

First look at H6 combined testbeam 2004 data

ATLAS Meeting

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► Data quality

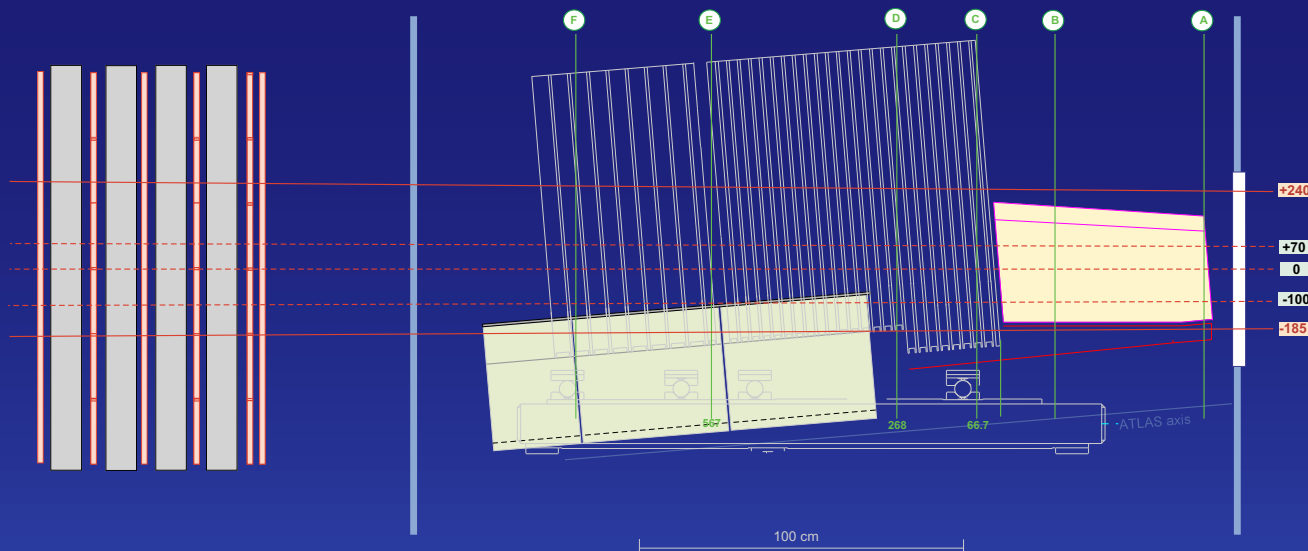
- only basic signal reconstruction so far
- fixed sample or polynomial shape fit – no digital filtering
- one calibration constant for each layer – no channel-to-channel calibration

► Cabling bugs

► Alignment

► Reconstruction

- Reco is done in athena
- Standard Topo Clustering
- Event Display examples



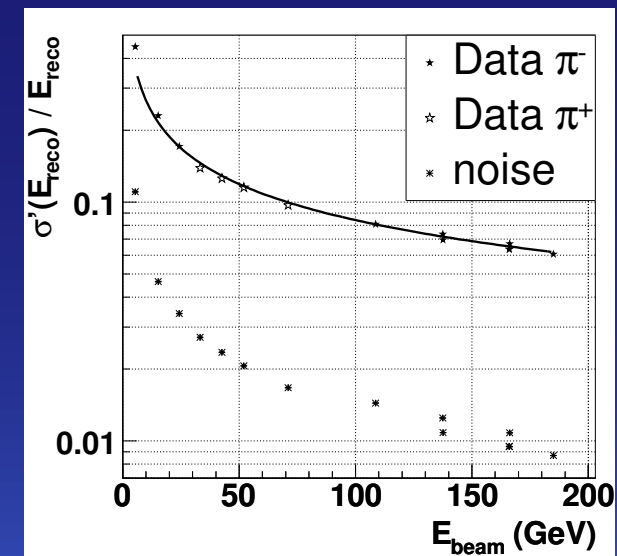
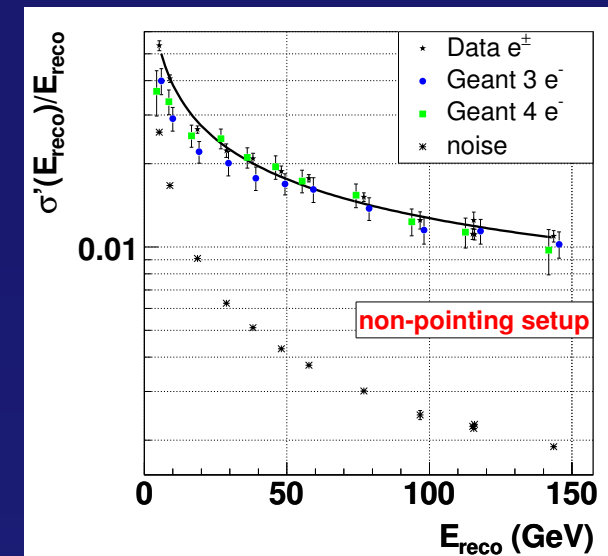
► Rob's monitoring page

<http://atlas.web.cern.ch/Atlas/GROUPS/LIQARGSOFF/TestBeam/Monitoring/>

explains how to run on H6 data

- full analysis is possible with standard athena code
 - constants for digital filtering and calibration are being worked on
 - for the time being use cubic fit to pulse shape (above 50 ADC counts) and maximum sample (else)
- most data was taken in **MEDIUM** gain for HEC and EMEC, **AUTO** gain for FCal
- $\sigma_{\text{noise}} = 200(660, 480)$ MeV for EMEC (HEC, FCal)
 - compared to CBT-EC1 factor of 10 larger noise in EMEC (would be factor of 2 with **HIGH** gain) and 3 in HEC (would be 1 with **HIGH** gain) – probably too much for good resolution for electrons, but o.k. for pions
 - need to repeat electron runs with **HIGH** gain or **AUTO** gain

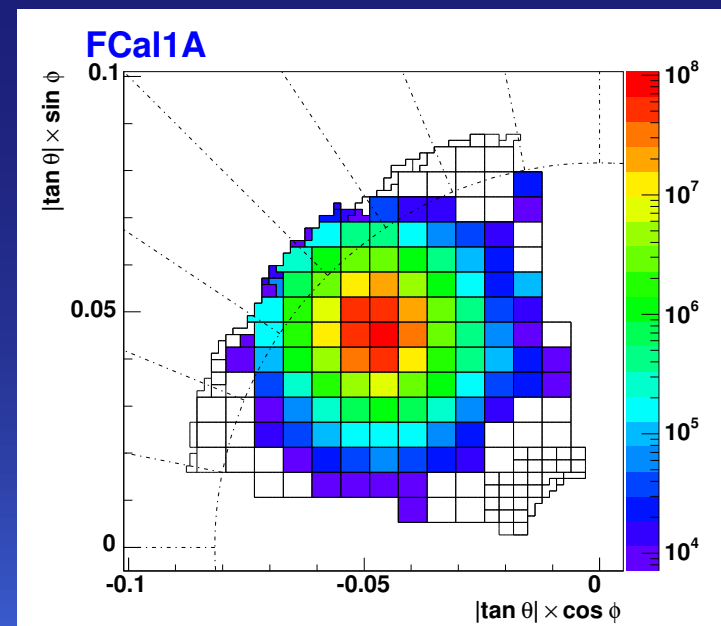
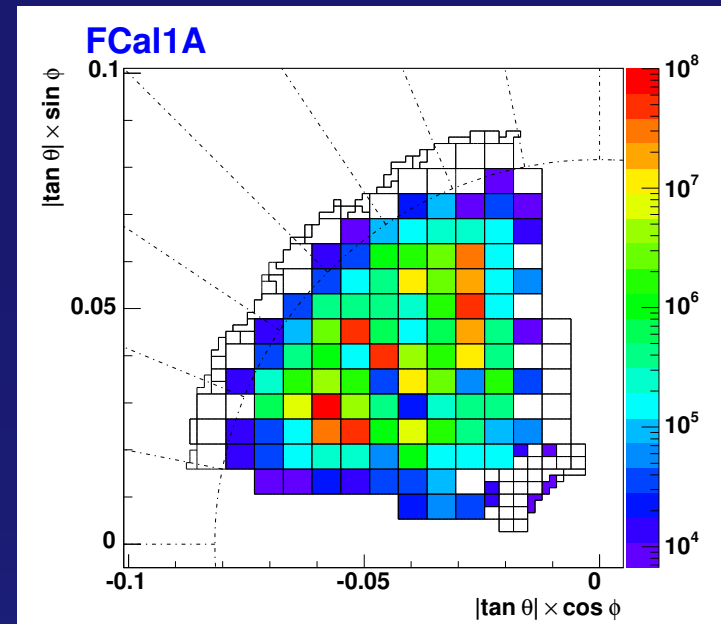
CBT-EC1 plots (2002)



Cabling bugs

- ▶ FCal module 0 should have been cabled as quadrant II on side A – actual cabling is quadrant II on side C
 - due to non-trivial `Identifier` mapping not so easy to convert everything to side C
 - kept everything on side A instead and swapped $\phi \rightarrow 1.5\pi - \phi$ for EMEC and HEC
- ▶ Some swaps on the FEB level have been found
 - sampling 1 and 2 were swapped for the EMEC
 - FCal channel numbers were swapped in 64-channel blocks ($1 \dots 64 \rightarrow 64 \dots 1$)

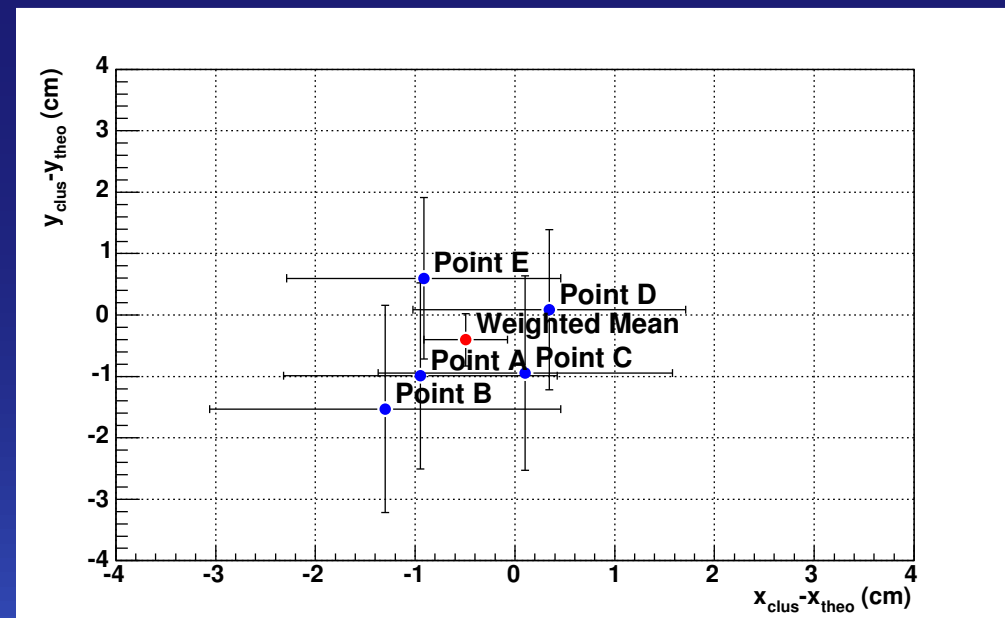
FCal channel swaps



HEC Alignment

- ▶ Unlike 2002 testbeam no cell boundaries parallel to beam
 - can't use simple cell boundary scan for alignment
 - take reconstructed cluster centers to compare with nominal impact position
 - take offset in y from Leonid's drawing: $y_0 = 53.1$ cm
- ▶ Results for mean of 5 standard points with 200 GeV π^- beams in TB coordinate frame:
 - $x_{\text{clus}} - x_{\text{theo}} = -0.49 \pm 0.42$ cm
 - $y_{\text{clus}} - y_{\text{theo}} = -0.40 \pm 0.43$ cm
 - no significant shift observed
 - uncertainty with 0.4 cm quite large

HEC cluster positions



Reconstruction

- ▶ Reconstruction is done in standard athena framework
 - can use `CaloTopoClusterMaker` for clustering
 - and get standard CBNT (combined ntuple)
- ▶ visualize H6 events (or other data) with <http://www.cern.ch/menke/CaloEventDisplayH6.tar.gz>
 - example shows $|\sum E_{\text{cell}}|$ for run Nr. 1068 (180 GeV, π^- , $x = -8.5$ cm, $y = -12.0$ cm)
 - projection is $x \rightarrow |\tan\theta| \times \cos\phi$, $y \rightarrow |\tan\theta| \times \sin\phi$,
 - keeps physical proportions in each layer
 - allows for easy matching in η

