

FCAL Gain Calibration Using Electrons

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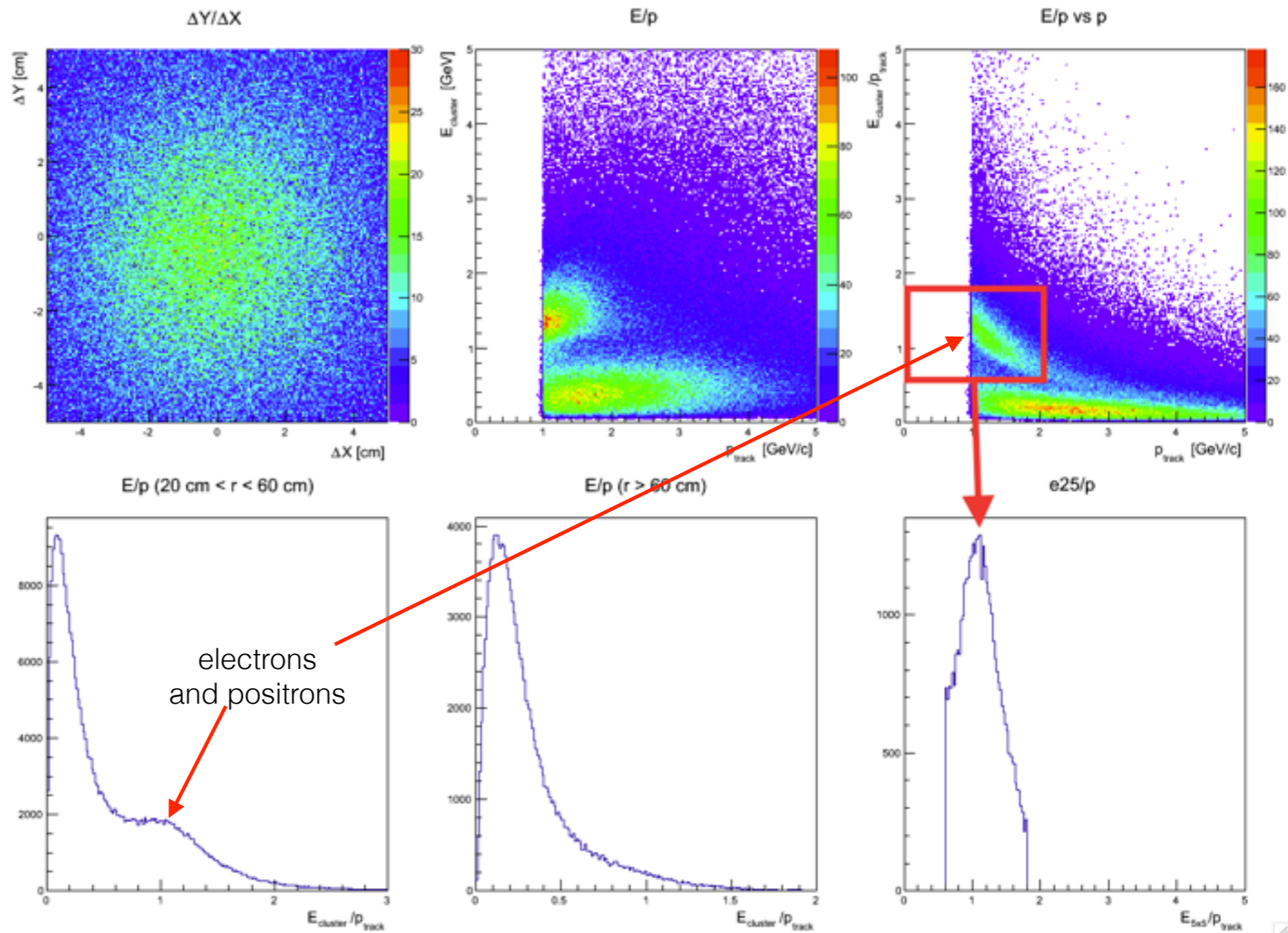


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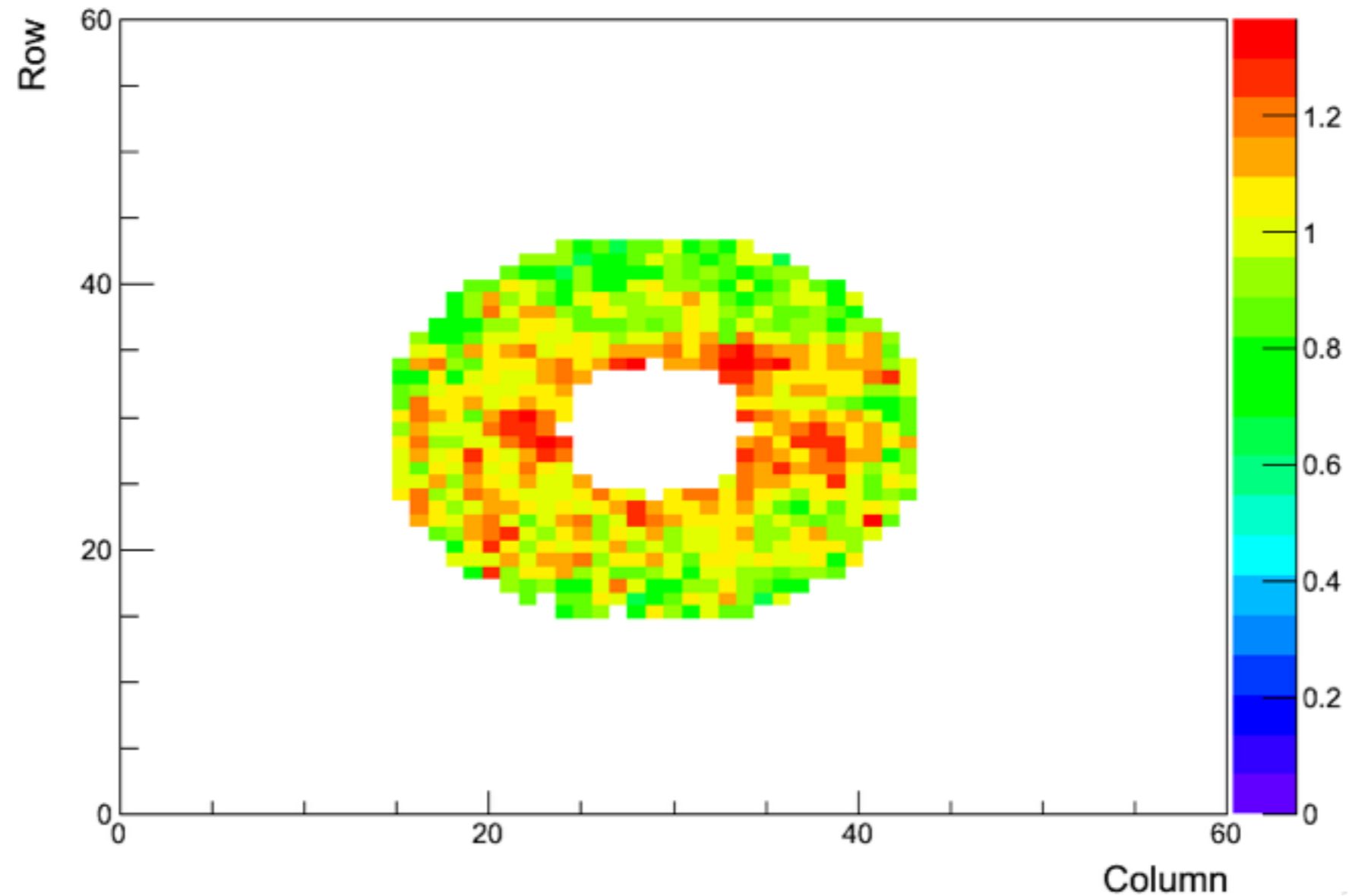
Methodology

- FCAL triggered runs (1501 - 1525)
- Cuts to select electrons
 - track match radius < 3 cm
 - 20 cm < r < 60 cm (614 blocks)
 - Cluster timing > 0
 - Number of Cluster = 1
- Select events in red box i.e., $0.6 < E(\text{cluster})/p(\text{track}) < 1.8$ & $p < 2$ (GeV/c)
- For every hit in a block, sum up energy of 5x5 blocks (e25) around the block. Obtain average e25/p
- Assume average e25/ p = 1
- Gain factor = 1/observed (e25/p)



Result

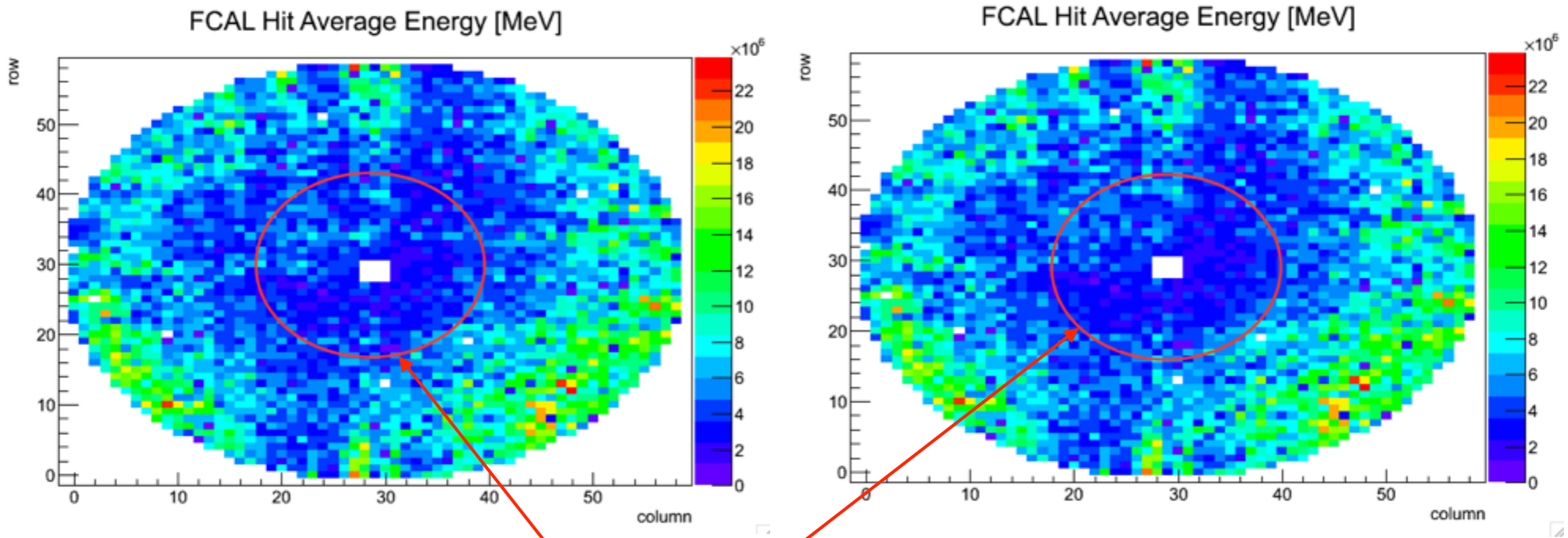
e25/p distribution



- Variation in average e25/p assumed due to gain mismatch
- Assume average $e25/p = 1$
- Gain factor = $1/\text{observed } (e25/p)$

Testing new gains

Gain calibration can be tested by looking at LED pulser data



Before calibration (unity gain)

After calibration

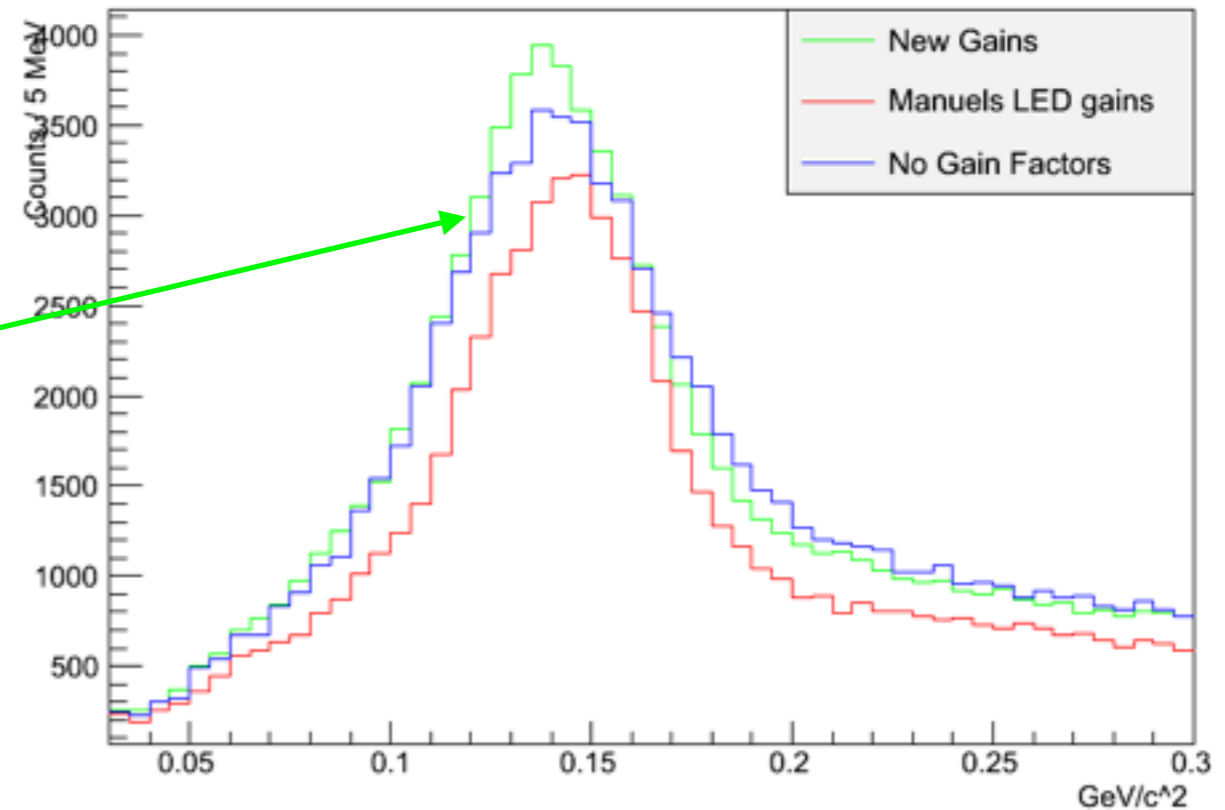
Region of calibrated channels

Effect on pi0 calibration

Plots courtesy: Jon Zarling

- Use gains for 614 channels as starting values for pi0 gain calibration for entire FCAL (top plot) (top plot)
- Not much of a big improvement
- Limit pi0 calibration to two clusters within $20 \text{ cm} < r < 60 \text{ cm}$ i.e., only 614 channels with gains from electron calibration (bottom plot)
- $\sim 1/2$ of the total pi0s used, slight reduction in pi0 mass distribution width

Reconstructed Pi0 Mass (post-cuts)



Reconstructed Pi0 Mass (post-cuts)

