

STATUS OF BABAR

David Hitlin

Caltech

ICFA Seminar

FNAL

October 5, 1999



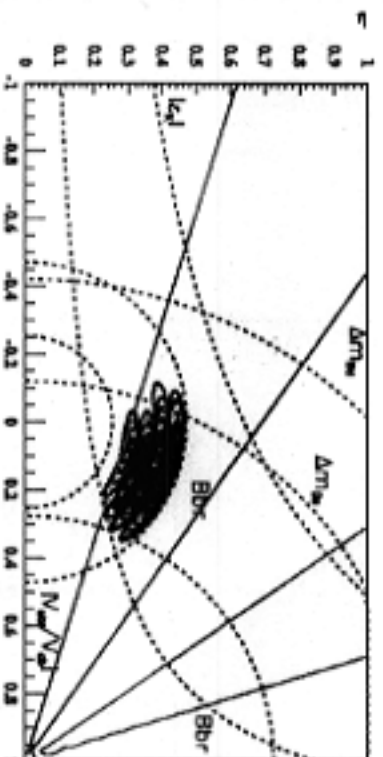
D. Hitlin

BABAR

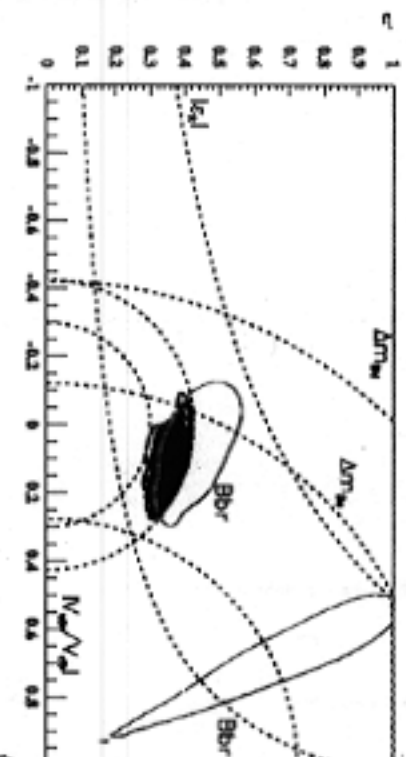
Babar™ and © L. de Brunhoff

BABAR Unitarity Triangle Sensitivity

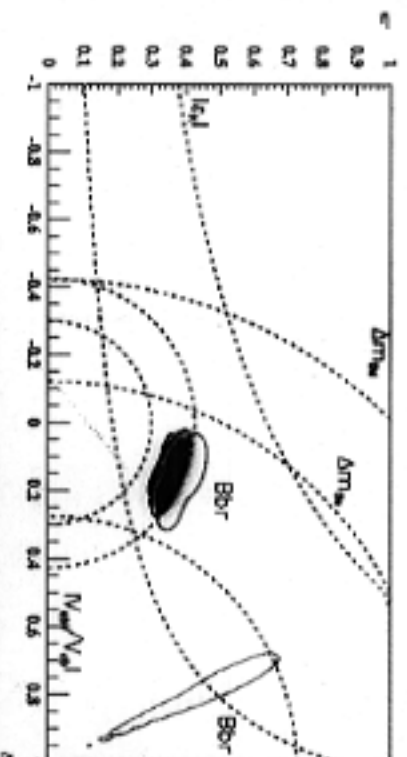
30 fb^{-1}
 $\sin 2\beta$



90 fb^{-1}
 $\sin 2\beta, \sin 2\alpha$



180 fb^{-1}
 $\sin 2\beta, \sin 2\alpha$



BABAR

BABAR is a joint project of SLAC and DESY



USA [34/349]

California Institute of Technology
UC, Irvine
UC, Los Angeles
UC, San Diego
UC, Santa Barbara
UC, Santa Cruz
U of Cincinnati
U of Colorado
Colorado State
Florida A&M
U of Iowa
Iowa State U
LSNL
LLNL
U of Louisville
U of Maryland
U of Massachusetts, Amherst
MIT
U of Mississippi
Mount Holyoke College
Northern Kentucky U
U of Notre Dame
ORNL/Y-12
U of Pennsylvania
Prairie View A&M
Princeton
Rutgers
SLAC
U of South Carolina
Stanford U
U of Tennessee
U of Texas at Dallas
Vanderbilt
U of Wisconsin



Italy [12/92]

INFN, Bari
INFN, Ferrara
Lab. Nazionali di Frascati dell' INFN
INFN, Genova
INFN, Milano
INFN, Napoli
INFN, Padova
INFN, Pavia
INFN, Pisa
INFN, Roma and U "La Sapienza"
INFN, Torino
INFN, Trieste

Norway [1/4]

U of Bergen

Russia [1/15]

Budker Institute, Novosibirsk

China [1/6]

Inst of High Energy Physics, Beijing

France [5/71]

LAPP, Annecy
LAI Orsay
LPHF des Universités Paris 6/7
Ecole Polytechnique
CEA, DAPNIA, CE-Saclay

Germany [2/21]

Ruhr U Bochum
Technische U Dresden

United Kingdom [10/77]

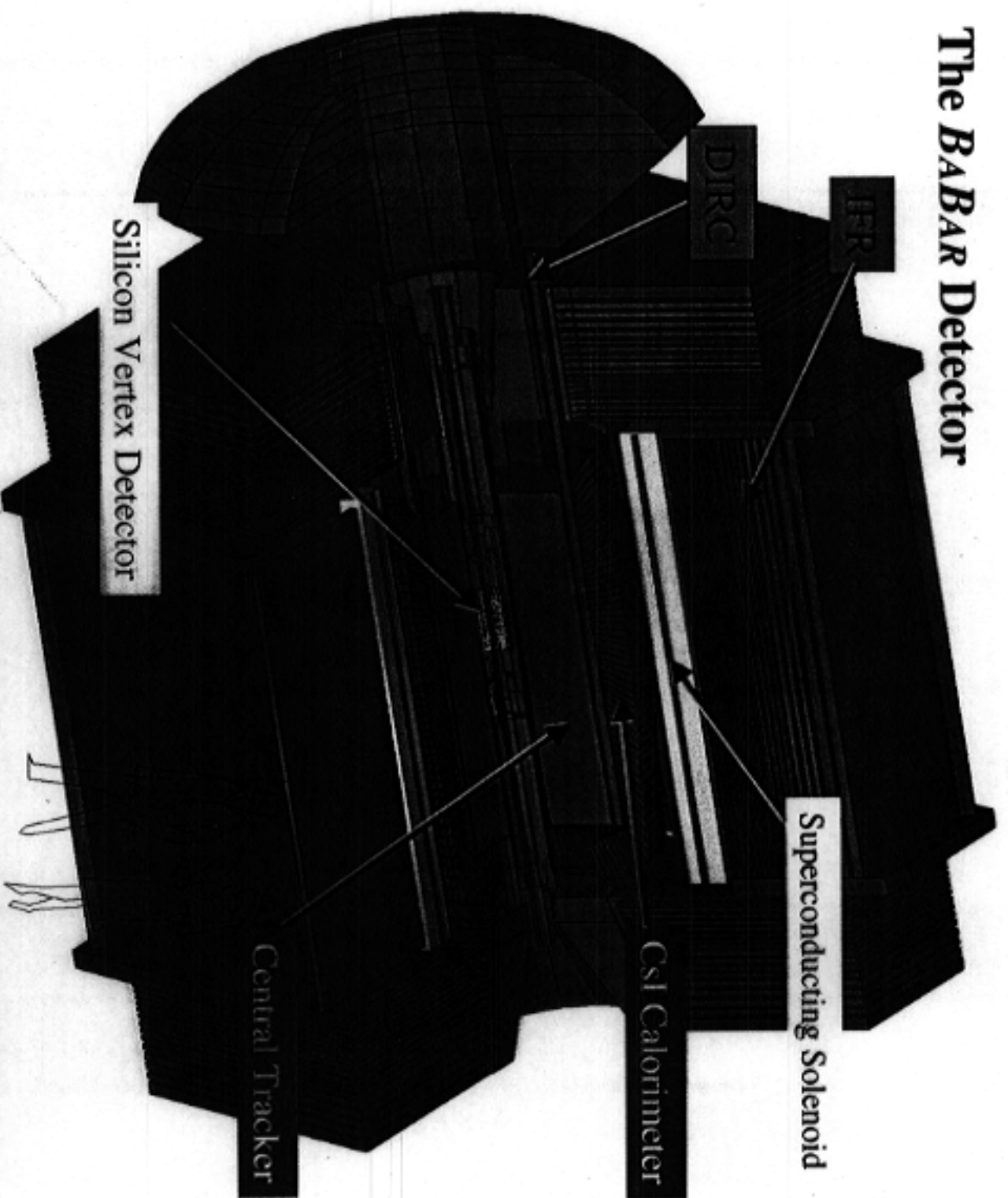
U of Birmingham
U of Bristol
Brunel University
U of Edinburgh
U of Liverpool
Imperial College
Queen Mary & Westfield College
Royal Holloway, University of London
U of Manchester
Rutherford Appleton Laboratory

May, 1999



BABAR

The BABAR Detector

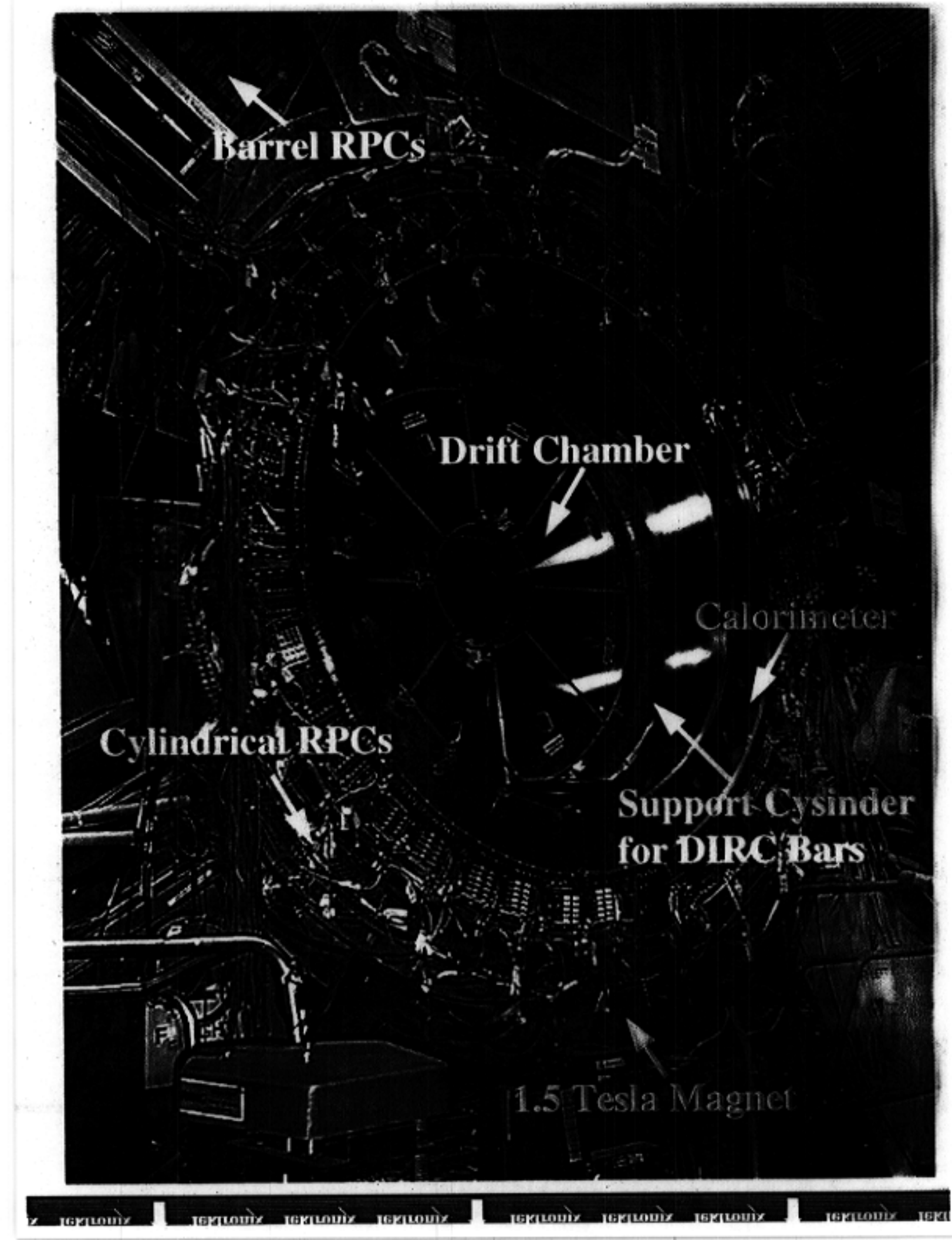


J. V. B.



BABAR

DEVELOPED BY THE BABAR COLLABORATION



Barrel RPCs

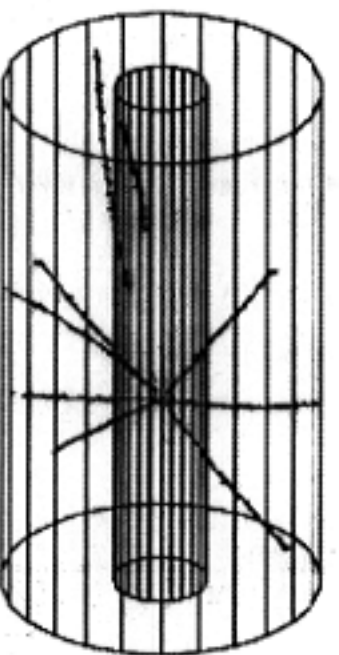
Drift Chamber

Calorimeter

Cylindrical RPCs

**Support Cylinder
for DIRC Bars**

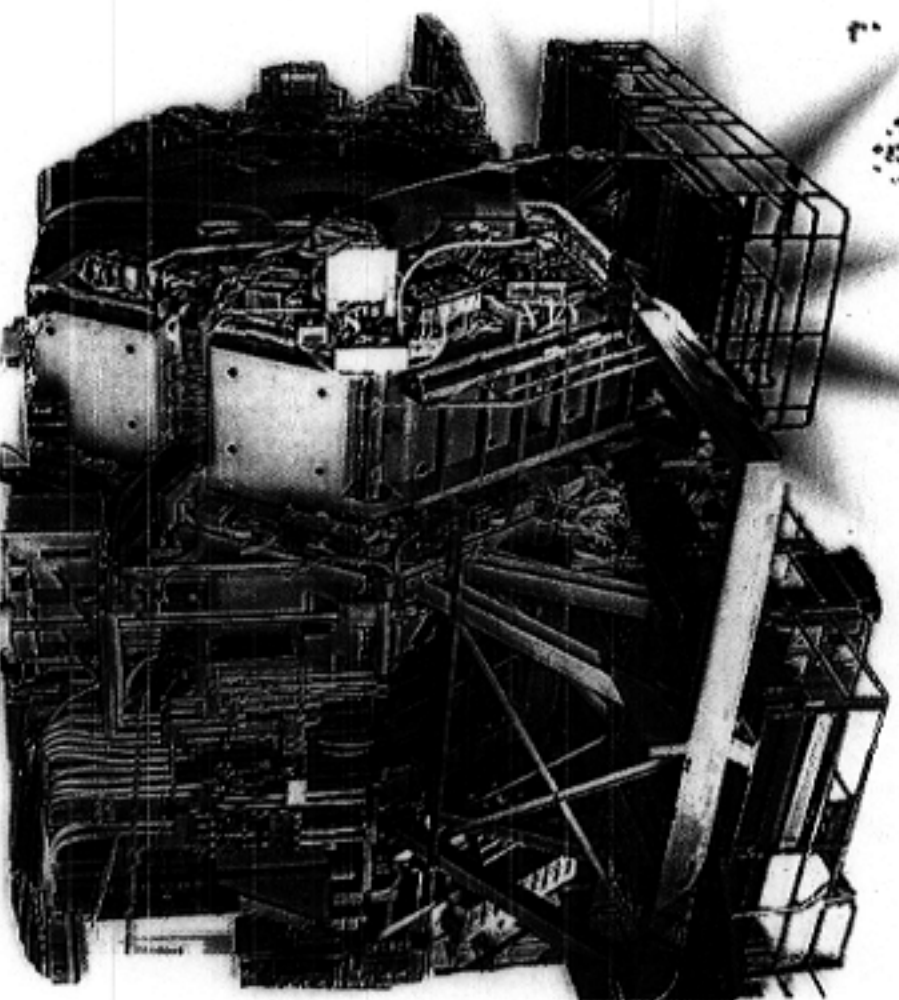
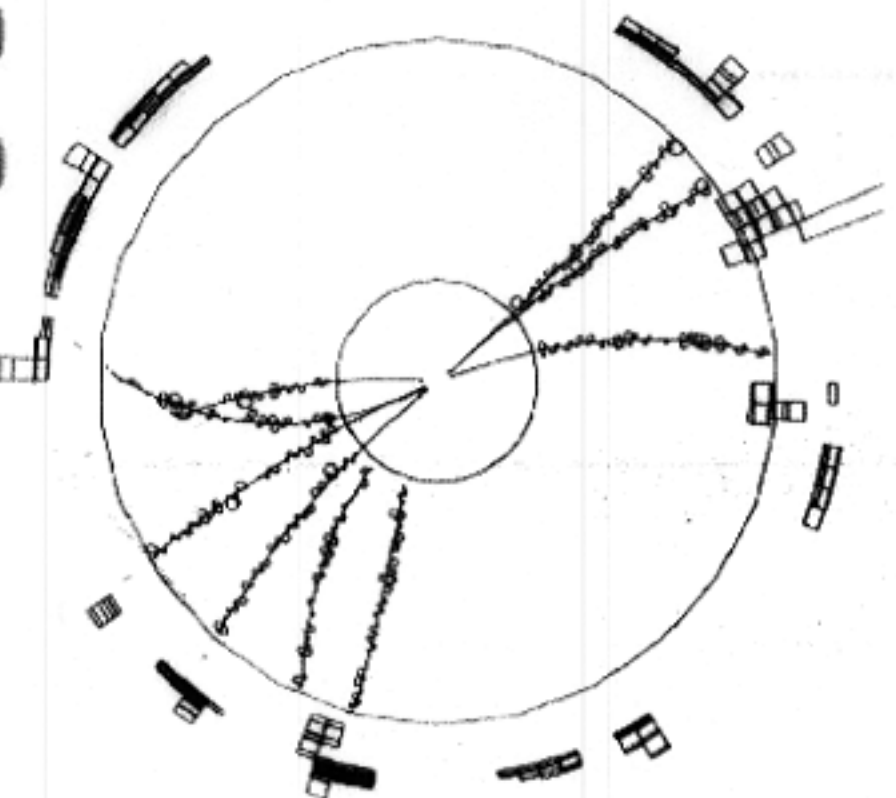
1.5 Tesla Magnet



First Collisions in *BABAR*

Hadronic Event

May 26, 1999

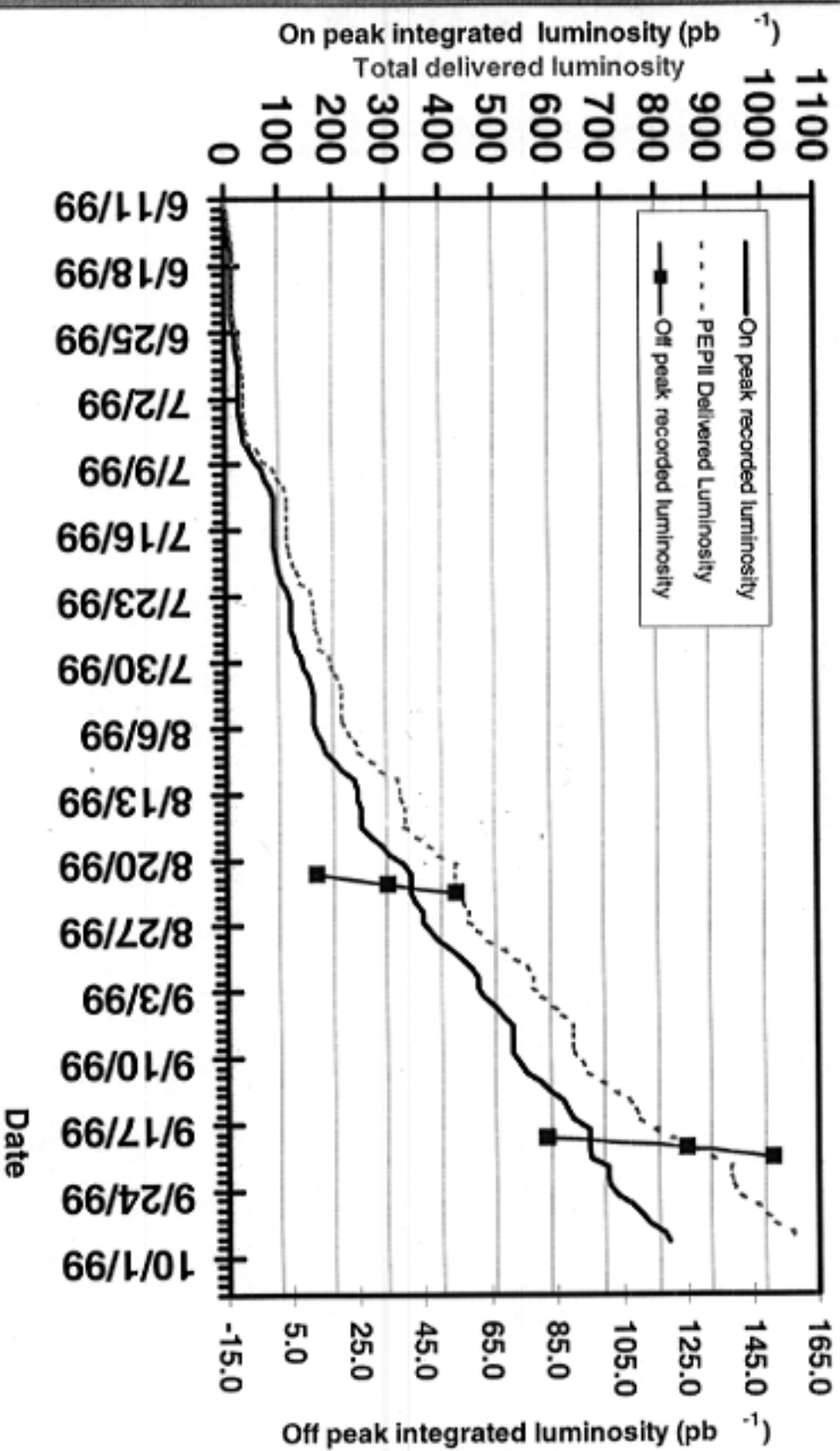


BABAR's first data run

- ☐ PEP-II is delivering excellent luminosity and *BABAR* is taking data efficiently
- ☐ As of the end of September 1999, *BABAR* has logged $\sim 1fb^{-1}$
- ☐ Detector device occupancies are at allowable levels at a luminosity of $1 \times 10^{33} \text{ cm}^{-2} \text{ sec}^{-1}$
- ☐ Occupancies are $\sim$ linear with current / luminosity
 - ☐ Continued vacuum improvement should allow us to run efficiently at design luminosity
- ☐ Radiation levels, including injection, are well within the pre-ordained budget
- ☐ Current run will continue until Christmas 1999, with a two-week hiatus starting October 4 to install the 8 missing DIRC Barboxes
- ☐ Running will commence again after Christmas. We anticipate a two-month shutdown in FY2000



BaBar Integrated Luminosity

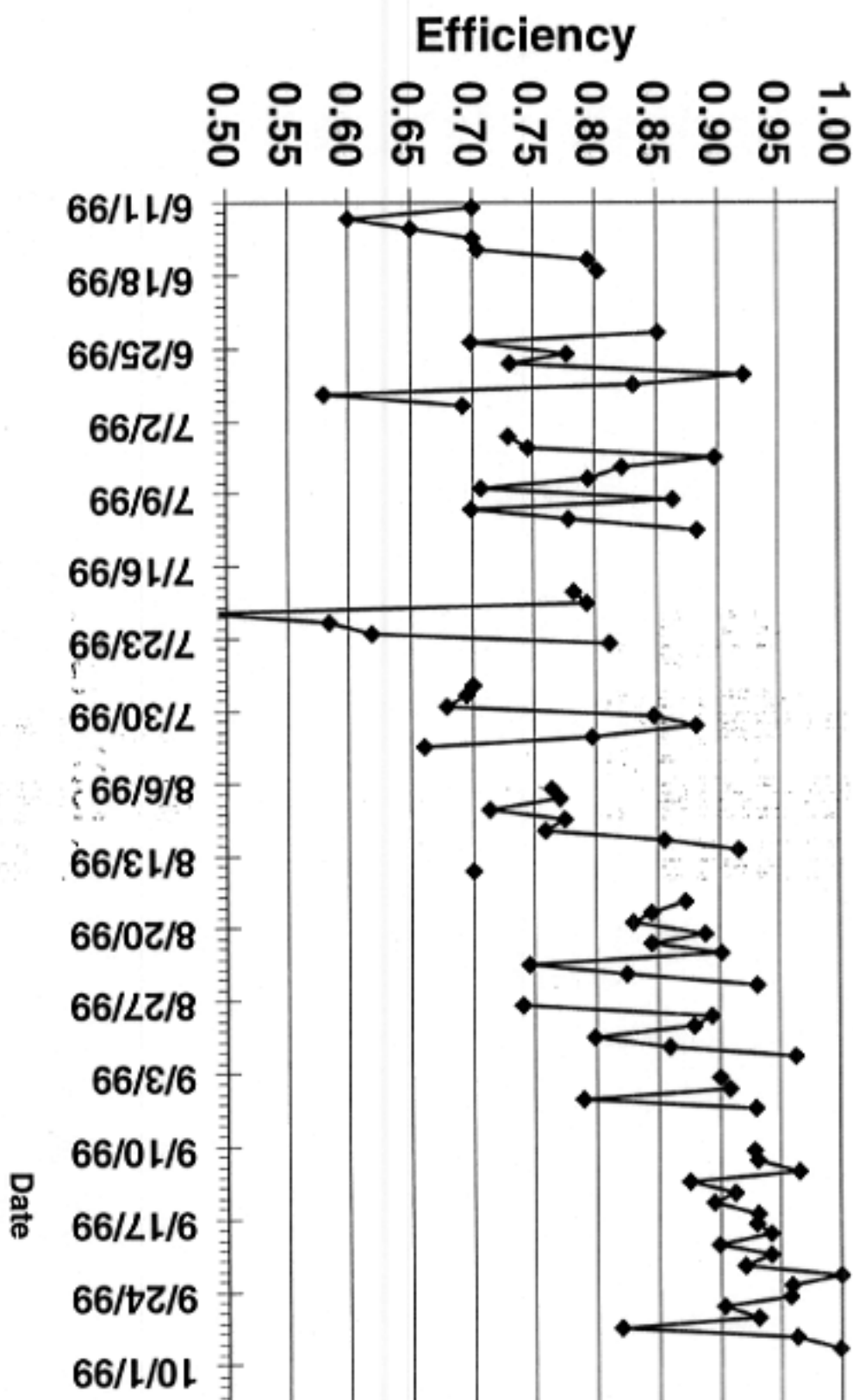


D. Hittin

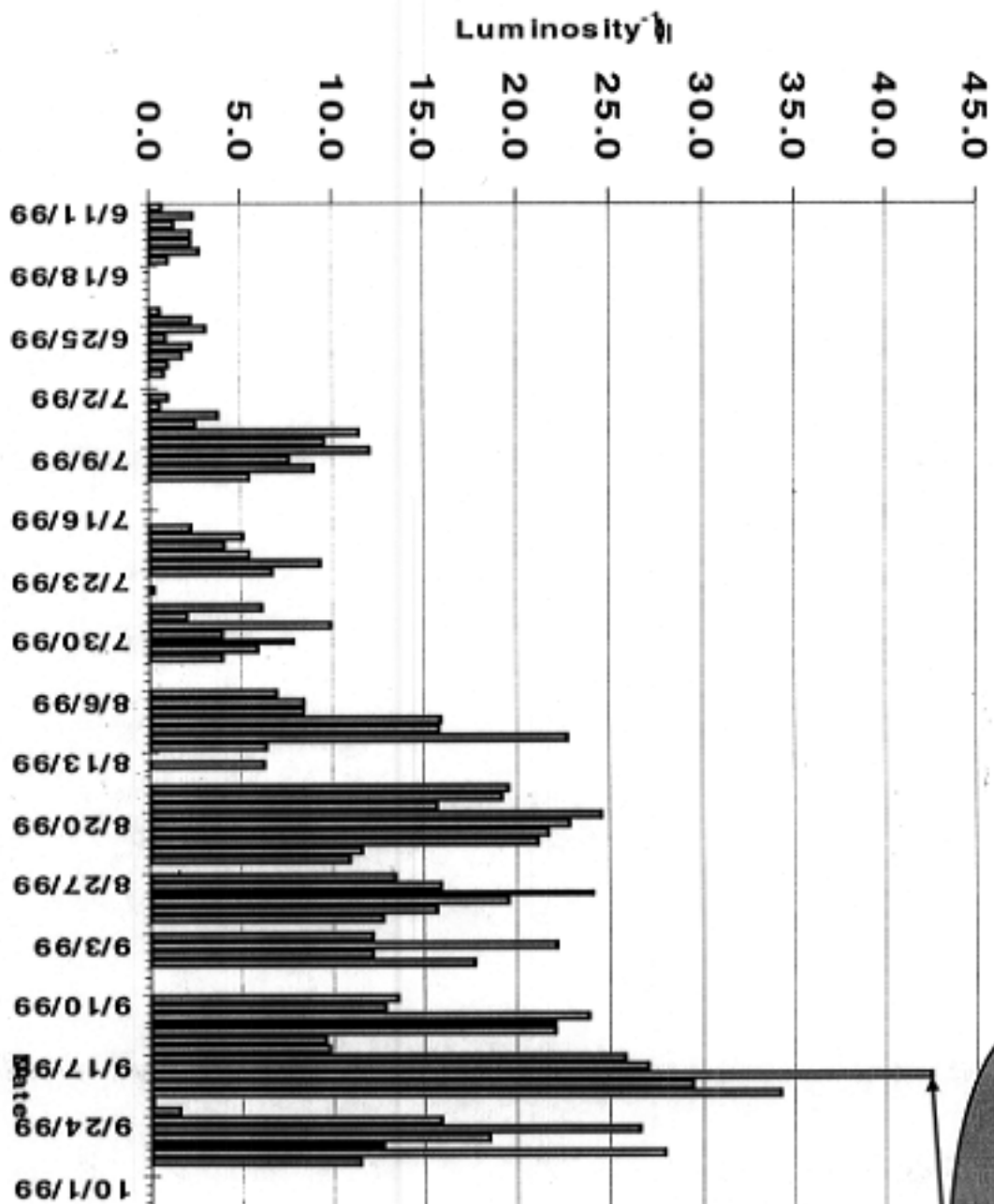
BaBar™ and © L. de Brunhoff

BABAR

BaBar efficiency



BaBar Daily Integrated Luminosity



World Record

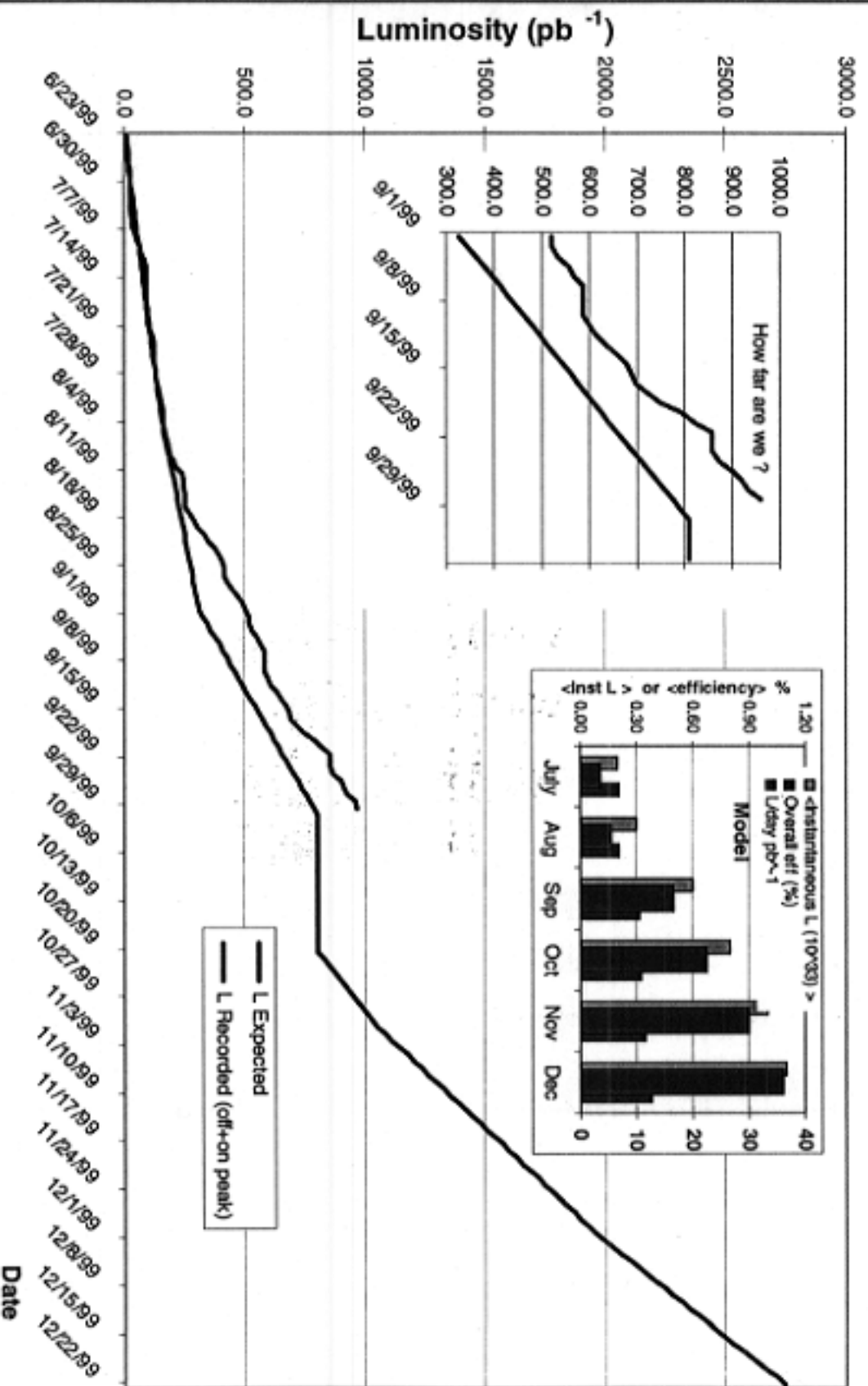


D. Hertz

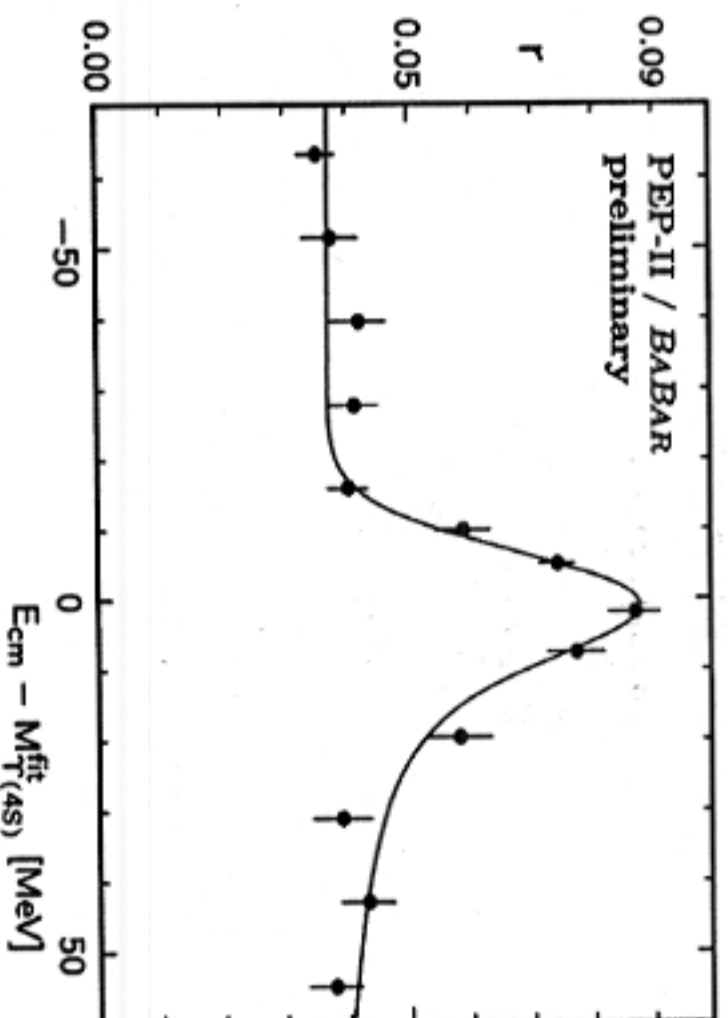
Babar™ and © L. de Brunhoff

BABAR

How much data might we expect?



$\Upsilon(4S)$ Energy Scan



$$M(\Upsilon) = 10.5841 \pm 0.0007 \text{ GeV}$$

$$\Gamma(\Upsilon) = 11.1 \pm 3.4 \text{ MeV}$$

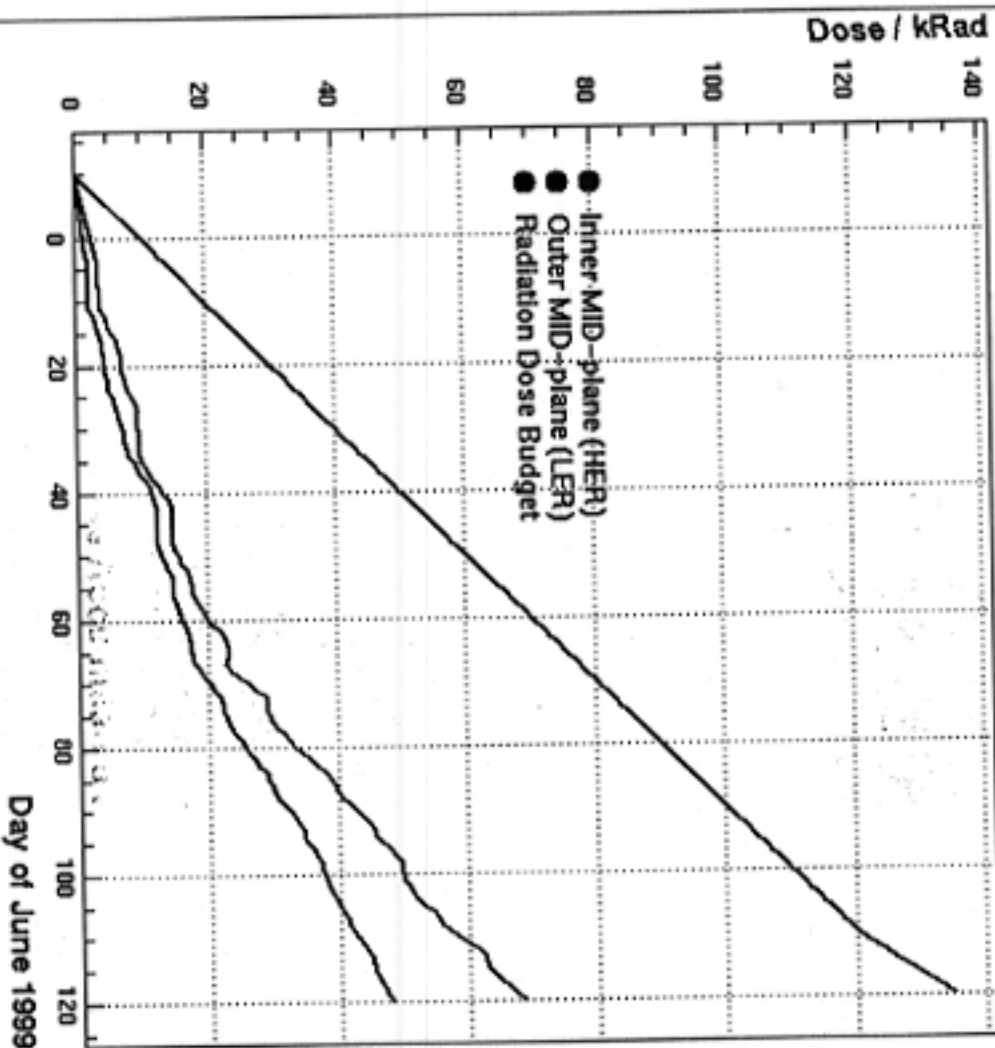
BABAR

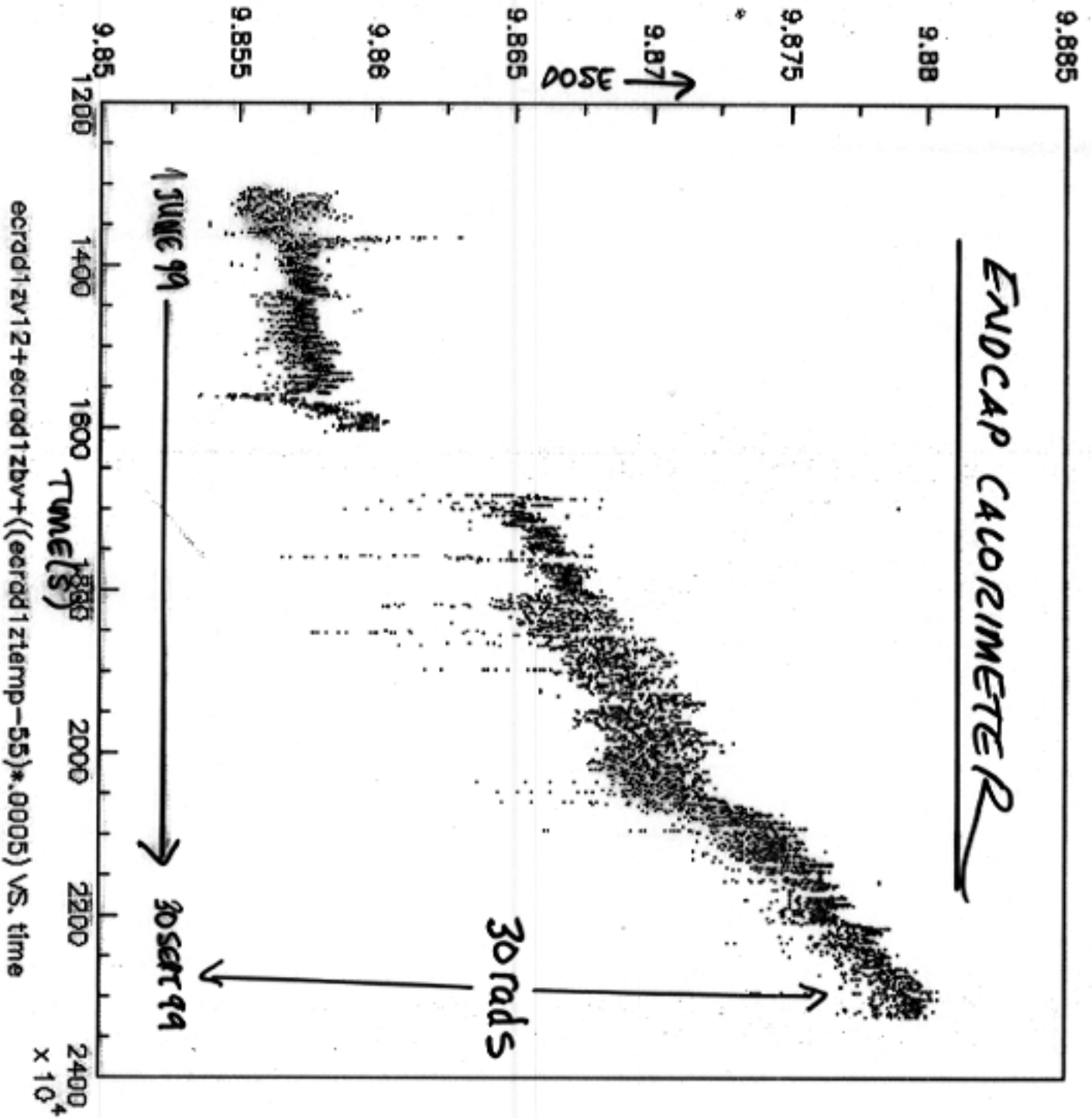
Babbar™ and © L. de Brunhoff

D. Hertz

SVT Radiation: Dose Accumulated and Budget

99/09/29 14.01

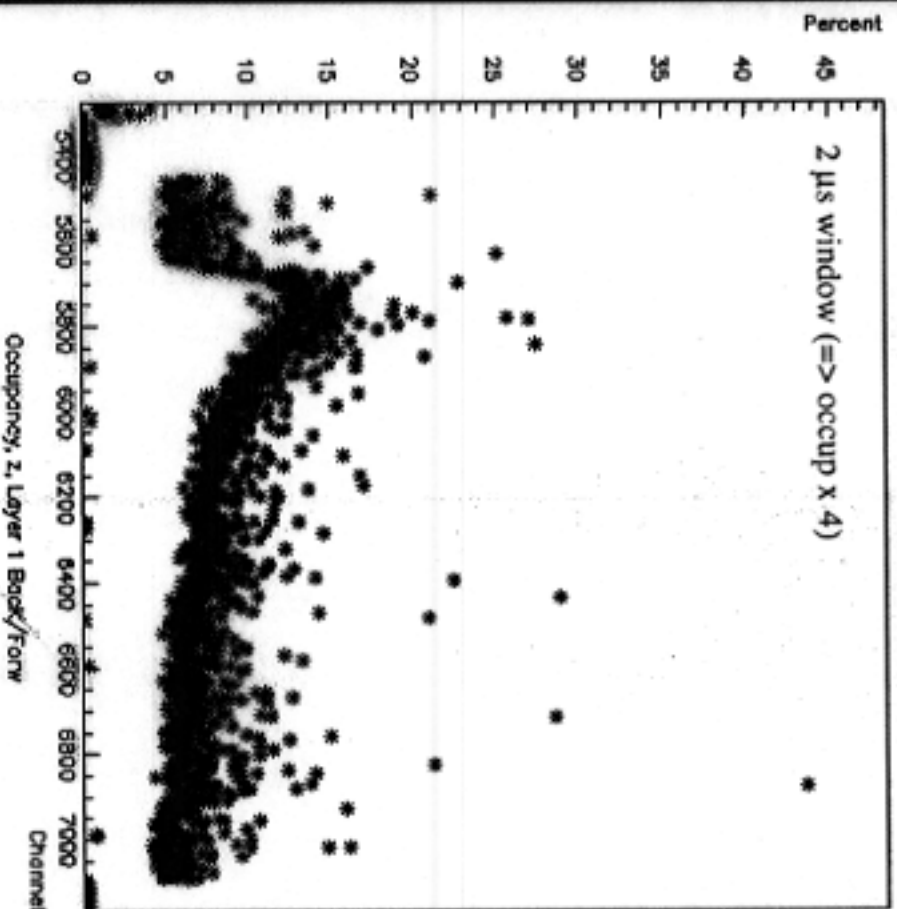




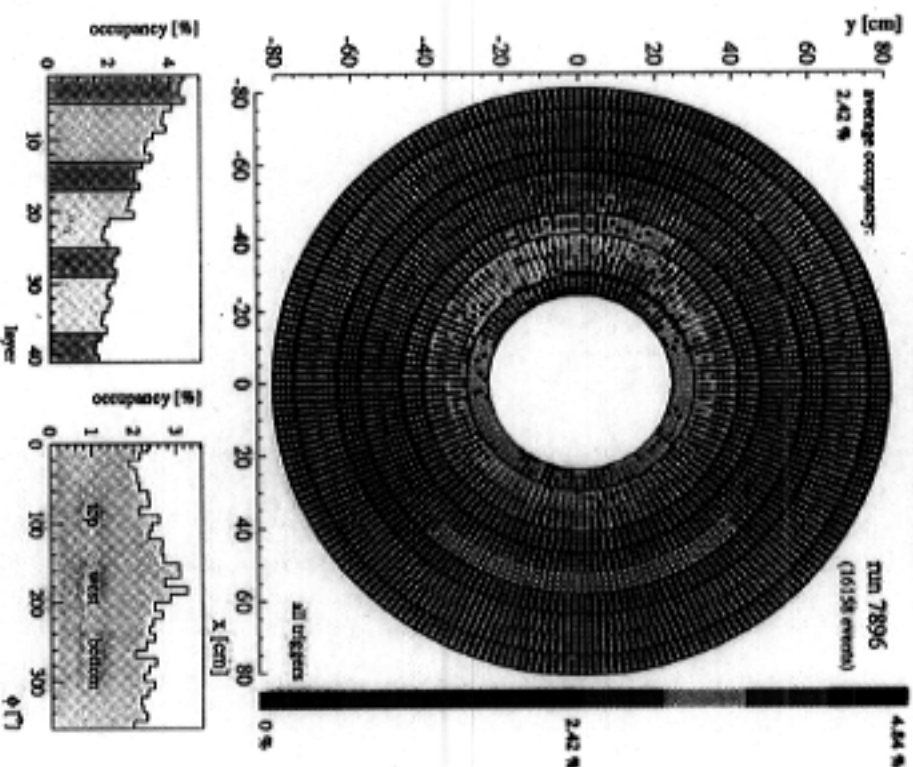
HEE
DOMINATED.

Background impact on detector performance

Silicon Vertex Tracker occupancy

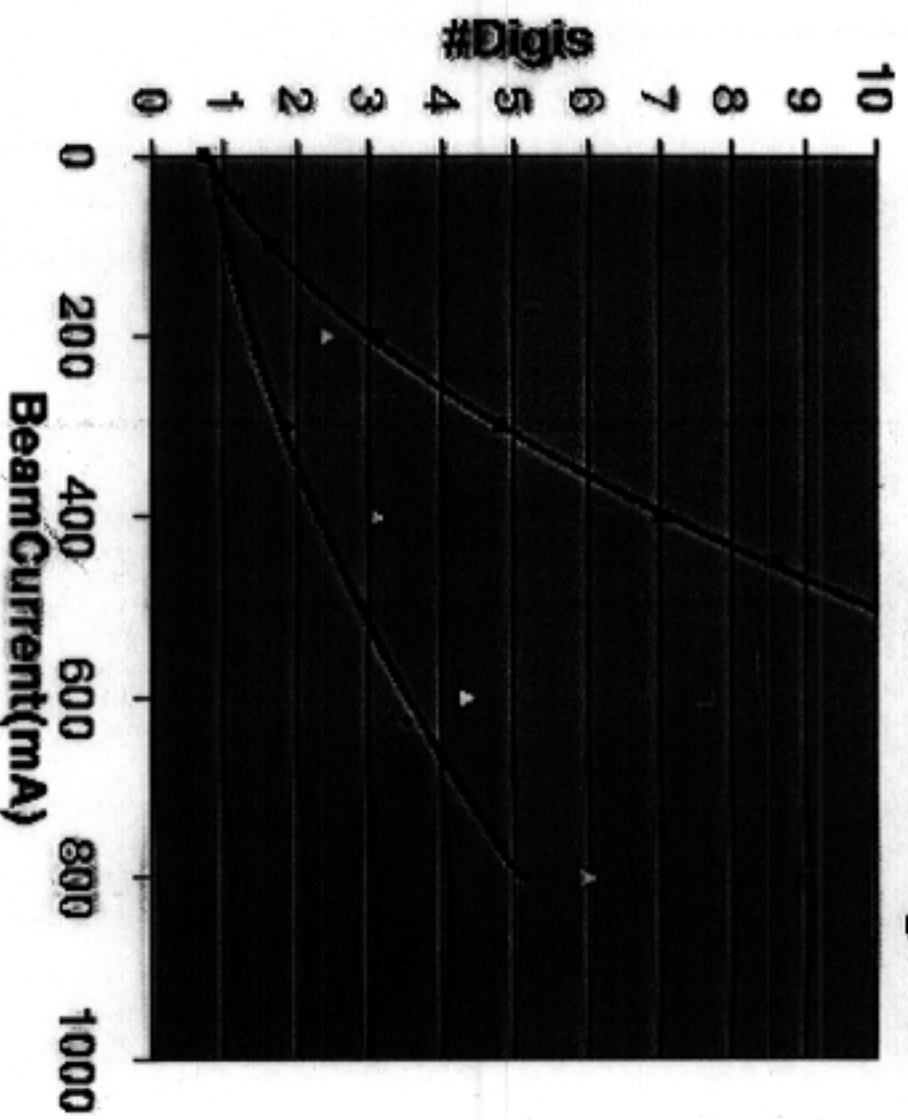


Drift Chamber Occupancy



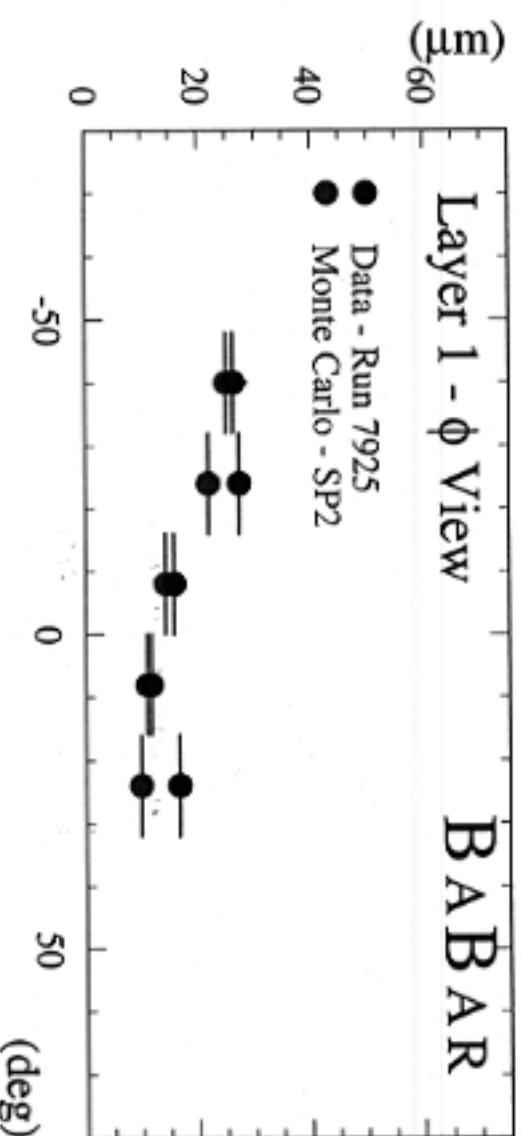
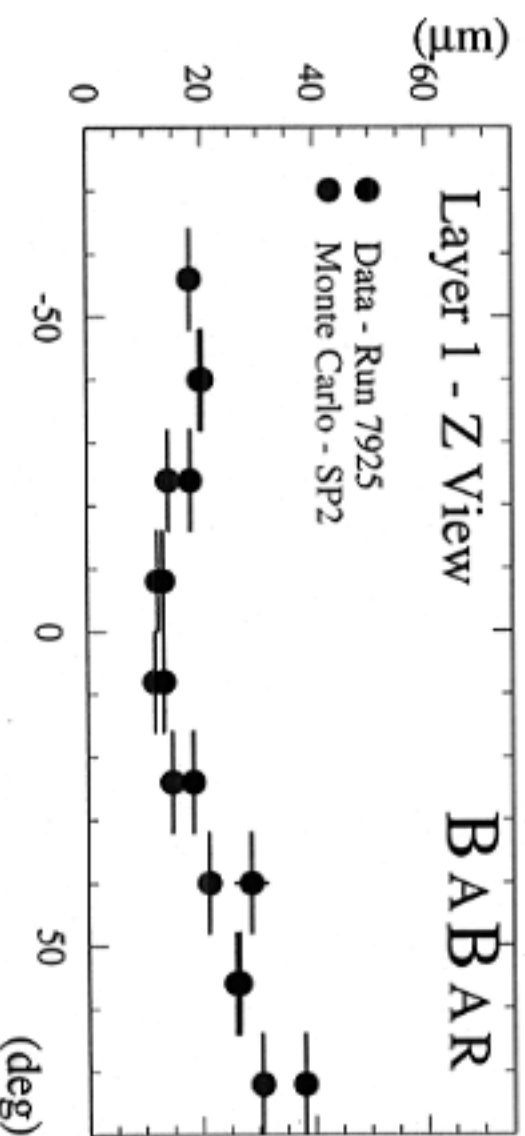
HER only, 450 mA

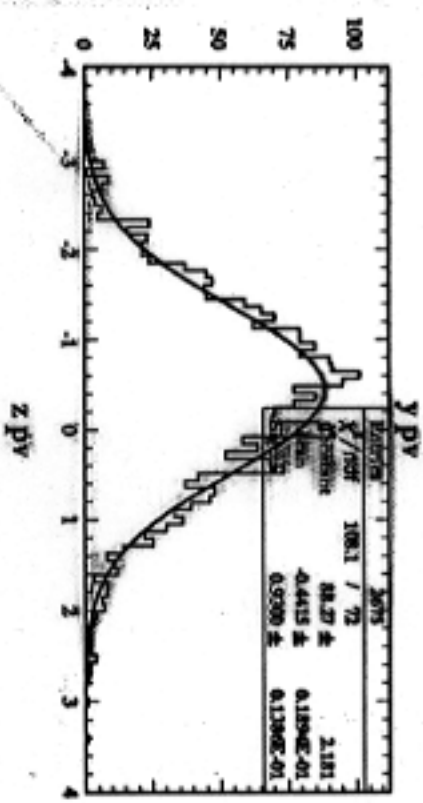
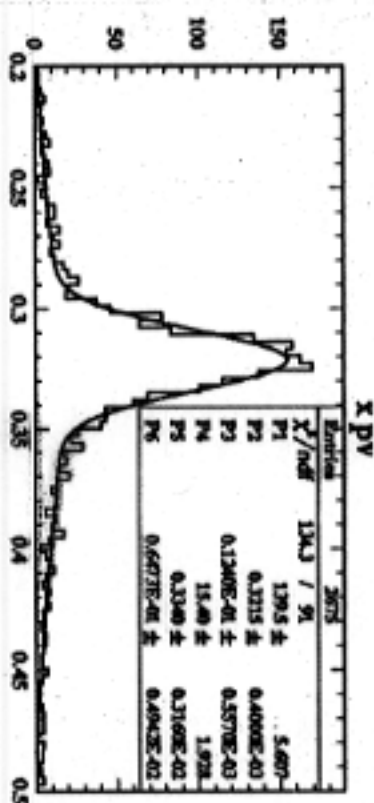
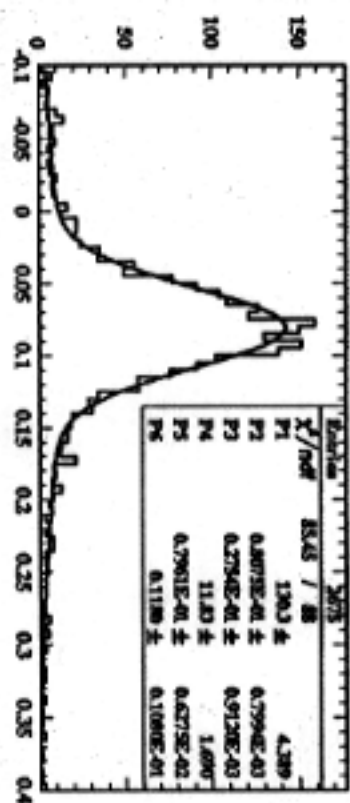
Digits > 5Mev (beam X trigger) vs Beam Current Non Colliding Beams



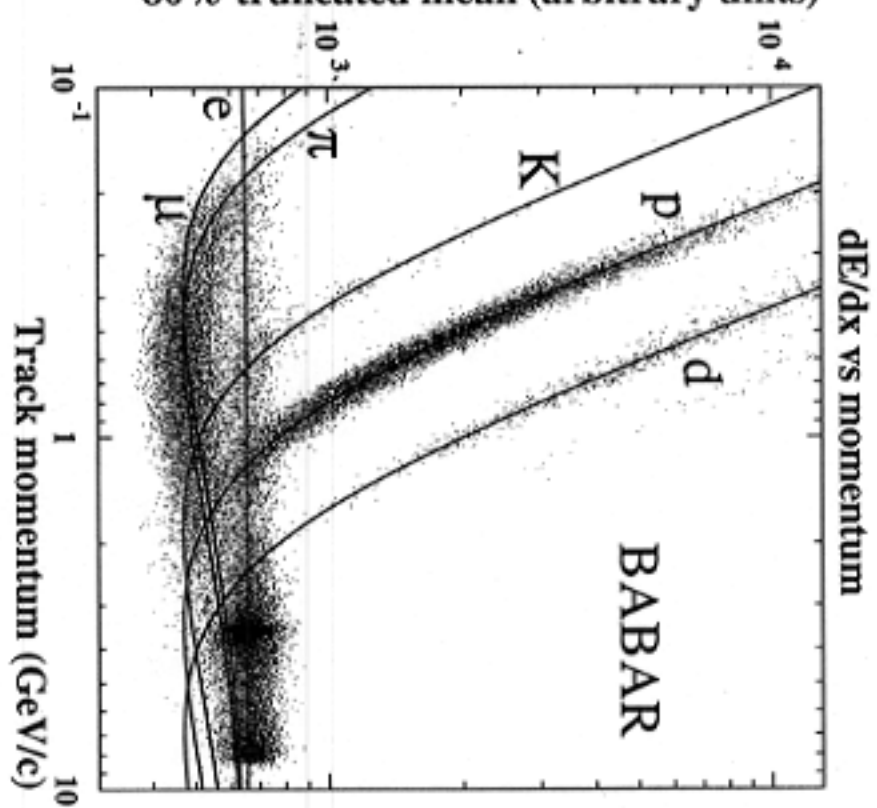
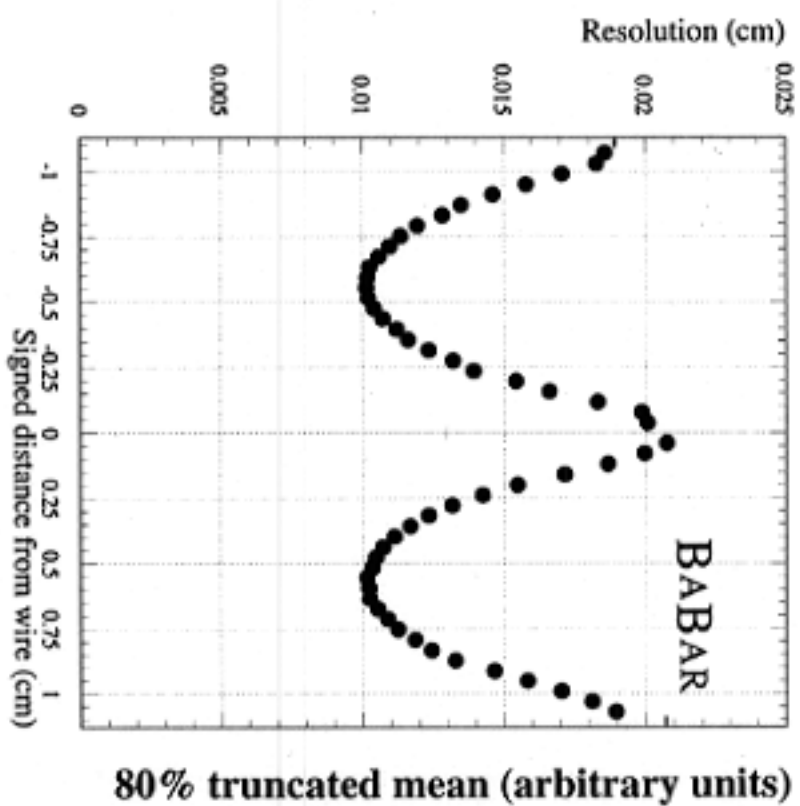
- ◆ LER only
- HER only
- ▲ LER with HER at 100mA
- LER with HER at 300mA

SVT Hit Resolution vs. Incident Track Angle

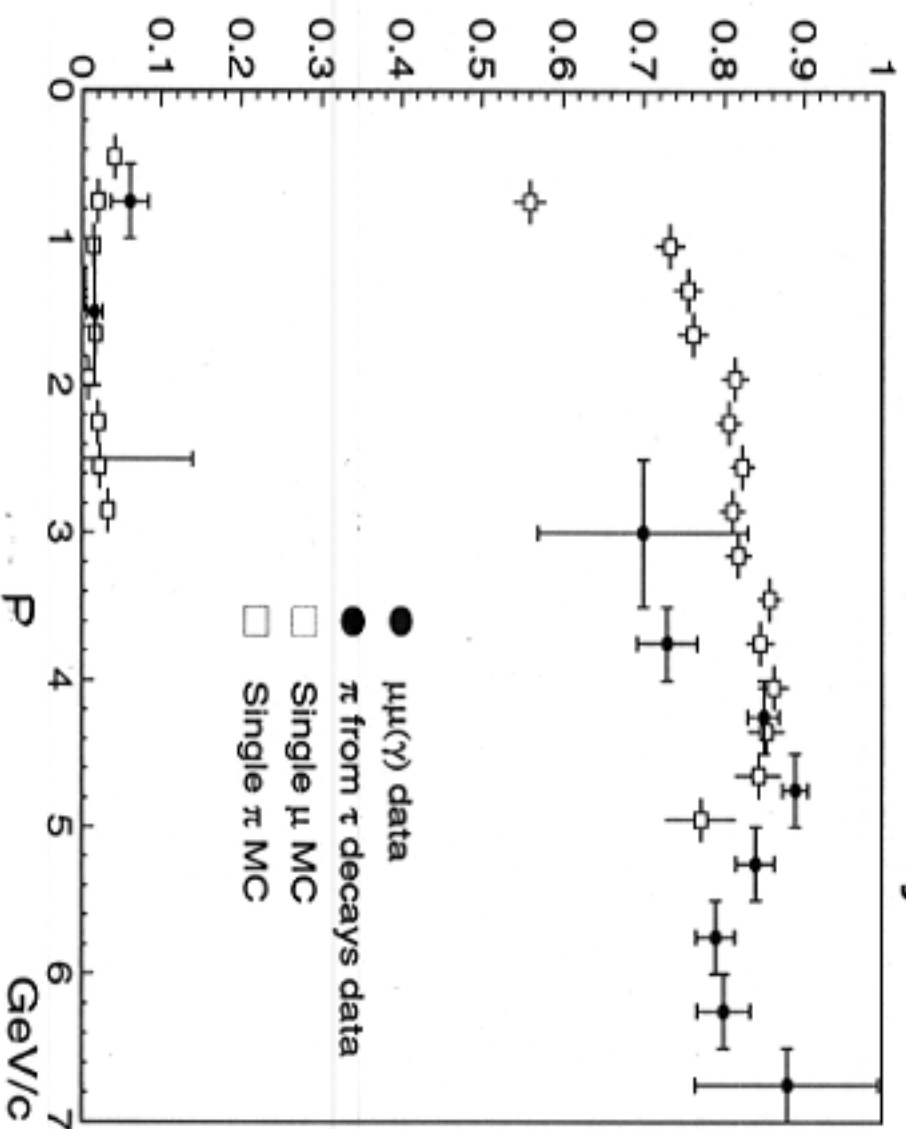




BAFAR



Muon ID Efficiency

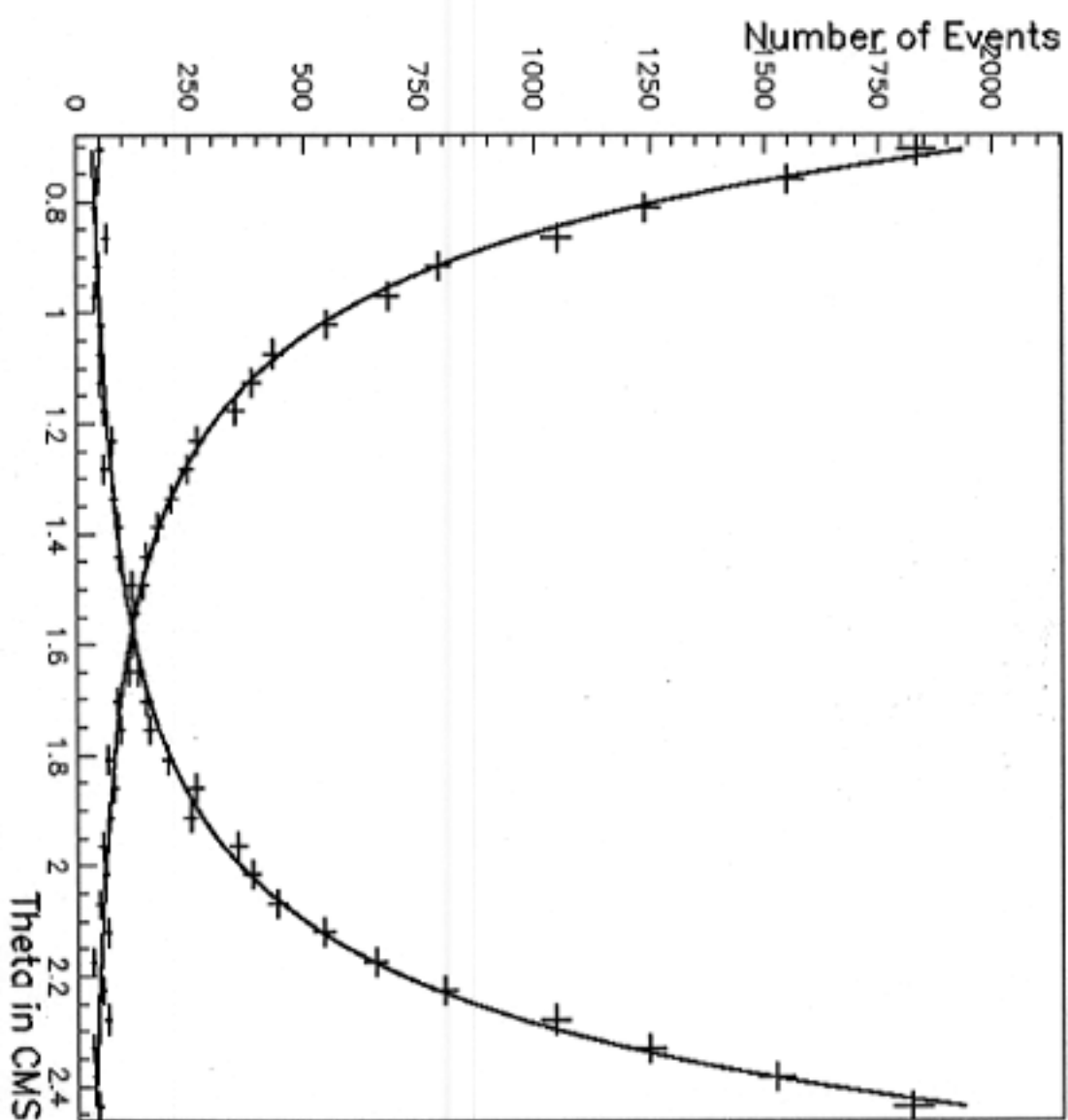


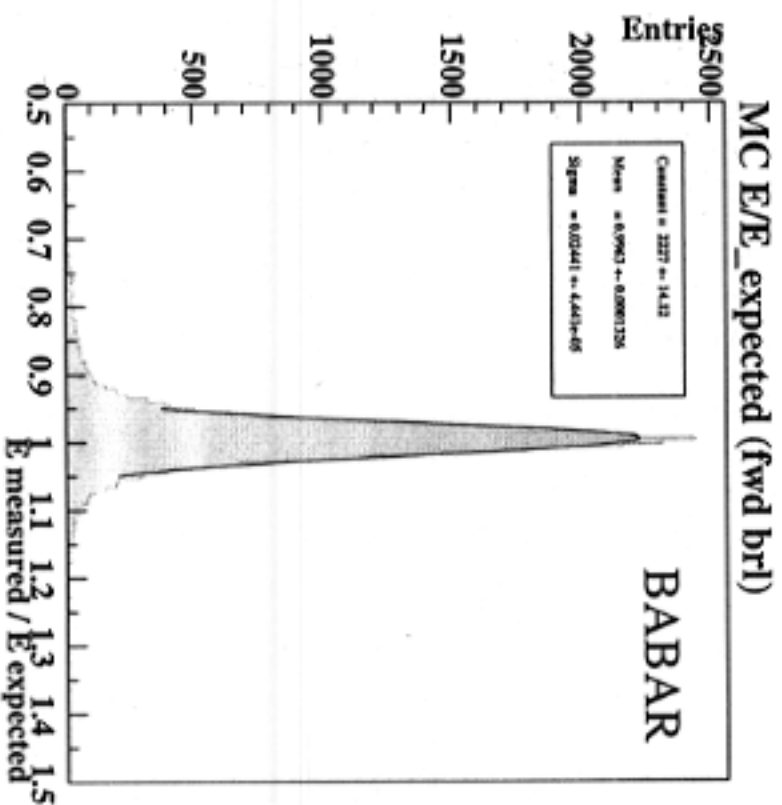
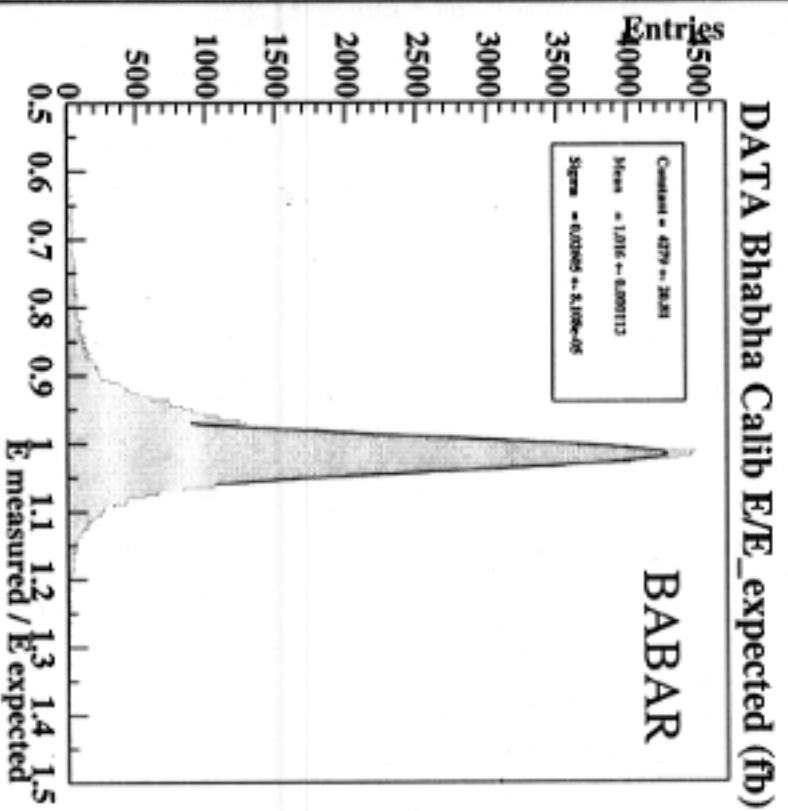
Trigger Rates and Data Analysis

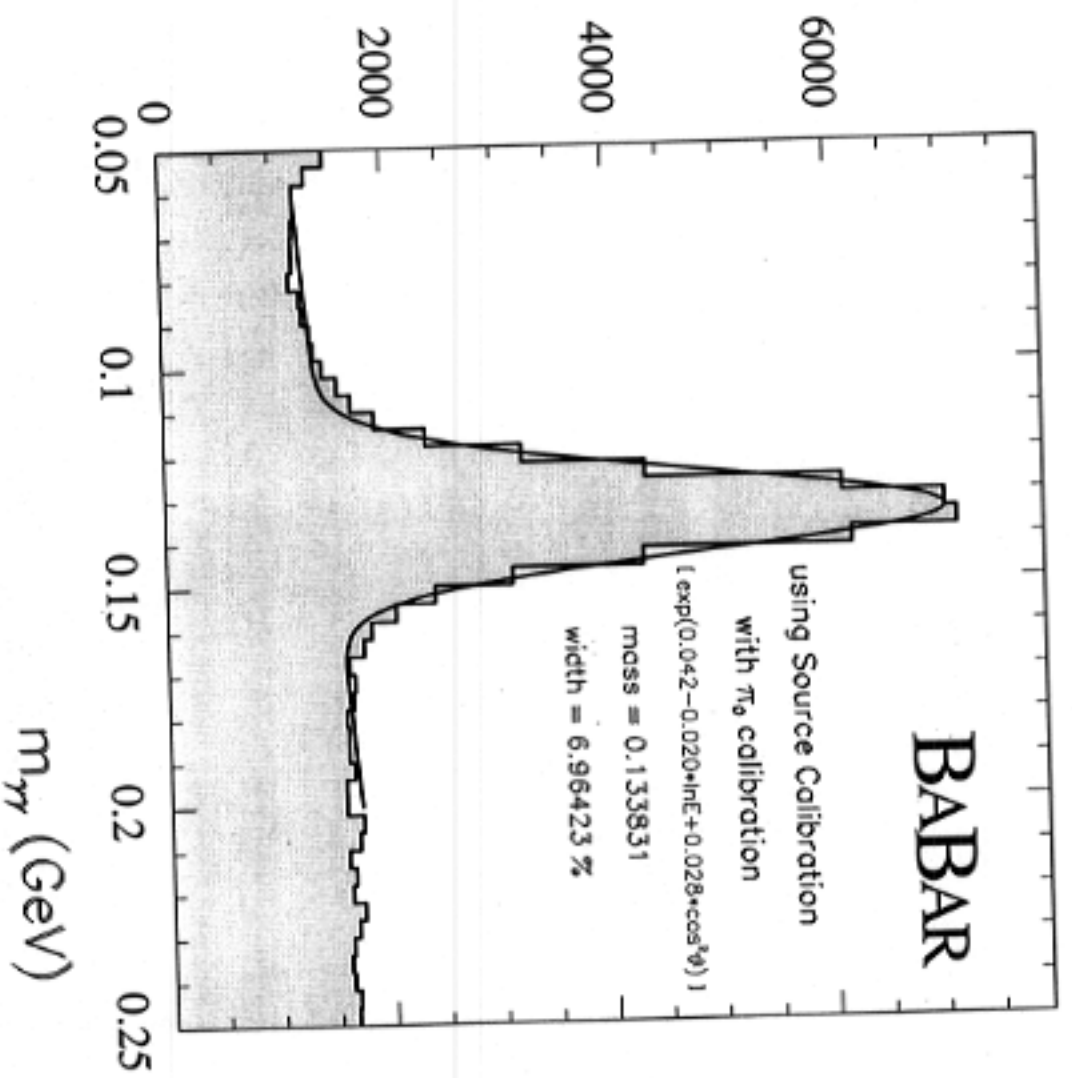
- ☐ Level 1 trigger rates at 1×10^{33} have averaged around 700 Hz
- ☐ Level 3, which has been run fairly open in order to study efficiencies yields a rate to disk of ~ 75 Hz
 - ☐ We will presently institute a more restrictive Level 3 trigger (veto for excess Bhabhas, geometric and p_T restrictions,) to enrich the sample
- ☐ The BABAR computing system design goal is to reconstruct 98% of events within two hours of their having been written on disk
 - ☐ This includes "rolling calibration", i.e., the use of constants derived from preceding runs in an automated way
 - This goal has not yet been achieved, but we expect to approach it within the next several months
- ☐ Event storage and retrieval is based on the Objectivity oo database
 - ☐ Learning to use this cutting edge tool has been painful, but Objectivity is in daily use and efficiency climbing rapidly
 - ☐ Development work continues with production ongoing
 - Architecture revisions have been made to allow both to proceed with minimal interference



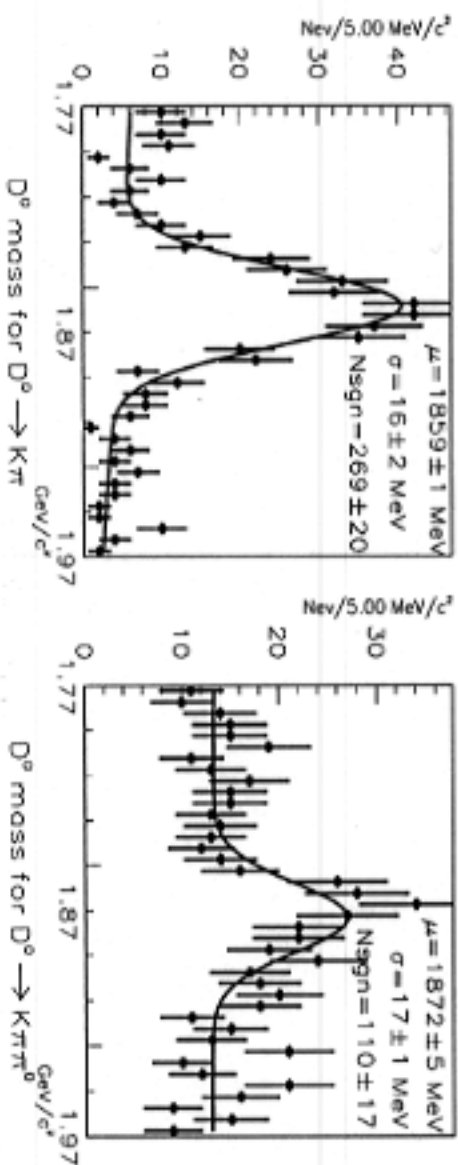
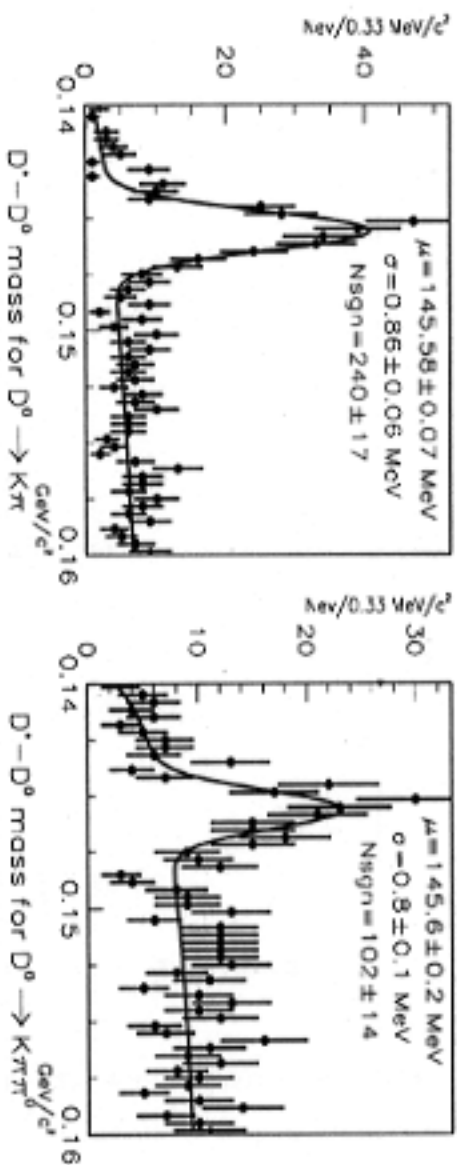
QED Fit to Bhabha Selected Events







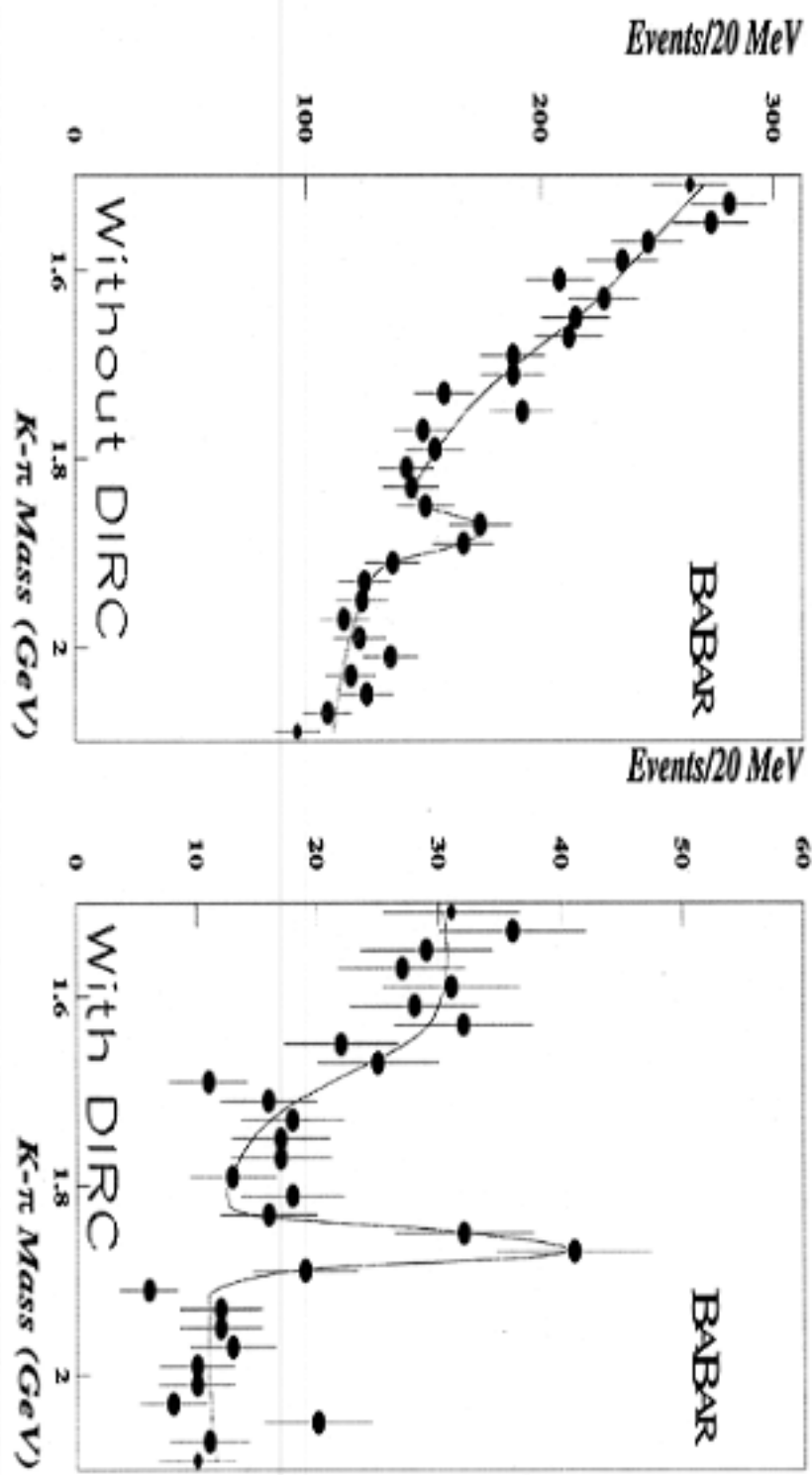
BABAR



D. Hahn

BABAR

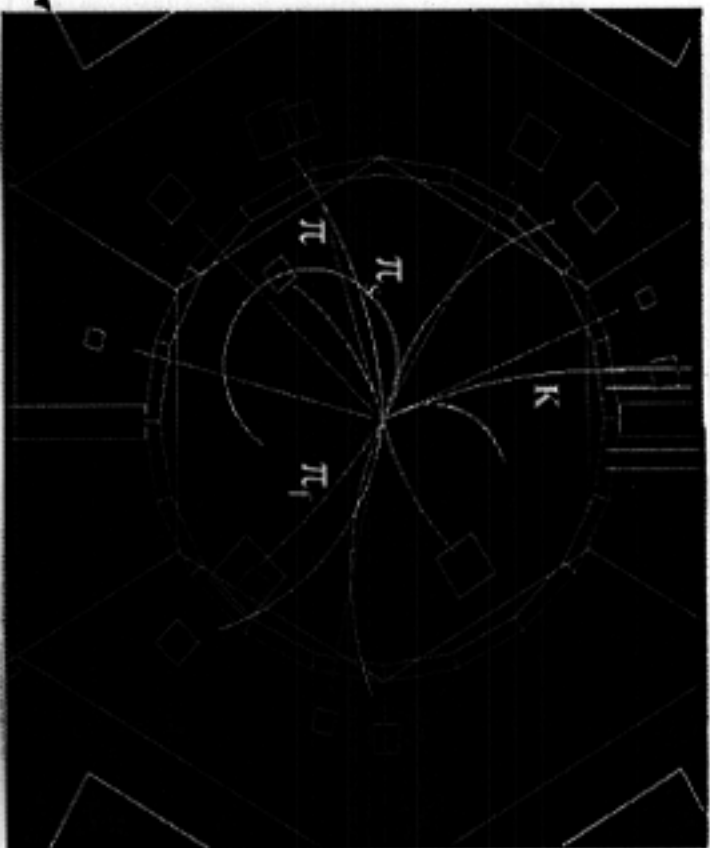
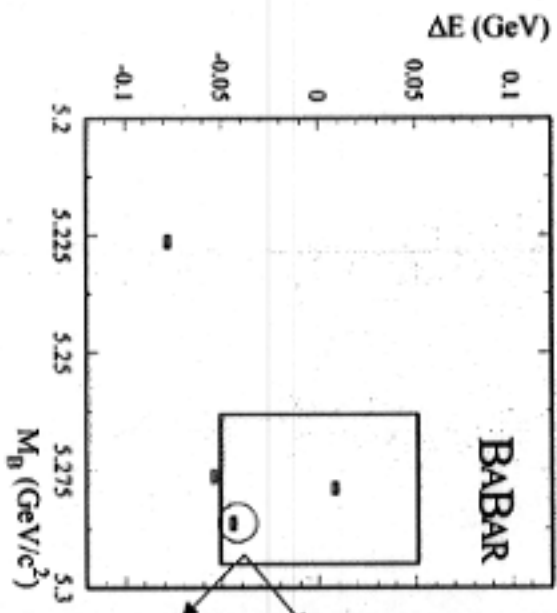
Babar™ and © L. de Brunhoff



$B^0 \rightarrow D^{*-} \pi^+$

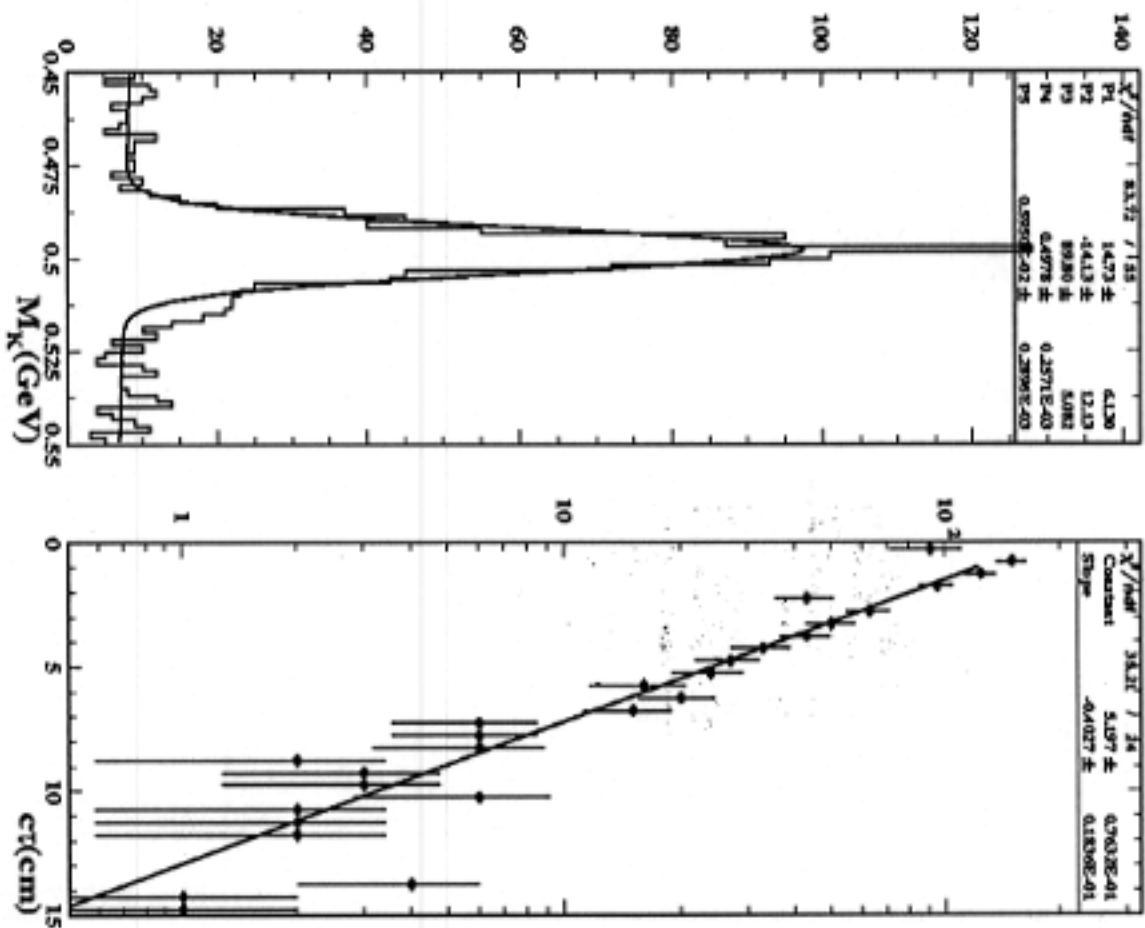
$\swarrow \bar{D}^0 \pi^-$

$\searrow K^+ \pi^-$



BABAR

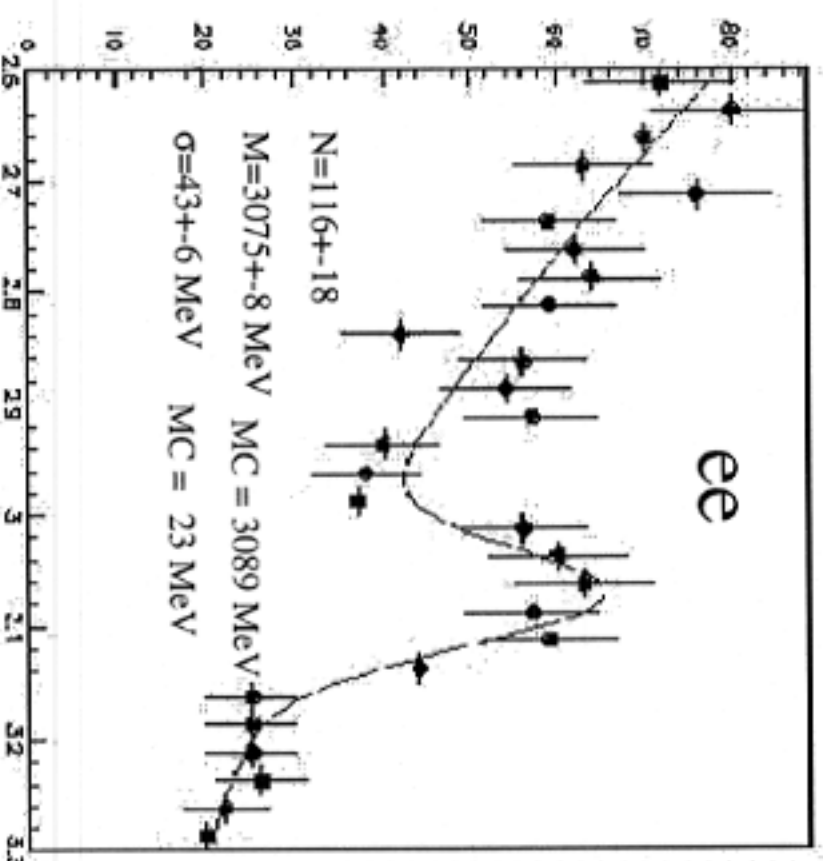
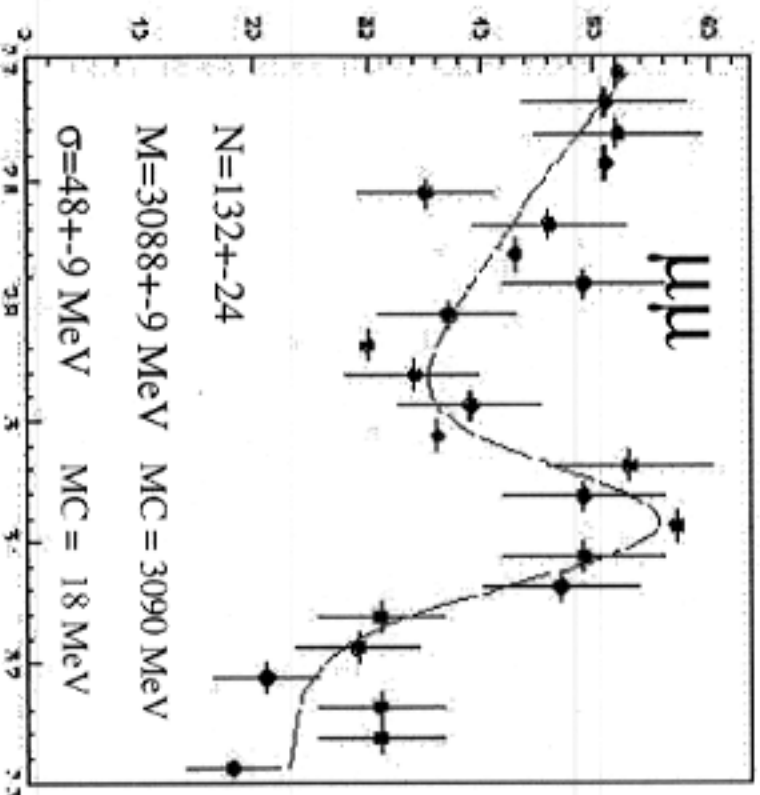
SLAC-PH-97-017, hep-ex/9701017



DATA!

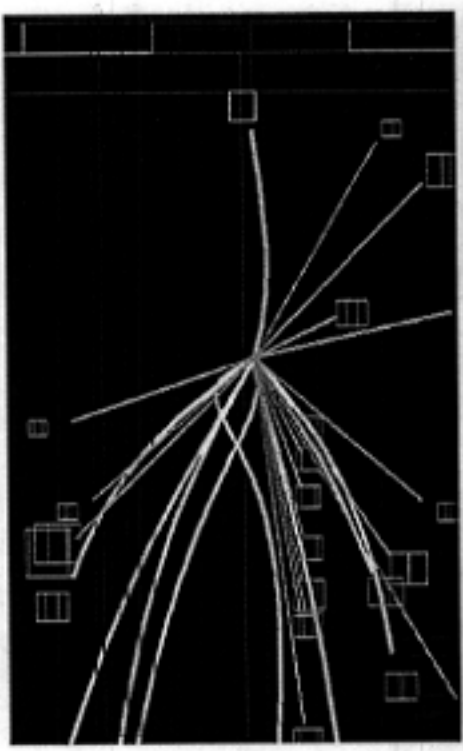
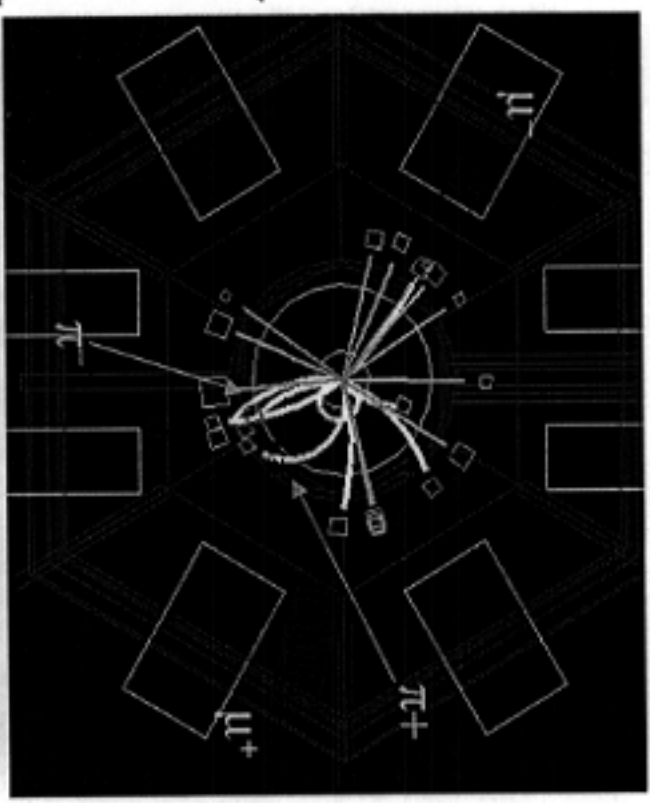
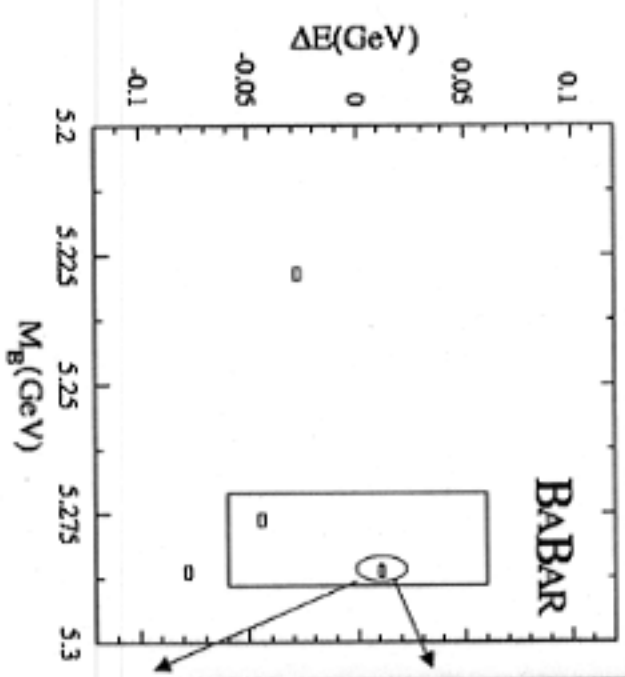
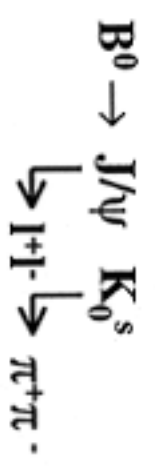
$L \sim 350 \text{ pb}^{-1} \Rightarrow$

$N_{\text{produced}} \sim 420 \text{ ee} + 420 \mu\mu$



Analysis on skim

ntuples shown since it is the highest statistics one (the others are consistent)

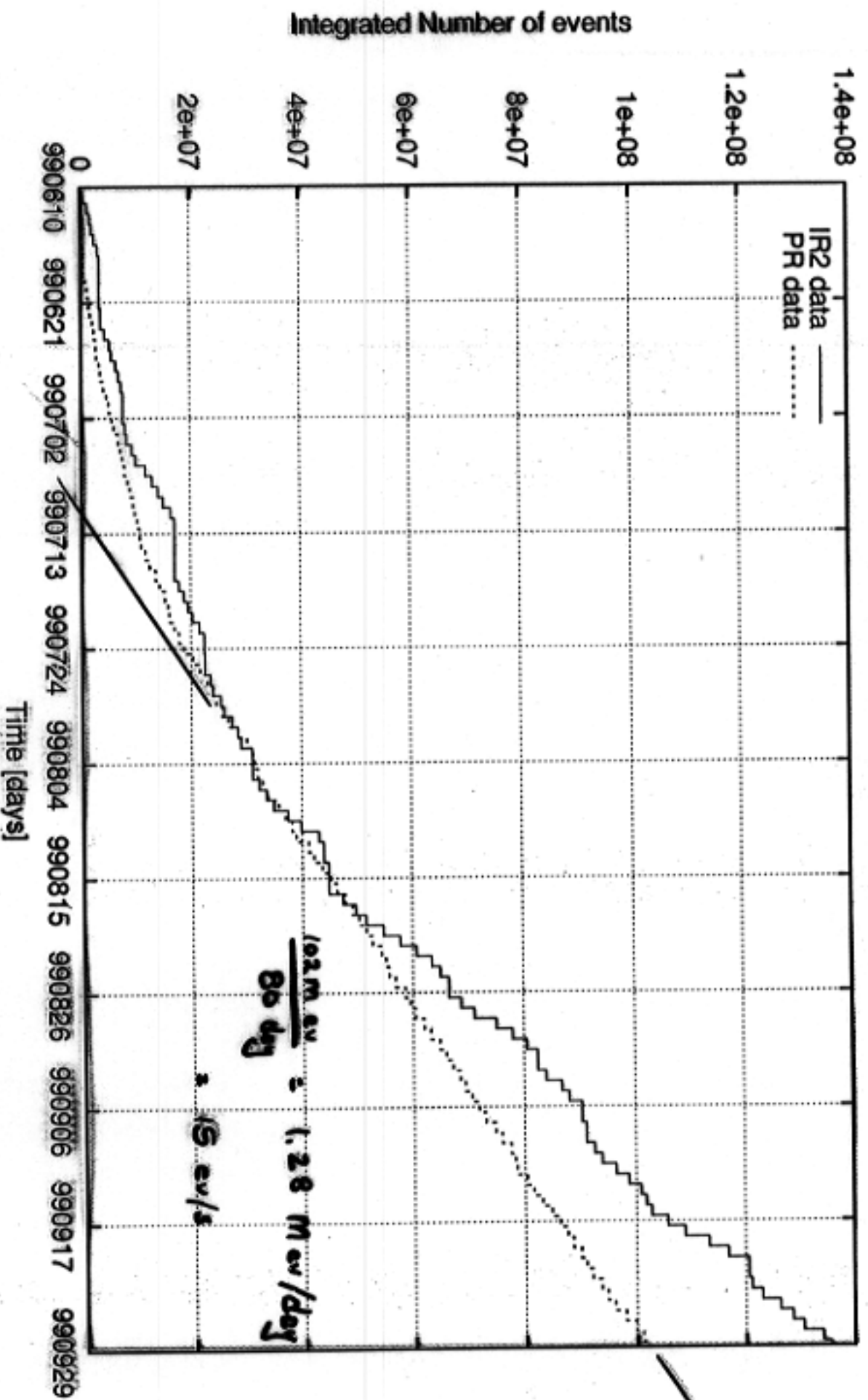


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D. Heikin

Event Production (Ev.diff.=33904537)



9/29/1999

