

The Apparatus

The ECAL has 30 layers which are 24 radiation lengths in depth, with 1 cm² readout segments for its transverse granularity.

HCAL, located behind the ECAL, has 38 detector layers with 3 x 3 cm² tiles in the center, surrounded by 6 x 6 cm² tiles and 12 x 12 cm² tiles. It is 4.5 λ deep.

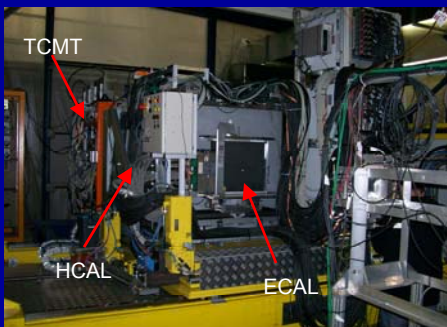
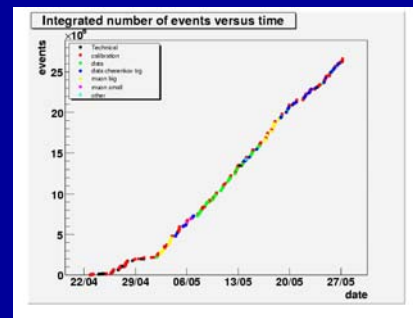
TCMT sits behind the HCAL, has 16 layers each containing 20 scintillator strips (1 m by 5cm), and has an interaction length of 6 λ; the strip are oriented perpendicular to each other in successive layers.

The CALICE collaboration is developing prototype calorimeters for the International Linear Collider. The apparatus is now in the Meson Test Beam Facility (MTBF) at Fermilab. It contains an electromagnetic calorimeter (ECAL), hadronic calorimeter (HCAL) and a tail catcher/muon tracker (TCMT). Data is being taken with electron, proton, muon, and pion beams.

Materials

The ECAL uses silicon-tungsten (Si-W) wafers as readout segments. The HCAL and TCMT use plastic scintillator with Silicon Photo Multipliers (SiPM) as the photodetectors. The SiPMs do not require magnetic shielding (unlike standard photo-multiplier tubes).

Test Beam



The Purpose

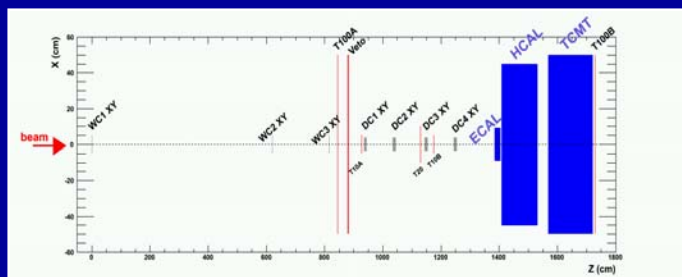
To collect a reference data sample to compare to the CERN data

To accumulate low energy (1-5 GeV) pion data (not done at CERN)

To provide a dataset which would allow for direct performance comparisons between different technologies in the same environment



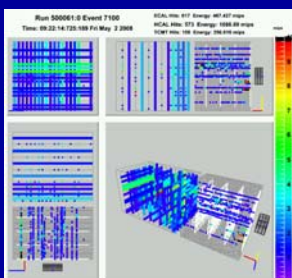
Apparatus Layout



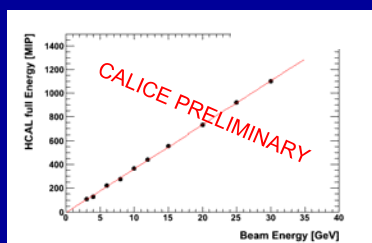
Data

FNAL MTBF	May 2008 complete	July 2008 tentative	2009 tentative
Particle	p, e ⁽⁺⁾ , π ⁻	p, e ⁽⁺⁾ , π ⁻ (π ⁺), μ ⁻ (μ ⁺)	data collection with gaseous hadron calorimeters
Energy (GeV)	1 - 120	1 - 120	
Angles	0, 10, 30	0, 10, 15, 20, 30	

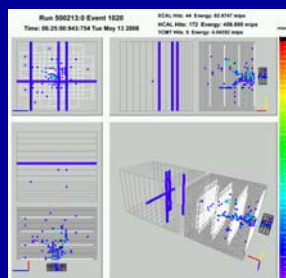
Muons



Pions



-15 GeV Pions



Electrons

