

The U.S. is a Major Collaborator in ATLAS

The U.S. has a leading role in the ATLAS (**A** Toroidal **L**H**C** **A**pparatu**S**) experiment at the Large Hadron Collider (LHC) which will start taking data in 2007 in Geneva, Switzerland. Over 1700 physicists and engineers from over 34 countries including 31 U.S. universities and 3 U.S. national laboratories are participating in ATLAS.

ATLAS addresses the most fundamental question in particle physics: **What gives particles their mass?**

ATLAS will discover the answer to this question which is conjectured to have one of four distinct possibilities: 1) the existence of a Higgs boson; 2) a new group of particles called Supersymmetry; 3) replacement of the Higgs boson with a dynamical condensate (technicolor is the prototype); 4) the extension of four dimensional space-time at short distances to include extra dimensions. ATLAS will be able to make precision measurements in any of these cases.

ATLAS will measure the products of the 100,000,000 proton-proton interactions that will occur each second at an energy of 140,000,000,000,000 electron volts. This high energy is necessary to probe the mass scale of the new particles expected to be found. The detector must be able to identify the products of the hypothesized new particles which includes electrons, photons, muons, and hadrons.

Arizona
BNL
Columbia
Pittsburgh
Rochester
Southern Methodist U.
SUNY-Stony Brook

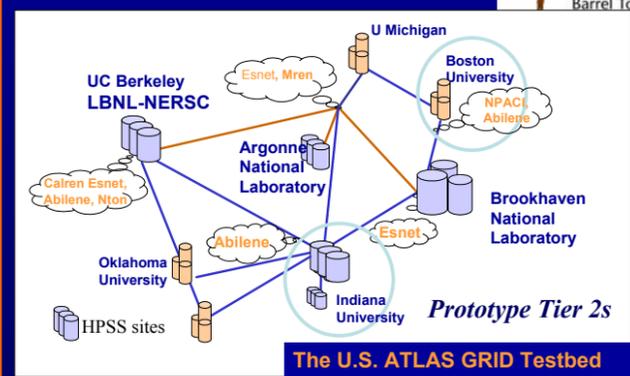
Liquid Argon Calorimeter



The Liquid Argon Calorimeter identifies and measures the energy of the electrons and photons. This shows the Liquid Argon Barrel Cryostat with signal feed-throughs installed at CERN, one of BNL's responsibilities.

ANL
Boston U.
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UT-Arlington
Arizona
Columbia
Pittsburgh

Computing



Duke
Hampton
Indiana
Pennsylvania
Yale

Transition Radiation Detector



TRT module being built at Indiana



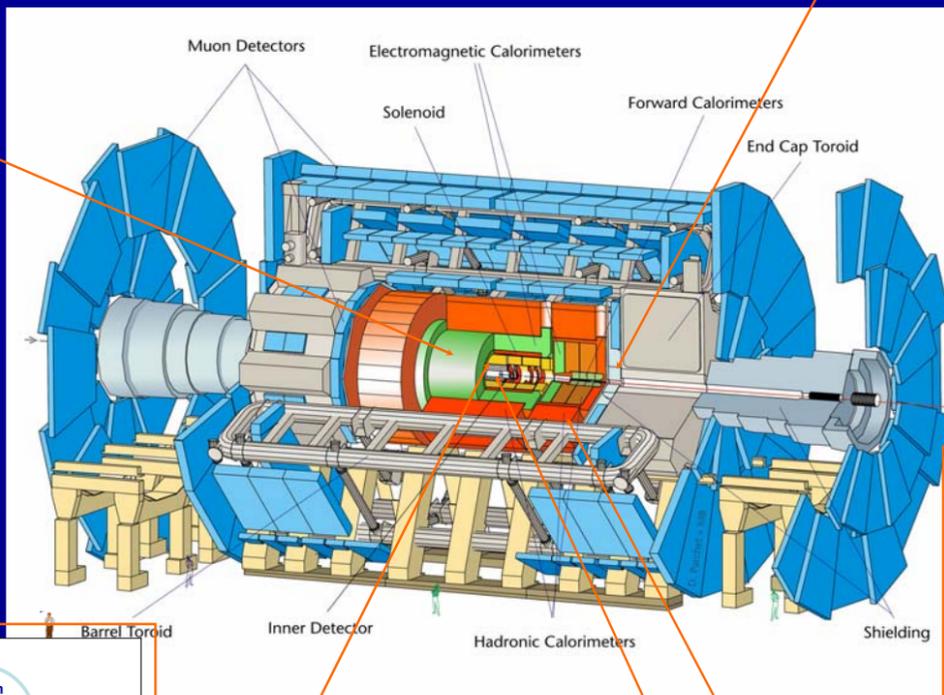
World Wide ATLAS Collaboration Meeting at BNL, June 2001

Boston
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Brandeis
Harvard
MIT
Michigan
Northern Illinois
SUNY-Stony Brook
Tufts
Washington

Muon Spectrometer

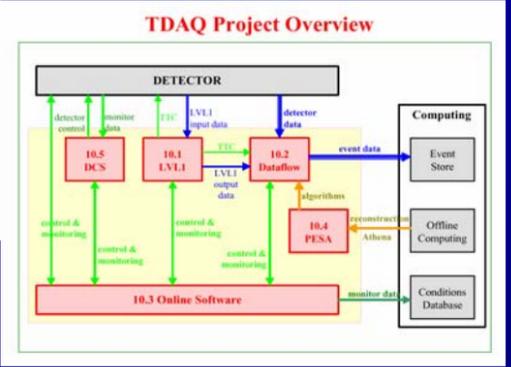


The Muon Spectrometer makes a precision measurement of the muon trajectory using gas-filled wire chambers. BNL is responsible for the Cathode Strip Chamber (CSC) design, assembly, and electronics. Seen here are components of the CSC's.



Trigger/Data Acquisition

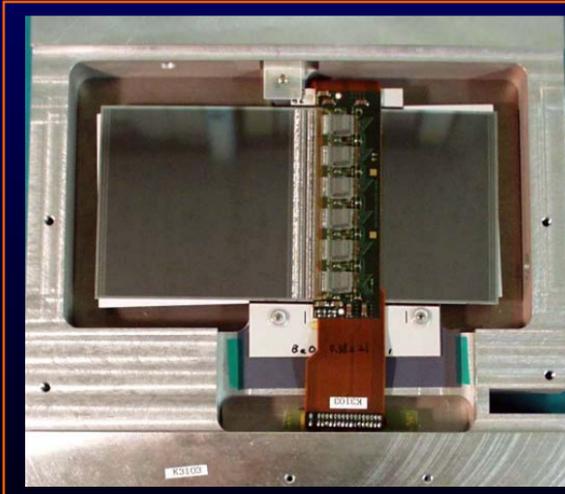
ANL
UC-Irvine
Michigan State
Wisconsin



Trigger/DAQ Architecture

UC Berkeley/LBNL
UC Santa Cruz
Iowa State
SUNY-Albany
Ohio State
Oklahoma/Langston
Wisconsin/Madison

Silicon Detector



Silicon Strip Detector with bonded electronics

Tile Calorimeters

ANL
Chicago
Illinois Champaign/Urbana
Michigan State
UT-Arlington



Extended Barrel Tilecal modules