1.) Creating a photocathode thin enough for photo-generated carriers to be emitted before recombination and 2.) Implementing a tiered doping profile to create a strong built-in field to guide carriers to the surface.
We will present our program which is based on the rational design of the device structure, state-of-the-art growth techniques, and the corresponding materials-, especially surface-science program which allows cross correlation between functionality and microscopic structure. The talk will address the specific problems correlated with the transfer and bonding of ultra-thin GaAs layers onto glass substrates and the optimization of the negative electron affinity of the cathode ,e.g. the surface modifications including the activation process.

Primary authors : Mr. DOWDY, Ryan (UIUC)

Co-authors : Dr. ATTENKOFER, Klaus (ANL) ; Dr. LEE, Seon Woo (ANL)

Presenter : Mr. DOWDY, Ryan (UIUC)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : DOWDY, Ryan

Submitted on Friday 15 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 10:10
Comments : ""

Abstract ID : 424

Station electronics for the Askaryan Radio Array testbed and first prototype

Content :

The Askaryan Radio Array (ARA) is an ultrahigh energy radio neutrino detector currently in the prototype and development phase. A testbed to examine the RF environment was deployed in the 2010-2011 polar season and is currently operating. A prototype ARA station is due to be deployed in 2011-2012. The testbed consisted of custom digitization and triggering for 8 antennas, digitized at 1 and 2 GSa/s, along with a commercial off-the-shelf single-board computer. The prototype ARA station, with 16 wider spaced antennas, presents additional challenges, with digitization at 3.2 GSa/s, and requiring an analog buffer of approximately 10 microseconds. The design and performance of the testbed, as well as the design of the prototype station, will be presented.

Primary authors : Dr. ALLISON, Patrick (Ohio State University)

Co-authors :

Presenter : Dr. ALLISON, Patrick (Ohio State University)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : ALLISON, Patrick

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

For the ARA Collaboration.

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)

Judged by : CATTAI, Ariella

Date : 21 April 2011 22:55

Comments : "Review talk on neutrino session - still wait the opinion of the Neutrino Conveners"

Abstract ID : 425

Measurement of the longitudinal coordinate in Mu2e straws using time division

Content :

Straw tracking chambers are capable of producing very good momentum resolution. Proposed Mu2e experiment at Fermilab will use a straw tracker to measure electrons with a momentum around 100 MeV. In this project, we find the electron's position along the length of a straw by time division using one preamplifier on each end of the straw. High gain ultra low noise RF transistors are used in the preamplifier. The Straw that is used for this analysis has 5 mm diameter and is filled with gaseous mixture of 80% Argon and 20% Carbon Dioxide at 1 atm pressure. To estimate the position resolution along the straw, we use X-rays from Fe-55 source and then cosmic ray muons. The resolution of about 5 cm is expected.

Primary authors : JOGLEKAR, Aniket (University of Chicago)

Co-authors : RUSU, Vadim (Fermilab) ; MUKHERJEE, Aseet (Fermilab) ; Prof. KIM, Young-kee (Fermilab, University of Chicago)

Presenter : JOGLEKAR, Aniket (University of Chicago)

Track classification : Gaseous Detectors

Contribution type : Poster Presentation

Submitted by : JOGLEKAR, Aniket

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : KOBAYASHI, Makoto
Date : 27 April 2011 12:49
Comments : ""

Abstract ID : 426

Gravitational Wave Detection: Past, Present and Future

Content :

The direct detection of gravitaitonal waves (GWs) offers a revolutionary new probe of the most energetic processes in the universe and precision tests of fundamental theories of gravity. Through their detailed waveforms, GWs carry information about their parent neutron stars, supernovae and black holes, opening a window to the unexplored strong-field, strong-curvature regime of general relativity.

Several techniques and collaborations are vying to make the first direct detection within the next 5 to 10 years. In this talk, I will describe: 1. the first-generation, kilometer scale LIGO and Virgo interferometers that have demonstrated the sub-attometer displacement sensitivity (< 10^{-18} m/ Hz^{1/2}) and continuous operation (> 75\% duty factor) needed to detect GWs from beyond the Virgo cluster; 2. the Pulsar timing arrays that have demonstrated the sub-microsecond timing residuals and multi-year observations needed to detect a passing GW's effect; and 3. the detection of the of a GW's imprint on the polarization of the cosmic microwave background.

Primary authors : WALDMAN, Sam (LIGO MIT)

Co-authors :

Presenter : WALDMAN, Sam (LIGO MIT)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : WALDMAN, Sam

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:48
Comments : "Note that this is a plenary talk."

Abstract ID : 427

A new generation of RPCs to be used as muon trigger detectors at the super- LHC

Content :

Very large systems of RPCs with 2 mm gas gap are presently working at LHC as muon trigger detectors. In order to conceive a new generation of RPCs, fully adequate to the needs of the high luminosity super-colliders of the next future, two aspects have to be reconsidered: the gap width which determines the amount of charge delivered in the gas per detected avalanche and the front end electronics which determines the minimum charge that can be discriminated from the noise. Both aspects have a crucial effect on the rate capability. Moreover the gap width has also a strong effect on the time resolution.
We present here the results of a cosmic ray test carried out on small size RPCs of gap width 2.0, 1.0 and 0.5 mm respectively. The wave forms of both the prompt signal due to the fast drifting electrons and the signal generated in the HV circuit, which is dominated by the slow ion drift, are recorded for each detected cosmic muon. The analysis of these signals is crucial to understand the RPC working features.
We present also the results of a test carried out on a 2 mm gap RPC equipped with a new, high sensitivity and low noise front end electronics, irradiated with an intense gamma ray source of 137Cs, working at a rate of 7 kHz/cm2.

Primary authors : Prof. SANTONICO, Rinaldo (INFN and University of Roma "Tor Vergata") ; Dr. AIELLI, Giulio (INFN and University of Roma "Tor Vergata") ; Dr. CARDARELLI, Roberto (INFN Roma "Tor Vergata") ; Dr. LIBERTI, Barbara (INFN Roma "Tor Vergata")

Co-authors :

Presenter : Prof. SANTONICO, Rinaldo (INFN and University of Roma "Tor Vergata")

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : AIELLI, Giulio

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 27 April 2011 12:49
Comments : ""

Abstract ID : 428

A high-resolution PET demonstrator using a silicon "magnifying glass"

Content :

To assist our ongoing investigations of the limits of the tradeoff between spatial resolution and noise in PET imaging, several PET instruments based on silicon-pad detectors have been developed. The latest is a segment of a dual-ring device to demonstrate that excellent reconstructed image resolution can be achieved with a scanner that uses high-resolution detectors placed close to the object of interest or surrounding a small field-of-view in combination with detectors having modest resolution at larger radius. The outer ring of our demonstrator comprises conventional BGO block detectors scavenged from a clinical PET scanner and located at a 500mm radius around a 44mm diameter field-of-view. The inner detector—in contrast to the high-Z scintillator typically used in PET—is based on silicon-pad detectors located at 70mm nominal radius. Each silicon detector has 512 1.4mm x 1.4mm x 1mm detector elements in a 16 x 32 array and is read out using VATA GP7 ASICs (Gamma Medica-Ideas, Northridge, CA). Even though virtually all interactions of 511 keV annihilation photons in silicon are Compton-scatter, both high spatial resolution and reasonable sensitivity appears possible. The system has demonstrated resolution of ~0.7mm FWHM with Na-22 for coincidences having the highest intrinsic resolution (silicon-silicon) and 6–7mm FWHM for the lowest resolution BGO-BGO coincidences. Spatial resolution for images reconstructed from the mixed silicon-BGO coincidences is ~1.5mm FWHM demonstrating the "magnifying-glass" concept. In the next months, the system will be upgraded to silicon detectors having 1mm x 1mm pads.

Primary authors : CLINTHORNE, Neal (University of Michigan)

Co-authors : COCHRAN, Eric (Ohio State University) ; CHESI, Enrico (CERN) ; GROSICAR, Borut (Jozef Stefan Institute) ; HONSCHEID, Klaus (Ohio State University) ; HUH, Sam (University of Michigan) ; KAGAN, Harris (Ohio State University) ; LACASTA, Carlos (IFIC/CSIC University of Valencia) ; BRZEZINSKI, Karol (IFIC/CSIC University of Valencia) ; LINHART, Vladimir (IFIC/CSIC University of Valencia) ; MIKUZ, Marko (Jozef Stefan Institute) ; SMITH, D Shane (Ohio State University) ; STANKOVA, Vera (IFIC/CSIC University of Valencia) ; STUDEN, Andrej (Jozef Stefan Institute) ; WEILHAMMER, Peter (CERN) ; ZONTAR, Dejan (Jozef Stefan Institute)

Presenter : CLINTHORNE, Neal (University of Michigan)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : --not specified--

Submitted by : , Neal

Submitted on Friday 15 April 2011

Last modified on : Monday 25 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)

Judged by : CHEN, Chin-Tu

Date : 25 April 2011 18:02
Comments : ""

Abstract ID : 429

Cryogenic Loss Monitors with FPGA TDC Signal Processing

Content :

Radiation hard helium gas ionization chambers capable of operating in vacuum at temperatures ranging from 5K to 350K are designed, fabricated and tested and will be used inside the cryostats at Fermilab's Superconducting Radiofrequency beam test facility. The chamber vessel is made of stainless steel and all materials used including seals are known to be radiation hard and suitable for operation at 5K. The chamber is designed to measure radiation up to 30 k(Rad/hr) with sensitivity of approximately 1.9 pA/(Rad/hr). The current is measured with a recycling integrator current-to-frequency converter to achieve a required measurement capability for low current and a wide dynamic range. A novel scheme of using an FPGA-based time-to-digital converter (TDC) to measure time intervals between pulses output from the recycling integrator is employed to ensure a fast beam loss response along with a current measurement resolution better than 10-bit. This paper will describe the results at low temperature and highlight the processing techniques used.

Primary authors : WARNER, Arden (Fermi Naional Accelerator Laboratory)

Co-authors : WU, Jin-yuan (Fermi Naional Accelerator Laboratory)

Presenter : WARNER, Arden (Fermi Naional Accelerator Laboratory)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : WENDT, Manfred

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:36
Comments : ""

Abstract ID : 430

Application of Time Projection Chambers with GEMs and Pixels to WIMP Searches and Fast Neutron Detection

Content :

We present work on the detection of neutral particles via nuclear recoils in gas-filled Time Projection Chambers (TPCs). We employ Gas Electron Multipliers (GEMs) to amplify the signal and silicon pixel electronics to read out the projected track. These technologies allow ionization in the target gas to be detected with low noise, improved position and time resolution, and high efficiency. We review experimental results obtained in previous years, and report on ongoing simulation studies and construction of the first prototype at the University of Hawaii. We also present prospects of using such detectors to perform direction-sensitive searches for WIMP dark matter and fast neutron from fissionable material.

Primary authors : Mr. FENG, Haolu (University of Hawaii at Manoa, Department of Physics) ; Dr. GARCIA-SCIVERES, Maurice (Lawrence Berkeley National Lab) ; Dr. JAEGLE, Igal (University of Hawaii at Manoa, Department of Physics) ; Dr. KADYK, John (Lawrence Berkeley National Lab) ; Mr. NGUYEN, Young (Lawrence Berkeley National Lab) ; Mr. ROSEN, Marc (University of Hawaii at Manoa, Department of Physics) ; Mr. ROSS, Steven (University of Hawaii at Manoa, Department of Physics) ; Mr. THORPE, Thomas (University of Hawaii at Manoa, Department of Physics) ; Dr. VAHSEN, Sven (University of Hawaii at Manoa, Department of Physics) ; Dr. YAMAOKA, Jared (University of Hawaii at Manoa, Department of Physics)

Co-authors :

Presenter : Dr. YAMAOKA, Jared (University of Hawaii at Manoa, Department of Physics)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : YAMAOKA, Jared

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 27 April 2011 12:50
Comments : ""

Abstract ID : 431

Construction and commissioning of a 40m long Fabry–Pérot cavity at Fermilab: toward exploring Planck scale space-time phenomena

Content :

Macroscopic effects of space-time quantization due to the holographic principle will soon be tested at Fermilab, by cross-correlating the signals from two neighboring power-recycled Michelson interferometers. The diffractive nature of the predicted holographic position noise allows it to be amplified to a detectable level using 40m interferometer arms, in which the beams are recycled using cavity mirrors. The resulting high laser power buildup enables precision measurements of phase, and hence position. We present here studies of the initial 40m cavity that has been built, including Pound-Drever-Hall locking of the laser frequency to the cavity, and alignment control systems.

Primary authors : LANZA, Robert (University of Chicago & Fermilab)

Co-authors :

Presenter : LANZA, Robert (University of Chicago & Fermilab)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Poster Presentation

Submitted by : LANZA, Robert

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:48
Comments : ""

Abstract ID : 432

Acquisition system and detector interface for power pulsed detectors

Content :

A common DAQ system is being developed within the CALICE collaboration. It provides a flexible and scalable architecture based on giga-ethernet and 8b/10b serial links in order to transmit either slow control data, fast signals or read out data. A detector interface (DIF) is used to connect detectors to the DAQ system based on a single firmware shared among the collaboration but targeted on various physical implementations. The DIF allows to build, store and queue packets of data as well as to control the detectors providing USB and serial link connectivity. The overall architecture is foreseen to manage several hundreds of thousands channels.

Primary authors : JEANS, Daniel (Ecole Polytechnique) ; CORNAT, Rémi (LLR - École polytechnique)

Co-authors :

Presenter : CORNAT, Rémi (LLR - École polytechnique)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : JEANS, Daniel

Submitted on Friday 15 April 2011

Last modified on : Monday 09 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 09 May 2011 13:54
Comments : ""

Abstract ID : 433

Scintillator-based muon detector/tail catcher with SiPM readout

Content :

Extruded scintillator with wavelength shifting (wls) fiber for light collection and silicon avalanche photo-detection (SiPMs), followed by modest amplification remains an attractive candidate for large area counters such as are required for muon detectors/tail catchers for collider detectors. We report on R for the optimization of such detectors which has included the development of ad hoc SiPMs and frontend electronics with 12 bit waveform digitization at 100 − 200 MHz. Bias voltage is generated locally and provision is made for on board data storage and fast transfer to a local PC for immediate analysis. In addition to describing the data collection and counter assembly we will present representative data results from tests performed at the Fermilab Test Beam Facility.

Primary authors : FISK, H.e. (Fermilab) ; Prof. PAULETTA, G. (University of Udine) ; Dr. RUBINOV, P.m. (Fermilab)

Co-authors : PARA, A. (Fermilab) ; RAMBERG, E. (Fermilab) ; Dr. SOHA, A. (Fermilab) ; FITZPATRICK, T. (Fermilab) ; Dr. BONVICINI, W. (INFN Trieste) ; Dr. CAUZ, D. (University of Udine) ; Dr. IORI, M. (Universiy of RomaI) ; Prof. WAYNE, M. (University of Notre Dame) ; Dr. MCKENNA, M. (University of Notre Dame) ; Dr. COLE, S. (Northern Illinois University) ; Dr. VITI, Ivan (Northern Illinois University) ; Prof. SANTI, L. (University of Udine)

Presenter : Prof. PAULETTA, G. (University of Udine)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : PAULETTA, Giovanni

Submitted on Friday 15 April 2011

Last modified on : Wednesday 20 April 2011

Comments :

Please schedule before June 12th if possible

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 20 April 2011 17:59
Comments : "New development"

Abstract ID : 434

Longterm Operational Experience with the Silicon Micro-strip Tracker at the D0 detector

Content :

The Silicon Microstrip Tracker (SMT) at the D0 experiment in the Fermilab Tevatron collider has been operating since 2001. In 2006, an
additional layer, referred to as 'Layer 0', was installed to improve
impact parameter resolution and compensate for detector degradation
due to radiation damage to the original innermost SMT layer. The SMT detector provides valuable tracking and vertexing information for the
experiment.
This talk will highlight aspects of the long term operation of the SMT, including the impact of the silicon readout test stand. Due to the full integration of the test stand into the D0 trigger framework, this test stand provides a valuable tool for training new experts and
studying subtle effects in the SMT while minimizing impact on the
global data acquisition.

Primary authors : Dr. JUNG, Andreas Werner (Fermilab)

Co-authors :

Presenter : Dr. JUNG, Andreas Werner (Fermilab)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : Dr. JUNG, Andreas Werner

Submitted on Friday 15 April 2011

Last modified on : Tuesday 03 May 2011

Comments :
The talk is on behalf of the D0 SMT group.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 10:13
Comments : ""

Abstract ID : 435

Longterm Operational Experience with the Silicon Micro-strip Tracker at the D0 detector

Content :

The Silicon Microstrip Tracker (SMT) at the D0 experiment in the Fermilab Tevatron collider has been operating since 2001. In 2006, an
additional layer, referred to as 'Layer 0', was installed to improve
impact parameter resolution and compensate for detector degradation
due to radiation damage to the original innermost SMT layer. The SMT detector provides valuable tracking and vertexing information for the
experiment.
This talk will highlight aspects of the long term operation of the SMT, including the impact of the silicon readout test stand. Due to the full integration of the test stand into the D0 trigger framework, this test stand provides a valuable tool for training new experts and
studying subtle effects in the SMT while minimizing impact on the
global data acquisition.

Primary authors : Dr. JUNG, Andreas Werner (Fermilab)

Co-authors :

Presenter : Dr. JUNG, Andreas Werner (Fermilab)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : Dr. JUNG, Andreas Werner

Submitted on Friday 15 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

The talk is on behalf of the D0 SMT group.

Status : DUPLICATED (434 : Longterm Operational Experience with the Silicon Micro-strip Tracker at the D0 detector)

Track judgments :

Track : Semiconductor Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 436

Recent progress of the ATLAS Planar Pixel Sensor R Project

Content :

To extend the physics reach of the LHC, upgrades to the accelerator are planned which will allow to boost the integrated luminosity delivered to the experiments from about 700/fb to 3000/fb. To achieve this, the peak luminosity will have to rise by a factor 5 to 10 which leads to increased occupancy and radiation damage of the tracking detectors.

To cope with the elevated occupancy, the ATLAS experiment plans introduce an all-silicon inner tracker with the HL-LHC upgrade in 2021. With silicon sensors, the occupancy can be adjusted by using the appropriate unit size (pixel, strip or short strip sensors). To minimize adverse effects of radiation damage, only electron-collecting sensor designs are considered (n-in-p and n-in-n) as they are less prone to trapping.

To investigate the suitability of pixel sensors using the proven planar technology for the upgraded tracker, the ATLAS Planar Pixel Sensor R Project was established comprising 17 institutes and more than 80 scientists. Main areas of research are the performance of planar pixel sensors at highest fluences, the exploration of possibilities for cost reduction to enable the instrumentation of large areas, the achievement of slim or active edges to provide low geometric inefficiencies without the need for shingling of modules and the investigation of the operation of highly irradiated sensors at low thresholds to increase the efficiency.

The presentation will give an overview of the recent accomplishments of the R project. Among these are testbeam results obtained with n-in-n pixel sensors irradiated up to $2\ 10^{16}\ n_{eq}\ cm^{-2}$, investigations of the edge efficiency of slim-edge designs exhibiting a reduction of the inactive zone from 1100 um to only 250 um, and comparisons of these experimental findings with TCAD simulations taking into account the radiation damage. In addition, updates will be given on the status of several efforts towards fully active edges with planar technology and on a n-in-n sensor production with thicknesses varying from 150 um to 250 um.

Primary authors : MUENSTERMANN, Daniel (CERN/PH-ADE-ID)

Co-authors :

Presenter : MUENSTERMANN, Daniel (CERN/PH-ADE-ID)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : MUENSTERMANN, Daniel

Submitted on Friday 15 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

This presentation will be given on behalf of the ATLAS Planar Pixel Sensor R Collaboration and will contain results from several of the member institutes.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 07:54
Comments : ""

Abstract ID : 437

Superconducting Detectors and Multiplexed SQUID Readout Systems for CMB Polarimetry

Content :

We are building large arrays of feedhorn-coupled superconducting transition-edge sensor (TES) polarimeters to measure the polarization of the cosmic microwave background (CMB) radiation. These polarimeters will be deployed on three experiments in the coming year: the Atacama B-mode Search, the South Pole Telescope Polarimeter, and the Atacama Cosmology Telescope Polarimeter. The science goals of these instruments include probing the energy scale of inflation by searching for the signature of inflationary gravity waves and constraining the sum of the neutrino masses.

TES detectors are most sensitive when voltage biased at sub-Kelvin temperatures, which necessitates minimizing the number of wires connected to the cold stage. These constraints have driven the development of multiplexed superconducting quantum interference device (SQUID) readout technologies. Two SQUID multiplexing techniques (time-division and MHz frequency-division multiplexing) have recently been used for astrophysical observations, and two more techniques are under development (GHz frequency-division and code-division multiplexing).

I will describe the arrays of TES polarimeters we are building for upcoming measurements of the CMB polarization, then will review the four SQUID multiplexing techniques and some of the non-astrophysical applications our group works on, including x-ray, gamma-ray, and alpha particle detection.

Primary authors : Dr. NIEMACK, Michael (National Institute of Standards and Technology)

Co-authors :

Presenter : Dr. NIEMACK, Michael (National Institute of Standards and Technology)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : NIEMACK, Michael

Submitted on Friday 15 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:49
Comments : ""

Abstract ID : 438

Theory and Applications of Transmission Mode Metal (Aluminum) Photocathode

Content :

Although metal photocathodes show very low quantum efficiency (< 10-4), they are often used in applications which require a robust, easy-to-handle, but well characterized electron source. External and easy producibility, stability in air, and their process compatibility (high temperature tolerance) make metal cathodes indispensible for many tasks. Injector guns for accelerators, test cathodes for multi-channel plates or MEMS electronics applications are only a few prominent examples. Additionally, metal cathodes show an ultrafast response in the femto-second range making this class worthwhile to study in detail. In contrast to most previous work we are focusing on transmission mode cathodes, especially aluminum ones.
We have derived a quantitative model of the quantum efficiency for transmission mode metal cathodes which permits to optimize the geometry of these cathodes. The model includes reflectance, absorbance, optical penetration depth and a simple estimation of the escape depth of the photo-electron based on the mean free path of the photo electron and the surface barrier. To test the model we grew a set of photo cathodes with different thicknesses. We will present these results and will elucidate the influence of surface modifications, such as oxidation on the cathode performance. We will also discusses pathways which will include ab-initio calculations to determine the escape path of the material.

Primary authors : Dr. LEE, Seon Woo (Argonne National Laboratory)

Co-authors : Dr. ATTENKOFER, Klaus (Argonne National Laboratory) ; Dr. WALTERS, Dean (Argonne National Laboratory) ; Dr. DEMARTEAU, Marcellinus (Argonne National Laboratory) ; Dr. FRISCH, Henry (University of Chicago) ; Dr. XIE, Junqi (Argonne National Laboratory) ; Dr. YUSOF, Zikri (Argonne National Laboratory)

Presenter : Dr. LEE, Seon Woo (Argonne National Laboratory)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : LEE, Seon Woo

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:51
Comments : ""

Abstract ID : 439

Cold electronics development for the LBNE LArTPC

Content :

The LBNE Project is developing a design for 20 kiloton liquid argon (LAr) time projection chambers to be used as the far detector for the Long Baseline Neutrino Experiment. An essential component of this design is a complete electronic readout system designed to operate in LAr (at 87 K). This system is being implemented in mainstream commercial CMOS technology that will provide low-noise readout of the signals induced on the TPC wires, digitization of those signals at an appropriate sampling frequency (1-2 MS/s), zero-suppression, buffering and output multiplexing to a small number of cryostat feedthroughs. A resolution better than 1000 rms electrons at 200 pF input capacitance for an input range of 300 fC is required, along with low power (<15mW/channel) and operation in LAr with a lifetime greater than 15 years. An analog-only frontend ASIC in 180 nm technology has been successfully completed and fully evaluated, and is available for use in the MicroBooNE LArTPC. A prototype of a novel ADC has been fabricated and is being tested. All circuits have been designed using rules to ensure a long lifetime at cryogenic temperatures. The results demonstrate that CMOS transistors have lower noise and much improved DC characteristics at LAr temperature. We will describe the progress to date and plans for the remaining development.

Primary authors : THORN, Craig (Brookhaven National Laboratory)

Co-authors :

Presenter : THORN, Craig (Brookhaven National Laboratory)

Track classification : Experimental Detector Systems ; Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : THORN, Craig

Submitted on Friday 15 April 2011

Last modified on : Monday 25 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed for other tracks (Detectors for neutrino physics)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:57
Comments : ""

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 25 April 2011 17:03

Comments : ""

Abstract ID : 440

Study of Highly Pixilated CdZnTe Detector for PET applications

Content :

In this study we investigate the feasibility of a high resolution PET insert device based on CdZnTe detector with sub-millimeter anode pixel size to be integrated into a conventional animal PET scanner to improve its image resolution to sub-millimeter range. In this study we investigated the position resolution, energy resolution and timing properties of the CdZnTe detector.
In this work, we have used a simplified version of the future 2048-pixel CdZnTe planar detector with 0.25 mm anode pixel size and 0.350 mm pitch. The simplified 9 anode pixel structure makes it possible to carry out experiments without a complete ASIC readout system (with 2048 channels) that is still under development.
The experimental measurements were accompanied by Monte Carlo simulations. The MC simulations include the generation of the hole-electron charge cloud (EGSnrc code), charge trapping and diffusion. Numerical integration of the 3D Laplace equation is used for calculation of electric field and weighting potentials of the finite 3D detector structure.
Special attention was paid for the charge charring events.

Primary authors : KOMAROV, Sergey (Radiology, Washington University in St.Louis,)

Co-authors : YIN, Yongzhi (School of Nuclear Science and Technology, Lanzhou University, PRC) ; WU, Heyu (Radiology, Washington University in St.Louis, St. Louis, MO) ; MENG, Ling-jian (Plasma and Radiological Engineering, University of Illinois at Urbana-Champaign, Urbana, IL) ; WEN, Jie (Radiology, Washington University in St.Louis, St. Louis, MO) ; KRAWCZYNSKI, Henric (Physics, Washington University in St. Louis, St. Louis, MO) ; TAI, Yuan-chuan (Radiology, Washington University in St.Louis, St. Louis, MO)

Presenter : KOMAROV, Sergey (Radiology, Washington University in St.Louis,)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : --not specified--

Submitted by : KOMAROV, Sergey

Submitted on Friday 15 April 2011

Last modified on : Monday 25 April 2011

Comments :
This presentation fits also to "Semiconductor Detectors".

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 25 April 2011 18:06
Comments : ""

Abstract ID : 441

A High-speed Adaptively-biased Current-to-current Front-end for SSPM Arrays

Content :

Solid-state photomultiplier (SSPM) arrays are an interesting technology for use in PET detector modules due to their low cost, high compactness, insensitivity to magnetic fields, and sub-nanosecond timing resolution. However, the large intrinsic capacitance of SSPM arrays results in RC time constants that can severely degrade the response time, which leads to a trade-off between array size and speed. Instead, we propose a front-end that utilizes an adaptively biased current-to-current converter that minimizes the resistance seen by the SSPM array, thus preserving the timing resolution for both large and small arrays. This enables the use of large SSPM arrays with resistive networks, which creates position information and minimizes the number of outputs for compatibility with general PET multiplexing schemes. By tuning the bias of the feedback amplifier, the chip allows for precise control of the close-loop gain, ensuring stability and fast operation from loads as small as 50pF to loads as large as 1nF. The chip has 16 input channels, and 4 outputs capable of driving 100 Ω loads. The power consumption is 12mW per channel and 313mW for the entire chip. The chip has been designed and fabricated in an AMS 0.35um high-voltage technology, and demonstrates a fast rise-time response of 2 ns and 1.3% rms noise.

Primary authors : ZHENG, Bob (Lawrence Berkeley National Lab)

Co-authors : WALDER, Jean-pierre (Lawrence Berkeley National Lab) ; VON DER LIPPE, Henrik (Lawrence Berkeley National Lab) ; MOSES, William (Lawrence Berkeley National Lab) ; JANECEK, Martin (Lawrence Berkeley National Lab)

Presenter : ZHENG, Bob (Lawrence Berkeley National Lab)

Track classification : Front-end Electronics

Contribution type : Oral Presentation

Submitted by : ZHENG, Bob

Submitted on Friday 15 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Oral Presentation)
Judged by : WALDER, Jean Pierre
Date : 21 April 2011 19:00
Comments : "This ASIC design fits perfectly in our tracks."

Abstract ID : 442

IceCube-DeepCore and beyond: towards precision neutrino physics at the South Pole

Content :

The IceCube Neutrino Observatory is the world's largest high-energy neutrino telescope, utilizing the deep Antarctic ice as the Cherenkov detector medium. In December 2010 the last of the observatory's 86 strings of optical detectors was deployed, completing the approximate cubic-kilometer array. The DeepCore detector, the low-energy extension to the IceCube, uses high-quantum efficiency optical modules in the clearest ice to instrument a fiducial volume of up to 30MT. With DeepCore, IceCube has very high neutrino detection efficiency for energies ranging from ~10 GeV to a few EeV, providing extended reach to, among other neutrino physics, indirect Dark Matter searches and atmospheric neutrino oscillations. Much of the success in achieving a pure neutrino sample in the detector is the use of the IceCube array as the world's largest active veto for cosmic ray muons. The possibility exists to further infill the DeepCore array to achieve lower detector energy thresholds and higher precision measurements in the deep ice and we consider a two phase approach to such an infill array.

The first phase detector, similar in design to DeepCore, has goals of 10MT with sub-GeV energy sensitivity, augmenting the DeepCore physics program. The potential second phase would seek to achieve a few MT fiducial volume with an approximate 10 MeV energy threshold, for burst of events, for a large-scale physics program that includes proton decay, supernova neutrinos and potential future long baseline efforts.

Presented will be a status of the IceCube detector, with initial data from the first full year of the complete DeepCore detector, and the ongoing physics feasibility studies for these potential new arrays buried in the ice.

Primary authors : Prof. GRANT, Darren (University of Alberta)

Co-authors :

Presenter : Prof. GRANT, Darren (University of Alberta)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : GRANT, Darren

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

It is my understanding this is the only IceCube talk for the conference. If the schedule permitted, I would really appreciate this be considered for an overview talk (25+5 min) for the IceCube experiment to provide enough time to cover the substantial material.

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell

Date : 27 April 2011 00:42
Comments : ""

Abstract ID : 443

Revealing the Correlations between Growth Recipe and Microscopic Structure of Multi-alkali Photocathodes

Content :

Multi-alkali photocathodes are the workhorses and golden standards for industrially produced cathodes. They are grown in cost-effective thin-film technology permitting the use of a wide range of amorphous and polycrystalline substrates. The growth process parameters are chosen by heuristically optimized recipes which typically are proprietary. The resulting quantum efficiency (QE) of the detection devices is widely varying between 20% and 25% for typical detector systems and up to 42% for newly developed high QE detectors. Quantum efficiencies of up to 60% were even reported for one-of-a-kind cathode-systems. Our goal is to explain these variations by cross-correlating the microscopic and chemical compositions of the cathode film with the individual process steps and ultimately to develop a theory-inspired growth recipe which results in high quantum efficiency, wavelength tunability, and is compatible with conventional process technology in industry.
To achieve these objectives it is essential to visualize the microscopic structure, chemical composition, and speciation of the film during the execution of the growth recipe in real time. Using an in-situ X-ray diffraction (XRD) setup, we are able to analyze the crystal structure of the film, e.g. the identification of coexisting crystalline phases, their quantitative analysis, the determination of the crystallite sizes, and a preferential growth or texture if existent. By combining state-of-the-art detector technology and high flux x-ray beamlines at synchrotrons we are not only able to achieve a time resolution of 100ms or better but also perform grazing incidence techniques which allow a depth probe of the film. The achieved data quality in combination with the time resolution allow us to characterize all changes inside the cathode during the processing, including interdiffusion of the alkali metals into the antimony matrix, the solid state reactions of the alkalis with the antimony to the different inter-metallic compounds and to determine the individual time constants of these processes.
In our talk we will provide a short introduction to in-situ XRD techniques followed by an exemplary investigation of a standard growth recipe for a CsK2Sb-cathode. The movie-like information on the temporal changes of the structural and chemical composition will be discussed in context of the cathode functionality and will demonstrate how the recipe should be modified to achieve enhanced quantum efficiency.

Primary authors : Dr. LEE, Seon Woo (Argonne National Laboratory)

Co-authors : Dr. ATTENKOFER, Klaus (Argonne National Laboratory) ; Dr. DEMARTEAU, Marcellinus (Argonne National Laboratory) ; Dr. FRISCH, Henry (University of Chicago) ; Dr. XIE, Junqi (Argonne National Laboratory) ; Dr. SMEDLEY, John (Brookhaven National Laboratory) ; Dr. YUSOF, Zikri (Argonne National Laboratory)

Presenter : Dr. LEE, Seon Woo (Argonne National Laboratory)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : LEE, Seon Woo

Submitted on Friday 15 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:36
Comments : ""

Abstract ID : 444

High Precision Measurement of the Target Mass of the Daya Bay Detectors

Content :

The Daya Bay neutrino experiment utilizes the high anti-electron neutrino flux from the Guondong nuclear power complex in mainland China to perform a measurement of theta_13. The experiment uses a near-far detector technique to minimize systematic errors from reactor power fluctuations and fuel cycles. The method requires at least two “identical” near and far detectors, and for Dayabay includes a total of 8 detectors. Each detector is filled with 20 tons of gadolinium doped scintillating liquid target (GDLS), 20 tons of γ detecting plain LS and 40 tons of mineral oil buffer separated from each other by nested thin wall acrylic vessels. To keep relative systematic differences between the eight detectors below our goal of 0.4% it is important to accurately know the amount of GDLS in each detector because the number of protons in the target region scales with the mass of GDLS. This talk will describe a fluid handling system that continuously maintains the integrity of the O2 and Fe sensitive GDLS, allows the simultaneous filling of the three detector fluids while keeping tight control of liquid levels, and measures the delivered GDLS target fluid mass to a precision of 6 kg out of 20,000 Kg target mass or Δm/m = 3x10-4. The techniques we have developed may be applicable to other neutrino or dark matter experiments requiring precise mass measurements of large volumes of liquid or which handle delicate scintillating fluids.

Primary authors : Mr. WISE, Thomas (university of Wisconsin)

Co-authors :

Presenter : Mr. WISE, Thomas (university of Wisconsin)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : WISE, Thomas

Submitted on Friday 15 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

One of three talks about the Daya Bay detectors. Others by Heeger (overview) and Littlejhon. All on behalf of the Daya Bay neutrino experiment

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:42
Comments : ""

Abstract ID : 445

SLAC End Station A Test Beams (ESTB) for MDI and Beam Instrumentation Experiments

Content :

End Station A Test Beam (ESTB) is a beam line at SLAC using a small fraction of the bunches of the 13.6 GeV electron beam from the Linac Coherent Light Source (LCLS), restoring test beam capabilities in the large End Station A (ESA) experimental hall. ESTB will provide one of a kind test beam essential for developing accelerator instrumentation and accelerator R, performing particle and particle astrophysics detector research, linear collider machine and detector interface (MDI) R studies, development of radiation-hard detectors, and material damage studies with several distinctive features. To measure wakefields generated by beam collimators, we are planning to install new rf beam position monitors with resolution 100 nm and an electro-optic device for critical bunch length measurements. Beam energy measurements aiming at an accuracy of 100-200 parts per million (ppm) also call for BPMs with highest resolution, next-generation synchrotron stripe detector and new instrumentation to improve stability.

Primary authors : Dr. HAST, Carsten (SLAC)

Co-authors : Dr. PIVI, Mauro (SLAC) ; Prof. JOHN, Jaros (SLAC)

Presenter : Dr. HAST, Carsten (SLAC)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : Dr. HAST, Carsten

Submitted on Friday 15 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:36
Comments : ""

Abstract ID : 446

R for the observation of Coherent Neutrino Scatter at a Nuclear Reactor with a Dual-Phase Argon Ionization Detector

Content :

Coherent scattering of neutrinos on nuclei is a well-known prediction of the Standard Model that has so far eluded all experimental attempts to detect it. Aside from validating core elements of the Standard Model, the detection of coherent neutrino scattering has other interesting applications as a flavor-blind monitor of neutrino flux for neutrino oscillation experiments, supernova explosions and nuclear reactors.

Detection of coherent neutrino scattering relies on the ability to measure the tiny recoil energy (few keV for reactor neutrinos) of the target nucleus. Dual-phase liquid-gas detectors using noble elements provide good sensitivity on low-energy nuclear recoils, as demonstrated in searches for dark matter. The ability to detect low-energy nuclear recoils is related to the amount of primary electrons produced by the recoiling nucleus. This quantity is described by the nuclear ionization quench factor, which is experimentally largely unknown at very low energy.

We have constructed a dual-phase Argon detector to measure the nuclear ionization quench factor of Argon at 8 keV using a neutron beam. We have also proposed a novel technique based on nuclear resonance fluorescence that could bring us down in the sub-keV range. These measurements will be very interesting also for dark matter experiments. Moreover, the detector is a prototype for a larger experiment to measure coherent neutrino scattering at a nuclear reactor.

We will present an overview of our program, the technical challenges we face in looking for coherent neutrino scatter at a nuclear reactor, and report on the commissioning of the dual-phase prototype, with details on the proposed techniques for the quench factor measurements.

This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. Funded by Lab-wide LDRD. LLNL-ABS-XXXX

Primary authors : SANGIORGIO, Samuele (Lawrence Livermore National Laboratory)

Co-authors : BERNSTEIN, Adam (Lawrence Livermore National Laboratory) ; FOXE, Michael (Pennsylvania State University) ; HAGMANN, Chris (Lawrence Livermore National Laboratory) ; JOSHI, Tenzing (University of California - Berkeley) ; JOVANOVIC, Igor (Pennsylvania State University) ; KAZKAZ, Kareem (Lawrence Livermore National Laboratory) ; PEREVERZEV, Sergey (Lawrence Livermore National Laboratory)

Presenter : SANGIORGIO, Samuele (Lawrence Livermore National Laboratory)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : SANGIORGIO, Samuele

Submitted on Friday 15 April 2011

Last modified on : Sunday 24 April 2011

Comments :

This contribution could alternatively be considered for the category "Dark Matter detector" given the similarity in detector technology.

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:56
Comments : ""

Abstract ID : 447

Large Diameter Cryogenic Germanium Detectors for Dark Matter Direct Detection Experiments

Content :

Weakly Interacting Dark Matter (WIMP) interactions with ordinary matter are characterized by very low rates and extremely low energy depositions. A leading technique in dark matter detection is the use of cryogenic single-crystal Germanium (Ge) detectors that simultaneously measure the crystal lattice vibrations (phonons) and ionization produced by nuclear recoils. To increase the sensitivity of future experiments, we have investigated the use of 100mm diameter 33mm thick Germanium crystals that significantly increase the target mass per crystal. High purity Ge crystals of this size have been obtained in both [100] and [111] orientations. The detector readout is obtained by photolithographic deposition of phonon sensors and charge collection electrodes on the two faces of the Ge crystal. Commercial semiconductor fabrication equipment has been modified to accommodate these large detectors and the first such detector has been fabricated with ionization electrodes to study the charge collection properties in large Ge detectors. The performance of this detector at the base operating temperature of 50mK has been characterized using a dilution refrigerator equipped with mechanical and readout systems adapted from those used by the Cryogenic Dark Matter Search (CDMS) experiment. Preliminary results on the charge collection properties of this detector will be reported and future plans for the development of large diameter cryogenic Germanium detectors will be described.

Primary authors : Dr. BRINK, Paul (SLAC National Accelerator Laboratory/KIPAC)

Co-authors :

Presenter : Dr. BRINK, Paul (SLAC National Accelerator Laboratory/KIPAC)

Track classification : Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : DO COUTO E SILVA, Eduardo

Submitted on Friday 15 April 2011

Last modified on : Wednesday 11 May 2011

Comments :

This talk is on behalf of a larger group, we will provide additional authors later.

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HOFFMAN, Kara
Date : 11 May 2011 21:58
Comments : ""

Abstract ID : 448

High-pressure xenon gas TPC for neutrino-less double-beta decay in 136Xe: Progress toward the goal of 1% FWHM energy resolution

Content :

A high-pressure xenon gas (HPXe) TPC offers attractive possibilities in the search for neutrino-less double-beta decay in 136Xe. In the gas phase, near-intrinsic energy resolution is available from the ionization signal only, in contrast to the liquid phase which displays anomalously large fluctuations in the partition of energy between scintillation and ionization. In addition, events in the gas phase extend over several cm, permitting topological tests to discriminate efficiently against gamma-ray backgrounds. Our TPC exploits the nearly noiseless gain mechanism of electroluminescence to detect the signal. We report on progress with a small HPXe TPC that probes pressures up to 17 bars, also permitting variation of drift fields over an interesting range. The TPC provides excellent performance at the 662 keV gamma ray of 137Cs.

Primary authors : Dr. GOLDSCHMIDT, Azriel (LBNL) ; Dr. NYGREN, David (LBNL) ; Mr. RENNER, Joshua (LBNL) ; Prof. WHITE, James (Texas A&M) ; Dr. SPIELER, Helmuth (LBNL)

Co-authors :

Presenter : Dr. NYGREN, David (LBNL)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by :

Submitted on Friday 15 April 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:56
Comments : ""

Abstract ID : 449

The Characteristic of Neutron Spectroscopy with Silicon-based Photo-sensors

Content :

Most detection systems for radiation detection are basically made up of scintillator and photo-sensor, and the most popular instrument for collecting a light from a scintillator in the field of the nuclear experiments is PMT(Photomultiplier Tube). However, silicon-based photo-sensors as like Photodiode and APD(Avalanche photodiode) have been developed so as to replace it. One of promising replacements in a spectroscopy is SiPM(Silicon photomultiplier). For measurements of the characteristics of neutron spectrometer, a scintillator for the neutron detection was chosen among commercially available scintillators.
In this study, a Stilbene and a BC501A are selected as neutron detecting material because they have a good performance of pulse-shape discrimination under PMT-based measurements.
The performance of decay time is measured against neutrons using SiPM. Not only we tested the performance of pulse-shape discrimination of the neutron and gamma-ray with SiPM using a 252Cf neutron source at a room temperature, but also we measured the characteristics of it at sub-zero temperatures. Gain, decay time and pulse shape discrimination of SiPM are compared with that of PMTs or APDs. This study is supported by Ministry of Knowledge Economy through KEIT(10030104).

Primary authors : Dr. KIM, Hyunduk (KAIST)

Co-authors : Prof. CHO, Gyuseong (KAIST) ; Prof. KIM, Hongjoo (Kyungpook National University) ; Prof. KIM, Chan Kyu (KAIST)

Presenter : Dr. KIM, Hyunduk (KAIST)

Track classification : Experimental Detector Systems

Contribution type : Poster Presentation

Submitted by : KIM, Hyunduk

Submitted on Saturday 16 April 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:57
Comments : ""

Abstract ID : 450

The D0 Luminosity Monitor Operations and Performance

Content :

The D0 Luminosity Monitor (LM) plays a crucial role in D0 physics analyses by providing the normalization for many cross section measurements. The detector consists of two sets of 24 scintillator wedges read out with photomultiplier tubes. The detector is located in the forward regions surrounding the beam pipe, covering a pseudorapidity range of $2.7 < |\eta| < 4.4$. The LM is sensitive to a large fraction of the total inelastic cross section and measures the luminosity by counting the number of empty proton-antiproton bunch crossings, using Poisson statistics to extract the instantaneous luminosity. The techniques used to convert the measurements made by the LM into the assessed luminosity will be discussed, as well as the performance and operational details of the detector.

Primary authors : Ms. PREWITT, Michelle (Rice University)

Co-authors : D0, Luminosity Group (D0)

Presenter : Ms. PREWITT, Michelle (Rice University)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : PREWITT, Michelle

Submitted on Saturday 16 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:37
Comments : ""

Abstract ID : 451

Thin active elements for DHCAL based on THGEMs

Content :

The thick-Gas Electron Multiplier (THGEM) is an expanded version of the standard GEM, which has been shown to have very competitive performance as an electron multiplier in gaseous particle detectors, in terms of charge gain, behaviour at high event rate, operational stability, simplicity and price of production, even at small scale. The possibility of using THGEM detectors as active elements for Digital Hadron Calorimetry has been tested, using THGEM based chambers to detect X-rays, cosmic radiation and muons and pions in beam environment.

It has been shown that the THGEM can easily deliver pulses above 30 fC when irradiated with muons and pions. Several geometries will be presented, and a critical evaluation of the performance of each will be given.

Primary authors : WHITE, Andy (University of Texas at Arlington)

Co-authors : ARAZI, Lior (Department of Particle Physics – Weizmann Institute of Science) ; AZEVEDO, Carlos (I3N - Physics Department - University of Aveiro) ; BRESKIN, Amos (Department of Particle Physics – Weizmann Institute of Science) ; CORTESI, Marco (Department of Particle Physics – Weizmann Institute of Science) ; COVITA, Daniel (I3N - Physics Department - University of Aveiro) ; DOS SANTOS, Joaquim (Physics Department - University of Coimbra) ; NATAL DA LUZ, Luz (Physics Department - University of Coimbra) ; PARK, Seongtae (University of Texas at Arlington) ; VELOSO, Joao (I3N - Physics Department - University of Aveiro) ; YU, Jae (University of Texas at Arlington)

Presenter : WHITE, Andy (University of Texas at Arlington)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : CALAPEZ DE ALBUQUERQUE VELOSO, Joao Filipe

Submitted on Saturday 16 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 27 April 2011 12:50
Comments : ""

Abstract ID : 452

The Xenon1T demonstration system

Content :

The future prospect of dark matter detection lies in larger target masses and volumes, of which the next step is a ton scale. Liquefied noble gas detectors, such as Argon and Xenon, are relatively simple to scale up. However, the challenge of purifying the medium and drifting charges over lengths of about three times longer than previously done (about 1m), has never been overcome.
A test setup was constructed and tested at Columbia University, consisting of a liquid
xenon chamber, a cryocooler, a gas recirculation system with pump and SAES getter, and a heat exchanger module. The setup is used to test and demonstrate our ability to drift charges over 1 meter with minimal losses. The main challenges include high voltage techniques, high rate gas flow and purifying of the gas. The detector, the cooling tower and the heat exchanger are mounted in three separate thermal vacuum vessels to reduce heat losses to the ambient air. For the cryocooler, an Iwatani PC-150 PTR with a 6.5 KW water cooled He compressor delivers 200 W of cooling power at 165K. This PTR is the same as used on XENON100. The liquid is taken from the detector through the heat exchanger, where the latent heat is transferred to the returning xenon gas stream with a very high efficiency, measured to be above 96 percent. For the XENON1T Demonstrator, the optimized size of heat exchanger, pipes and getter should allow a recirculation rate in excess of 100 slpm.

Primary authors : Dr. BUDNIK, Ran (Columbia university)

Co-authors : Prof. APRILE, Elena (Columbia university)

Presenter : Dr. BUDNIK, Ran (Columbia university)

Track classification : Experimental Detector Systems ; Dark Matter Detectors

Contribution type : Oral Presentation

Submitted by : BUDNIK, Ran

Submitted on Saturday 16 April 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed for other tracks (Dark Matter Detectors)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:58
Comments : ""

Track : Dark Matter Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : HOFFMAN, Kara
Date : 11 May 2011 21:54
Comments : ""

Abstract ID : 453

General purpose, cheap, and FPGA based Data Acquisition system

Content :

Data acquisition systems are the central part of experiments that require large amount of data in a short time, demanding sharp resolution, high rate sampling, fast triggering, quick input reading, and quick output writing. We present a cheap-two-channel-general solution consisting of two analogical to digital converters, at 105 MHz, 10 bit resolution, 50 Ohms of input impedance, with the Spartan-3 Xilinx FPGA board as the main control system.Technical details, testing characterization and preliminary applications and results, on high energy physics, will be presented.

Primary authors : Mr. ARCEO-MIQUEL, Luis (Divición de Ciencias e Ingenieria Campus Leon)

Co-authors : Dr. MORENO, Gerardo (Divición de Ciencias e Ingenieria Campus Leon) ; Dr. FELIX, Julian (Divición de Ciencias e Ingenieria Campus Leon) ; Dr. SHMALIY, Yury (Divicion de Ingenierias Campus Irapuato-Salamanca)

Presenter : Mr. ARCEO-MIQUEL, Luis (Divición de Ciencias e Ingenieria Campus Leon)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : ARCEO-MIQUEL, Luis

Submitted on Saturday 16 April 2011

Last modified on : Friday 22 April 2011

Comments :

Registrant Id: 122, First Name: Luis, Surname: Arceo-Miquel, please confirm me my summary

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 22 April 2011 20:59
Comments : ""

Abstract ID : 454

THE NEU-RAD EXPERIMENT

Content :

Neu-Rad is an experiment to investigate the recently observed variations in isotope decay rates correlated with the earth-sun distance and solar flares. Isotope decay rates will be observed near high flux neutrino sources with energies similar to what is observed from the sun such as the nuclear reactor facility in Rio De Janerio, Brasil. Isotope decay rates will also be measured at the underground neutrino beamline at Fermilab. The isotope decay rates are recorded using a Ge detector and are integrated every 12 hours. The decay rates in the laboratory, at the Fermilab neutrino source, and at the nuclear reactor facility will be compared. Initial measurements using a Sr-90 source in the laboratory will be shown.

Primary authors : Mr. CEASE, Herman (Fermilab)

Co-authors : Dr. ESTRADA, J. (Fermilab) ; Dr. BONIFAZI, C. (Instituto de Fisica, Unversidade Federal Do Rio De Janeiro, Brasil) ; Dr. MOLINA, J. (National University of Asuncion, Paraguay) ; Dr. MAKLER, M. (Instituto de Fisica, Unversidade Federal Do Rio De Janeiro, Brasil) ; Dr. DA MOTTA, Helio (Filho Centro Brasileiro De Pesquisas Fisicas, Brasil)

Presenter : Mr. CEASE, Herman (Fermilab)

Track classification : Detectors for neutrino physics

Contribution type : Poster Presentation

Submitted by : CEASE, Herman

Submitted on Saturday 16 April 2011

Last modified on : Sunday 24 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 24 April 2011 22:56
Comments : ""

Abstract ID : 455

Progress on the Upgrade of the CMS Hadron Calorimeter Front-End Electronics

Content :

We present a scheme to upgrade the CMS HCAL front-end electronics in the Phase 1 Upgrade (~2017). The HCAL upgrade is required to handle a major luminosity increase of the LHC that is expected for 2017. A key aspect of the HCAL upgrade is to readout longitudinal segmentation information to improve background rejection, energy resolution, and electron isolation at the L1 trigger. This paper focuses on the requirements for the new electronics and on the proposed solutions. The requirements include increased channel count, additional timing capabilities, and additional redundancy. The electronics are required to operate in a harsh environment and are constrained by the existing infrastructure. The proposed solutions span from chip level to system level. They include the development of a new ADC ASIC, the design and testing of higher speed transmitters to handle the increased data volume, the evaluation and use of circuits from other developments, evaluation of commercial FPGAs, better thermal design and improvements in the overall architecture.

Primary authors : WHITMORE, Julie (Fermi National Accelerator Lab. (Fermilab))

Co-authors :

Presenter : WHITMORE, Julie (Fermi National Accelerator Lab. (Fermilab))

Track classification : Experimental Detector Systems

Contribution type : Poster Presentation

Submitted by : WHITMORE, Julie

Submitted on Saturday 16 April 2011

Last modified on : Thursday 21 April 2011

Comments :
For the CMS Collaboration

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:58
Comments : ""

Abstract ID : 456

High Voltage Systems for Liquid Argon Time Projection Chambers

Content :

We will identify requirements for High Voltage *(HV) supplies, noise filters, and feedthroughs. Many present solutions have their origins in the ICARUS design. We will
present existing and proposed HV systems, mention some solutions for less and more extreme high voltages, and touch on field cage issues and designs. We also discuss grounding and noise issues and how the moving electron current couples into the wires and electronics chains.

Primary authors : JOSTLEIN, Hans (Fermilab)

Co-authors :

Presenter : JOSTLEIN, Hans (Fermilab)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Saturday 16 April 2011

Last modified on : Wednesday 27 April 2011

Comments :
submitted for Hans Jostlein by Ted Liu.

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Poster Presentation)
Judged by : SODERBERG, Mitchell
Date : 27 April 2011 00:42
Comments : "We propose to accept as a poster."

Abstract ID : 457

A novel atomic layer deposition method to fabricate economical and robust large area microchannel plates for photodetectors

Content :

Microchannel plate (MCP)-based photodetectors have a combination of unique properties like high gain, high spatial resolution, and high temporal resolution. They can be used in wide variety of applications including imaging spectroscopy, photo detectors, astronomy, Time-of-Flight mass spectrometry, molecular and atomic collision studies, and cluster physics. The same MCP-based technology is used to make visible light image intensifiers for night vision goggles and binoculars. We demonstrate a cost-effective and robust method to fabricate large-area microchannel plate (MCP) detectors, which will open new prospectives in larger area MCP-based detector technologies. For the first time, using our newly developed process flow we have fabricated large area (8”x8”) MCPs. Among the various thin film processes we have selected atomic layer deposition (ALD) for functionalizing borosilicate (non leaded) glass capillary arrays as a route to fabricate cost effective MCPs. ALD provides exquisite thickness control and conformality using sequential, self-limiting surface reactions between gaseous chemical precursors and a solid surface to deposit films in an atomic layer-by-layer fashion. This strategy yields monolayer-level thickness and composition control as well as continuous, pinhole-free films. The self-limiting aspect of ALD yields conformal deposition on very high aspect ratio structures such as MCP pores. ALD processing is also extendible to very large substrates and batch processing of multiple substrates. All of these ALD process capabilities are important for the fabrication of clean, batch-to-batch reproducible, economical, fully functionalized large area MCPs. The self limiting growth mechanism in ALD allows atomic level control over the thickness and composition of resistive and secondary electron emission layers that can be deposited conformally on high aspect ratio capillary glass arrays. We have developed several robust and reliable ALD processes for the resistive coatings and secondary electron emission (SEE) layers to give us precise control over the resistance (106-1010Ω) and SEE coefficient (up to 5). This novel approach allows the functionalization of microporous, insulating substrates to produce MCPs with high gain and low noise. These capabilities allow a separation of the substrate material properties from the electronic properties. Here we will discuss a complete process flow to fabricated working large area MCPs.

Primary authors : Dr. MANE, Anil U. (ANL)

Co-authors :

Presenter : Dr. MANE, Anil U. (ANL)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Saturday 16 April 2011

Last modified on : Friday 29 April 2011

Comments :

submitted by Ted Liu for Anil U. Mane et al. (ANL, Chicago, Berkeley, Incom, Inc).

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 16:03
Comments : ""

Abstract ID : 458

Development of Microwave Kinetic Inductance Detectors for CMB B-mode polarization measurements.

Content :

A development of Microwave Kinetic Inductance Detectors (MKIDs) is
presented. Our main objective for using this novel ultra sensitive millimeter wave detector technology is the detection of the Cosmic Microwave Background (CMB) B-mode polarization, which is a smoking-gun signal of the primordial gravitational waves predicted by the cosmic inflation theory. A satellite project named LiteBIRD (Lite(light) Satellite for the studies of B-mode polarization and Inflation from cosmic background Radiation Detection) is under consideration for this purpose.

The current design of the LiteBIRD has about 2,000 millimeter wave detectors, whose frequency ranges from 50 to 250 GHz. Candidate superconducting detector technologies include transition edge sensors (TES), superconducting tunnel junction sensors (STJ) and MKIDs.

MKIDs consist of many high-Q microwave resonators coupled to the same feed line with a HEMT or SQUID amplifier for readout. With this frequency-domain multiplexing scheme, MKIDs allow much higher multiplexing factors, lower power consumption and heat load than other superconducting detectors. This is an important adtantage for use in space.

In our MKIDs design, the multichroic antenna-coupled structure is adopted to cover the required frequency range. Additionally, the transmission-type MKID is used to simplify the resonant-frequency tracking for the enhancement of the dynamic range. We fabricated MKIDs using both CPW and microstrip transmission lines for the resonator structure, and measured their performance using newly developed readout circuit.
Further the combined mulrichroic design will be presented.

Primary authors : Dr. YOSHIDA, Mitsuhiro (High Energy Research Organization)

Co-authors : Dr. ISHINO, Hirokazu (Okayama University) ; Prof. HAZUMI, Masashi (High Energy Research Organization) ; Mr. WATANABE, Hiroki (The Graduate University for Advanced Studies) ; Dr. OKAMURA, Takahiro (High Energy Research Organization) ; Dr. TOMARU, Takayuki (High Energy Research Organization) ; Dr. KIBAYASHI, Atsuko (Okayama University) ; Dr. KIMURA, Nobuhiro (High Energy Research Organization) ; Mr. MIMA, Satoru (Okayama University) ; Dr. SATO, Nobuaki (High Energy Research Organization) ; Mr. KAWAI, Masanori (High Energy Research Organization) ; Dr. TAJIMA, Osamu (High Energy Research Organization) ; Dr. HATTORI, Kaori (Okayama University)

Presenter : Dr. ISHINO, Hirokazu (Okayama University)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Poster Presentation

Submitted by : YOSHIDA, Mitsuhiro

Submitted on Saturday 16 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:49
Comments : ""

Abstract ID : 459

Seismic attenuation technology for the advanced Virgo gravitational wave detector

Content :

The current interferometric gravitational wave detectors are being upgraded to what are termed ‘2nd generation' devices. Sensitivities will be increased by an order of magnitude and these new instruments are expected to uncover the field of gravitational astronomy. A main challenge in this endeavor is the mitigation of noise induced by seismic motion. Detailed studies with Virgo show that seismic noise can be re-injected into the dark fringe signal. For example, laser beam jitter and backscattered light noise limits the sensitivity of the interferometer.
We will focus on short superattenuators based on compact inverted pendulums in combination with geometric antisprings in order to obtain at least 40 dB (> 10 Hz) of attenuation in six degrees of freedom. Low frequency resonances (< 0.5 Hz) are damped by using an elaborate control system based on input from LVDTs and accelerometers. Such systems are under development for the seismic attenuation of optical benches operated both in air and vacuum. The design and realization of attenuator and control systems will be discussed, while performance and commissioning results will be presented. We also describe how future implementation of similar seismic attenuation technology will improve advanced detector designs.

Primary authors : BEKER, Mark (Nikhef, National Institute for Subatomic Physics, Amsterdam, The Netherlands) ; BLOM, Mathieu (Nikhef, National Institute for Subatomic Physics, Amsterdam, The Netherlands)

Co-authors : Prof. VAN DEN BRAND, Johannes (Nikhef, National Institute for Subatomic Physics, Amsterdam, The Netherlands. VU University Amsterdam, Amsterdam, The Netherlands) ; Dr. BULTEN, Henk-jan (Nikhef, National Institute for Subatomic Physics, Amsterdam, The Netherlands. VU University Amsterdam, Amsterdam, The Netherlands) ; DOETS, Martin (Nikhef, National Institute for Subatomic Physics, Amsterdam, The Netherlands) ; HENNES, Eric (Nikhef, National Institute for Subatomic Physics, Amsterdam, The Netherlands) ; MUL, Frans (VU University Amsterdam, Amsterdam, The Netherlands)

Presenter : BEKER, Mark (Nikhef, National Institute for Subatomic Physics, Amsterdam, The Netherlands)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : BEKER, Mark

Submitted on Saturday 16 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 18:15
Comments : ""

Abstract ID : 460

A Summary of Timing Measurements at Fermilab for TOF-PET

Content :

We have performed comparative measurements of timing resolution at Fermilab, using several types of photodetectors, data acquisition and analysis techniques and will show the applicability for time-of-flight improvements to PET imaging. In addition, we will outline a future program for SiPM readout of PET systems.

Primary authors : Dr. RAMBERG, Erik Ramberg (FNAL)

Co-authors :

Presenter : Dr. RAMBERG, Erik Ramberg (FNAL)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : , Erik Ramberg

Submitted on Saturday 16 April 2011

Last modified on : Monday 25 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 25 April 2011 20:28
Comments : ""

Abstract ID : 461

Quality control in the production of the MINERvA detector

Content :

We give the purpose and goals of the MINERvA experiment. We present the design of the experiment. As quality control is part of the design, we show some quality control which took place during the production phase. We also show the performance of the detector.

Primary authors : Dr. BUDD, Howard (University of Rochester)

Co-authors : OSTA, Jyotsna (Fermilab)

Presenter : Dr. BUDD, Howard (University of Rochester)

Track classification : Experimental Detector Systems

Contribution type : --not specified--

Submitted by : , Erik Ramberg

Submitted on Saturday 16 April 2011

Last modified on : Thursday 21 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : CATTAI, Ariella
Date : 21 April 2011 22:59
Comments : ""

Abstract ID : 462

A novel temperature monitoring sensor for gas-based detectors in large HEP experiments

Content :

Operating and planned HEP experiments use and study large area gas-based detectors for charged particles. For most such detectors the control of the gas temperature is of foremost importance because of the very large dependance on the gas gain. Examples of detectors whose efficiency is particularly dependent on temperature are Resistive Plate Counters (RPC) and Gas Electron Multipliers (GEM). Large arrays of RPC's and GEM's are in operation in running experiments.

We propose a gas temperature monitoring system specifically suited for large scale HEP experiments. The proposed system is based on fiber optic technology and uses Fiber Gragg Grating (FBG) sensors as temperature probes. Taking advantage of the wavelength division multiplexing technique applicable in data taking of FBG sensors, the proposed system allows to connect tens of sensors in series along one single optical fiber, thus greatly simplifying cable routing. Moreover, the proposed technology is an intrinsic spectroscopic optical technique with no electrically powered component at the sensing point, thus neither suffering nor causing e.m. disturbances.
We have designed and successfully tested a prototype sensing device on a fully functional RPC module. We show experimental results including long term stability, precision and resolution. We describe the concept design of a full scale monitoring system suitable for HEP experiments.

Primary authors : Dr. CAPONERO, Michele (ENEA and INFN Frascati)

Co-authors : Dr. BENUSSI, Luigi (INFN Frascati) ; Dr. BIANCO, Stefano (INFN Frascati) ; Mr. COLAFRANCESCHI, Stefano (INFN Frascati) ; Prof. SAVIANO, Giovanna (INFN Frascati and Roma 1 Univ.) ; Prof. FELLI, Ferdinando (INFN Frascati and Roma 1 Univ.) ; Dr. VENDITTOZZI, Cristian (Roma 1 Univ.) ; Dr. FERRINI, Mauro (INFN Frascati and Roma 1 Univ.)

Presenter : Dr. CAPONERO, Michele (ENEA and INFN Frascati)

Track classification : Gaseous Detectors

Contribution type : Oral Presentation

Submitted by : BIANCO, Stefano

Submitted on Saturday 16 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto

Date : 29 April 2011 16:15
Comments : ""

Abstract ID : 463

Diamond for high energy radiation and particle detection

Content :

Progress in experimental particle physics in the coming decade depends crucially upon the ability to carry out experiments at high energies and high luminosities. These two conditions imply that future experiments will take place in very high radiation areas. In order to perform these complex and perhaps expensive experiments new radiation hard technologies will have to be developed. Chemical Vapor Deposition (CVD) diamond is being developed as a radiation tolerant material for use very close to the interaction region where detectors may have to operate in extreme radiation conditions. During the past few years many CVD diamond devices have been manufactured and tested. As a detector for high radiation environments CVD diamond benefits substantially from its radiation hardness, very low leakage current, low dielectric constant, fast signal collection and ability to operate at room temperature. As a result CVD diamond now has been used extensively in beam conditions monitors as the innermost detectors in the highest radiation areas of e+e- colliders (BaBar and Belle experiments) and hadron colliders (CDF and every experiment at the recently commissioned CERN Large Hadron Collider). In addition, CVD diamond is now being considered as a sensor material for the particle tracking detectors closest to the interaction region where the most extreme radiation conditions exist. We will present the present state-of-the-art of polycrystalline CVD diamond and the latest results obtained from detectors constructed with this material. Recently single crystal CVD diamond material has been developed which resolves many of the issues associated with polycrystalline material. We will also present recent results obtained from devices constructed from this new diamond material. Finally, we will discuss the use of diamond detectors in present and future experiments and their survivability in the highest radiation environments.

Primary authors : Mr. TRISCHUK, William (U. Toronto)

Co-authors : Prof. KAGAN, Harris (Ohio State)

Presenter : Prof. KAGAN, Harris (Ohio State)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : TRISCHUK, William

Submitted on Saturday 16 April 2011

Last modified on : Friday 29 April 2011

Comments :

This abstract submitted on behalf of the RD42 collaboration. If a talk is scheduled we can certainly find a speaker.

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : COLLINS, Paula
Date : 29 April 2011 11:15
Comments : ""

Abstract ID : 464

Beam Conditions Monitoring in ATLAS

Content :

Beam conditions and the potential detector damage resulting from their anomalies have pushed the LHC experiments to build their own beam monitoring devices. The ATLAS Beam Conditions Monitor (BCM) consists of two stations (forward and backward) of detectors each with four modules. The sensors are required to tolerate doses up to 500 kGy and in excess of 10^15 charged particles per cm2 over the lifetime of the experiment. Each module includes two diamond sensors read out in parallel. The stations are located symmetrically around the
interaction point, positioning the diamond sensors at z = ±184 cm and r = 55 mm (a pseudorapidity of about 4.2). Equipped with fast electronics (2 ns rise time) these stations measure time-of-flight and pulse height to distinguish events resulting from lost beam particles from those normally occurring in proton-proton interactions. The BCM also provides a measurement of bunch-by-bunch luminosities in ATLAS by counting in-time and out-of-time collisions. Eleven detector modules have been fully assembled and tested and the best eight installed in ATLAS. Testbeam results from the CERN SPS show a module median-signal to noise of 11:1 for minimum ionising particles incident at a 45-degree angle. The BCM has operated reliably in ATLAS for the last 18 months, has provided feedback on every beam dump during that time and is required to show a clean abort before ATLAS returns the LHC injection permit. In addition the BCM provides collision rate and background measurements that have been instrumental in ATLAS achieving a luminosity precision of better than 4%. The performance of the detector and their contributions to ATLAS physics will be presented.

Primary authors : TRISCHUK, William (U. Toronto)

Co-authors : Prof. MIKUZ, Marko (Josef Stefan Institute Ljubljana) ; Prof. KAGAN, Harris (Ohio State)

Presenter : Prof. MIKUZ, Marko (Josef Stefan Institute Ljubljana)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : TRISCHUK, William

Submitted on Saturday 16 April 2011

Last modified on : Friday 22 April 2011

Comments :

This abstract submitted on behalf of the ATLAS Beam Conditions Monitor Group. If a talk can be accommodated we can certainly find a speaker to deliver it.

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:37
Comments : ""

Abstract ID : 465

Hadronic Showers in a Highly Granular Imaging Calorimeter

Content :

The CALICE collaboration develops highly granular calorimeter prototypes to evaluate technologies for experiments at a future lepton collider. The analogue hadronic calorimeter prototype consists of steel absorber plates interleaved with 38 active plastic scintillator layers which are sub-divided into small tiles. In total 7608 tiles are read out individually via embedded Silicon Photomultipliers. The prototype is one of the first large scale applications of these novel and very promising miniature photodetectors. Since 2006, the calorimeter has been operated in combined test beam setups at DESY, CERN and FNAL. The high-resolution 3D image data with analogue energy information are used to study properties and composition of hadronic showers at a new level of detail. This helps to constrain hadronic shower models through comparisons with model calculations. The spatial shower development and the substructure of the showers, compared to a variety of different Geant 4 shower models including decompositions into individual shower components are presented. Aspects of the energy reconstruction of hadronic showers, such as Particle Flow, will be discussed.

Primary authors : Mr. KAPLAN, Alexander (University of Heidelberg)

Co-authors :

Presenter : Mr. KAPLAN, Alexander (University of Heidelberg)

Track classification : Calorimetry

Contribution type : Oral Presentation

Submitted by : KAPLAN, Alexander

Submitted on Saturday 16 April 2011

Last modified on : Wednesday 20 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Calorimetry

Judgment : Proposed to accept (Oral Presentation)
Judged by :
Date : 20 April 2011 18:01
Comments : "New development"

Abstract ID : 467

The DAQ and Trigger Systems for the Daya Bay Reactor Neutrino Experiment

Content :

The Daya Bay Reactor Neutrino Experiment will consist of seventeen separate detector subsystems distributed in three underground experimental halls. There will be eight PMT based anti-neutrino detectors (ADs), six water-Cherenkov detectors, and three RPC detector subsystems. Each will be readout using an independent VME crate with a self-contained trigger. A master trigger module will be deployed in each detector hall that will process and issue trigger signals between VME crates, as well as external trigger signals. A system overview will be presented along with design and performance details for the Daya Bay Reactor Neutrino Experiment DAQ and trigger systems.

Primary authors : Prof. WHITE, Christopher (IIT)

Co-authors :

Presenter : Prof. WHITE, Christopher (IIT)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : WHITE, Christopher

Submitted on Sunday 17 April 2011

Last modified on : Monday 09 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 09 May 2011 13:55
Comments : ""

Abstract ID : 468

Ultrahigh Resolution CZT/CdTe Detectors with a Hybrid Pixel-Waveform Readout System

Content :

In this paper, we will report on the development of a hybrid pixel-waveform (HPWF) readout system for highly pixelated (with a few hundred um pitch size) CZT and CdTe gamma ray detectors. This readout system is based on an energy-resolved photon counting (ERPC) ASIC for reading out the anode pixels, working in coincidence with a high-speed circuitry for sampling the cathode waveform. This approach could provide an ultrahigh spatial resolution, an excellent timing resolution and a reasonable spectroscopic performance at the same time. The rationales behind the HPWF readout system are the following. First, the cathode waveform could provide precise energy information using digital processing techniques that takes into account the effect of charge trapping. This helps to alleviate the difficulties in extracting energy information from the tiny anode pixels, with the presence of severe charge sharing and charge loss. Second, the cathode waveform could provide timing information at a precision well beyond that available with anode pixel readout. The latter is limited by the intrinsic uncertainties in charge collection process. Finally, this method could also provide reliable DOI information, by measuring the electron drifting time in sampled waveforms. In contrast, deriving DOI information from the cathode-to-anode ratio is unreliable for detectors having pixel sizes similar to or smaller than the anticipated signal electron cloud size in the detector. In summary, the proposed readout system provides a relatively practical solution for extracting precise energy, timing and spatial information from CZT or CdTe detectors, which could offer a promising candidate for future high-performance multi-modality gamma ray imaging systems.

Primary authors : Prof. MENG, Ling-jian (University of Illinois at Urbana-Champaign)

Co-authors : Mr. CAI, Liang (University of Illinois at Urbana-Champaign)

Presenter : Prof. MENG, Ling-jian (University of Illinois at Urbana-Champaign)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : --not specified--

Submitted by : MENG, Ling-jian

Submitted on Sunday 17 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : AMERIO, Silvia
Date : 29 April 2011 17:57
Comments : ""

Abstract ID : 469

Development of a 10 Picosecond Resolution Time-of-flight Detector

Content :

At the University of Texas, Arlington, we have been leading the development of an ultra-precise timing detector as part of a proposed far forward proton detector system upstream and downstream of the ATLAS detector to aid in new particle searches at the Large Hadron Collider. This timing detector would have unprecedented accuracy on the 10 ps scale, providing rejection against the combinatoric background arising from the overlap of several proton-proton collisions in the same bunch crossing. We give an overview of the Cherenkov-based fast timing detector, describe the micro-channel plate photomultipliers under development, and present results from beam and laser tests.

Primary authors : Prof. BRANDT, Andrew (UTA)

Co-authors : Mr. HOWLEY, Ian (Doctoral Student)

Presenter : Mr. HOWLEY, Ian (Doctoral Student)

Track classification : Photon Detectors

Contribution type : Poster Presentation

Submitted by : BRANDT, Andrew

Submitted on Sunday 17 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 29 April 2011 16:52
Comments : ""

Abstract ID : 470

Studies of pulse shape in SiPMs

Content :

We discuss the shape of the of the electrical signal produced by a single micro pixel avalanche in an SiPM. We compare the results of recent measurements with simulation, and how design choices affect the observed pulse shape. This has important implications for how the signal scales as an SiPM is made larger.

Primary authors : Dr. RUBINOV, Paul (Fermilab)

Co-authors :

Presenter : Dr. RUBINOV, Paul (Fermilab)

Track classification : Photon Detectors

Contribution type : --not specified--

Submitted by : Dr. RUBINOV, Paul

Submitted on Monday 18 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : AMERIO, Silvia
Date : 29 April 2011 16:53
Comments : ""

Abstract ID : 471

The FONT5 bunch-by-bunch position and angle feedback system at ATF2

Content :

The FONT5 upstream beam-based feedback system at ATF2 is designed to correct the position and angle jitter at the entrance to the ATF2 final-focus system, and also to demonstrate a prototype intra-train feedback system for the International Linear Collider interaction point. We discuss the hardware, from stripline BPMs to kickers, and RF and digital signal processing, as well as presenting results from the latest beam tests at ATF2.

Primary authors : CHRISTIAN, Glenn (John Adams Institute for Accelerator Science)

Co-authors :

Presenter : CHRISTIAN, Glenn (John Adams Institute for Accelerator Science)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : WENDT, Manfred

Submitted on Monday 18 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:37
Comments : ""

Abstract ID : 472

BVIT: A visible imaging, photon counting instrument on the Southern African Large Telescope for high time resolution astronomy

Content :

The Berkeley Visible Imaging Tube (BVIT) was installed on the Southern African Large Telescope (SALT) in January 2009 and subsequently refurbished in August 2010. BVIT is an imaging, photon counting camera with multi-color (U, B, V, R – U was replaced by H-α post- refurb.) capability. At the heart of BVIT is a 25 mm, microchannel plate sealed tube device with a visible photocathode and a cross-delay line readout. For each detected event the readout electronics record an X, Y position, an event pulse size (P), and an arrival time (T) – recorded with 25 ns precision. Post-acquisition processing of the X, Y, P, T photon lists can be used to build images and light curves (to whatever sampling rate is supported by the SNR of the source). The instrument design is presented as well as some examples of data acquired with the instrument on SALT.

Primary authors : Dr. MCPHATE, Jason (Univ. of California, Berkeley)

Co-authors : Dr. SIEGMUND, Oswald (Univ. of California, Berkeley) ; Dr. WELSH, Barry (Univ. of California, Berkeley) ; Dr. VALLERGA, John (Univ. of California, Berkeley) ; Dr. BUCKLEY, David (South African Astron. Observatory) ; Dr. GULBIS, Amanda (South African Aston. Observatory) ; Mr. BRINK, Janus (South African Astron. Observatory) ; Mr. ROGERS, Doug (Univ. of California, Berkeley)

Presenter : Dr. MCPHATE, Jason (Univ. of California, Berkeley)

Track classification : Astrophysics and Space Instrumentation

Contribution type : --not specified--

Submitted by : MCPHATE, Jason

Submitted on Monday 18 April 2011

Last modified on : Saturday 30 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 30 April 2011 22:51
Comments : ""

Abstract ID : 473

Instrumentation for Theory-Inspired Photocathode Development within the Large Area Picosecond Photodetector (LAPPD) Project

Content :

In a phototdetector, the photocathode is the element responsible for the conversion of the photon into an initial photoelectron. Many fundamental detector properties such as dark current, quantum efficiency, response time, and lifetime, as well as the production cost of the detection system, are determined by the properties of the cathode.

This talk will discuss instrumentation specifically designed for a theory-driven approach to the development of cost-effective large area photocathodes. We have designed and commissioned a laboratory for the growth and characterization of photocathodes at Argonne National Laboratory. The instrumentation allows the study of optical properties, electrical behavior (I/V-curves, photoconductivity), and spectral response of the cathode (quantum efficiency); the system is part of a network using various DOE user facilities allowing in-situ experiments to determine the microscopic and chemical structure of the cathode. By combining these tools we correlate the cathode's functionality with its microscopic structure. Another important aspect of this infrastructure is to bridge the gap between one-of-a-kind production and industrial manufacturing resulting in large availability for end users.

The interaction between basic sciences and implementation of the results into industrial production processes for photocathode development are well-suited to a multi-purpose National Laboratory. In the future we plan to make these tools available to the broad scientific and industrial community.

Primary authors : Dr. XIE, Junqi (Argonne National Laboratory)

Co-authors : Dr. ATTENKOFER, Klaus (Argonne National Laboratory) ; Dr. DEMARTEAU, Marcel (Argonne National Laboratory) ; Dr. FRISCH, Henry (Argonne National Laboratory, University of Chicago) ; Dr. LEE, Seon (Argonne National Laboratory) ; Dr. PARAMONOV, Alexander (Argonne National Laboratory) ; Dr. WAGNER, Robert (Argonne National Laboratory) ; Dr. YUSOF, Zikri (Argonne National Laboratory)

Presenter : Dr. XIE, Junqi (Argonne National Laboratory)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : XIE, Junqi

Submitted on Monday 18 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:52
Comments : ""

Abstract ID : 474

The LHCb Trigger: present and future.

Content :

LHCb is a single arm spectrometer covering the pseudo-rapidity range between 1.9 and 4.9, and has been optimised to perform flavour physics measurements at the LHC. The present two level trigger system is able select charm and beauty decay products with high efficiency due to the ability to trigger on transverse momenta below the B-meson invariant mass. The trigger can select both leptonic, and purely hadronic decays. The performance of the trigger is determined from the data itself without having to rely on Monte-Carlo simulation, and will be presented. LHCb has recently submitted their upgrade LOI, which mainly aims at profiting from much larger luminosities by moving towards a single fully software based trigger. The upgrade strategy and expected performance will be presented.

Primary authors : DIJKSTRA, Hans (CERN)

Co-authors :

Presenter : DIJKSTRA, Hans (CERN)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : DIJKSTRA, Hans

Submitted on Tuesday 19 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 22 April 2011 17:27
Comments : ""

Abstract ID : 475

Recent progress in vacuum photon detectors from Hamamatsu

Content :

Hamamatsu Photonics has been providing vacuum photon detectors for Neutrino physics experiments and Dark Matter experiments as well as other HEP experiments in many years. For instance, 11,700 pcs of 20-inch PMTs were delivered to Super-Kamiokande experiment in Japan, 5,500 pcs of 10-inch PMTs were delivered to ICECUBE experiment in Antarctica. Recently, we are providing several kinds of unique PMTs for XENON, WArP, ArDM, DAMA experiments in European laboratories.
We developed 12-inch large size PMT for Neutrino physics experiments and 3-inch metal bulb PMT with ultra low radioactive materials for Dark Matter experiments. Their features and the evaluation result will be shown in this presentation.

Primary authors : Mr. YOSHIZAWA, Yuji (Hamamatsu Photonics)

Co-authors :

Presenter : Mr. YOSHIZAWA, Yuji (Hamamatsu Photonics)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : YOSHIZAWA, Yuji

Submitted on Tuesday 19 April 2011

Last modified on : Friday 29 April 2011

Comments :

We, Hamamatsu would like to show the latest developmental products such as 12-inch PMT for Neutrino physics experiment and 3-inch PMT for Dark Matter experiment. This presentation does not have any academic content, so we will not submit its paper later. Please allow us to use your important time in this conference.

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 29 April 2011 15:54
Comments : ""

Abstract ID : 476

Skipper CCD for DAMIC

Content :

We present results for the Skipper CCD in preparation for its implementation in the DAMIC (Dark Matter In Ccds) project. The skipper reduces readout noise by averaging the value of each pixel over multiple samplings. Electrons are brought to a floating well at readout rather than being connected to ground, after which they may be returned to the summing well for repeated measurements. Preliminary results show readout noise of less than .5 e- for 100 samplings per pixel. The skipper has further application in any setting requiring extremely low readout noise without stringent readout speed requirements.

Primary authors : JOHANSEN, Jacob (University of Chicago)

Co-authors : ESTRADA, Juan (Fermilab) ; MORONI, Guillermo (Fermilab)

Presenter : JOHANSEN, Jacob (University of Chicago)

Track classification : Dark Matter Detectors

Contribution type : Poster Presentation

Submitted by : JOHANSEN, Jacob

Submitted on Tuesday 19 April 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Dark Matter Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : HOFFMAN, Kara
Date : 11 May 2011 22:01
Comments : ""

Abstract ID : 477

Low Material Budget Silicon Avalanche Pixel Sensor

Content :

Proposed Si tracking detector consists of aligned microcells on top and bottom of semiconductor wafer. Microcells are operated in breakdown mode and intrinsic gain of amplification can reach extremely high values up to 10^6. High intrinsic gain gives the possibility dramatically reduce the necessary thickness of sensitive area and total thickness of the detector up to few microns. The size of microcells can be varied from ~5 to 100 microns. The technology of such Si structure allowed implementation the electronics elements on the same substrate as the detection elements. Two aligned microcells are connected to one logic element and to the well known readout schematic as for active pixel detectors.
In the report will be shown the experimental prove of the principle.

Primary authors : Prof. SAVELIEV, Valeri (National Research Nuclear University)

Co-authors : Dr. D'ASCENZO, Nicola (National Research Nuclear University)

Presenter : Prof. SAVELIEV, Valeri (National Research Nuclear University)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : , Valeri Saveliev

Submitted on Wednesday 20 April 2011

Last modified on : Tuesday 03 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Semiconductor Detectors

Judgment : Proposed to accept (Poster Presentation)
Judged by : COLLINS, Paula
Date : 03 May 2011 10:22
Comments : ""

Abstract ID : 478

Optimization of Pixel Sizes in An SiPM Array for A Monolithic PET Detector

Content :

The interest for molecular imaging on small animals keeps requiring higher detection efficiency (DE) in a PET system. PET detectors based on monolithic scintillators show the great potential of improving the DE due to the minimized packing fraction. Silicon photo-multipliers (SiPMs) are compact photo-detectors with high gains, high photon detection efficiencies (PDEs) and fast timing response. Using SiPM in the monolithic scintillator based detector has attracted substantial interests. We investigate the optimization of pixels sizes in an SiPM array reading out a monolithic scintillation crystal. The pixel size determines the spatial resolution of the detector. Usually a smaller pixel size could get more details about the light distributions and results in a higher spatial resolution. However, decreasing the pixel size will decrease the number of the photon collected per pixel. That will increase the noise, worsen the energy resolution and degrade the spatial resolution. The balance between the accurate light photons distribution and the noise determines the optimal pixel size of the SiPM array. Using DETECT2000, we conduct Monte-Carlo (MC) simulations to study the relationship between the pixel size of an SiPM array and the spatial resolution of a monolithic PET detector. The thickness of the simulated scintillator is 10 mm and the interaction point is set at the center of the scintillator. The light output of the scintillator is 30000 photons per 1 MeV, matching that of the LYSO crystal. The PDE of the SiPM is set as 20%. The initial simulation results show that The initial simulation results show that the Signal-to-Noise-Ratio (SNR) of the SiPM array is 145 with a 6 mm×6 mm pixel size, 270 with 9 mm×9 mm and 420 with 12 mm×12 mm. By conducting the 3D-Leasting-Fitting method, the interaction point was located based on the number of light photons collected by the SiPM pixels. The Full-Width-at-Half-Maximum (FWHM) of the point spread function is obtained to measure the spatial resolution of the detector. The spatial resolution of the detector is 0.84 mm with a 6 mm×6 mm pixel size, 0.58 mm with 9 mm×9 mm and 0.69 mm with 12 mm×12 mm. The results imply that the optimal pixel size will be somewhere between 6 mm×6 mm and 12 mm×12 mm.

Primary authors : XI, Daoming (Huazhong University of Science and Technology, Wuhan, China)

Co-authors : Dr. XIE, Qingguo (Huazhong University of Science and Technology, Wuhan, China;Wuhan National Laboratory for Optoelectronics, Wuhan, China) ; Mr. ZHU, Jun (Huazhong University of Science and Technology, Wuhan, China;Wuhan National Laboratory for Optoelectronics, Wuhan, China) ; Mr. LIN, Li (Huazhong University of Science and Technology, Wuhan, China) ; Mr. NIU, Ming (Huazhong University of Science and Technology, Wuhan, China) ; Dr. XIAO, Peng (Huazhong University of Science and Technology, Wuhan, China;Wuhan National Laboratory for Optoelectronics, Wuhan, China) ; Dr. KAO, Chien-min (The University of Chicago, Chicago, USA) ; Dr. CHEN, Chin-tu (The University of Chicago, Chicago, USA)

Presenter : XI, Daoming (Huazhong University of Science and Technology, Wuhan, China)

Track classification : Photon Detectors

Contribution type : --not specified--

Submitted by : XI, Daoming

Submitted on Wednesday 20 April 2011

Last modified on : Wednesday 20 April 2011

Comments :

Status : WITHDRAWN

Track judgments :

Track : Photon Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 479

Initial Results of an LYSO/SiPM PET Insert for Small Animal PET/MRI

Content :

To explore the biomedical applications, a positron emission tomography (PET) insert for small animal PET/magnetic resonance imaging (MRI) has been developed at Huazhong University of Science and Technology (HUST). The PET insert composes of the lutetiumyttrium oxyorthosilicate (LYSO) crystal array and the silicon photomultipliers (SiPMs) array, and it can be inserted in a 4.7 Tesla MRI scanner. The SiPM is a novel, solid-state photodetector, and it has many advantages for PET/MRI system, such as high photon detection efficiency (PDE), high gain, low operation voltage, and insensitive to magnetic field. We have measured the performance of the PET insert in the MRI by an all-digital data acquisition (DAQ) system, and evaluated the influence between the PET insert and the MRI scanner. The results show that the PET insert can work well in the magnetic field. The spatial resolution of the insert is 1.5 mm full-width-at-half-maximum (FWHM) and the average energy resolution is 33.1%@511KeV, which are the same as the result without the effect of the magnetic field. And the imaging of the MRI is also perfect, except when the DAQ of the PET is working, because of the interference of the electromagnetic wave caused by the strong current of the DAQ system. It implies that the PET insert based on the SiPM is appropriate for the PET/MRI system. In future work, we will optimize the readout of the PET insert for a higher energy resolution, evaluate the timing determination, eliminate the effects of DAQ for the MRI and get the imaging of PET and MRI at the same time.

Primary authors : Mr. ZHU, Jun (Huazhong University of Science and Technology, Wuhan, China;Wuhan National Laboratory for Optoelectronics, Wuhan, China)

Co-authors : Dr. QINGGUO, Xie (Huazhong University of Science and Technology, Wuhan, China;Wuhan National Laboratory for Optoelectronics, Wuhan, China) ; Mr. MING, Niu (Huazhong University of Science and Technology, Wuhan, China) ; Mr. DAOMING, Xi (Huazhong University of Science and Technology, Wuhan, China;Wuhan National Laboratory for Optoelectronics, Wuhan, China) ; Mr. LI, Lin (Huazhong University of Science and Technology, Wuhan, China) ; Mr. ANWEN, Long (Huazhong University of Science and Technology, Wuhan, China) ; Dr. PENG, Xiao (Huazhong University of Science and Technology, Wuhan, China;Wuhan National Laboratory for Optoelectronics, Wuhan, China) ; Dr. HAO, Lei (Wuhan Institute of Physics and Mathematics, Chinese Academy of Sciences, Wuhan, China)

Presenter : Mr. ZHU, Jun (Huazhong University of Science and Technology, Wuhan, China;Wuhan National Laboratory for Opto

Track classification : Instrumentation for Medical, Biological and Materials Research ; Machine Detector Interface and Beam Instrumentation

Contribution type : --not specified--

Submitted by : ZHU, Jun

Submitted on Wednesday 20 April 2011

Last modified on : Tuesday 26 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 26 April 2011 06:56
Comments : ""

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed for other tracks (Instrumentation for Medical, Biological and Materials Research)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:22
Comments : "The target is evidently the biomedical audience. Probably a mistake by the authors. Manfred"

Abstract ID : 480

Shintake Monitor : Nanometer Beam Size Measurement and Beam Tuning

Content :

The Shintake Monitor (IPBSM) is a laser interferometer – type beam size monitor installed at the virtual interaction point of ATF2, a test facility for ILC. It is the only currently existing system capable of measuring electron beam sizes below 100 nm, and plays a role in achieving some of ATF2`s major goals; realizing the 37 nm design vertical beam size and verifying a novel final focus system featuring the Local Chromaticity Correction.
A laser interference fringe is formed as a Compton scattering target with the electron beam. The resulting signal photons are detected in a downstream detector. Modulation depth of the signal is measured, from which beam size is calculated.
From its first debut at the FFTB, Shintake Monitor has been upgraded to accommodate the smaller ATF2 beam sizes. Improved laser optics and operation modes enable a more flexible measurable range of 25 nm – 6 μm, with satisfactory resolution. A new gamma detector with a special multilayer design effectively separates signal from BG.
Shintake Monitor`s outcomes are indispensable to ATF2, which in turn affect directly the likelihood of ILC being realized.

Primary authors : Ms. YAN, Jacqueline (The University of Tokyo)

Co-authors : Mr. OROKU, Masahiro (The University of Tokyo) ; Mr. YAMAGUCHI, Tohei (The University of Tokyo) ; Dr. KAMIYA, Yoshio (International Center for Elementary Particle Physics) ; Prof. KOMAMIYA, Sachio (The University of Tokyo) ; Mr. YAMANAKA, Takashi (The University of Tokyo) ; Dr. OKUGI, Toshiyuki (KEK) ; Prof. TERUNUMA, Nobuhiro (KEK) ; Prof. TAUCHI, Toshiaki (KEK) ; Dr. ARAKI, Sakae (KEK) ; Prof. URAKAWA, Junji (KEK)

Presenter : Ms. YAN, Jacqueline (The University of Tokyo)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : WENDT, Manfred

Submitted on Wednesday 20 April 2011

Last modified on : Friday 22 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 22 April 2011 15:38
Comments : "Will be presented by Webex"

Abstract ID : 481

Optimization of the SiPM Pixel Size for a Monolithic PET Detector

Content :

Molecular imaging of small animals with PET demands high detection efficiency (DE). PET detectors consisting of monolithic scintillators coupled to position sensitive photo-detectors can yield high DE by eliminating detection-inactive space. Silicon photo-multipliers (SiPMs) are compact photo-detectors with high gain, high photon detection efficiency (PDE) and fast response, and there is substantial interest in employing SiPMs for developing monolithic scintillator-based PET detectors. In this work, we investigate the optimization of the pixels size of an SiPM array to read out a monolithic scintillator. This pixel size affects the spatial resolution of the resulting detector. Generally, smaller pixels can measure more accurately the distribution of the scintillation lights at the exit surface of the scintillator to attain higher spatial resolution. However, smaller pixels also detect fewer light photons and result in higher pixel noise, thereby degrading the spatial resolution and energy resolution. The tradeoff between accuracy and precision therefore determines the optimal pixel size for the SiPM array. Using DETECT2000, we conducted Monte-Carlo (MC) simulations to investigate the relationship between the pixel size of the SiPM array in conjunction with a monolithic-scintillator PET detector and the resulting spatial resolution. In our study, the scintillator was 10 mm thick LYSO. Gamma rays were assumed to interact at the center of the scintillator and the light output of the scintillator was 30,000 photons per 1 MeV. The PDE of the SiPM was set as 20%. The position of a detected event was estimated from the light distribution pattern measured by the SiPM array employing a least-square fitting method that we developed. The full-width-at-half-maximum (FWHM) of the point spread function was obtained for assessing the spatial resolution of the detector. Our initial results showed a spatial resolution of 0.84 mm with a pixel size of 6×6 mm2, 0.58 mm with 9×9 mm2, and 0.69 mm with 12×12 mm2, indicating an optimal pixel size between 6×6 mm2 and 12×12 mm2.

Primary authors : XI, Daoming (Huazhong University of Science and Technology, Wuhan, China)

Co-authors : XIE, Qingguo (Huazhong University of Science and Technology, Wuhan, China) ; ZHU, Jun (Huazhong University of Science and Technology, Wuhan, China) ; LIN, Li (Huazhong University of Science and Technology, Wuhan, China) ; NIU, Ming (Huazhong University of Science and Technology, Wuhan, China) ; XIAO, Peng (Huazhong University of Science and Technology, Wuhan, China) ; CHEN, Chin-tu (The University of Chicago) ; KAO, Chien-min (The University of Chicago)

Presenter : XI, Daoming (Huazhong University of Science and Technology, Wuhan, China)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : --not specified--

Submitted by : CHEN, Chin-tu

Submitted on Thursday 21 April 2011

Last modified on : Monday 25 April 2011

Comments :

This is the updated version of abstract #478

Status : ACCEPTED

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 25 April 2011 20:29
Comments : ""

Abstract ID : 482

Evaluation of Multi-Channel Readouts using SiPM-Arrays for Small Animal PET

Content :

• The SiPM has compact size, high photon detection efficiency (PDE), fast timing response, that makes SiPMs promising in positron emission tomography (PET) imaging. The SiPM-array, which is considered as a position sensitivity photodetector, has potential to replace PSPMT in certain applications. The PET detector which consists of SiPM-arrays is greatly attractive. However, it brings in the multi-channel readout problem at the same time. In this paper, we evaluate three multi-channel readout circuits with the position profile and energy resolution. The three circuits are evaluated with a SiPM-array based small animal detector module, the module is consist of 2×2 LYSO crystal blocks optical coupled to 2×2 SiPM-Array (Sensl SPMArray4), each LYSO block is made up of 4×4 LYSO crystal (3×3×10 mm3). Independent channel readout allows for a better discrimination of inter-crystal-scatter, energy resolution and count rates. However, such an implement brings huge number of readout channels. In this work, the Anger circuit, the discretized proportional counter (DPC) circuit and the cross-wire circuit are evaluated to reduce the number of readout channels from 64 to 16. The cross-wire circuit, as a new readout circuit, requires the least resistors, hence having the lowest power consumption and resistor thermal noise. Instead of only using anode signals, the cathode and anode signals of one SiPM channel will be detected simultaneously in this circuit. So, there is more information we can use than other anode circuits. In the process of evaluation, the scintillator identification accuracy in position profile will be compared for each circuit. The influencing factor of the identification accuracy, including the crystals interaction scatter and the crosstalk of SiPM-arrays, will be deeply investigated in the paper. Simultaneously, we also evaluate the average energy resolution of the detector module with readout circuits. It is deteriorated by the summation of the leakage current and electronic crosstalk from the SiPM-array. It gets worse from 15% to 28% in the DPC circuit. Our results show that DPC circuit has a good position profile and tolerable energy resolution, the cross-wire circuit has some potential for position and energy determination. In the future, the cross-wire circuit will be investigated and optimized.

Primary authors : Mr. NIU, Ming (Huazhong University of Science and Technology)

Co-authors : Prof. XIE, Qingguo (Huazhong University of Science and Technology) ; Mr. ZHU, Jun (Huazhong University of Science and Technology) ; Mr. LI, Lin (Huazhong University of Science and Technology) ; Mr. XI, Daoming (Huazhong University of Science and Technology) ; Mr. XIE, Ming (Huazhong University of Science and Technology) ; Prof. XIAO, Peng (Huazhong University of Science and Technology)

Presenter : Mr. NIU, Ming (Huazhong University of Science and Technology)

Track classification : Front-end Electronics

Contribution type : Poster Presentation

Submitted by : NIU, Ming

Submitted on Saturday 23 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Front-end Electronics

Judgment : Proposed to accept (Poster Presentation)
Judged by : WALDER, Jean Pierre
Date : 27 April 2011 20:39
Comments : ""

Abstract ID : 483

Dielectric Collimators for Beam Delivery Systems

Content :

The collimation systems of the Compact Linear Collider (CLIC) and International Linear Collider (ILC) need to simultaneously fulfill three different functions. These systems must (1) provide adequate halo collimation to reduce the detector background, (2) ensure collimator survival and machine protection against missteered beams, and (3) not significantly amplify incoming trajectory fluctuations via the collimator wakefields.Recent LHC studies have shown the benefits of replacing metal collimators with dielectrics (graphite). We are investigating the possibility of using collimator designs that incorporate dielectrics as a means to reduce wakefields in linear colliders, permitting higher luminosities to be achieved with smaller collimator apertures. Dielectrics provide the additional parameters of permittivity and bulk conductivity to be used in the optimization process. Based on experience with dielectric wakefield accelerating structures, composite dielectric-metal and dielectric-dielectric composite collimators have also been studied. Candidate dielectric materials include graphite and ceramics. We report on the status of our work including our proposed experiment at the SLAC/FACET facility.

Primary authors : KANAREYKIN, Alexei (Euclid Techlabs)

Co-authors :

Presenter : KANAREYKIN, Alexei (Euclid Techlabs)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : WENDT, Manfred

Submitted on Monday 25 April 2011

Last modified on : Wednesday 27 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 27 April 2011 22:56
Comments : ""

Abstract ID : 484

Status of the CMS detector

Content :

The Compact Muon Solenoid (CMS) detector is one of the two largest and most powerful particle physics detectors ever built. CMS is installed in P5 at CERN's Large Hadron Collider (LHC) and as of early 2011 has completed nearly a year of operation in which it recorded products of interactions produced in proton-proton collisions at a center of mass energy of 7 TeV.
The proton-proton run 2010 lasted 7 months and was followed by Pb-Pb ion collisions in November. Since few months the 2011 running period has started with LHC delivering higher luminosity.
The LHC machine is performing extremely well, allowing CMS to record enough data to perform a large number of studies of the Standard Model (SM) of particle physics in this new energy domain for the first time and to search for evidence of new physics in regions of phase space that have never before been entered.
In this presentation, the CMS detector components, the operational experience and the performance with colliding beams will be described. Very initial performance and results from collisions of Pb ions will also be shown. The performance of the trigger, necessary to identify the events of interest, will be discussed.

Primary authors : Prof. FOCARDI, Ettore (University/INFN Florence)

Co-authors :

Presenter : Prof. FOCARDI, Ettore (University/INFN Florence)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : FOCARDI, Ettore

Submitted on Tuesday 26 April 2011

Last modified on : Thursday 05 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 05 May 2011 23:31
Comments : "the session has one slot free - this is a good talk - still we are waiting for the official one on the upgrade"

Abstract ID : 485

Developments in High Power Target and Beam Dump Instrumentation at the SNS*

Content :

As the Spallation Neutron Source (SNS) ramped up to become a megawatt class facility, increasing attention has been paid to instrumentation at the target and the high power injection dump. Through a collaborative development effort, a target imaging system system was designed and deployed in time for replacement of the first Mercury target. This system has also spawned some related technical developments and applications. Radiation-tolerant luminescent coatings are an enabling technology and coating development is an ongoing activity. Characterization of the system's performance required measurement of emission spectra from both the coating on the target and the gas in the core vessel. Hyper-spectral imaging and luminescent lifetime imaging were both utilized to isolate the desired signal. During dedicated beam study periods, neutron production efficiencies and mechanical vibration intensities were measured and correlated with beam properties at the target. Finally, a concept has been developed for an imaging system that could monitor waste beam at the SNS ring injection dump.

*Work funded by the US Department of Energy

Primary authors : SHEA, Thomas (ORNL, Oak Ridge, Tennessee)

Co-authors :

Presenter : SHEA, Thomas (ORNL, Oak Ridge, Tennessee)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : WENDT, Manfred

Submitted on Wednesday 27 April 2011

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Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 27 April 2011 22:57
Comments : ""

Abstract ID : 486

MICE step I: first measurement of emittance with particle physics detectors

Content :

The muon ionization cooling experiment (MICE) is a strategic R project intending to demonstrate the only practical solution to prepare high brilliance beams necessary for a neutrino factory or muon colliders. MICE is under development at the Rutherford Appleton Laboratory (UK). It comprises a dedicated beam line to generate a range of input emittance and momentum, with time-of-flight and Cherenkov detectors to ensure a pure muon beam. The emittance of the incoming beam is measured in the upstream magnetic spectrometer with a sci-fiber tracker. A cooling cell will then follow, alternating energy loss in Li-H absorbers and RF acceleration. A second spectrometer identical to the first and a second muon identification system measure the outgoing emittance. In the 2010 run the beam and most detectors have been fully commissioned and a first measurement of the emittance of a beam with particle physics (time-of-flight) detectors has been performed. The analysis of these data should be completed by the time of the Conference. The next steps of more precise measurements, of emittance and emittance reduction (cooling), that will follow in 2011 and later, will also be outlined.

Primary authors : Prof. PALLADINO, Vittorio (Univ. & INFN Napoli, Italy)

Co-authors :

Presenter : Prof. PALLADINO, Vittorio (Univ. & INFN Napoli, Italy)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : Prof. PALLADINO, Vittorio

Submitted on Thursday 28 April 2011

Last modified on : Friday 29 April 2011

Comments :

Abstract is submitted by the MICE Speakers Bureau.
If accepted, a member of the collaboration will be identified to present it.

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 29 April 2011 21:55
Comments : ""

Abstract ID : 487

CCD testing for DECam (Dark Energy Camera)

Content :

The Dark Energy Survey Camera (DECam) will be comprised of a mosaic of 74 charge-coupled devices (CCDs). The DES science goals set stringent technical requirements for the CCDs. The CCDs are provided by LBNL with valuable cold probe data at -40 deg C, providing an indication of which CCDs are more likely to pass. After comprehensive testing of 270 CCDs at -100 deg C, 124 qualify as science grade. Testing this large number of CCDs to determine which best meet the DES requirements is a very time-consuming task. We developed a multistage testing program to automatically collect and analyze CCD test data.

Primary authors : KUBIK, Donna (Fermilab)

Co-authors :

Presenter : KUBIK, Donna (Fermilab)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Poster Presentation

Submitted by : KUBIK, Donna

Submitted on Thursday 28 April 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 11 May 2011 14:30
Comments : ""

Abstract ID : 488

Beam Loss Monitoring for LHC Machine Protection

Content :

The energy stored in the nominal LHC beams is two times 360 MJ, 100 times the energy of the TEVATRON. As little as 1 mJ/cc deposited energy quenches a magnet at 7 TeV and 1 J/cc causes magnet damage. The beam dumps are the only places to safely dispose of this beam. One of the key systems for machine protection is the beam loss monitoring (BLM) system. About 3600 Ionization chambers are installed at likely or critical loss locations around the LHC ring. The losses are integrated in 12 time intervals (from 40 us to 84 s), and compared to threshold values defined in 32 energy ranges. A beam abort is requested when potentially dangerous losses are detected, or when any of the numerous internal system validation tests fails. In addition, loss data are used for machine set-up and operational verifications. The collimation system for example uses the loss data for set-up and regular performance verification. Commissioning and operational experience of the BLM will be presented: The machine protection functionality of the BLM system has been fully reliable; the LHC availability has not been compromised by false beam aborts. Future system improvements are also discussed.

Primary authors : Dr. HOLZER, Eva Barbara (CERN)

Co-authors :

Presenter : Dr. HOLZER, Eva Barbara (CERN)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : Dr. HOLZER, Eva Barbara

Submitted on Friday 29 April 2011

Last modified on : Friday 29 April 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : WENDT, Manfred
Date : 29 April 2011 21:56
Comments : ""

Abstract ID : 489

Upgrade of the CMS Hadron Outer Calorimeter with SIPMs

Content :

The CMS Hadron Outer Calorimeter (HO) is undergoing an upgrade to replace the existing photodetectors (HPDs) with SIPMs. The chosen device is the Hamamatsu 3X3mm 50μm pitch MPPC. A system has been developed to be a “drop-in” replacement of the HPDs. A complete control system of bias voltage generation, leakage current monitoring, temperature monitoring, and temperature control using solid state Peltier coolers has been developed and tested. 108 channels of the system have been installed into CMS and operated for more that 1 year. The complete system of more than 2000 channels is in production and will be installed in the next LHC long shutdown scheduled for 2013.

Primary authors : Dr. FREEMAN, James (Fermi National Accelerator Lab. (Fermilab))

Co-authors :

Presenter : Dr. FREEMAN, James (Fermi National Accelerator Lab. (Fermilab))

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : WHITMORE, Julie

Submitted on Friday 29 April 2011

Last modified on : Wednesday 04 May 2011

Comments :

For the CMS Collaboration.

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 04 May 2011 10:05
Comments : ""

Abstract ID : 490

The Fermilab Large Cold Black Body Test Stand for CMB R&D

Content :

The Fermilab Large Cold Black Body Test Stand can be used to expose a horn plus receiver assembly to a large black body at cryogenic temperatures (as low as 20 K). The temperature of the black body can be varied while keeping the receiver temperature constant, facilitating Y factor measurements of receiver noise. The test stand has recently been used for studying a QUIET receiver module.

Primary authors : KUBIK, Donna (Fermilab)

Co-authors :

Presenter : KUBIK, Donna (Fermilab)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Poster Presentation

Submitted by : KUBIK, Donna

Submitted on Sunday 01 May 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Poster Presentation)
Judged by : KUSAKA, Akito
Date : 11 May 2011 14:27
Comments : ""

Abstract ID : 491

Design Challenges for a High-Rate TPC with Micromegas Readout

Content :

Experiments such as PANDA at the Facility for Antiproton and Ion Research (under construction in Darmstadt, Germany) and the proposed TAPAS antiproton experiment at Fermilab require Time Projection Chambers with good spatial and dE/dx resolution and very high rate capability, to cope with the anticipated ~10 MHz interaction rate and particle rates in the 20 to 50 MHz range. Issues to be dealt with include space-charge-induced distortion of the drift field and dead-timeless readout electronics that can cope with the high data rate. Promising solutions to these challenges will be presented.

Primary authors : Prof. KAPLAN, Daniel (Illinois Institute of Technology)

Co-authors : Dr. COLAS, Paul (CEA Saclay) ; Dr. GIOMATARIS, Ioannis (CEA Saclay)

Presenter : Prof. KAPLAN, Daniel (Illinois Institute of Technology)

Track classification : Gaseous Detectors

Contribution type : --not specified--

Submitted by : KAPLAN, Daniel

Submitted on Sunday 01 May 2011

Last modified on : Tuesday 03 May 2011

Comments :

Poster or oral

Status : ACCEPTED

Track judgments :

Track : Gaseous Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : KOBAYASHI, Makoto
Date : 03 May 2011 18:07
Comments : ""

Abstract ID : 492

Overview on measured properties of edgeless detectors and their use in high energy physics

Content :

During the past five years VTT has actively developed fabrication process for the state-of-the-art edgeless strip and pixel detectors with a negligible dead region at the edges (below 1 um). In total four prototype process runs have been completed and characterization results have been published actively. The presentation gives and overview on the properties of the edgeless detectors fabricated at VTT and how these can be utilized in the demanding environments of the experiments in the high energy physics. The overview part includes latest results from CERN's SPS 120 GeV muon/pion test beam and alpha particle characterization to evaluate the edge activity. Together the obtained results and the straightforward fabrication process yields that this technology is a promising candidate for the future experiments and upgrades that require large area coverage and approach close to the beam line.

Primary authors : Dr. KALLIOPUSKA, Juha (VTT)

Co-authors : Dr. JAKUBEK, Jan (IEAP CTU) ; Mr. BOSMA, Marten (Nikhef)

Presenter : Dr. KALLIOPUSKA, Juha (VTT)

Track classification : Semiconductor Detectors

Contribution type : Oral Presentation

Submitted by : KALLIOPUSKA, Juha

Submitted on Monday 02 May 2011

Last modified on : Monday 02 May 2011

Comments :

I apologize the very late submission and wish that you would consider the abstract for an oral presentation.

Status : SUBMITTED

Track judgments :

Track : Semiconductor Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 493

Instrumentation Challenges for High-Rate Antiproton Experiments

Content :

Experiments such as PANDA at the Facility for Antiproton and Ion Research (under construction in Darmstadt, Germany) and the proposed TAPAS antiproton experiment at Fermilab require high-rate data acquisition and triggering, and high-bandwidth data recording, in order to cope with a ~10 MHz event rate, 20 to 50 MHz charged-particle rate, and up to ~100 kHz rate of potentially interesting events. Possible solutions to these challenges will be discussed.

Primary authors : Prof. KAPLAN, Daniel (Illinois Institute of Technology)

Co-authors :

Presenter : Prof. KAPLAN, Daniel (Illinois Institute of Technology)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Poster Presentation

Submitted by : KAPLAN, Daniel

Submitted on Thursday 05 May 2011

Last modified on : Thursday 05 May 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 494

Experiences with the Muon Alignment Systems of the Compact Muon Solenoid Detector

Content :

After briefly explaining the need for a precise muon chamber alignment, the different muon alignment systems implemented at CMS are described.
Due to the tight spatial confinement and challenging large radiation and high magnetic field environment, unique alignment systems had to be developed that handle separately the Barrel and the Endcap regions. A third subsystem, called Link, connects these two together and to the Tracker in a common reference frame. The aligned chamber geometry obtained from the Hardware-based muon alignment is validated by comparisons with photogrammetry information and by studies of residuals of muon tracks extrapolated between chambers.
Stability studies, for which the hardware systems are particularly well suited, are also discussed.

Alignment methods based on tracks are also described. Muons from cosmic rays and from collisions are used to align the chambers relative to the inner tracker. In addition, beam halo muon tracks traversing overlapping endcap chambers are used for internal endcap alignment.
A comparison between the track-based and hardware-based results is given, together with an explanation of the advantages and disadvantages of the different alignment strategies.

Primary authors : BENI, Noemi (Institute of Nuclear Research of the Hungarian Academy of Sciences, Debrecen)

Co-authors :

Presenter : BENI, Noemi (Institute of Nuclear Research of the Hungarian Academy of Sciences, Debrecen)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : Ms. AMERIO, Silvia

Submitted on Thursday 05 May 2011

Last modified on : Thursday 05 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment :

Judged by :
Date :
Comments : ""

Abstract ID : 495

Commissioning and Performance of the CMS High Level Trigger

Content :

The CMS trigger system has been designed to cope with unprecedented luminosities and accelerator bunch-crossing rates of up to 40 MHz at LHC. The High-Level-Trigger (HLT) combines in a novel way the traditional L2 and L3 trigger components which are implemented in a commercial Filter Farm with thousands of CPUs. The flexibility of a contiguous software environment allows the coherent tuning of the HLT algorithms to accommodate multiple physics channels and enhance the CMS physics reach. We discuss the commissioning and performance of the HLT during the 2010 and 2011 data taking, and present our strategies for coping with increasing collision rates as the LHC luminosity continues to climb towards design specifications.

Primary authors : APANASEVICH, Leonard (UIC)

Co-authors :

Presenter : APANASEVICH, Leonard (UIC)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : APANASEVICH, Leonard

Submitted on Saturday 07 May 2011

Last modified on : Saturday 07 May 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 496

Design, Operation and Future of the CMS DAQ system.

Content :

The data-acquisition (DAQ) system of the CMS experiment at the LHC performs the read-out and assembly of events accepted by the first level hardware trigger. Assembled events are made available to the high-level trigger (HLT) which selects interesting events for offline storage and analysis. The system is designed to handle a maximum input rate of 100 kHz and an aggregated throughput of 100 GB/s originating from approximately 500 sources. An overview of the architecture and design of the hardware and software of the DAQ system is given. We report on the performance and operational experience from the 2010 and ongoing 2011 collision runs for pp and heavy-ion operation. Furthermore, we will discuss the near and medium term future of the DAQ system in order to address extension of the HLT capability, maintenance issues, integration of sub-detectors with new back-end electronics and operation for LHC luminosity upgrades.

Primary authors : MEIJERS, Frans (CERN)

Co-authors :

Presenter : MEIJERS, Frans (CERN)

Track classification : Trigger and Data Acquisition Systems

Contribution type : Oral Presentation

Submitted by : MEIJERS, Frans

Submitted on Sunday 08 May 2011

Last modified on : Sunday 08 May 2011

Comments :

To be scheduled after saturday 11 June 16:00.

Status : SUBMITTED

Track judgments :

Track : Trigger and Data Acquisition Systems

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 497

CMS: present status, limitations and upgrade plans

Content :

An overview of the CMS upgrade plans will be presented. A brief status of the CMS detector will be given, covering some of the issues we have so far experienced. This will be followed by an overview of the various CMS upgrades planned, covering the main motivations for them, and the various R efforts for the possibilities under study. Finally a possible upgrade schedule will be presented.

Primary authors : Dr. CHEUNG, Harry (Fermi National Accelerator Laboratory (FNAL))

Co-authors :

Presenter : Dr. CHEUNG, Harry (Fermi National Accelerator Laboratory (FNAL))

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : CHEUNG, Harry

Submitted on Monday 09 May 2011

Last modified on : Tuesday 10 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Oral Presentation)
Judged by : CATTAI, Ariella
Date : 10 May 2011 14:28
Comments : ""

Abstract ID : 498

Super-Kamiokande's Gadolinium Research and Developement Project

Content :

The proposed introduction of a soluble gadolinium [Gd] compound into water Cherenkov detectors can result in a high efficiency for the detection of free neutrons capturing on the Gd. The delayed 8 MeV gamma cascades produced by these captures in coincidence with a prompt positron signal serve to uniquely identify electron anti-neutrinos interacting via inverse beta decay. Such coincidence detection greatly reduces backgrounds, allowing a large Gd-enhanced water Cherenkov detector to make the first observation of the diffuse supernova neutrino background and high precision measurements of Japan's reactor anti-neutrino flux, while still allowing for all current physics studies to be continued. Now a dedicated Gd test facility is operating in the Kamioka Mine, home of the Super-Kamiokande [SK] detector. This new facility will house a stainless steel tank filled with 200 tons of water and lined with 240 50-cm photomultiplier tubes, a specially designed water system for filtration and gadolinium recovery, and multiple devices for evaluating the quality of the water in the tank. Successful running of this new facility will demonstrate that adding Gd salt to SK is both safe for the detector and is capable of delivering the expected physics benefits.

Primary authors : Dr. RENSHAW, Andrew (UCI)

Co-authors :

Presenter : Dr. RENSHAW, Andrew (UCI)

Track classification : Detectors for neutrino physics

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Monday 09 May 2011

Last modified on : Monday 09 May 2011

Comments :

This is a re-submission for Abstract ID 112 (to replace it), by Ted Liu for Andrew Renshaw.

Status : ACCEPTED

Track judgments :

Track : Detectors for neutrino physics

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 09 May 2011 15:15
Comments : "This is a talk from SK, requested by the organizers."

Abstract ID : 499

Performance of the CMS Pixel Detector at the LHC

Content :

This contribution discusses the performance of the CMS Pixel Detector at the LHC. It describes the status of the detector components and their behavior throughout the first two years of operation. The contribution will give an overview of the performance in term of efficiency, resolution and alignment as well as a description of the calibration process. Finally it will also cover the overall impact on the pixel detector on the physics reach of the CMS experiment.

Primary authors : SWARTZ, Morris (Johns Hopkins University-Unknown-Unknown)

Co-authors :

Presenter : SWARTZ, Morris (Johns Hopkins University-Unknown-Unknown)

Track classification : Semiconductor Detectors

Contribution type : --not specified--

Submitted by : SWARTZ, Morris

Submitted on Monday 09 May 2011

Last modified on : Monday 09 May 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Semiconductor Detectors

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 500

Diamonds for Beam Instrumentation

Content :

Diamond detectors are currently exciting a lot of attention. Their high radiation tolerance, their rapid response in the order of nanoseconds, and the low dark current in the order of pico-ampere make them excellent particle detectors. It has long been known that diamonds fluoresce and generate electrical signals when irradiated. The emergence of single-crystal and poly-crystalline CVD diamond made it possible to provide detector material with precise shapes, and uniform and predictable properties, while modern electronics make it possible to fully exploit the pico-second structure of the diamond response. These basic ingredients provide all that is needed for an extremely wide range of high-energy particle monitors and counters. Photons can be monitored above 5.5 eV using a diode configuration in which the photo-excitation current is measured. Diamond fluorescence monitors are widely used in the range of 2 keV up to 50 keV. Above 50 keV, the photo-ionised electrons start to create ionization in their own right and diamond detectors configured as ionization chambers can be used, even for single-photon detection. For neutrons, a diamond ionisation monitor can be used with a converter from thermal energies up to 6 MeV and from this energy upwards there is no need for the converter. Recent tests at n_TOF (CERN) have gone up to 1 GeV neutrons. For electrons, diamond is used in the ionization mode and is frequently configured as a quadrant monitor in synchrotron light sources. Possibly the main advance in diamond detectors is currently in the detection of protons and ions. Giga-particle counting up to 3.5 TeV has been demonstrated at the LHC (CERN) and carbon ions have been calorimetrically measured in the energy range of 30 MeV at ISOLDE (CERN). The development of diamond detectors is a field where the basic physics is known, but technology is constantly pushing the boundaries outwards.

Primary authors : GRIESMEYER, Erich (CERN)

Co-authors : DEHNING, Bernd (CERN)

Presenter : GRIESMEYER, Erich (CERN)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : WENDT, Manfred

Submitted on Monday 09 May 2011

Last modified on : Monday 09 May 2011

Comments :

Status : SUBMITTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment :
Judged by :
Date :
Comments : ""

Abstract ID : 501

Development of Superconducting Detectors for Measurements of Cosmic Microwave Background and Other Applications.

Content :

We present recent developments of Aluminum (Al) Superconducting Tunnel Junction (STJ) and Microwave Kinetic Inductance Detectors (MKIDs) for future measurements of the cosmic microwave background (CMB) polarization.

In an attempt to understand the mechanism of inflation in the early universe, we focus on observing the B-mode polarization pattern of the CMB. The pattern is known to carry information on the primordial gravitational wave which was generated during the inflation period. A satellite project named LiteBIRD (Lite(light) Satellite for the studies of B-mode polarization and Inflation from cosmic background Radiation Detection) is under consideration for this purpose. The current design of the LiteBIRD has about 2,000 millimeter wave detectors, whose frequency ranges from 50 to 250 GHz.

One of the candidate detectors is an Aluminum MKID (Microwave Kinetic Inductance Detector) consisting of many high-Q microwave resonators coupled to a readout feed line. MKIDs have much higher multiplexing factor, lower power consumption and heat load than other superconducting detectors. In our MKIDs design, the multichroic antenna-coupled structure is adopted to cover the required frequency range, and their performance is studied using newly developed readout system.

Another candidate is an antenna coupled Al STJ detector. The detector makes use of either the direct Cooper pair breaking or photon-assisted tunneling effect, and, in principle, is capable of covering a frequency range greater than 40GHz. We have newly developed the antenna coupled microstrip STJ that makes it much easier to match the impedance between the antenna and the STJ, compared with the parallel STJs widely used by the past experiments. This feature makes it possible to design the multichroic readout.

We are also fabricating Al STJ detectors that detect phonons generated in the substrate to which the energies are deposited by particles such as alpha, beta, X-ray and photon. The advantages of using STJs through phonons in the substrate instead of the TES calorimeters are that the STJ response is fast (~2us) and that the substrate can cover a large detection area. We have successfully detected alpha particles with the pure 7um diameter Al STJs on a 250x250um2 Al pad fabricated on a Si substrate.

Primary authors : Mr. MIMA, Satoru (Okayama University)

Co-authors : Dr. ISHINO, Hirokazu (Okayama University) ; Dr. HATTORI, Kaori (Okayama University) ; Dr. KIBAYASHI, Atsuko (Okayama University) ; Prof. HAZUMI, Masashi (High Energy Accelerator Research Organization (KEK)) ; Dr. YOSHIDA, Mitsuhiro (High Energy Accelerator Research Organization (KEK)) ; Dr. SATO, Nobuaki (High Energy Accelerator Research Organization (KEK)) ; Dr. TAJIMA, Osamu (High Energy Accelerator Research Organization (KEK)) ; Dr. OKAMURA, Takahiro (High Energy Accelerator Research Organization (KEK)) ; Dr. TOMARU, Takayuki (High Energy Accelerator Research Organization (KEK)) ; Dr. KIMURA, Nobuhiro (High Energy Accelerator Research Organization (KEK)) ; Mr. KAWAI, Masanori (High Energy Accelerator Research Organization (KEK)) ; Prof. NOGUCHI, Takashi (National Astronomical Observatory of Japan) ; Mr. WATANABE, Hiroki (The Graduate University for Advanced Studies)

Presenter : Mr. MIMA, Satoru (Okayama University)

Track classification : Astrophysics and Space Instrumentation

Contribution type : Oral Presentation

Submitted by : MIMA, Satoru

Submitted on Tuesday 10 May 2011

Last modified on : Wednesday 11 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Astrophysics and Space Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : KUSAKA, Akito
Date : 11 May 2011 14:26
Comments : ""

Abstract ID : 502

Fast Neutron Induced Nuclear Counter Effect in Hamamatsu Silicon PIN Diodes and APDs

Content :

Neutron induced nuclear counter effect in Hamamatsu silicon PIN diodes and APDs was measured by irradiating fast neutrons from a pair of Cf-252 sources directly to these devices. It was found that the entire kinetic energy of these neutrons may be converted into electron signals in these devices, leading to anomalous signals of up to a few million electrons in a single isolated calorimeter readout channel. Signals of such amplitude represent equivalent energy of several hundred GeV and a few GeV for PWO and LSO/LYSO crystals respectively assuming the corresponding light yields of 4 and 800 p.e./MeV. The overall rate of the neutron induced nuclear counter effect in APDs is found to be more than an order of magnitude less than that in PIN diodes. Increasing the APD gain was also found to reduce the neutron induced nuclear counter effect. An intelligent front-end chip capable of selecting un-contaminated signal is proposed to eliminate completely the nuclear counter effect without significant cost increase.

Primary authors : Dr. ZHANG, Liyuan (Caltech)

Co-authors : Dr. MAO, Rihua (Caltech) ; Dr. ZHU, Ren-yuan (Caltech)

Presenter : Dr. ZHANG, Liyuan (Caltech)

Track classification : Photon Detectors

Contribution type : Oral Presentation

Submitted by : LIU, Tiehui Ted

Submitted on Tuesday 10 May 2011

Last modified on : Tuesday 10 May 2011

Comments :

re-submitted by Ted Liu for the authors, to replace the original abstract ID 243, now to Photon track.

Status : ACCEPTED

Track judgments :

Track : Photon Detectors

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 10 May 2011 03:36
Comments : ""

Abstract ID : 503

Neutron Detectors for the Instruments of CSNS

Content :

Since 2007, we were involved in the China Spallation Neutron Source (CSNS) project. Several kinds of neutron detectors were under study in last three years, such as two-dimensional position sensitive neutron detector, MWPC (200mm*200mm), scintillator neutron detector and beam monitor with Gas Electron Multiplier (GEM). With those studies, we finished the preliminary design of the detectors for three neutron scattering instruments, the high intensity powder diffractmeter (HIPD), the multi-purpose reflectmeter (MR) and the Small-angle Neutron Spectrometer (SANS).

Primary authors : Dr. SUN, Zhijia (Institute of High Energy Physics, CAS)

Co-authors : Prof. CHEN, Yuanbo (Institute of High Energy Physics, CAS) ; Dr. ZHAO, Yubin (Institute of High Energy Physics, CAS)

Presenter : Dr. SUN, Zhijia (Institute of High Energy Physics, CAS)

Track classification : Experimental Detector Systems

Contribution type : Oral Presentation

Submitted by : SUN, Zhijia

Submitted on Tuesday 10 May 2011

Last modified on : Tuesday 10 May 2011

Comments :

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Experimental Detector Systems

Judgment : Proposed to accept (Poster Presentation)
Judged by : LIU, Tiehui Ted
Date : 10 May 2011 18:54
Comments : "after discussing with conveners, it is decided to move the beam monitor part to MDI as oral presentation, while leave the rest details for poster."

Abstract ID : 504

R of neutron beam monitor based GEM detector

Content :

A thermal neutron beam monitor with Gas Electron Multiplier (GEM) as a detector is developed to meet the needs of the next generation neutron facilities. A prototype chamber has been constructed with two 50mm x 50mm GEM foils. Enriched boron-10 is coated on one surface of aluminum cathode plate as the neutron convertor. 96 channel pads with area 4 mm x 4mm each are used for fast signal readout. In order to study the basic characteristics of boron-coated GEM detector, several irradiation tests were carried out with α source 239Pu and neutron source 241Am(Be). The signal induced by neutron has high signal-to-noise ratio. A clear image obtained from α source 239Pu is presented, which shows that the GEM-based detector has good two-dimensional imaging ability.

Primary authors : SUN, Zhijia (Institute of High Energy Physics, CAS)

Co-authors :

Presenter : SUN, Zhijia (Institute of High Energy Physics, CAS)

Track classification : Machine Detector Interface and Beam Instrumentation

Contribution type : Oral Presentation

Submitted by : SUN, Zhijia

Submitted on Tuesday 10 May 2011

Last modified on : Tuesday 10 May 2011

Comments :

Status : ACCEPTED

Track judgments :

Track : Machine Detector Interface and Beam Instrumentation

Judgment : Proposed to accept (Oral Presentation)
Judged by : LIU, Tiehui Ted
Date : 10 May 2011 18:52
Comments : "accept this after discussing with convener"

Abstract ID : 505

Full Field Imaging at the Advanced Photon Source

Content :

The Advanced Photon Source (APS), located within Argonne National Laboratory, is the brightest source of hard-x-rays in the Western Hemisphere. This has enabled full-field x-ray imaging with the highest spatial and temporal resolutions, using either absorption or phase-contrast. This talk will provide an overview of the present status of full field x-ray imaging. Examples from biology and material science will be presented. Challenges for the future will be discussed.

Primary authors : LEE, Wah-keat (APS/Argonne National Laboratory)

Co-authors :

Presenter : LEE, Wah-keat (APS/Argonne National Laboratory)

Track classification : Instrumentation for Medical, Biological and Materials Research

Contribution type : Oral Presentation

Submitted by : CHEN, Chin-tu

Submitted on Tuesday 10 May 2011

Last modified on : Tuesday 10 May 2011

Comments :

This is an invited overview talk

Status : PROPOSED TO ACCEPT

Track judgments :

Track : Instrumentation for Medical, Biological and Materials Research

Judgment : Proposed to accept (Oral Presentation)
Judged by : CHEN, Chin-Tu
Date : 10 May 2011 18:26
Comments : ""

Abstract ID : 506

Photon Counting with Arrays of Fully Digital SiPMs – Performance Data, Applications and Comparison to Analogue SiPM's

Content :

In recent years, Silicon Photomultipliers (SiPMs) attracted lot of interest as a replacement for photomultiplier tubes (PMT's) due to their ruggedness, compactness or insensitivity to magnetic fields. Other advantages of solid state detectors are their low operating voltage, low power consumption and large scale fabrication possibilities. However, conventional analog SiPMs still do not exploit the intrinsic digital nature of the underlying Geiger-mode cells due to parasitic capacitances and inductances of the interconnect, the influence of electronic noise and sensitivity to temperature drifts. In addition, they need dedicated readout electronics. The Digital Silicon Photomultiplier (dSiPM, developed by Philips Digital Photon Counting) overcomes those problems by early digitization of the Geiger cell output and integrated electronics (trigger network, time-to-digital converter (TDC), pixel controller) on chip [1].
This digital design provides several advantages for the application of SiPM sensors: The pixel and the pixel controller are highly configurable. Individual Geiger cells can be switched on or off, depending on their dark count performance and validation and integration times as well as readout schemes can be set according to the application needs. In addition, the digital nature and independence from analogue effects such as gain or amplification reduces the temperature sensitivity of the device. Since only digital signals (photon count and time) are provided, subsequent processing electronics are greatly simplified.

For many applications, it is necessary to cover larger areas (cm2 to m2) with detectors. For this reason, individual detector elements are mounted into arrays. We developed arrays of dSiPMs (see Fig.1) which consist of 4 x 4 chips (dies), each containing 2 x 2 dSiPMs (pixels), resulting in a 8 x 8 dSiPM (pixel) matrix. The outer dimension of the array is 32 mm x 32 mm, thus covering about 11 cm^2. Compared to earlier versions of the sensor (presented in [2]), a higher level of integration was achieved by developing a new version of the array that uses an FPGA on the backside. A flash memory, also located on the array, stores all relevant information to operate the array, like configuration settings and look-up-table entries for TDC and photon count corrections. A temperature sensor is included for easy temperature tracking. Due to the high integration, a 32-pin connector is sufficient to interface to the detector array. Figure 2 shows the block diagram of the array.

To demonstrate the performance of the detector array, we investigated its intrinsic performance with respect to timing resolution, PDE, linearity and other factors. In addition, the performance of the arrays in reading out scintillators used for e.g. PET and TOF-PET applications will be presented. Coincidence measurements between two arrays using a Na22 source are conducted and energy and timing resolution per pixel are analyzed. The results are compared to those from similar sensors built with analogue SiPM's (aSiPM's).

References:

[1] Th. Frach et al., "The Digital Silicon Photomultiplier – Principle of Operation and Intrinsic Detector Performance", NSS-MIC Conference Record, 2009

[2] C. Degenhardt et al., "Arrays of Digital Silicon Photomultipliers – Intrinsic Performance and Application to Scintillator Readout", NSS-MIC Conference Record, 2010

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