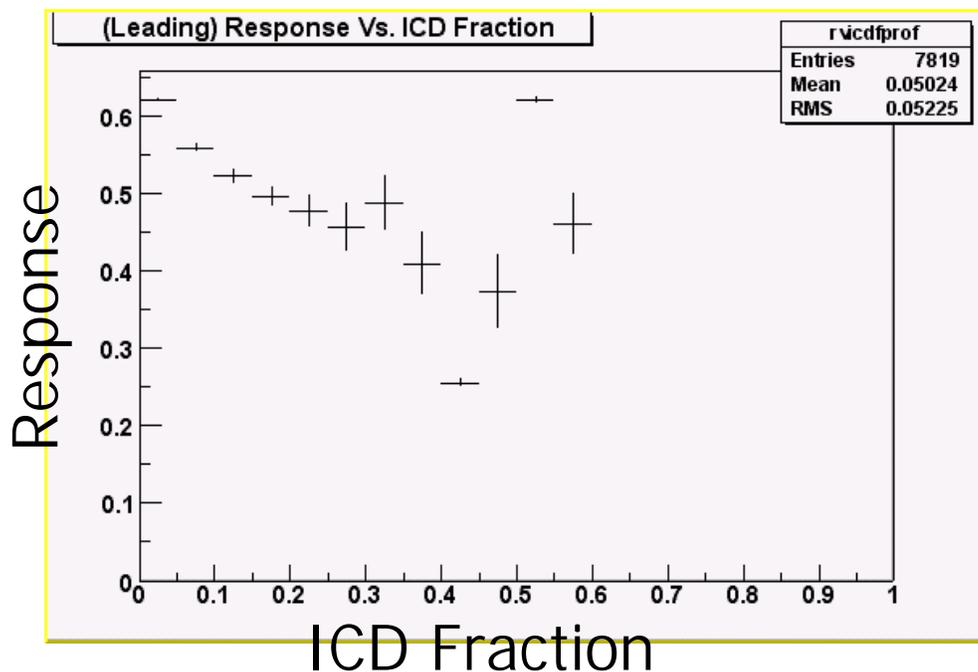


ICD/MG Detectors

- **Reweighting the ICD response**
- **First look at Muons**

Some news on the ICD detector

- Bob Kehoe noticed that the L1 CAL towers that include mainly ICD towers report much more energy than the precision readout
- I noticed the following:

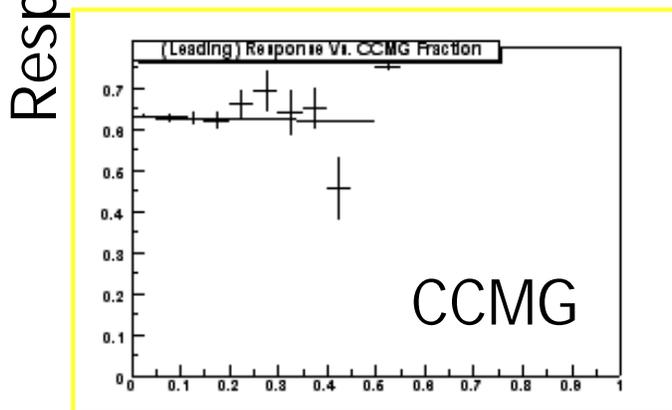
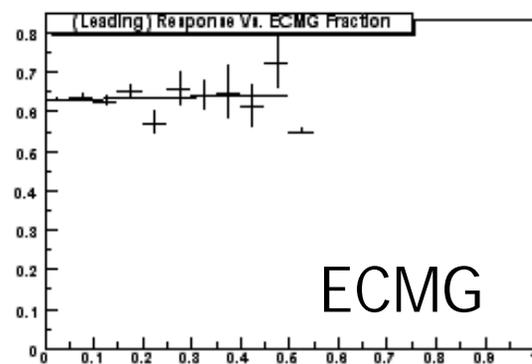
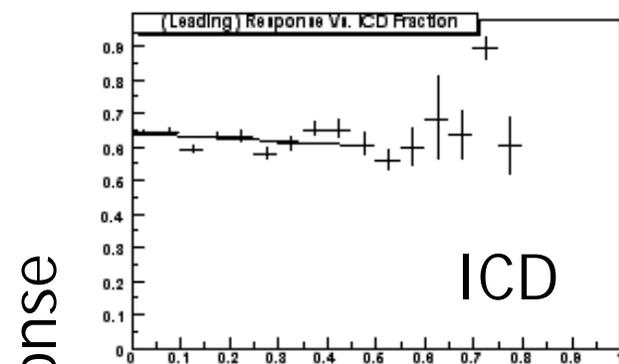


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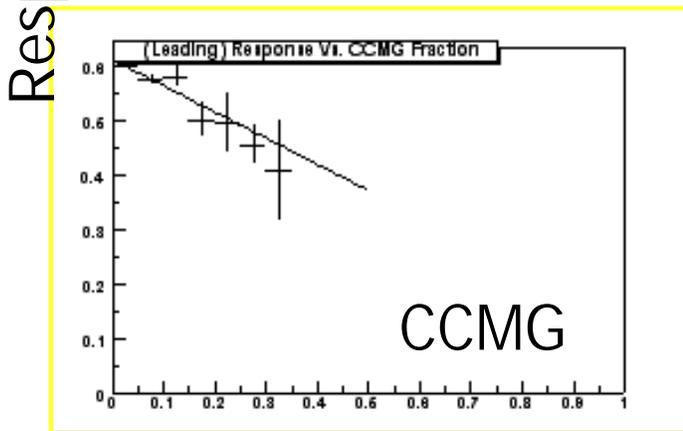
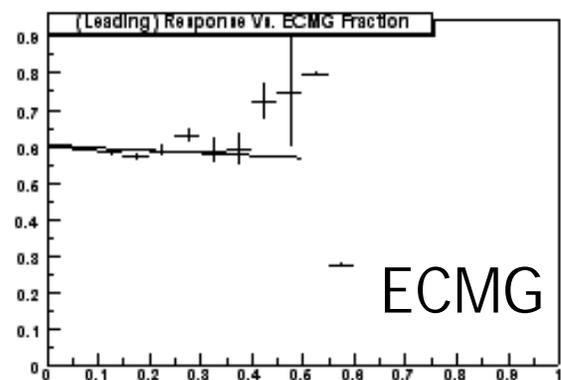
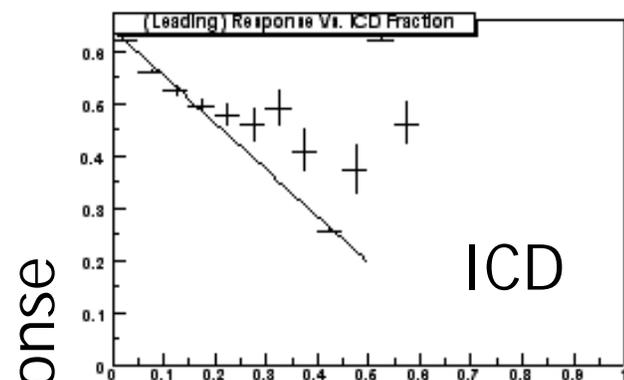
Response in MG Detectors: MonteCarlo



Monte Carlo predicts
response Vs. fraction
should be flat

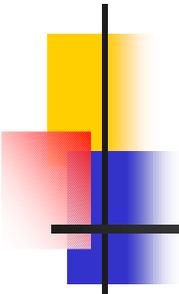
Fraction (0.0 - 1.0)

Response in MG Detectors: Data



Both ICD and CCMG look low to me.

Fraction (0.0 - 1.0)

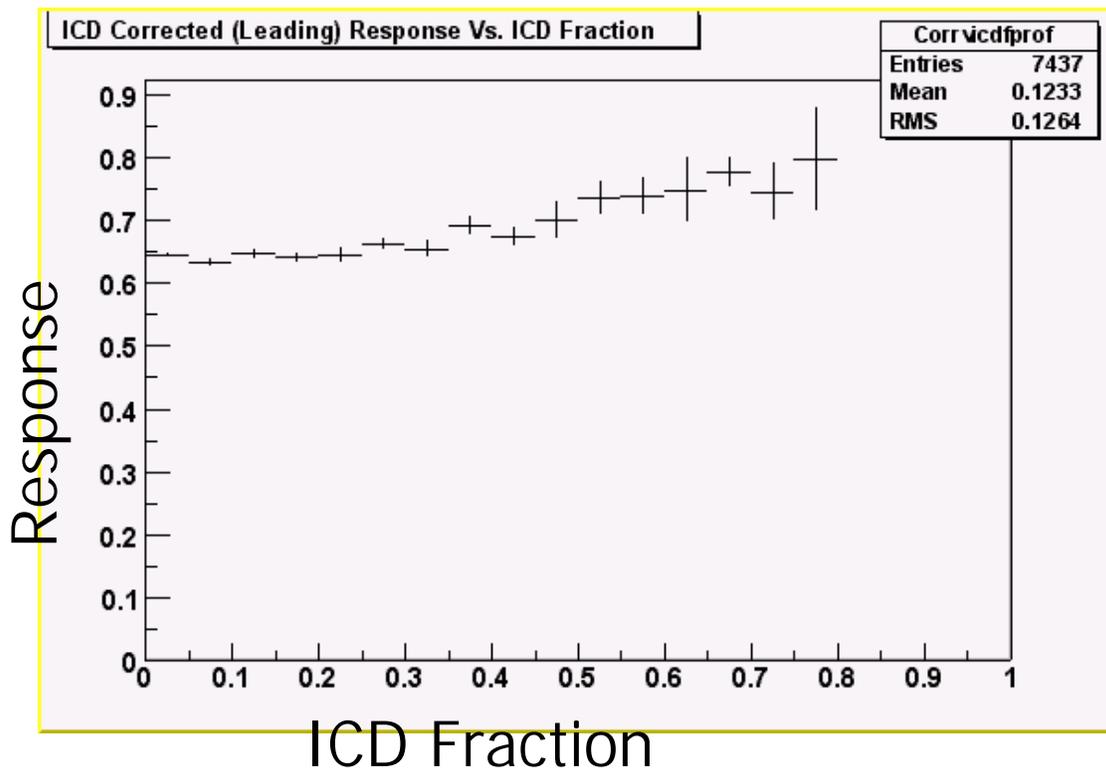


ICD reweighting?

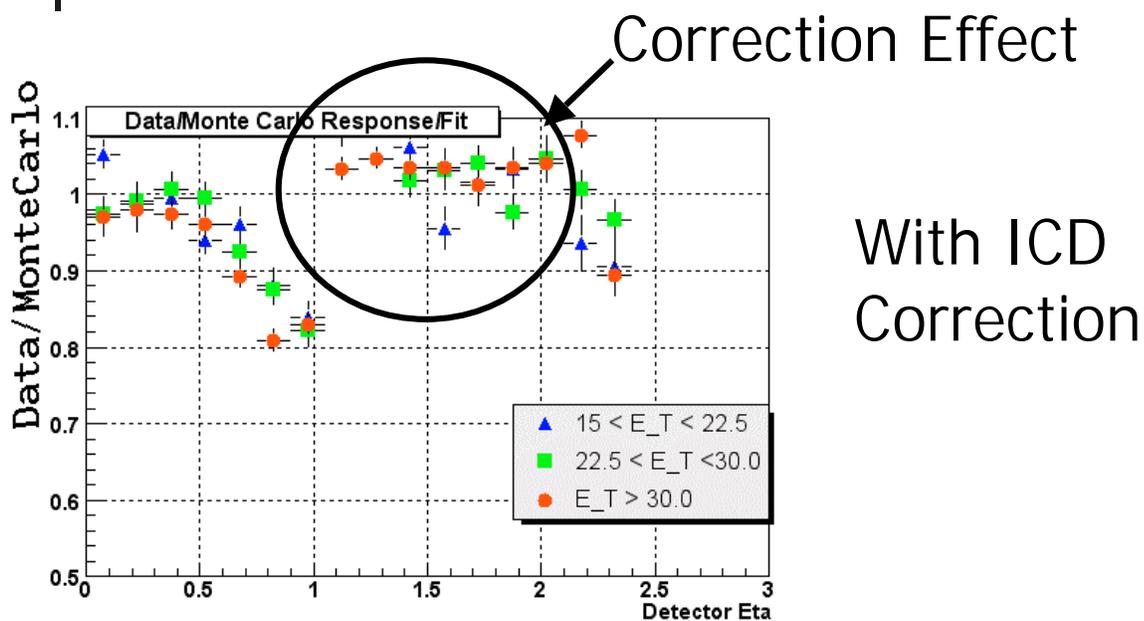
- Calibration of the ICD was done on a test stand using sources for MIP peaks
- The test stand used Calorimeter preamps because they have higher gains and made calibration of small signals easy
- In going from ADC counts to energy the difference of the calorimeter preamps/ICD preamps used in the detector was taken out
- This factor was 3.8 - measured on the test stand
- The ICD readout is really lower by 3.8 because of the lower gain preamps - which means this factor needs to go back in.
- If all this confuses you, it's because I don't understand it either

ICD reweighting?

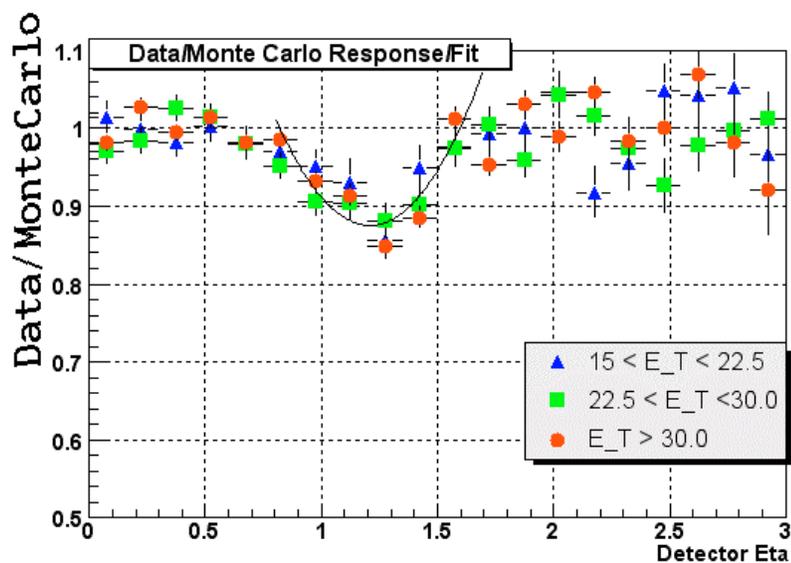
- I put this factor of 3.8 in a crude way into the response/fraction calculations and get:



Data/Monte Carlo



Without ICD Correction

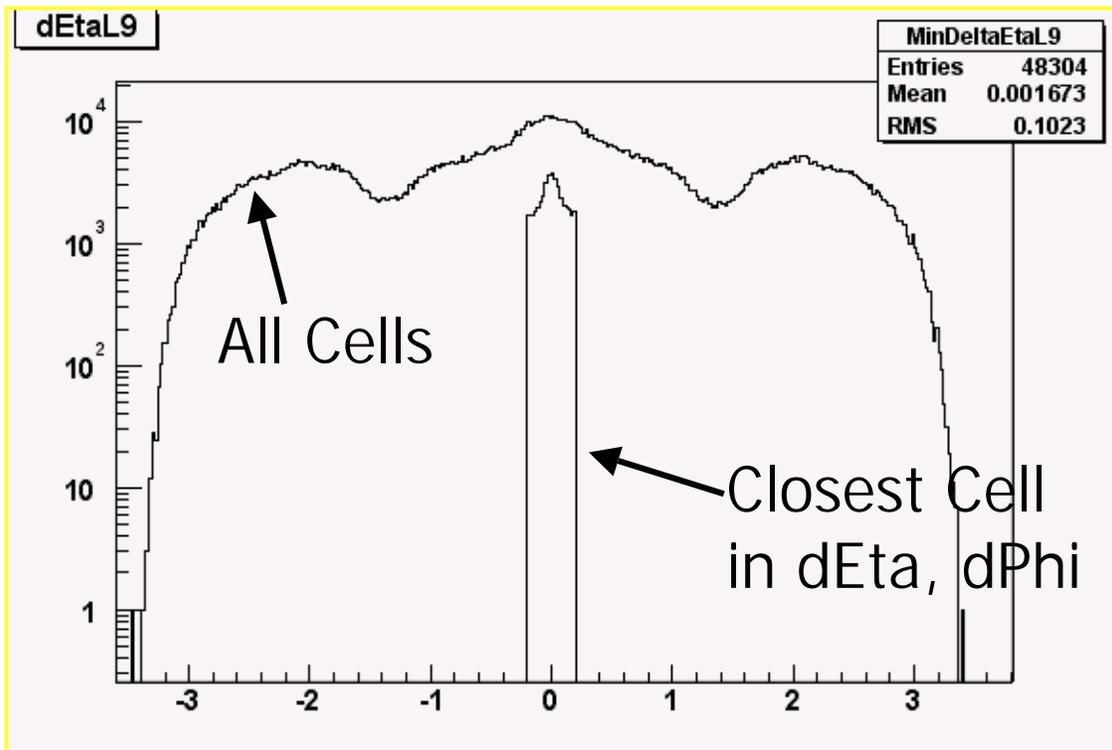


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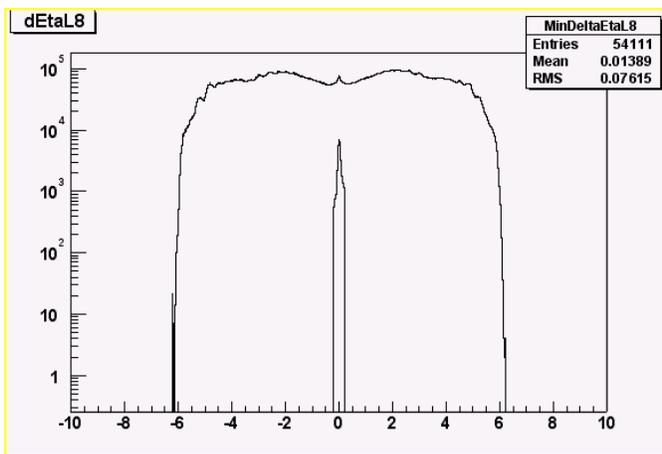
Looking At Muons

- It would be nice to find MIP peaks in the MG detectors to see where they are in the data
- For each good Muon object, make a linear extrapolation from the vertex to A Layer
- Then I look at Delta Eta, Delta Phi between Muon extrapolation and Cal Cells

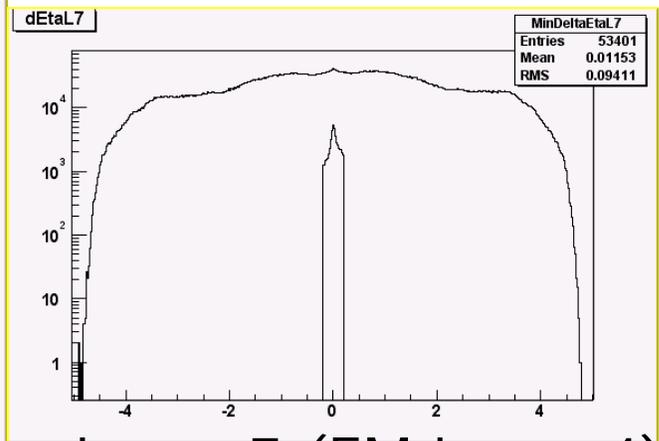


Delta Eta between Muon Object and ICD Cell
Cut at ± 0.2

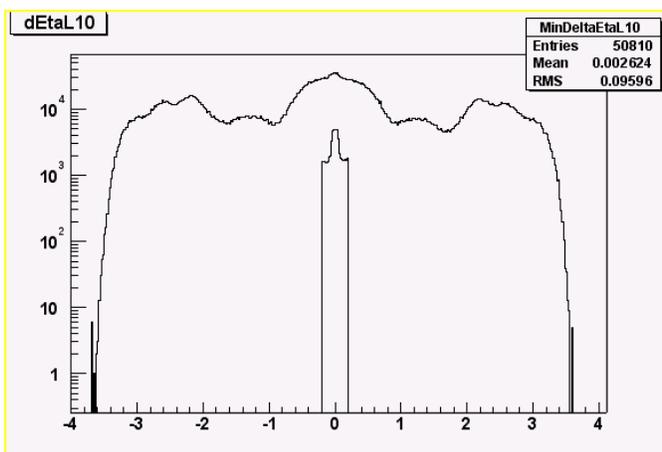
Looking At Muons



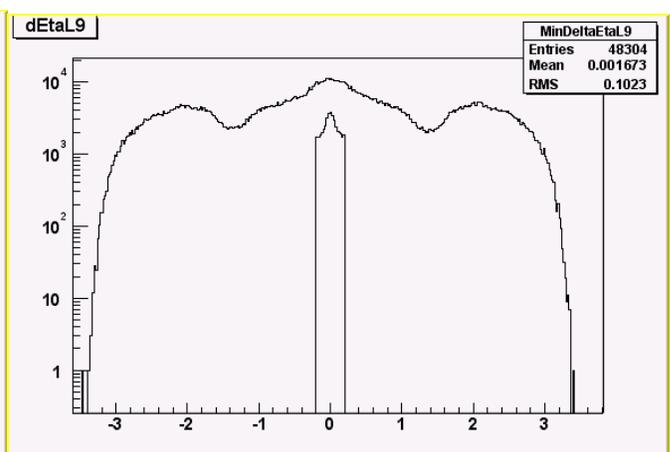
CC MG



Layer 7 (EM Layer 4)



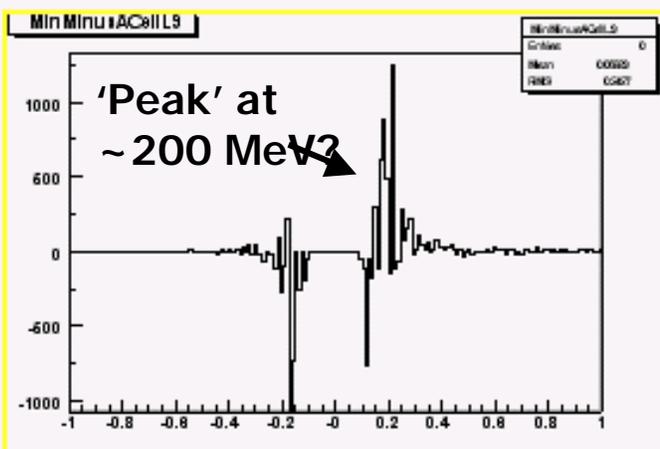
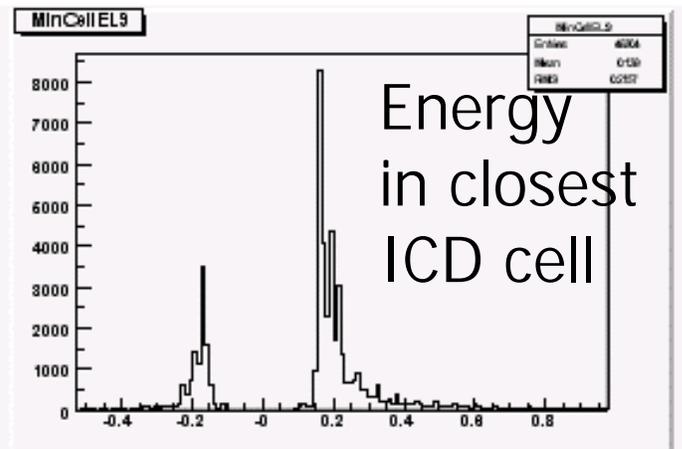
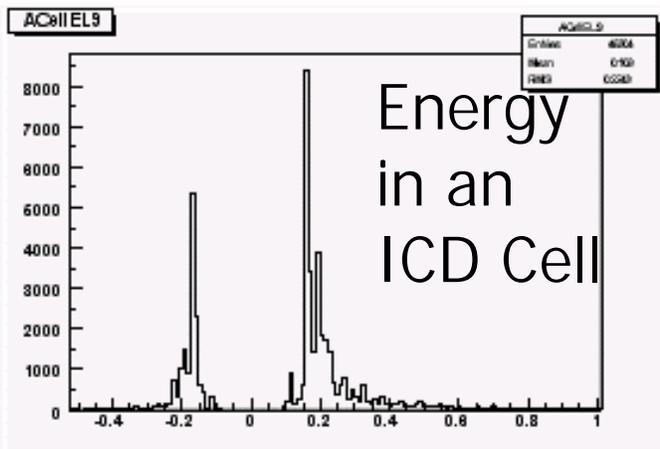
EC MG



ICD

Energy in Closest Cells

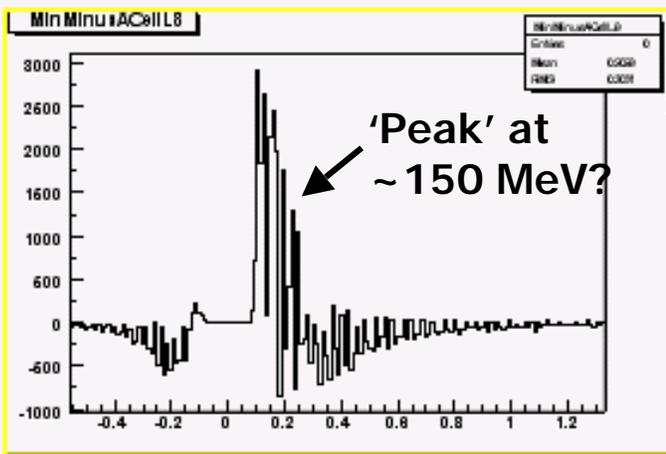
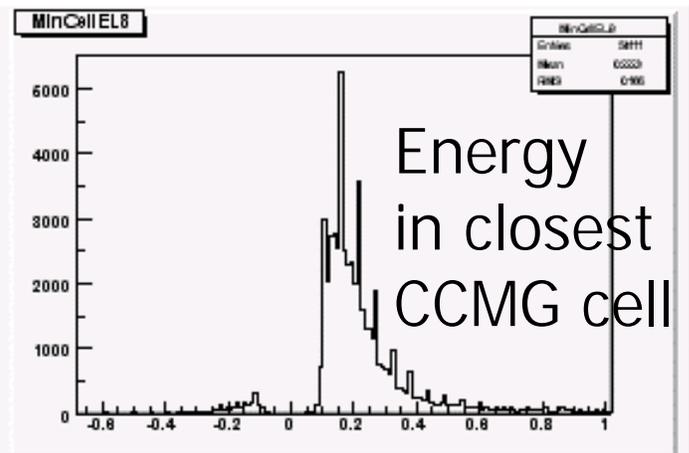
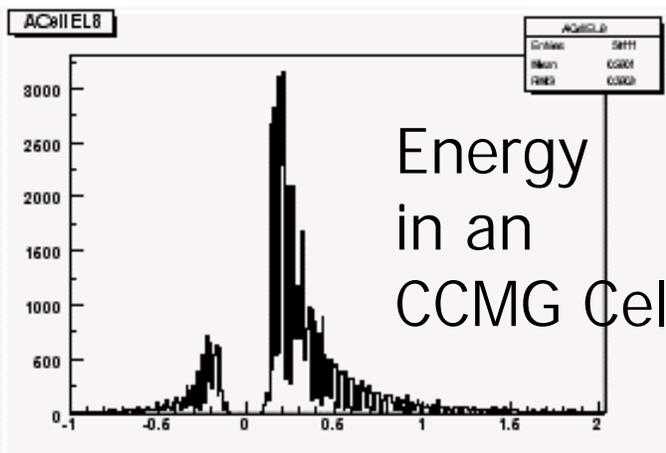
Energy in ICD



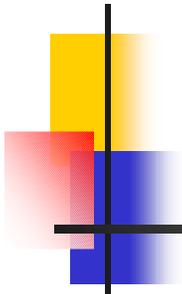
ICD Energy in closest - energy in random cell

Energy in Closest Cells

Energy in CCMG

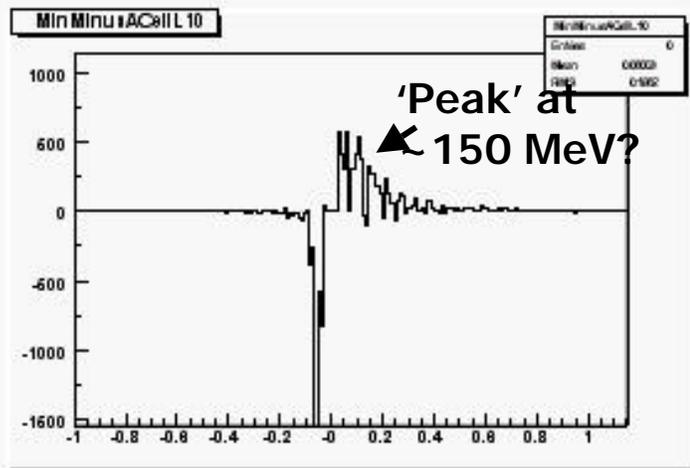
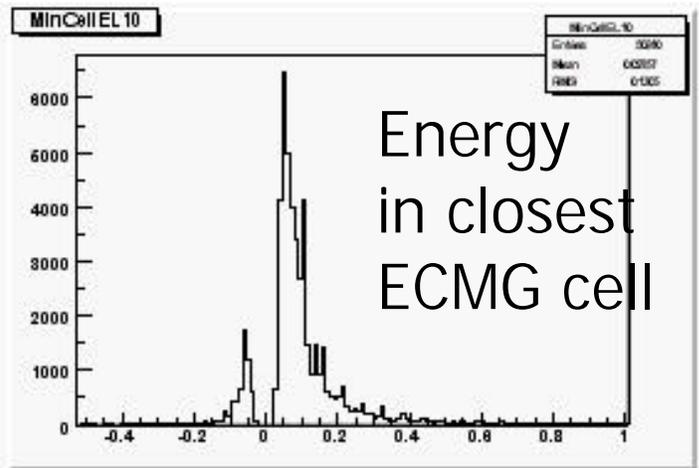
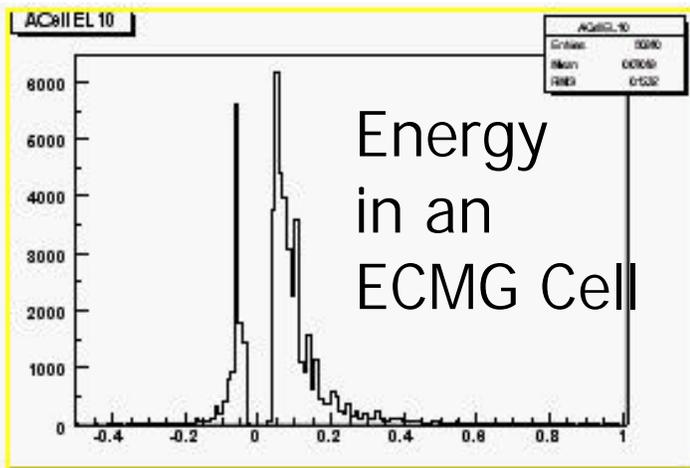


CCMG Energy in closest cell - energy in random cell



Energy in Closest Cells

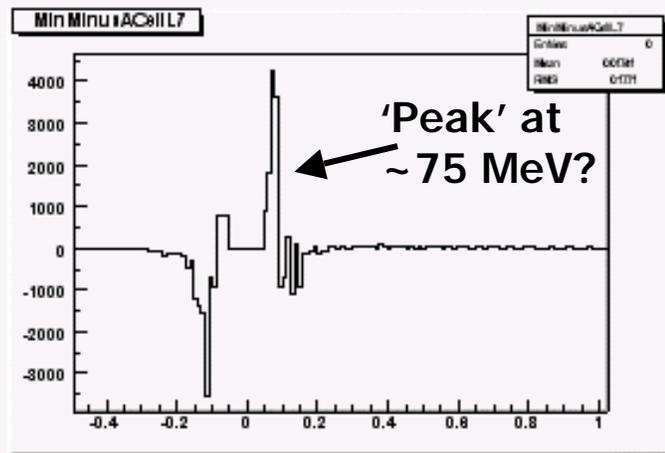
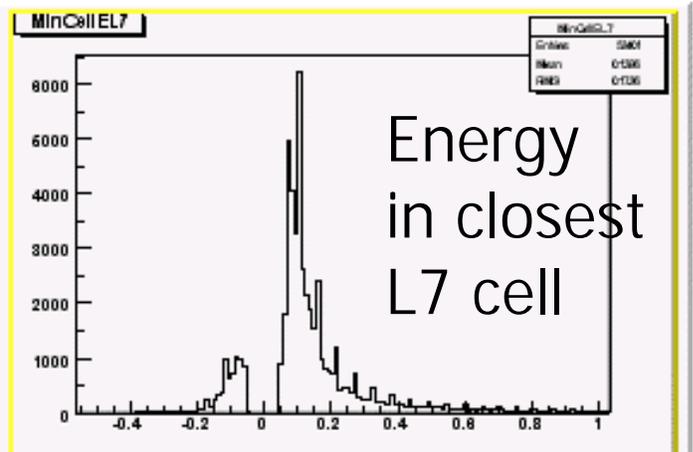
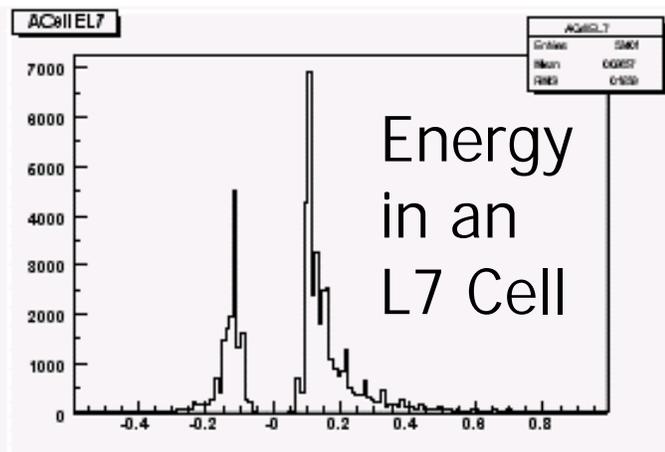
Energy in ECMG



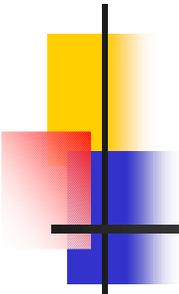
ECMG Energy in closest cell - energy in random cell

Energy in Closest Cells

Energy in Layer 7



L7 Energy in closest cell - energy in random cell



ICD next step

- **ICD also has channel to channel variation of MIP peaks as seen on the test stand - I would like to reproduce this with muon data - but clearly this will take a lot of data**
- **If we need channel - to - channel variations of calibration in reco, this is a non-trivial change to the calorimeter software framework**
- **Would like to get the factor of 3.8 into the next reco version and see how that helps**
- **Would like to understand CC & EC MG detectors better as well**