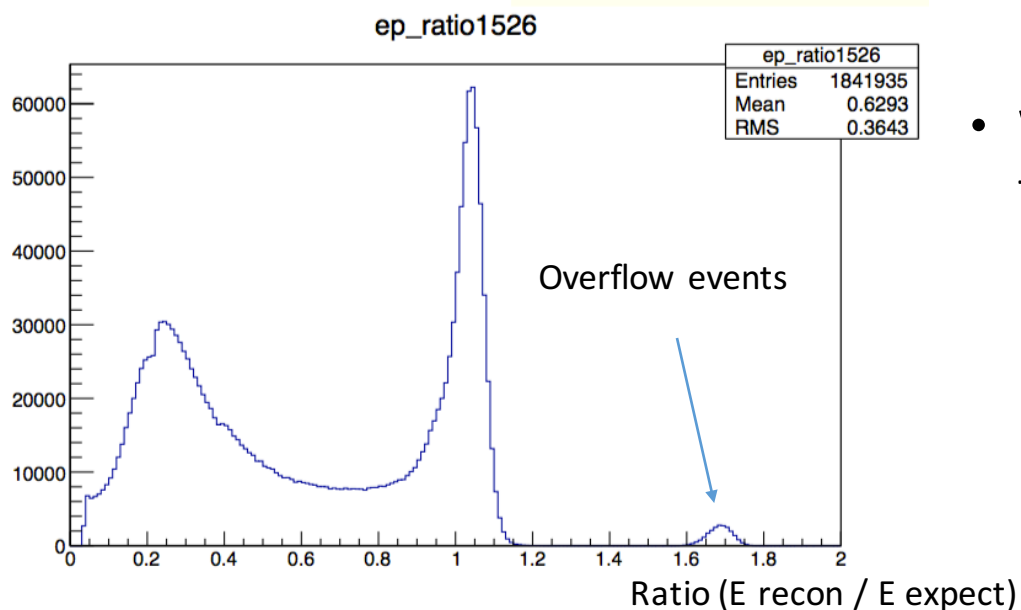


HyCal Physics Calibration

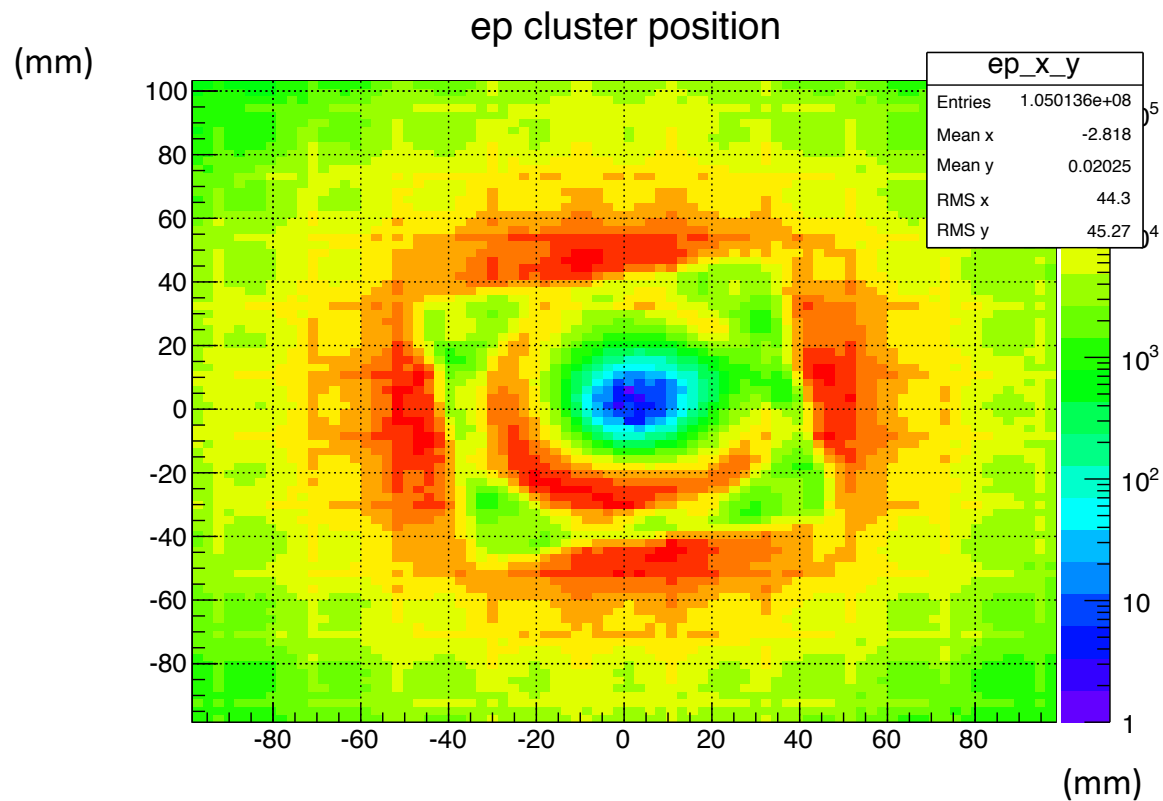
- There are a few overflow channel on HyCal
 - When overflow happens, the ADC readout suddenly goes to 16000, while the maximum valid ADC value is 8192



- What is the best we can do about this?
 - At the moment just set the maximum ADC value at 8192, so any ADC above this value will be set back to 8192

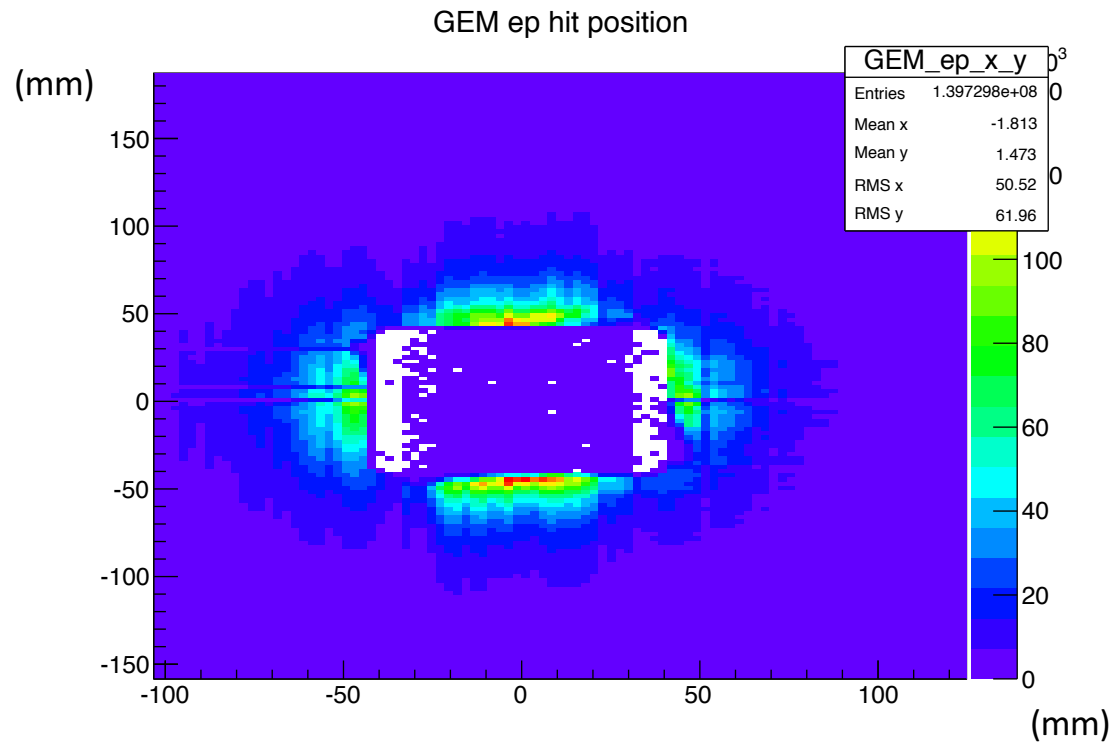
Calibration on the Inner Modules

- Rather strange shape is observed for the hit position distribution around the inner modules



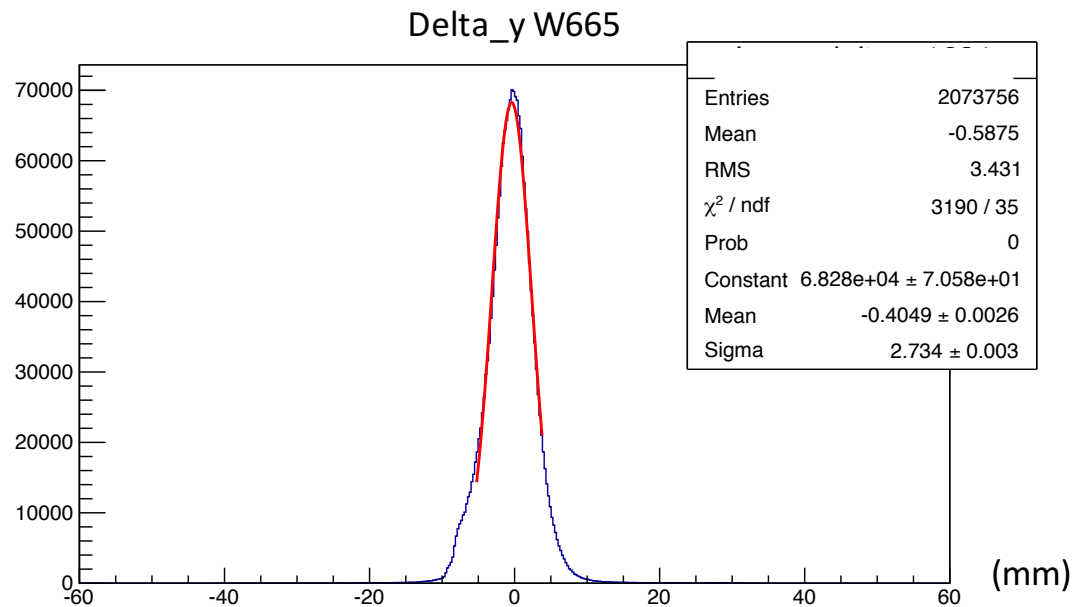
Calibration on the Inner Modules

- We see the corners of this rotated square on the GEM also
 - Plot require at most one hit from each chamber, without matching to HyCal



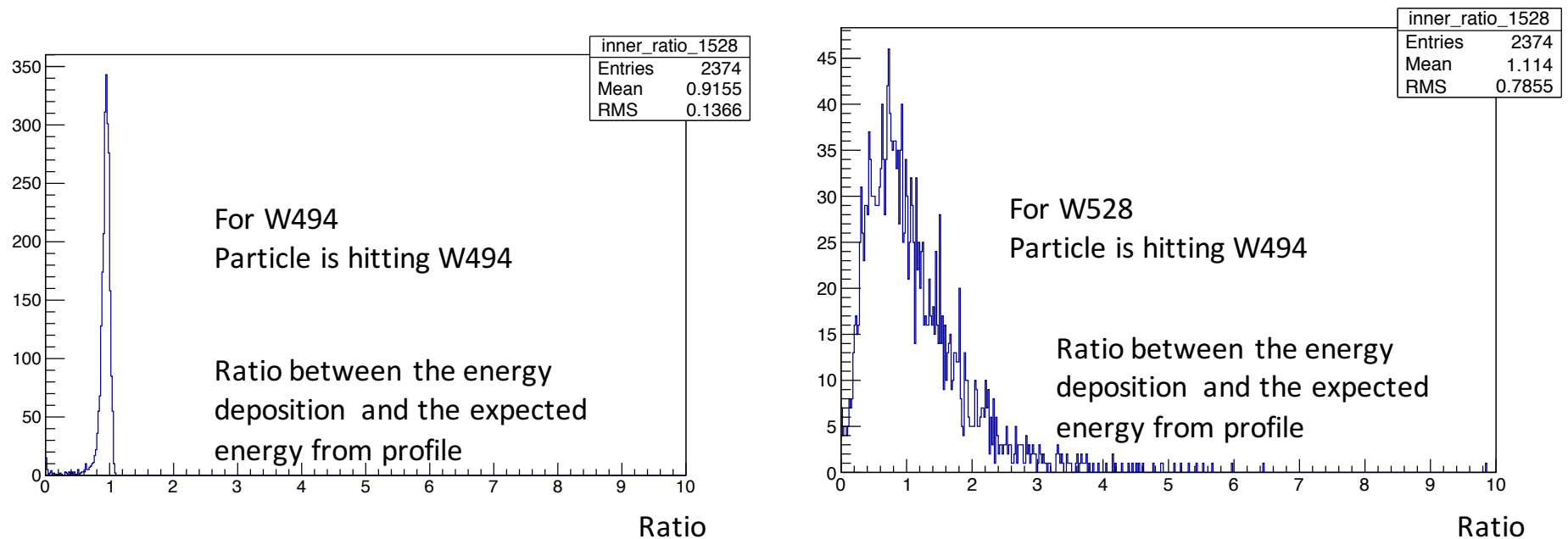
Calibration on Inner Module

- Using ep hitting the second inner most layer (position given by GEM) and the shower profile to calibrate the inner most layer
 - Fairly good agreement between the GEM hit position and HyCal reconstructed hit position on the second inner most layer



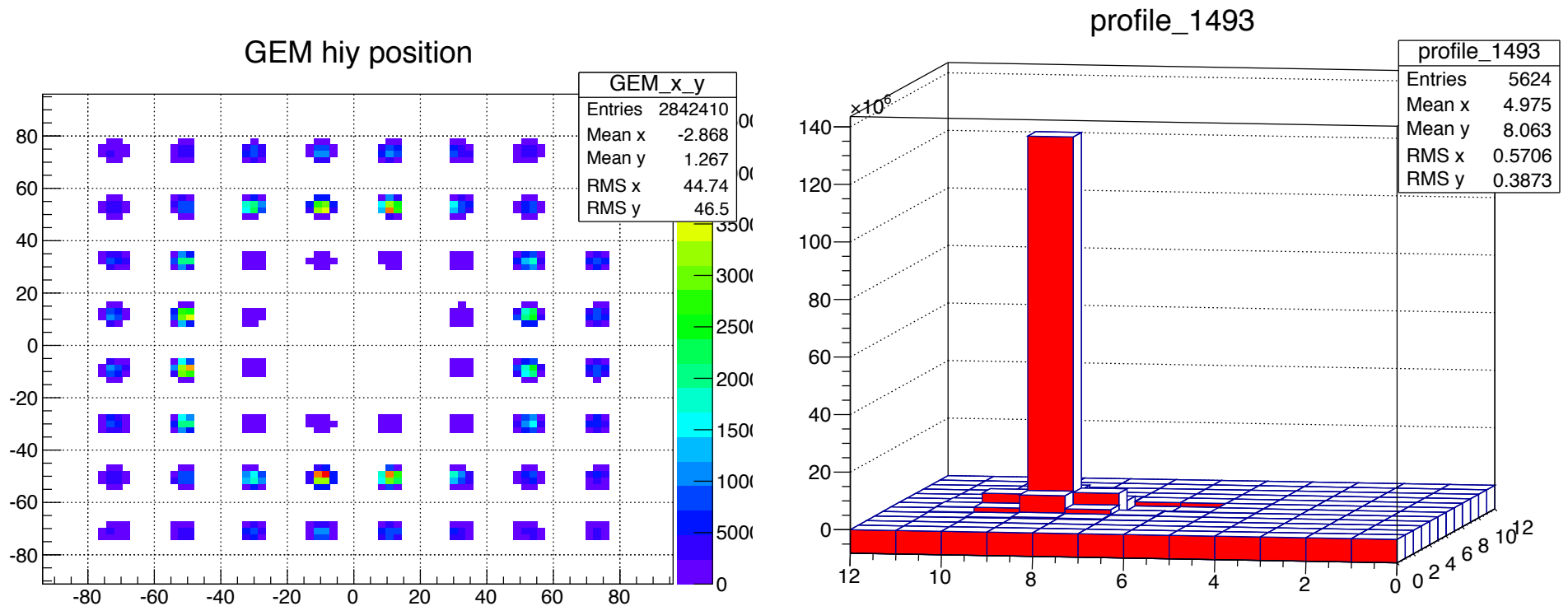
Calibration on Inner Module

- GEM hit position is considered as the shower center, and then use profile to compute the expected energy on the central and neighboring modules
 - For the central module, very clear peak at around 1 can be seen
 - For neighboring modules, it seems to be Landau distributed



Calibration on Inner Module

- Selecting particle hitting the central part of a module and look at the energy distribution around it, check if energy deposition is symmetric



Linearity

- Calibrate to ep and use ee to get the linearity constants for each modules:

$$E_{Corr} = \frac{E_{Recon}}{1 + \alpha(E_{Recon} - E_{Cali})}$$

- E_{cali} and E_{corr} are now both taken from kinematic calculation
- Moller peak differ from the expected value by no more than 2% for most part of HyCal

