

Energy Sum & nHits layerwise

Using DWC and AHCAL

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DESY, 17th December 2018

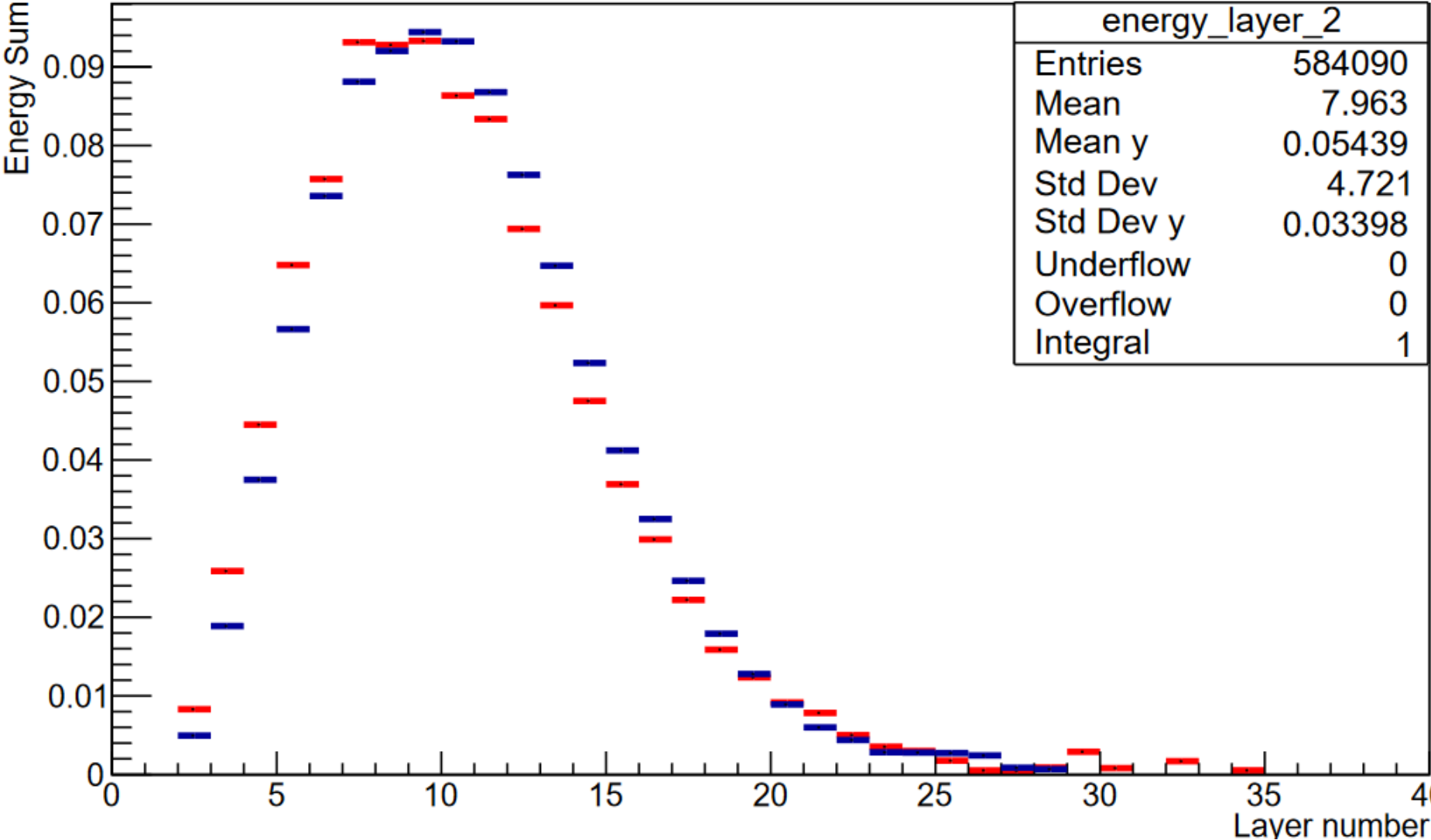
Energy Sum Layer wise

80 GeV

Energy sum per layer

Red: Data

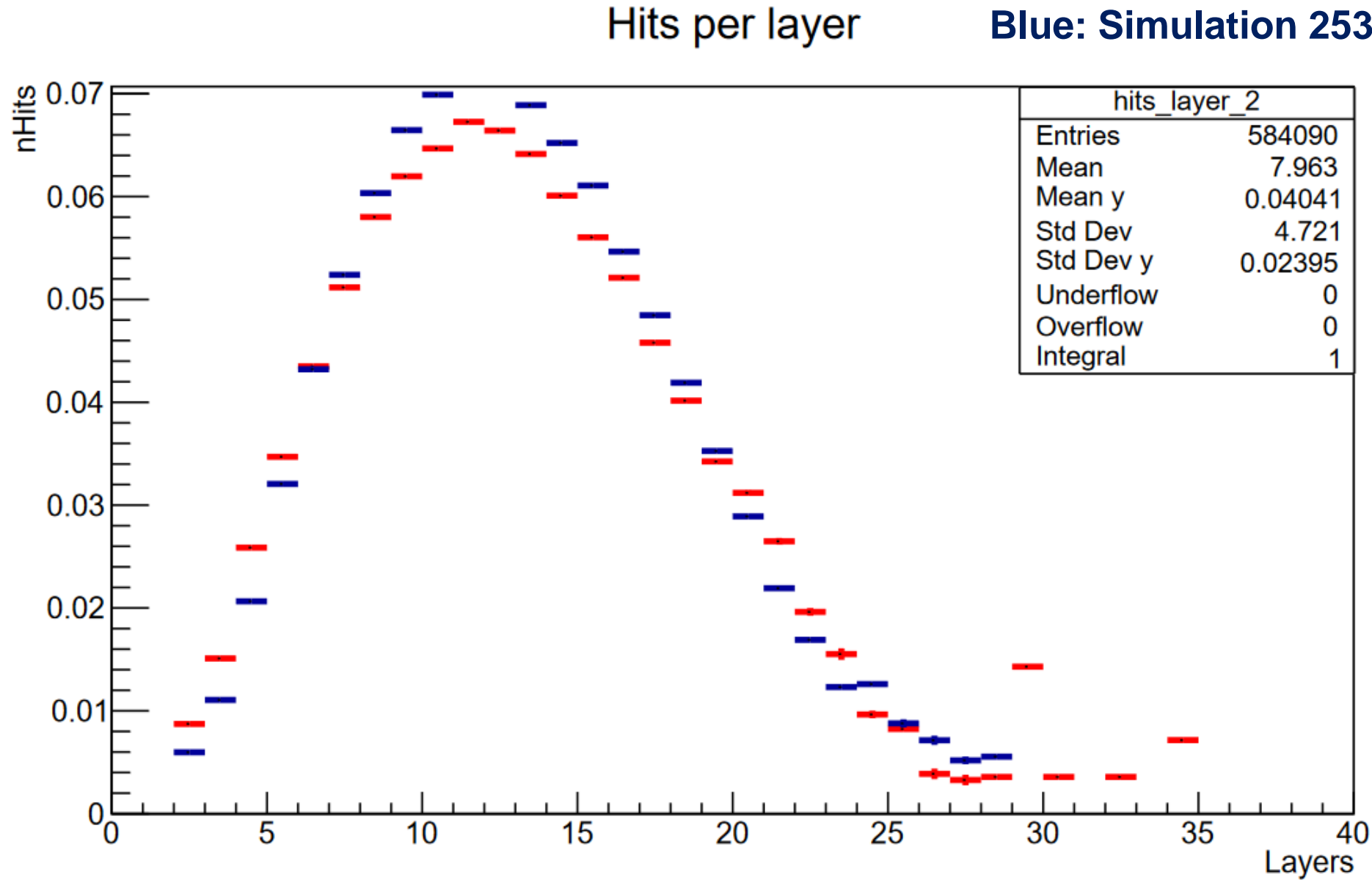
Blue: Simulation 2533 pixels



nHits layer-wise

Red: Data

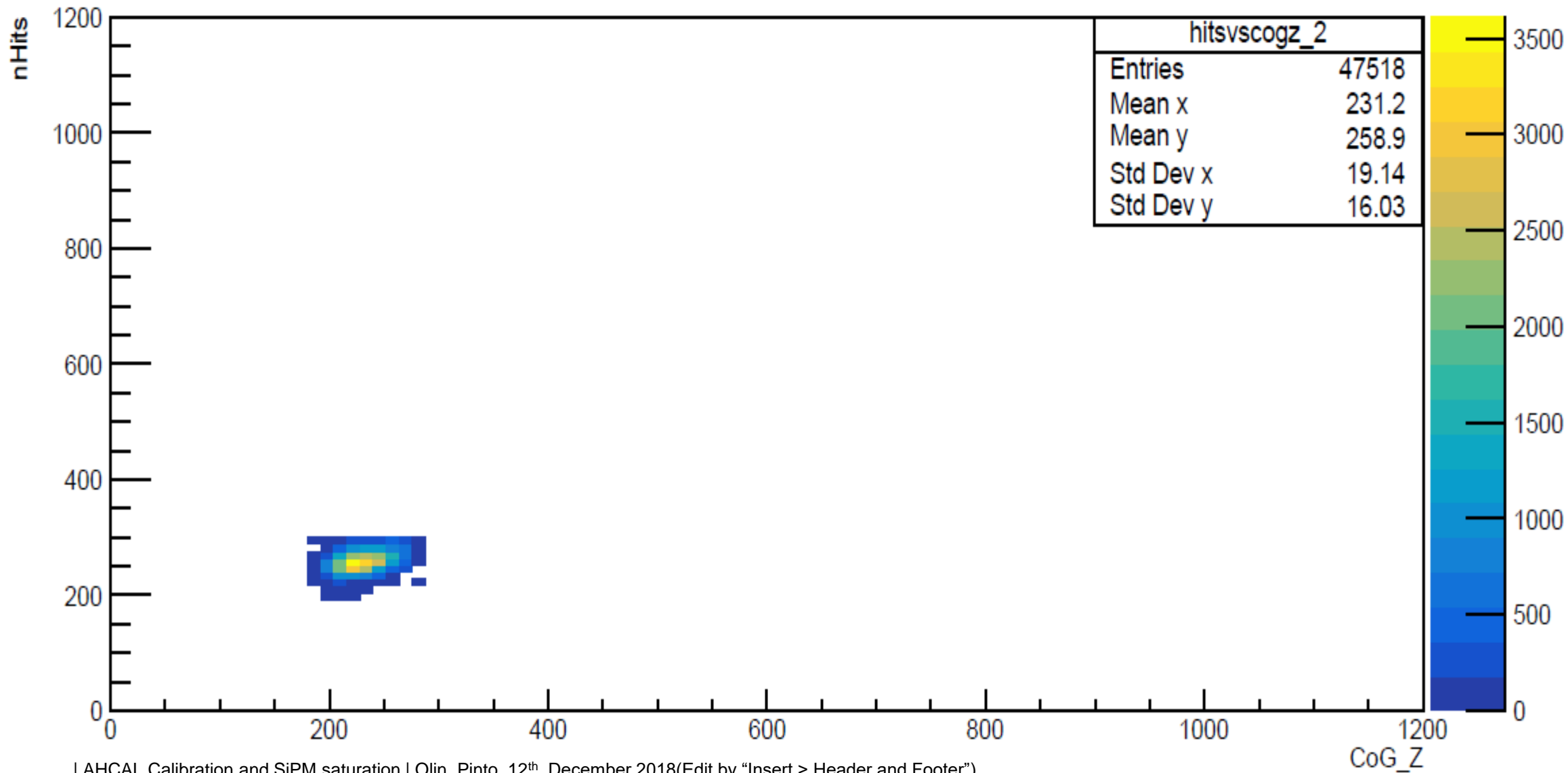
Blue: Simulation 2533 pixels



Nhits and Cog_Z

Data for 80GeV electron

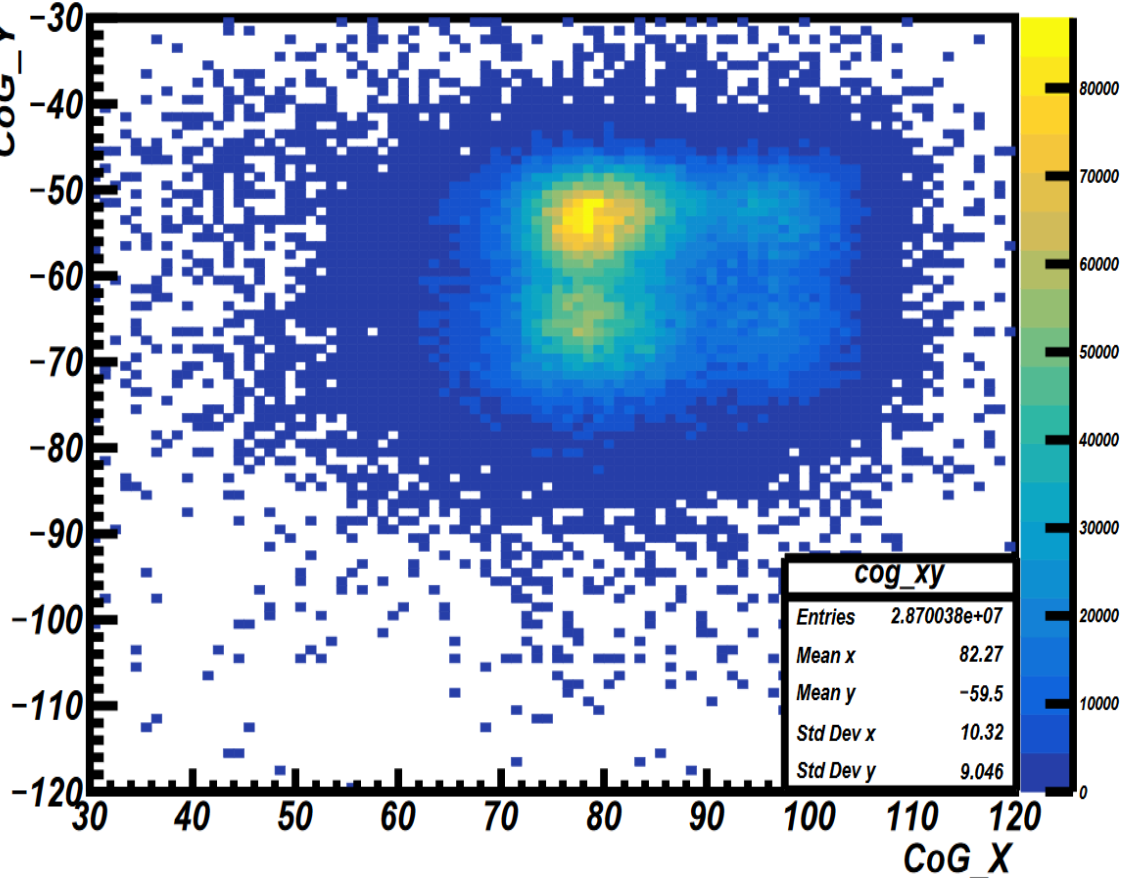
hitsvscog



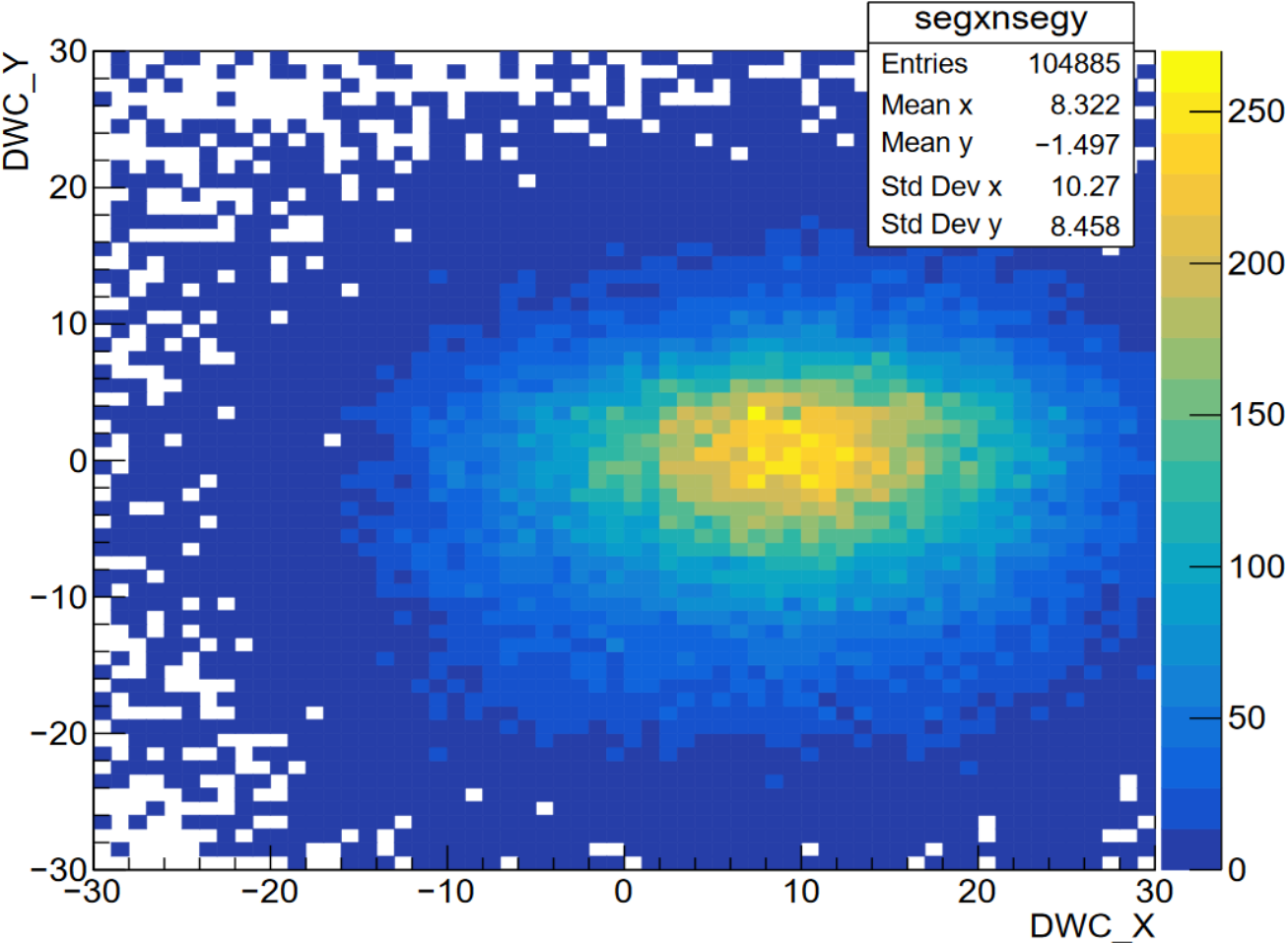
Centre of gravity

Run number: 61156

cog_x and cog_y in data



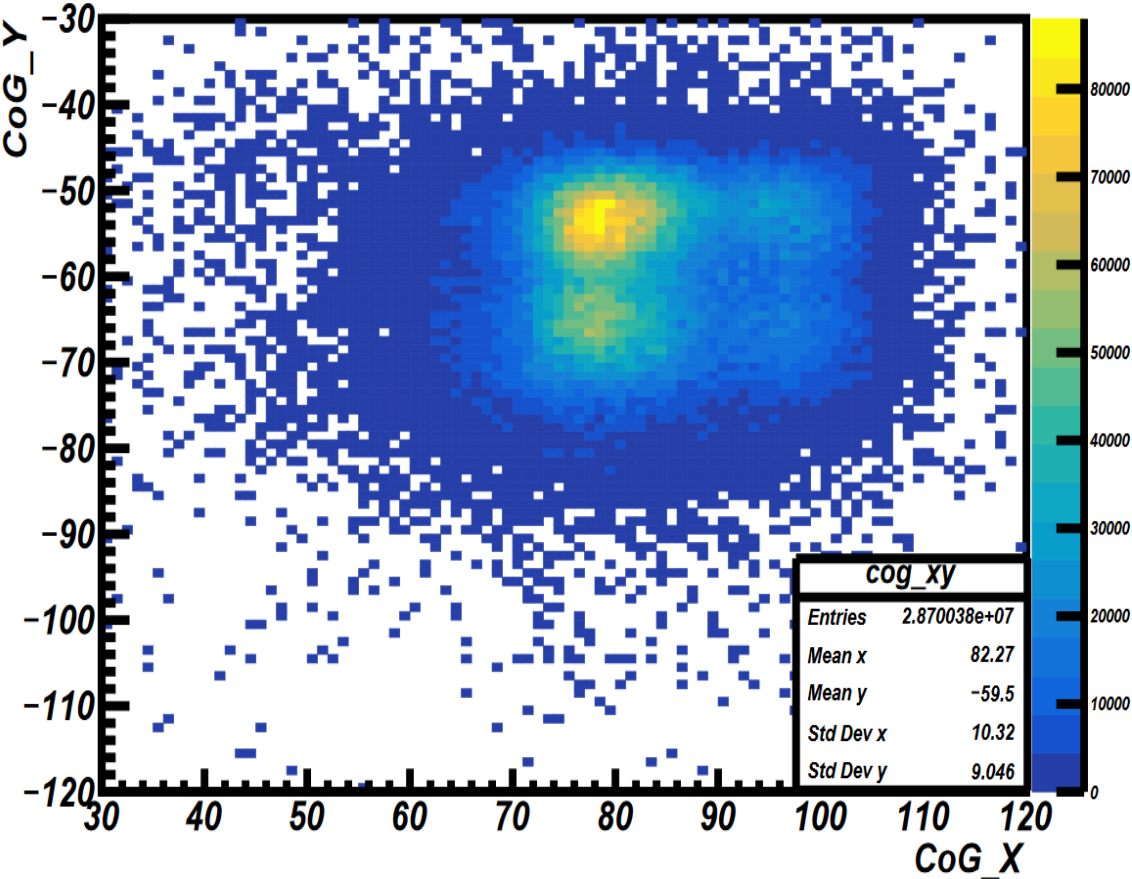
From Wire Chamber
segxnsegy



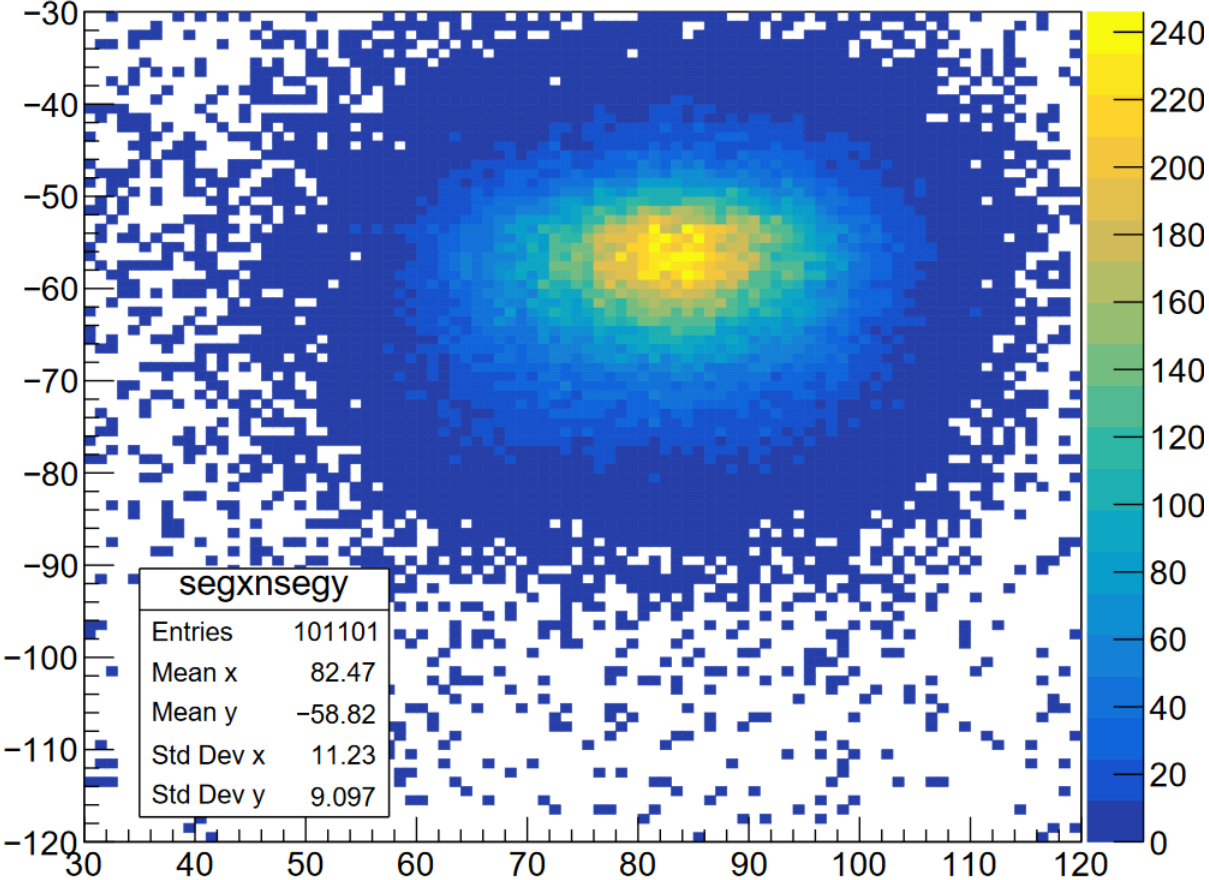
Centre of Gravity

Offset applied to DWC

cog_x and cog_y in data

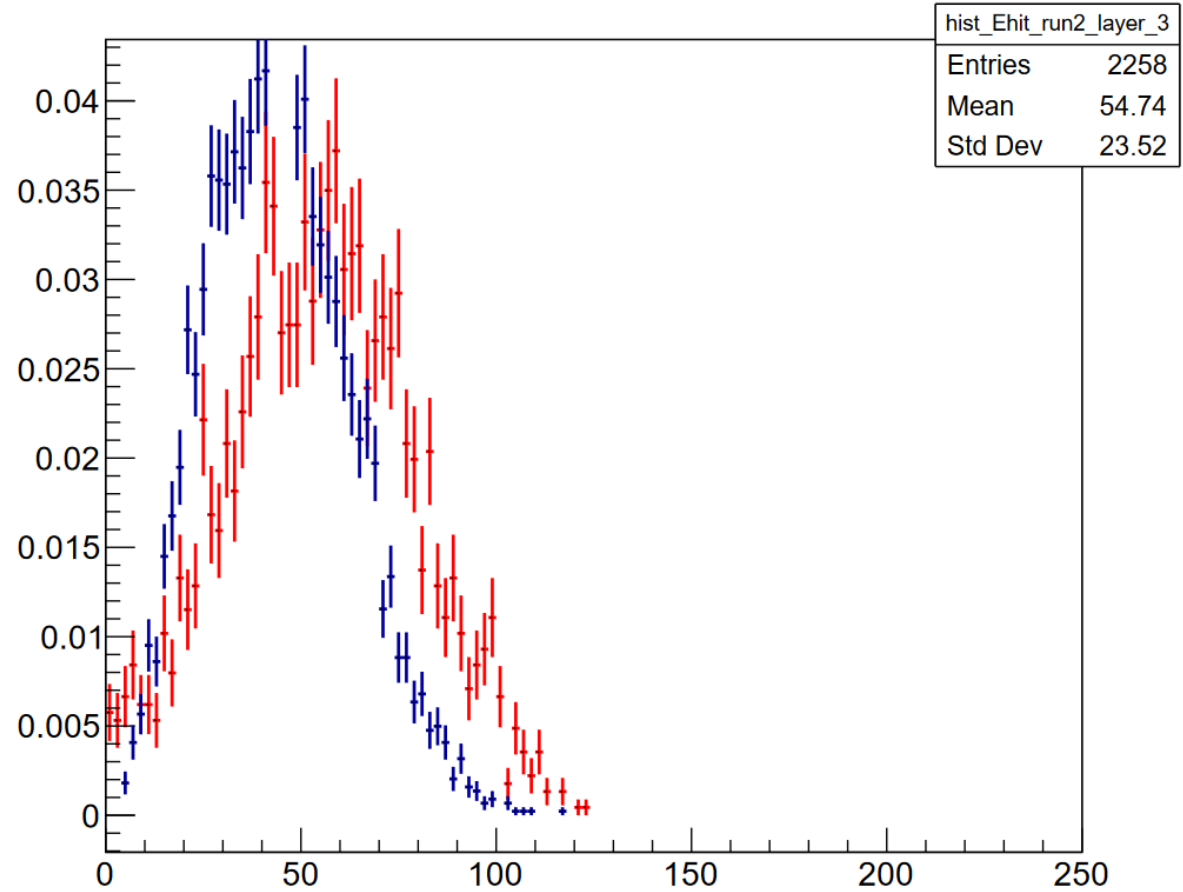
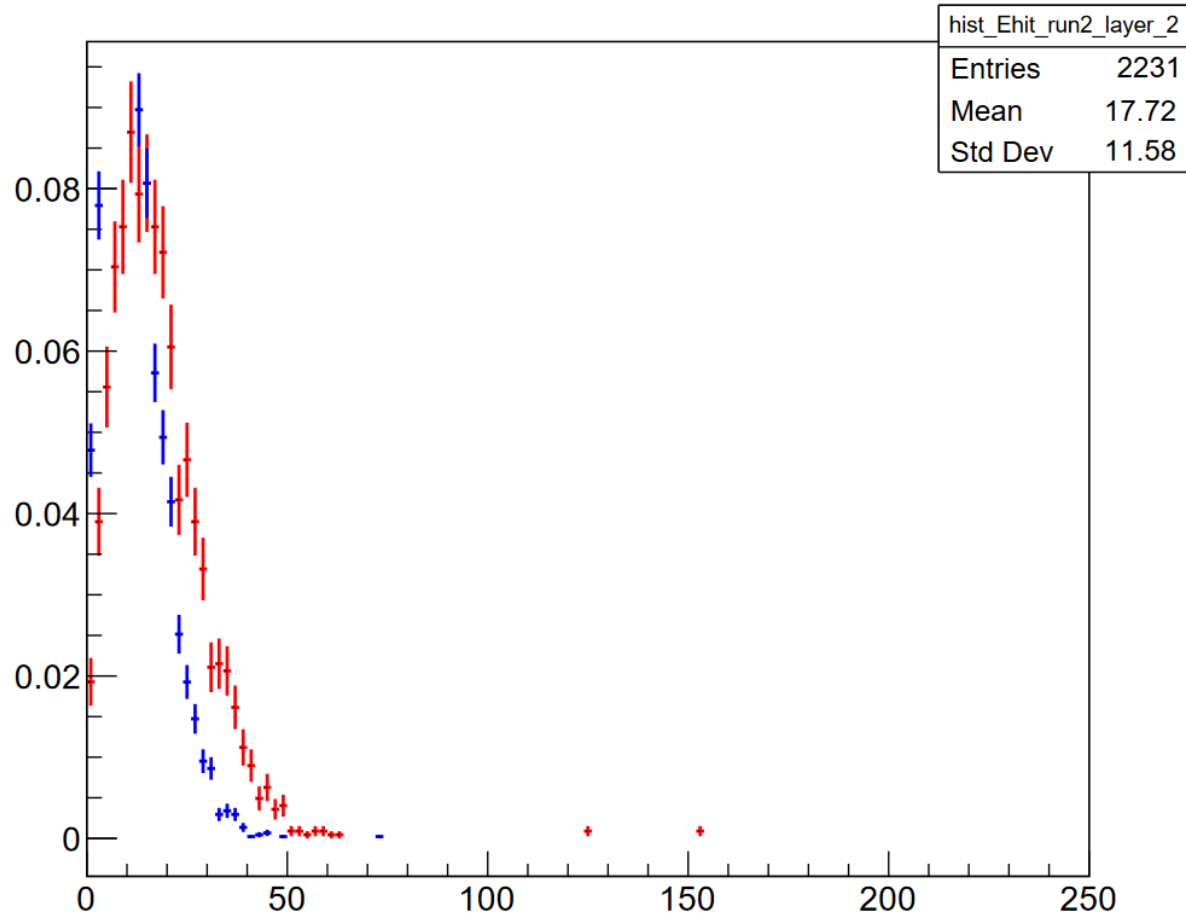


From Wire Chamber
segxnsegy

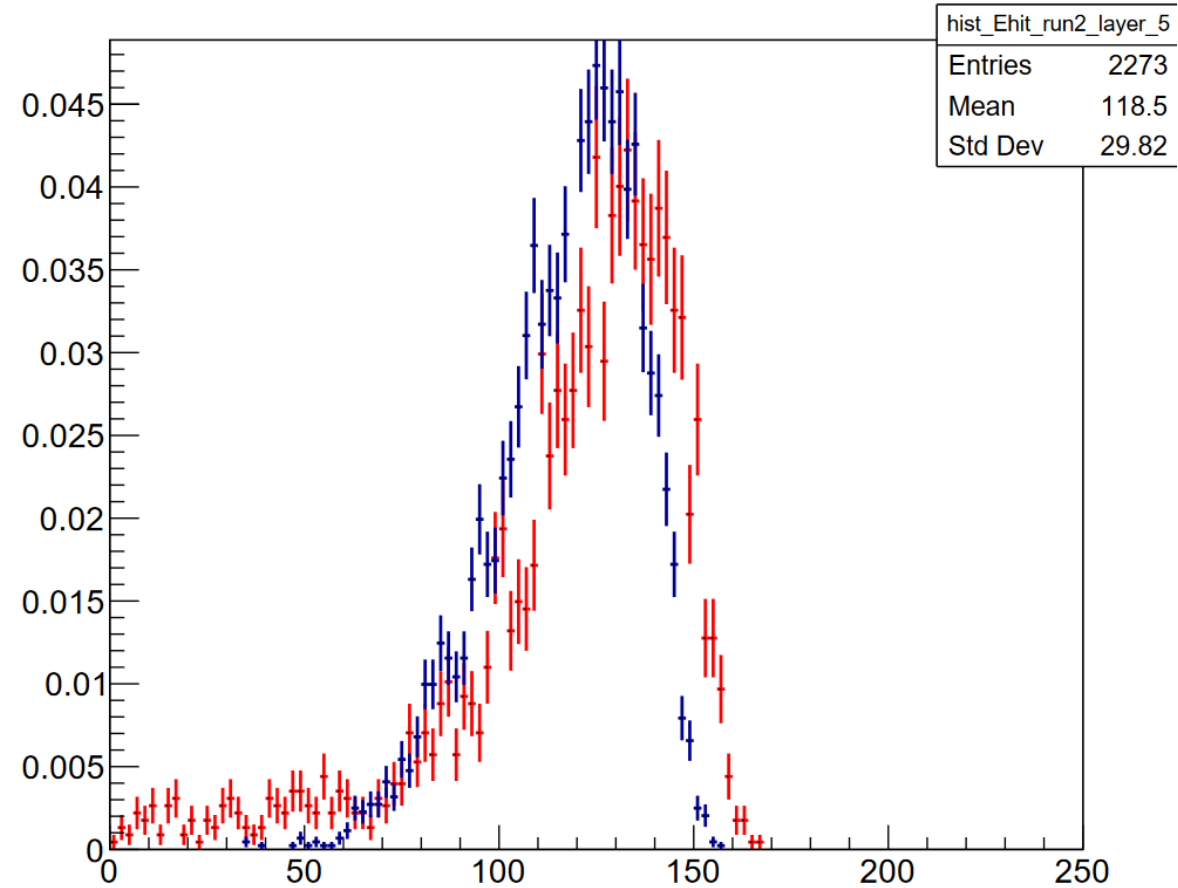
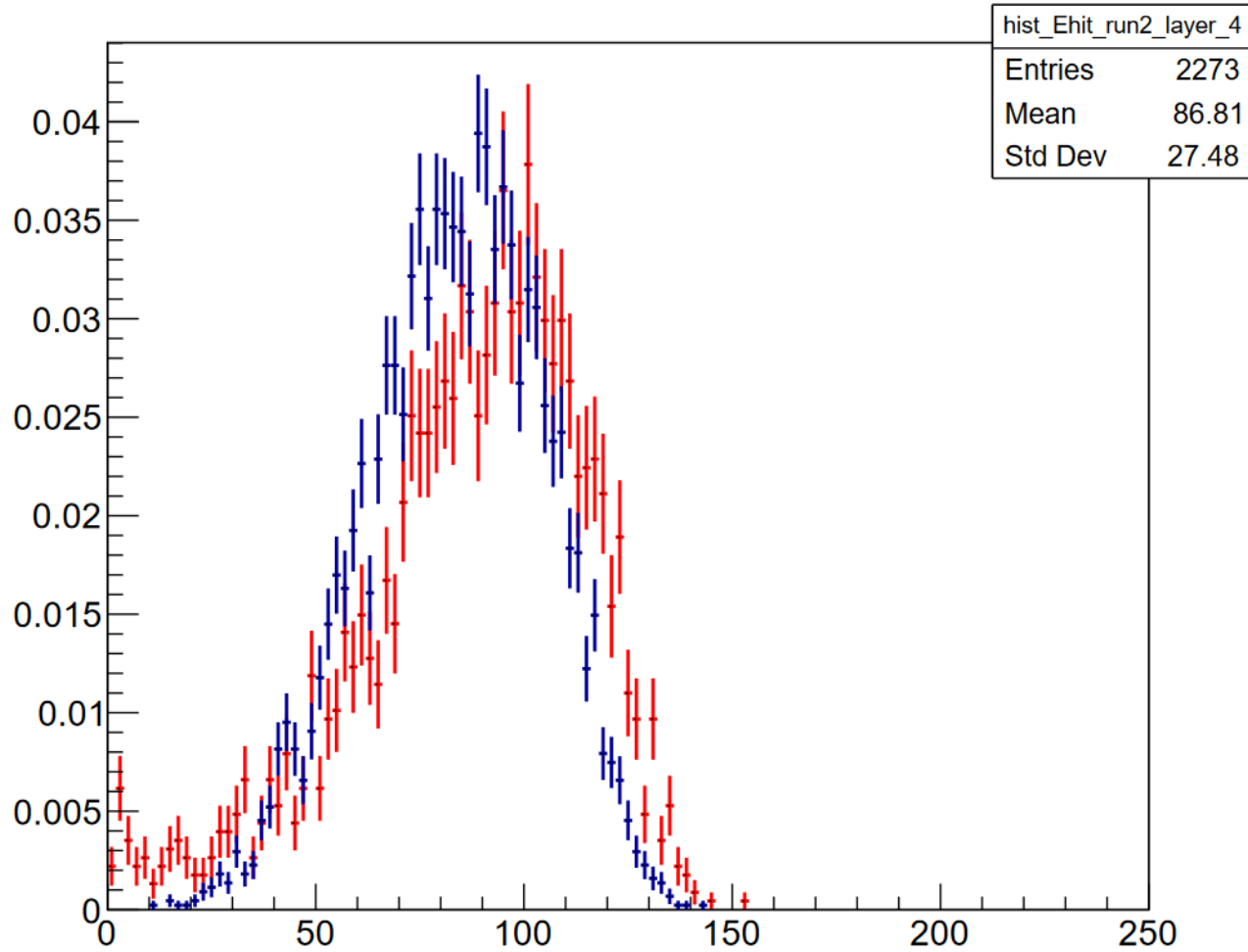


Hit Energy: Layer-wise Comparative study

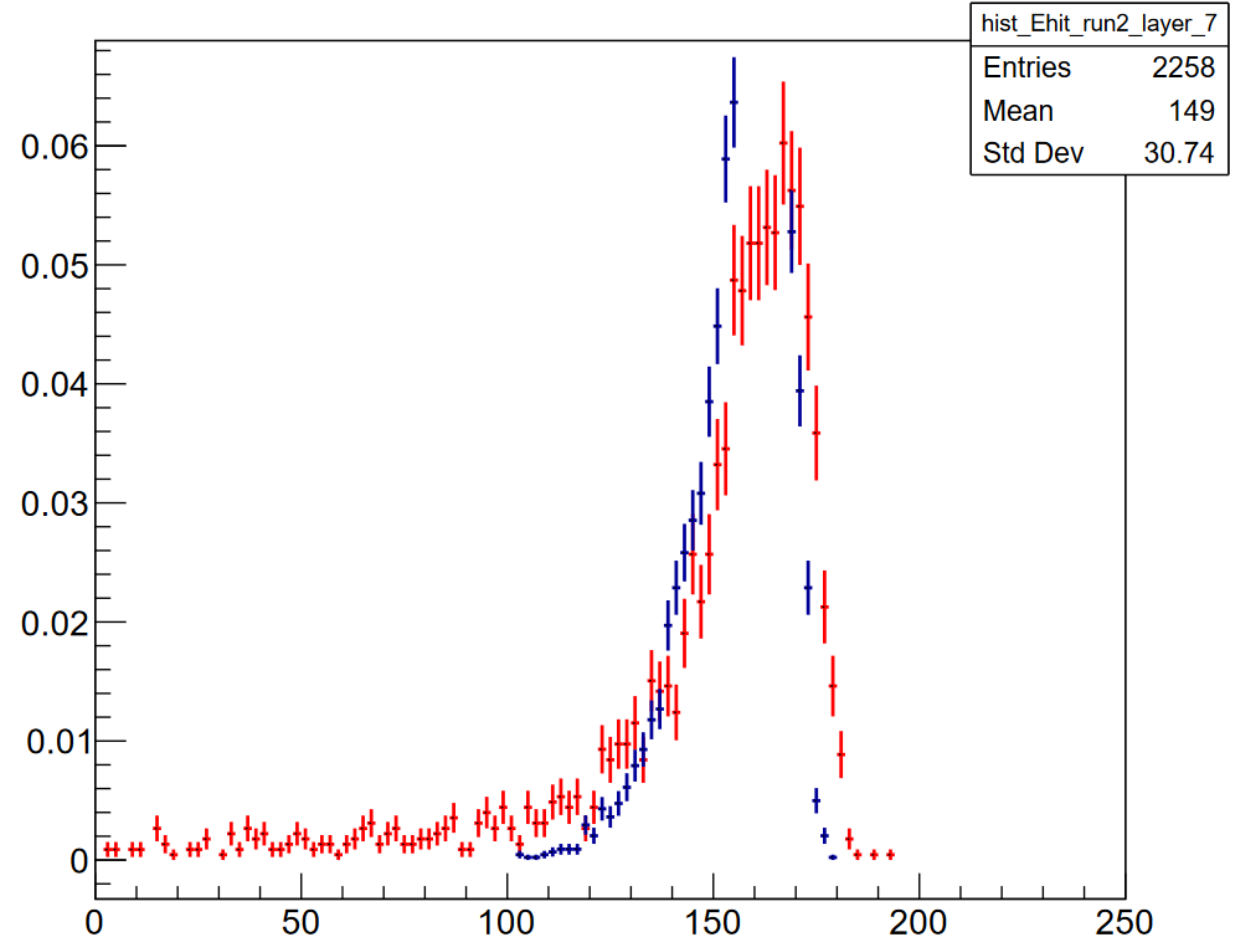
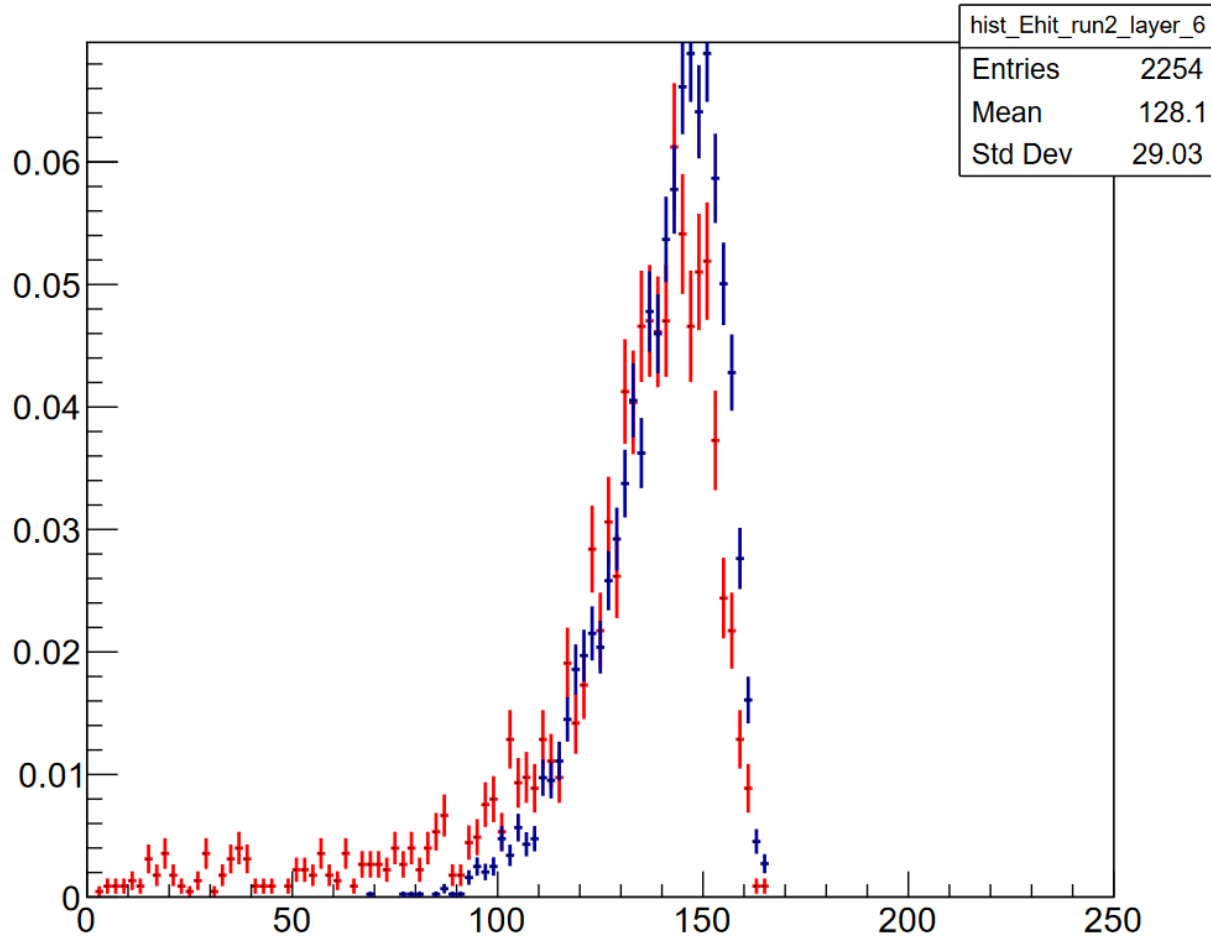
Layer 2 and 3



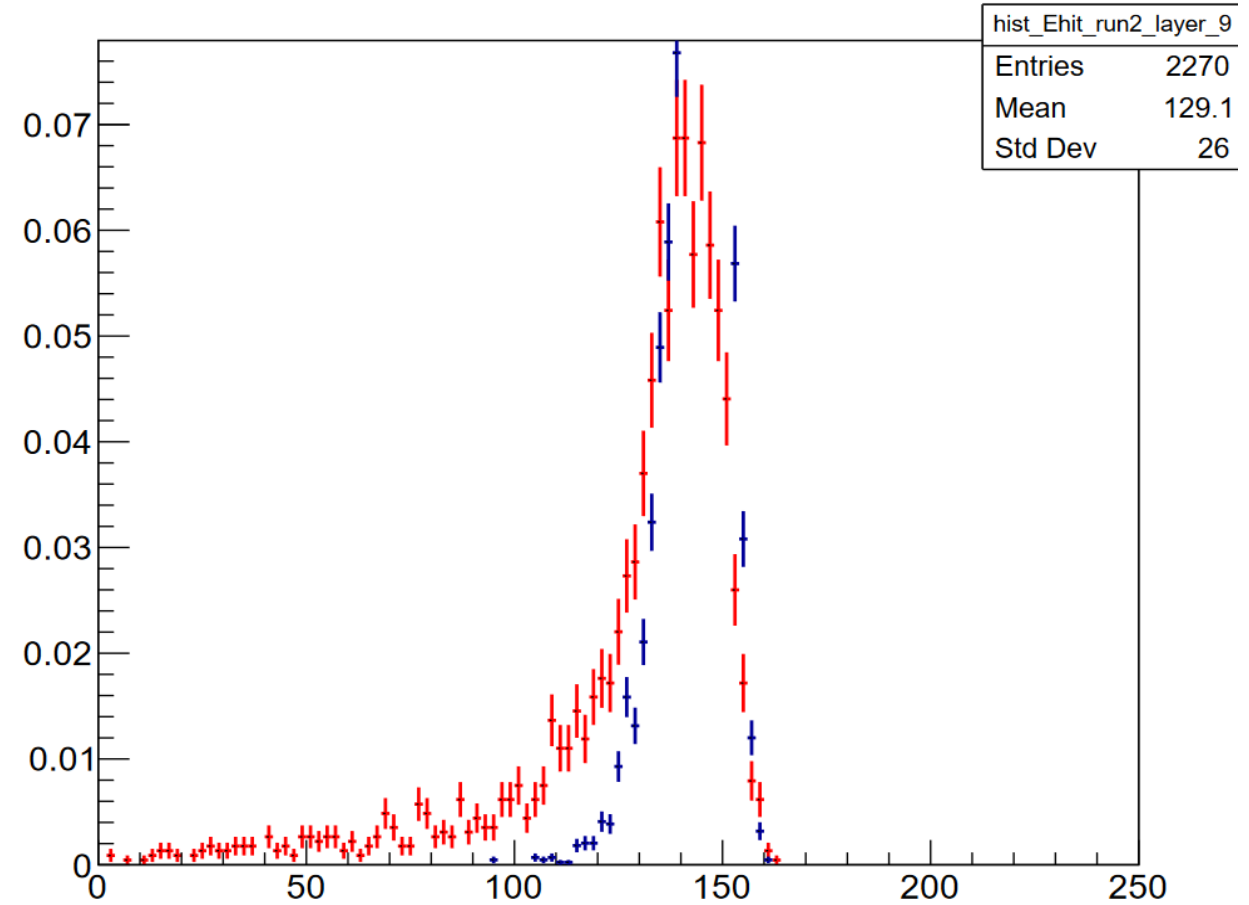
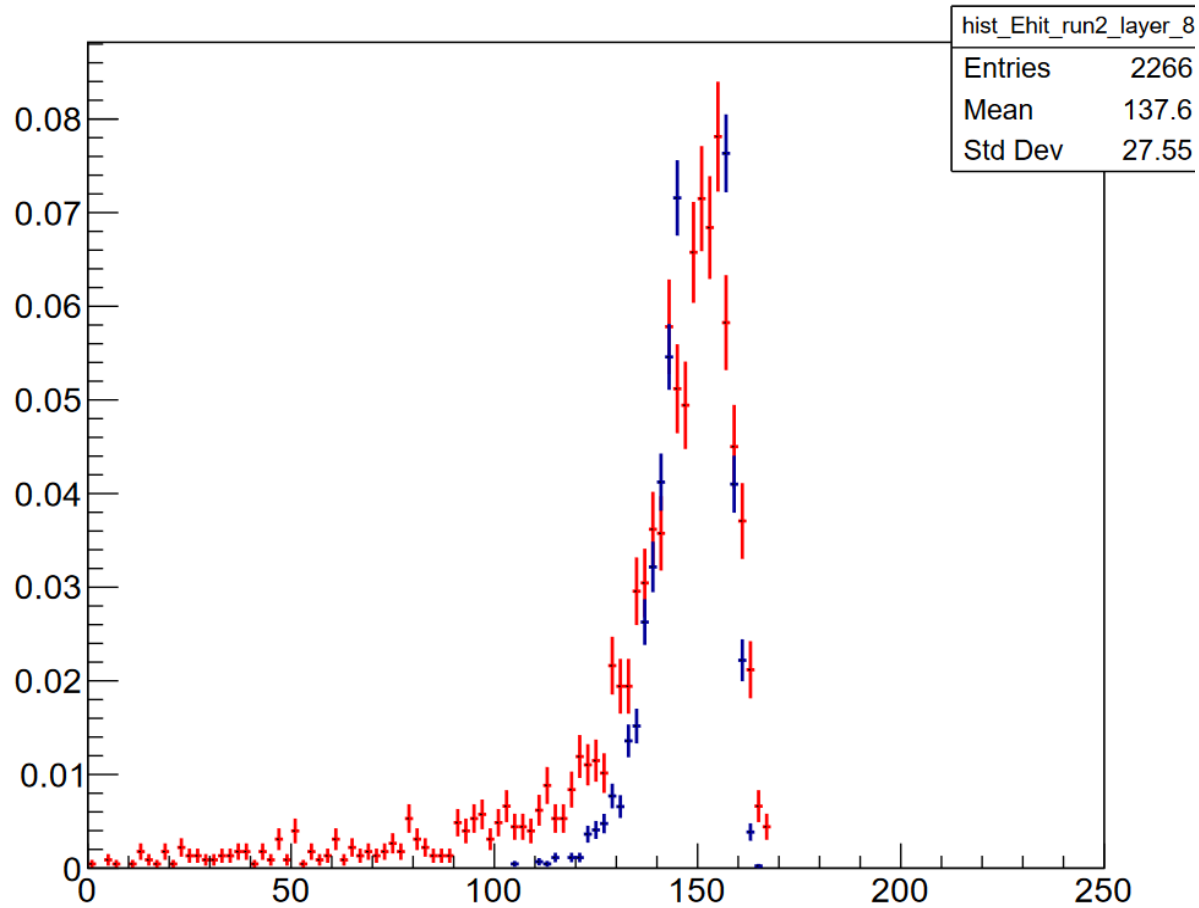
Layer 4 and 5



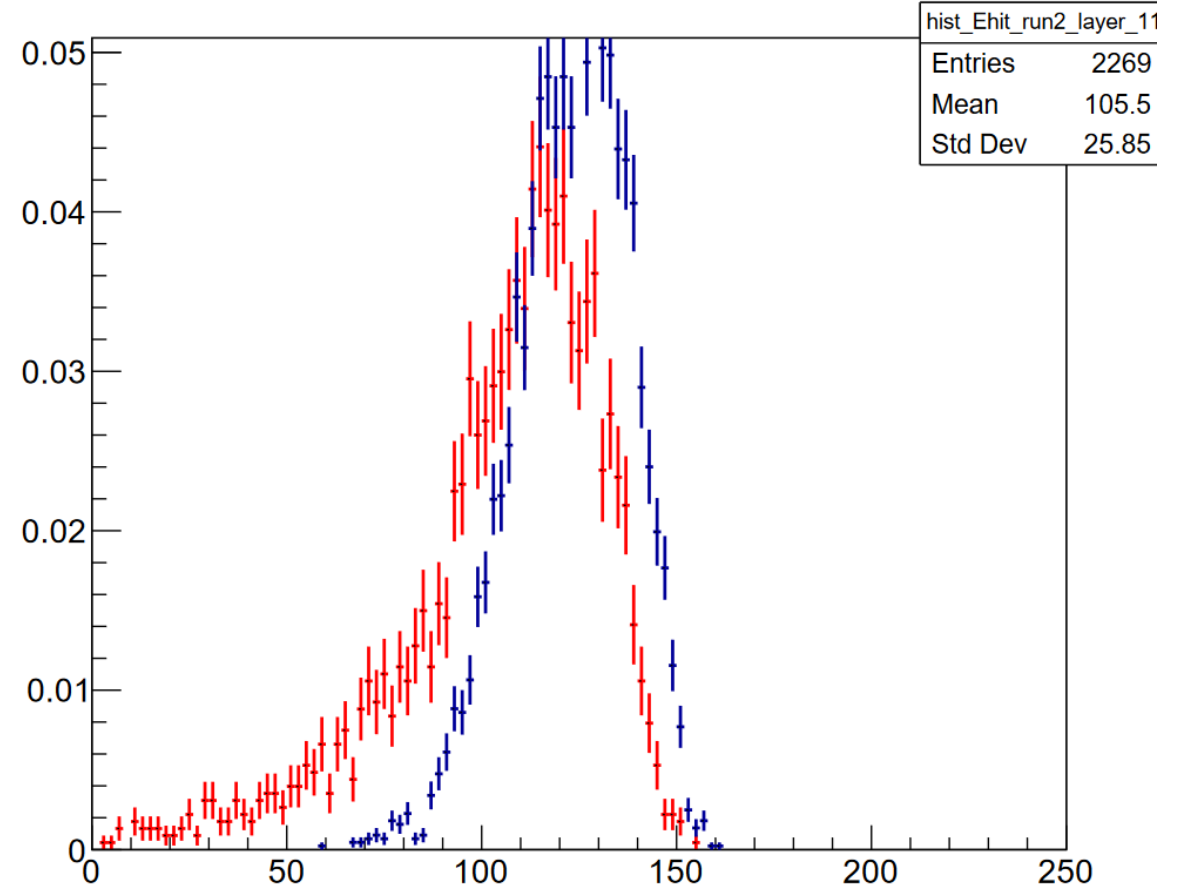
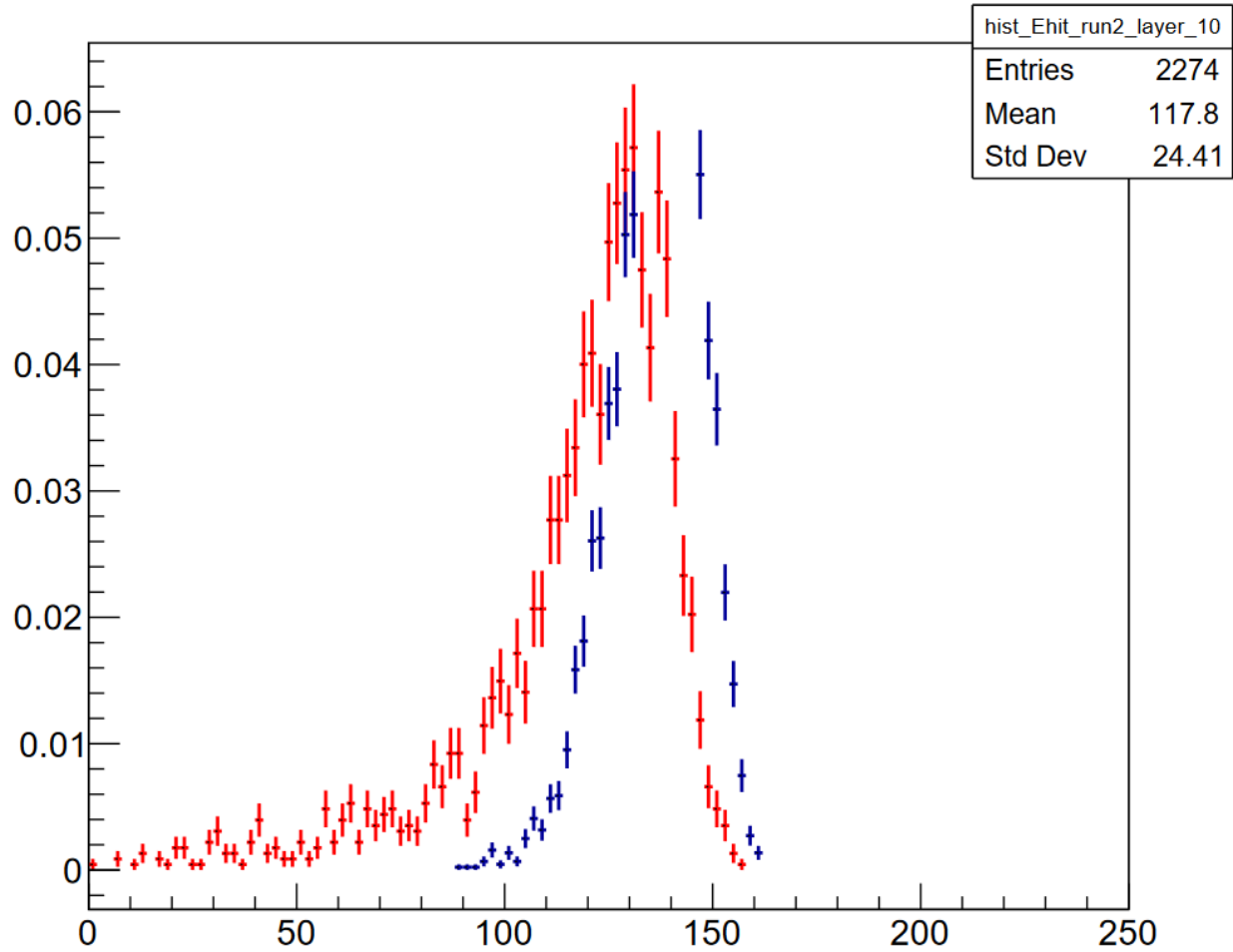
Layer 6 and 7



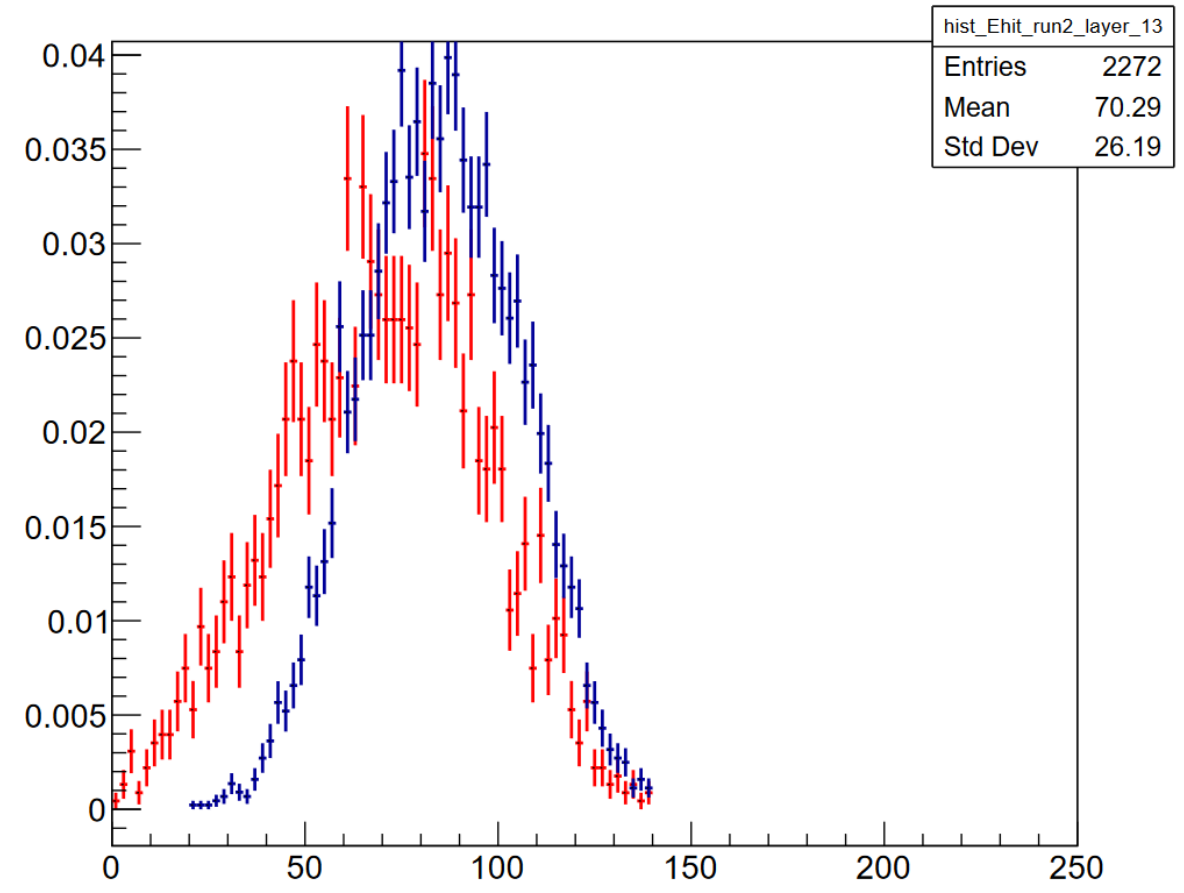
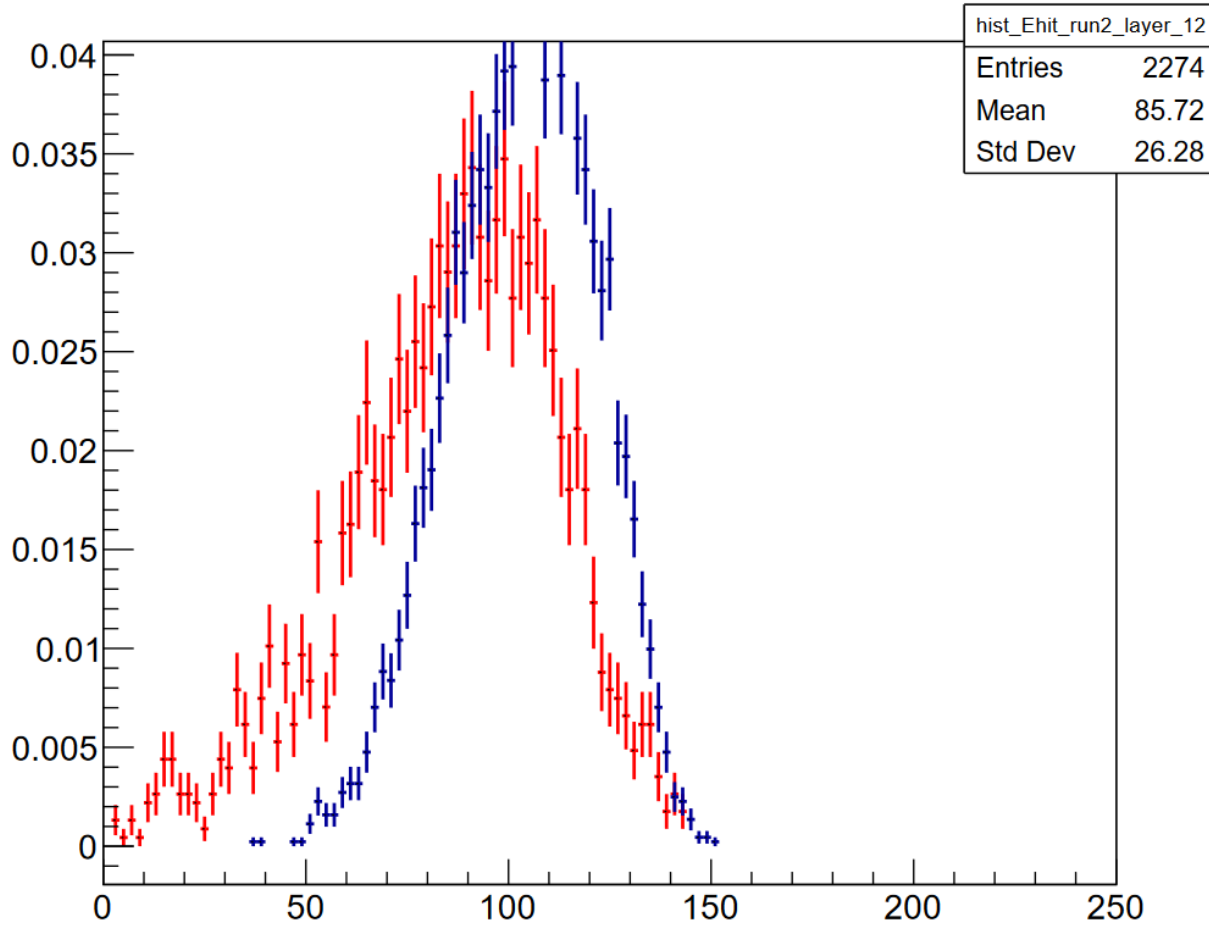
Layer 8 and 9



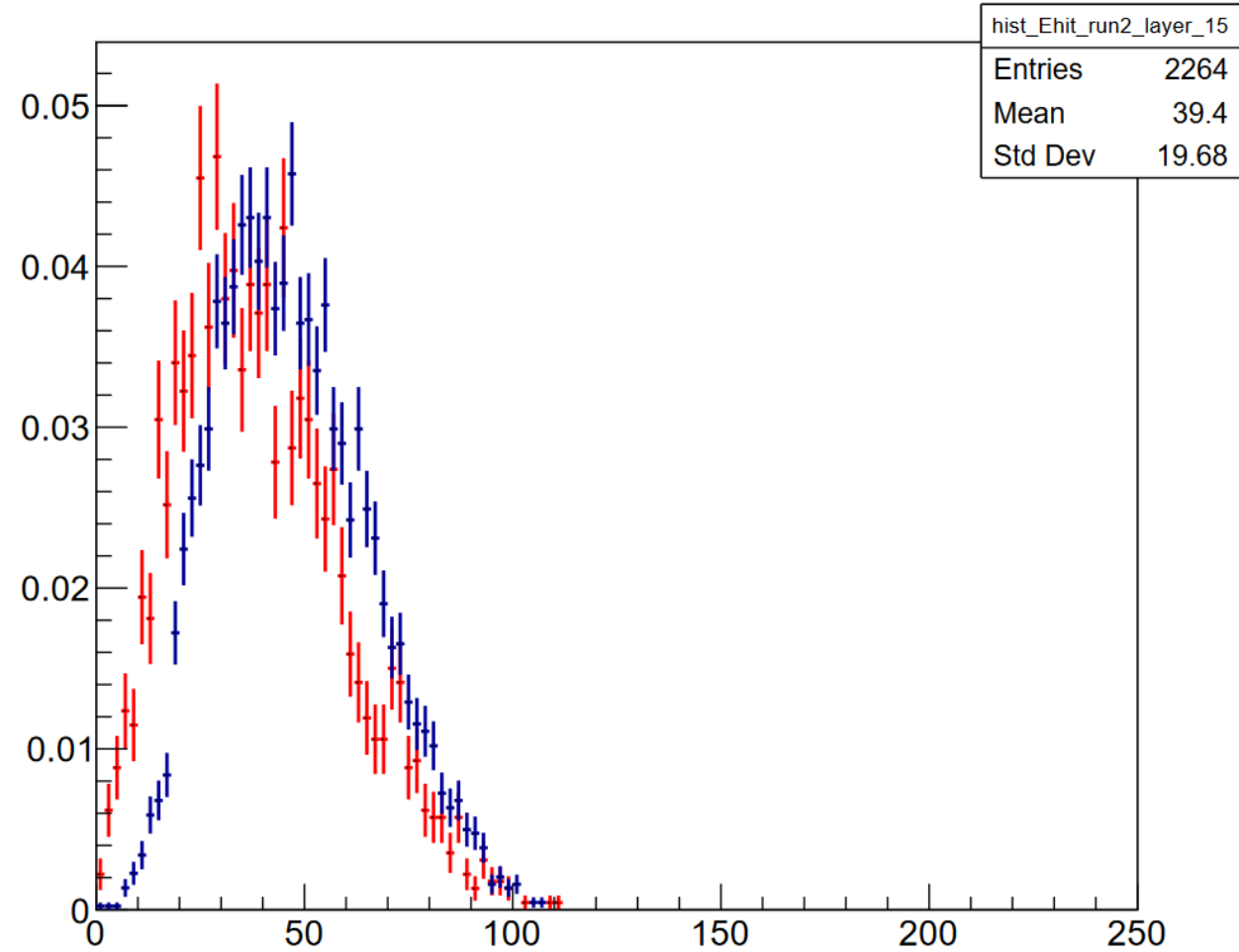
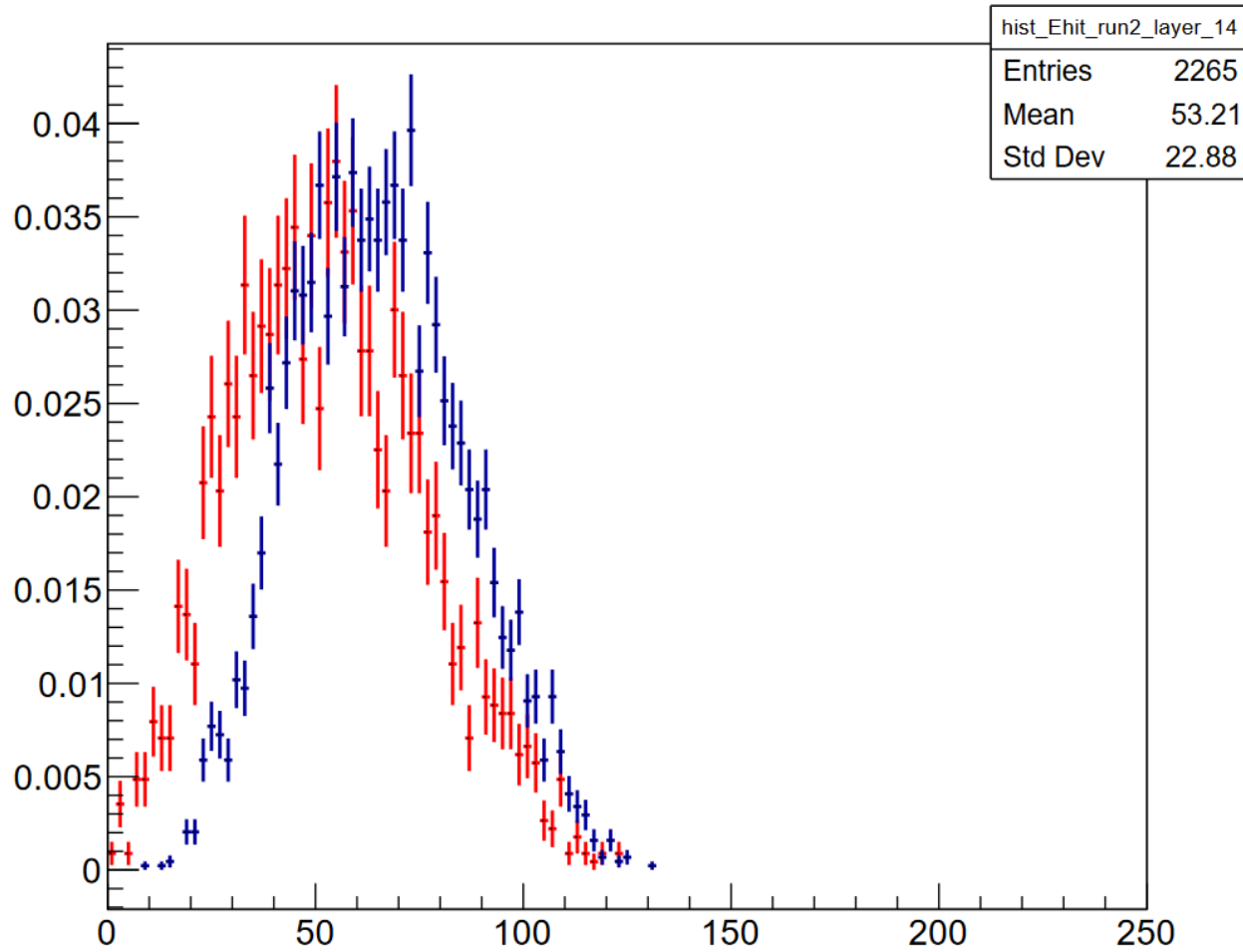
Layer 10 and 11



Layer 12 and 13



Layer 14 and 15



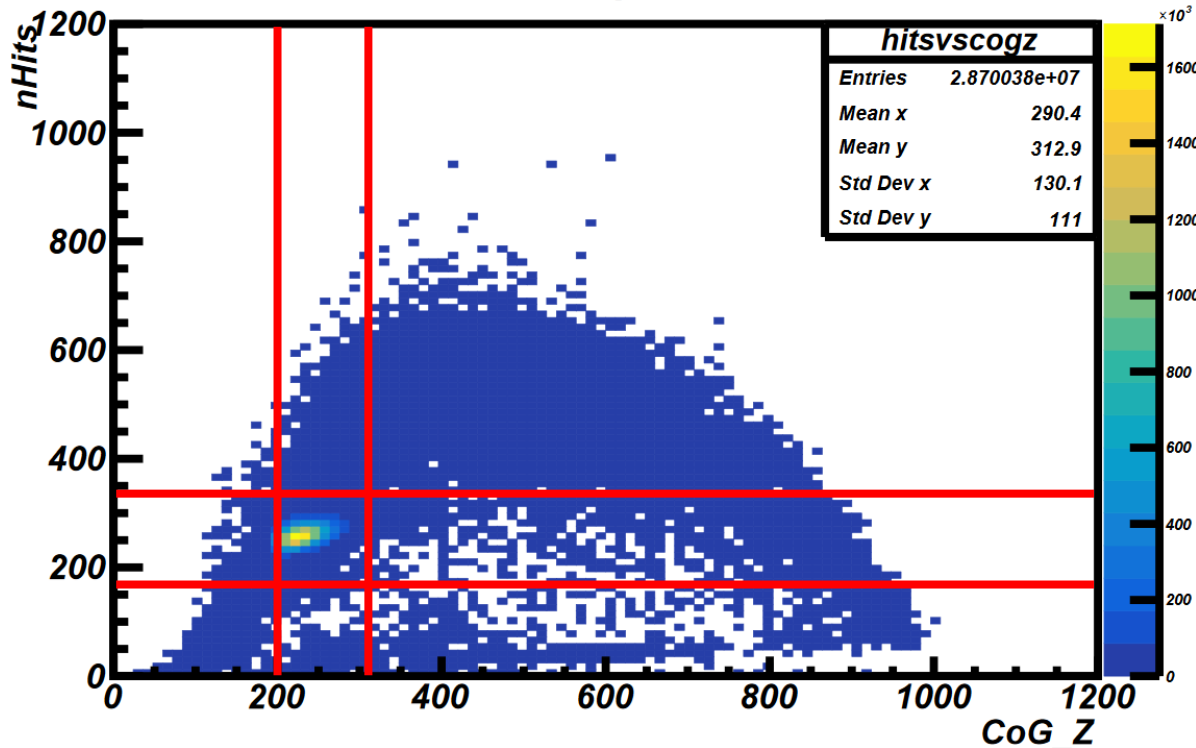
Thank you

Basic event selection for 80 GeV electron – June 2018 data

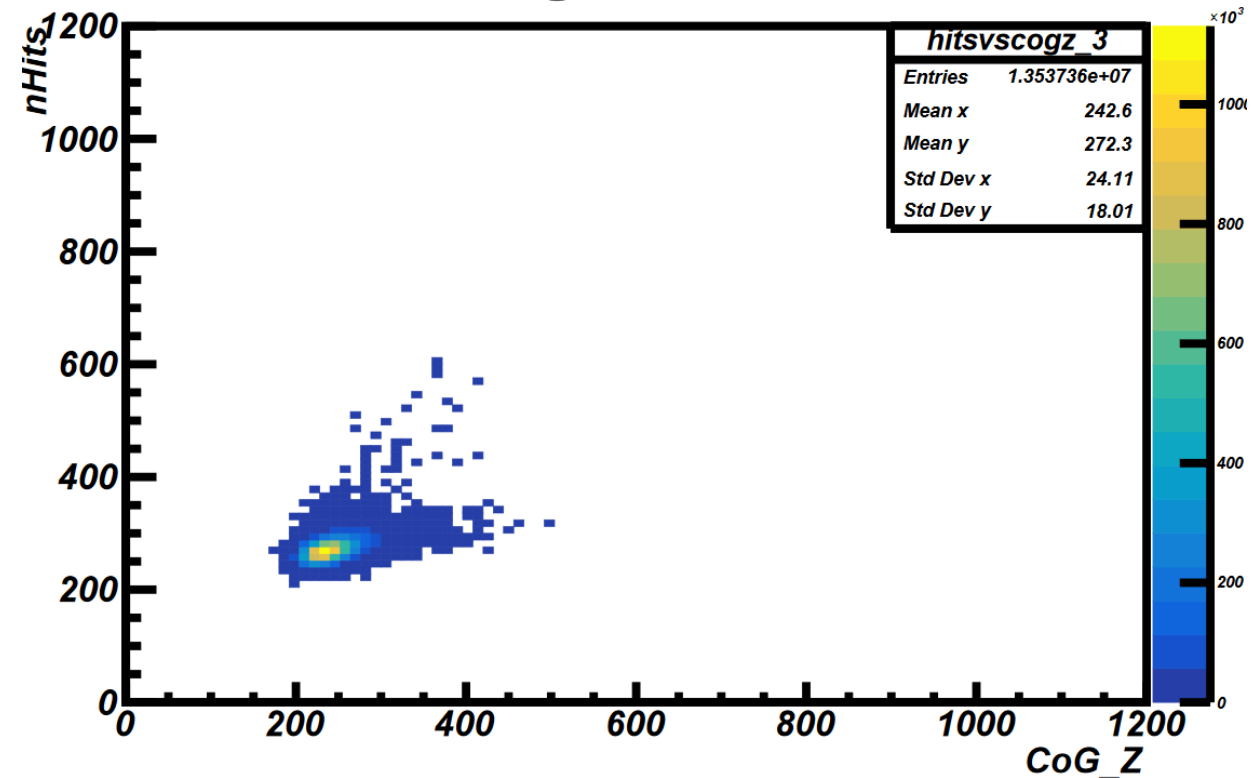
Run number: 61156

- Number of hits: Between 200 to 300 hits
- Center of gravity along Z: 180 mm to 280 mm

hitsvscog in data



hitsvscog in simulation



Basic event selection for 80 GeV electron – June 2018 data

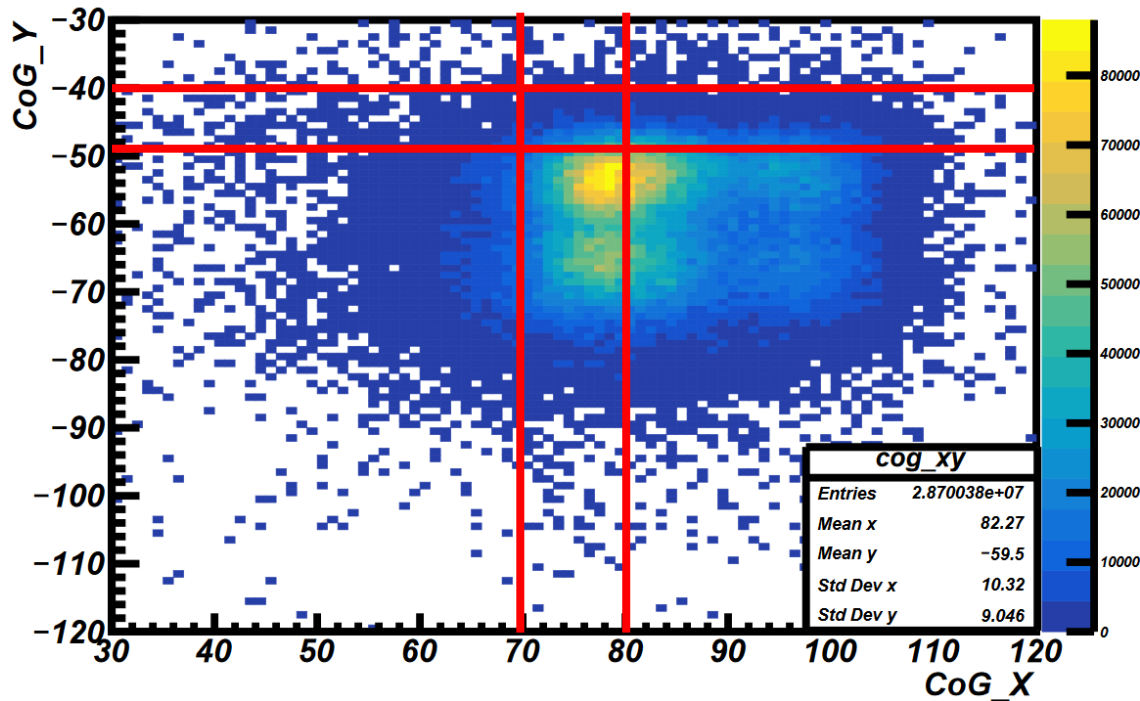
Run number: 61156

Centre of gravity X: Between 70 mm to 80 mm

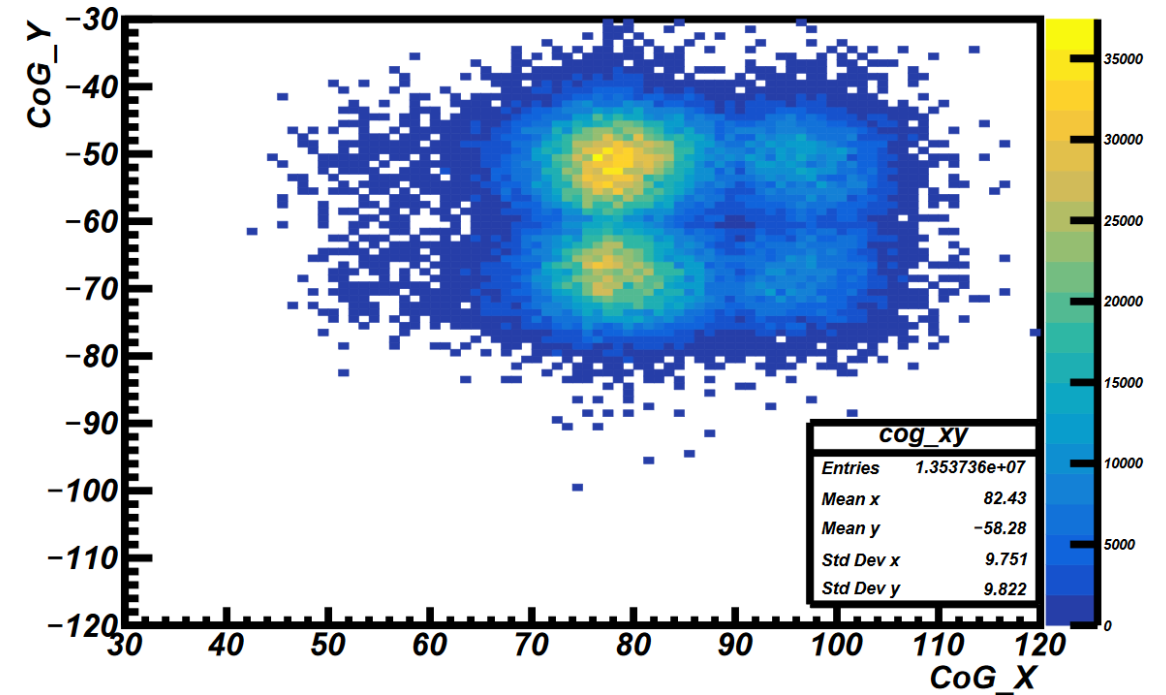
Centre of gravity Y: Between -50 mm to -40 mm

Choosing 1cm in centre of a tile: Pick events with maximum amplitude

cog_x and cog_y in data



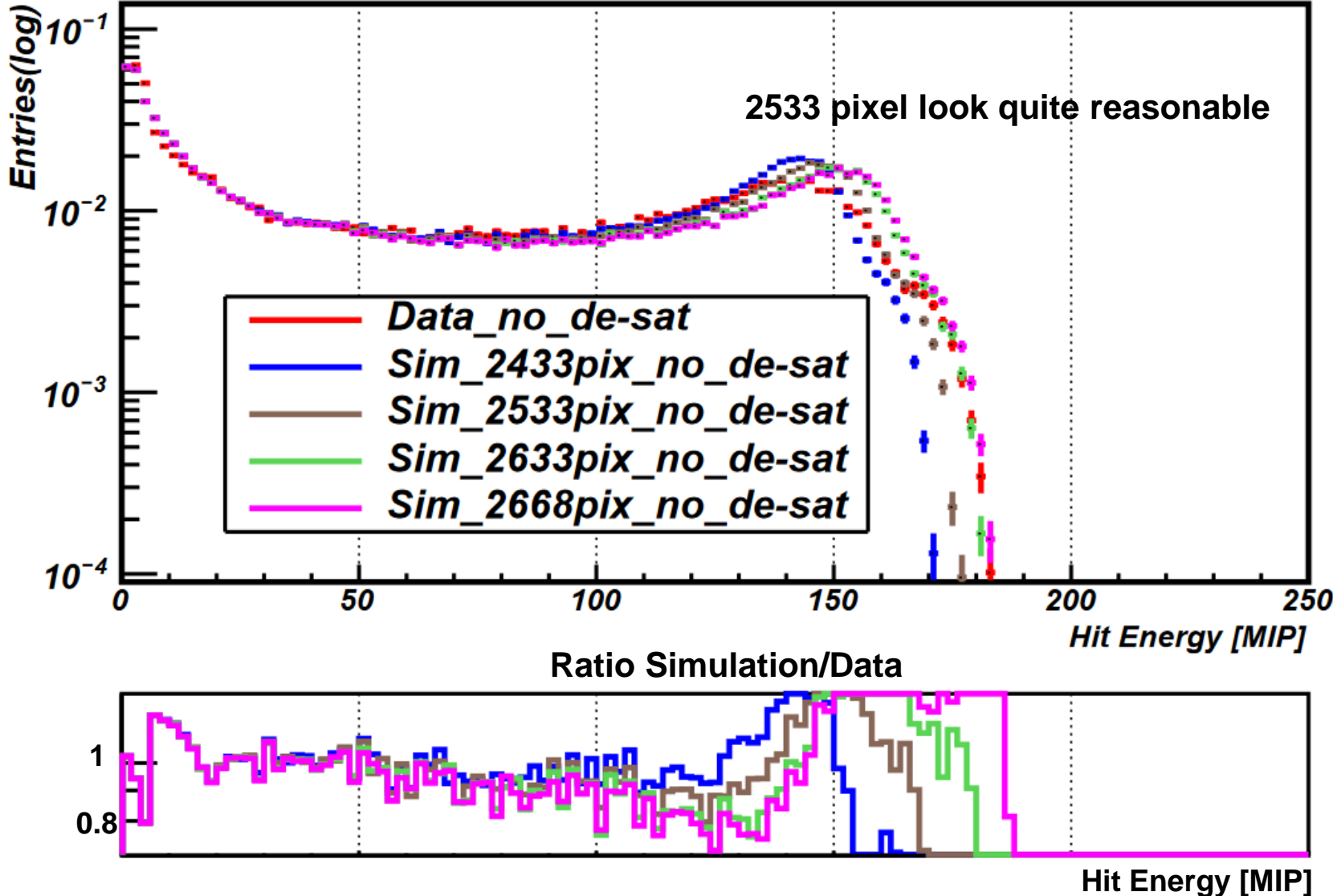
cog_x and cog_y in simulation



Saturation Correction

80 GeV electron June data, Run number: 61156

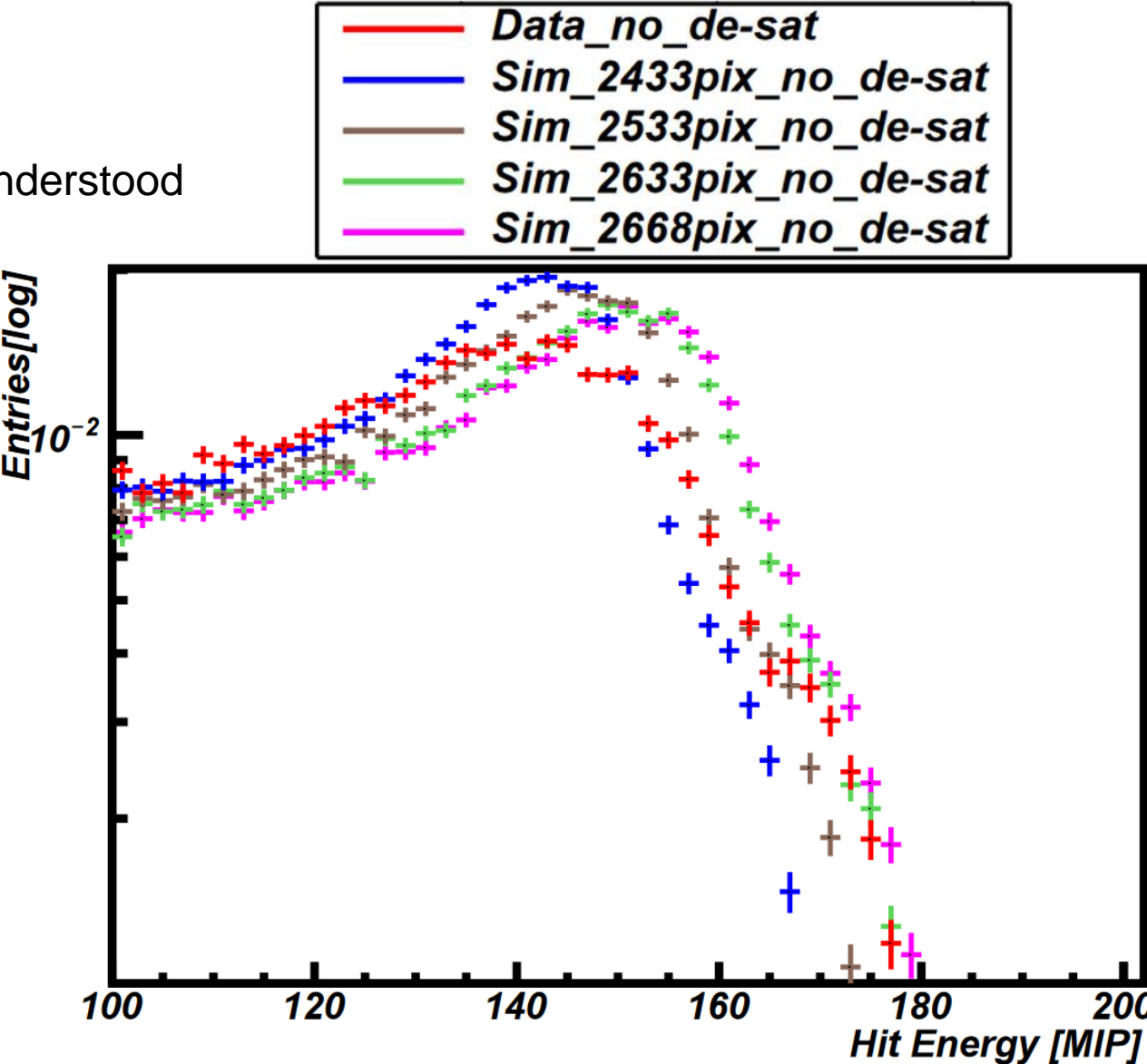
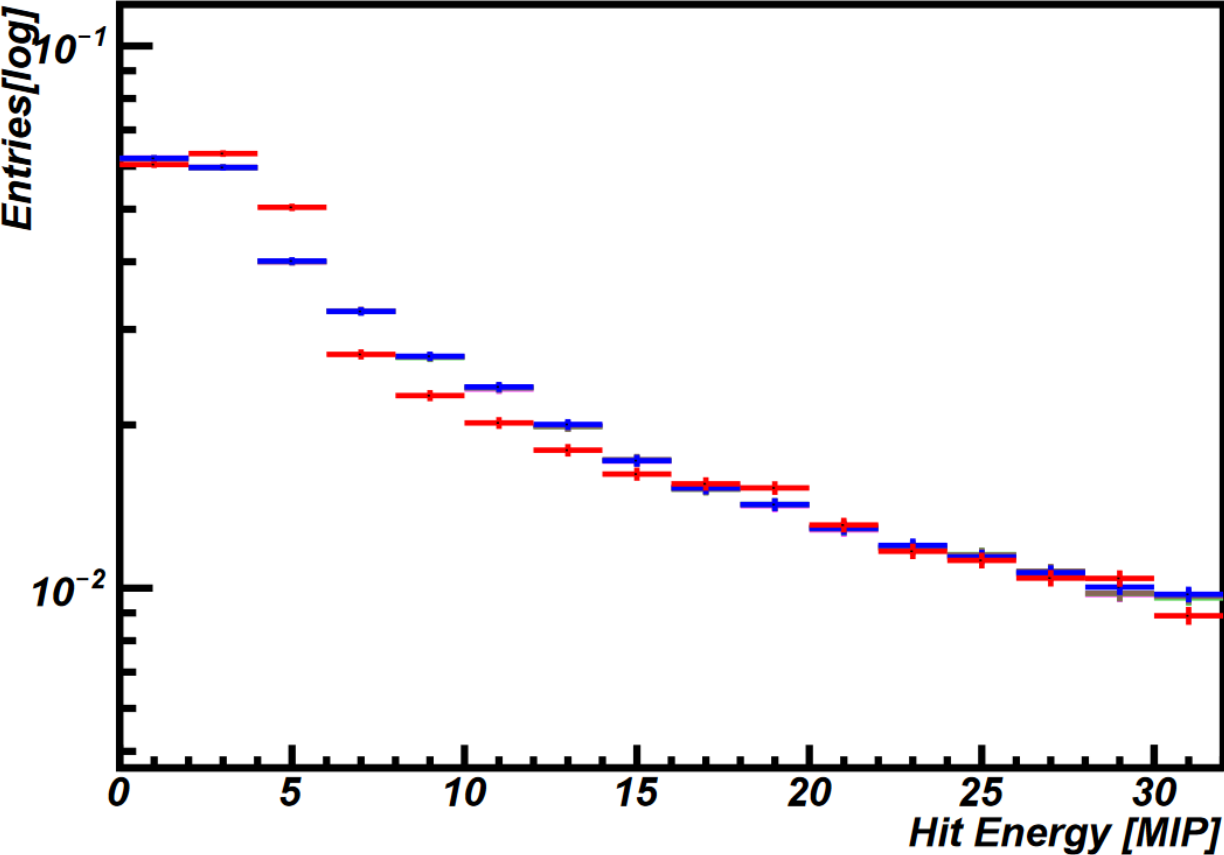
Saturation Correction for 80 GeV electron - June data



Saturation Correction

80 GeV electron June data, Run number: 61156

The transition region of HG-LG around 5 MIP not fully understood




BACKUP

Gain Calibration

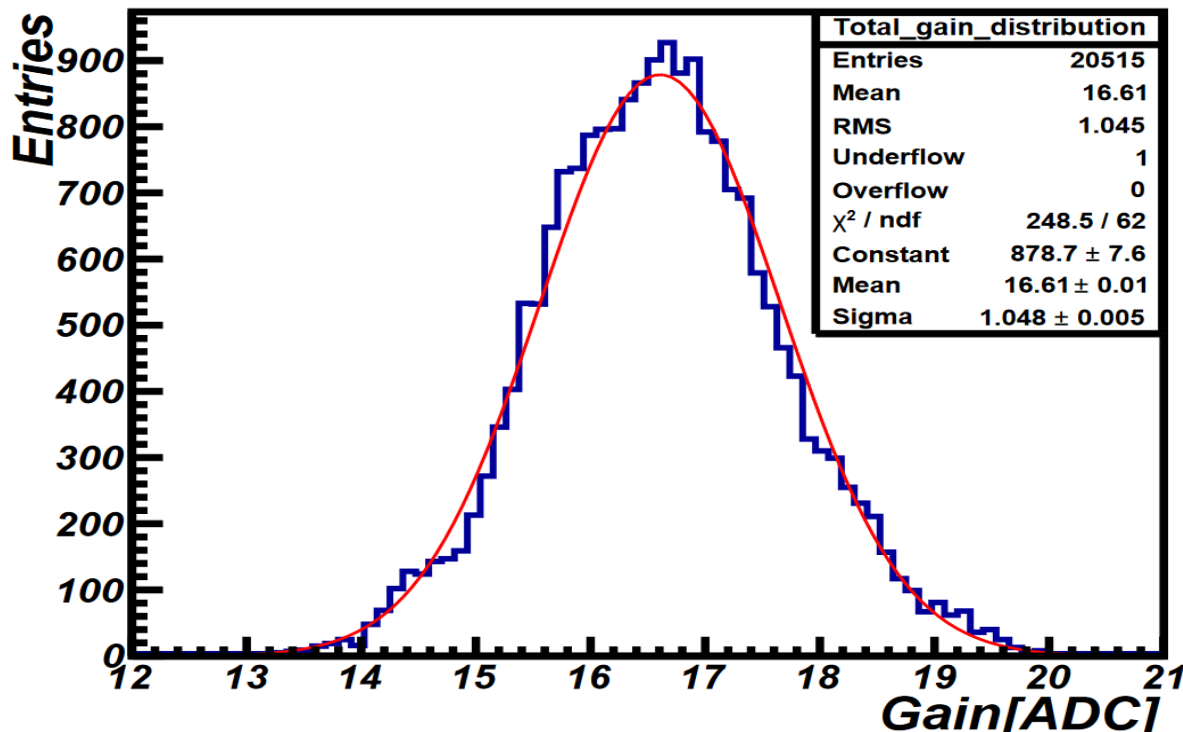
May 2018

- Fitted channels from each LED voltages are combined.

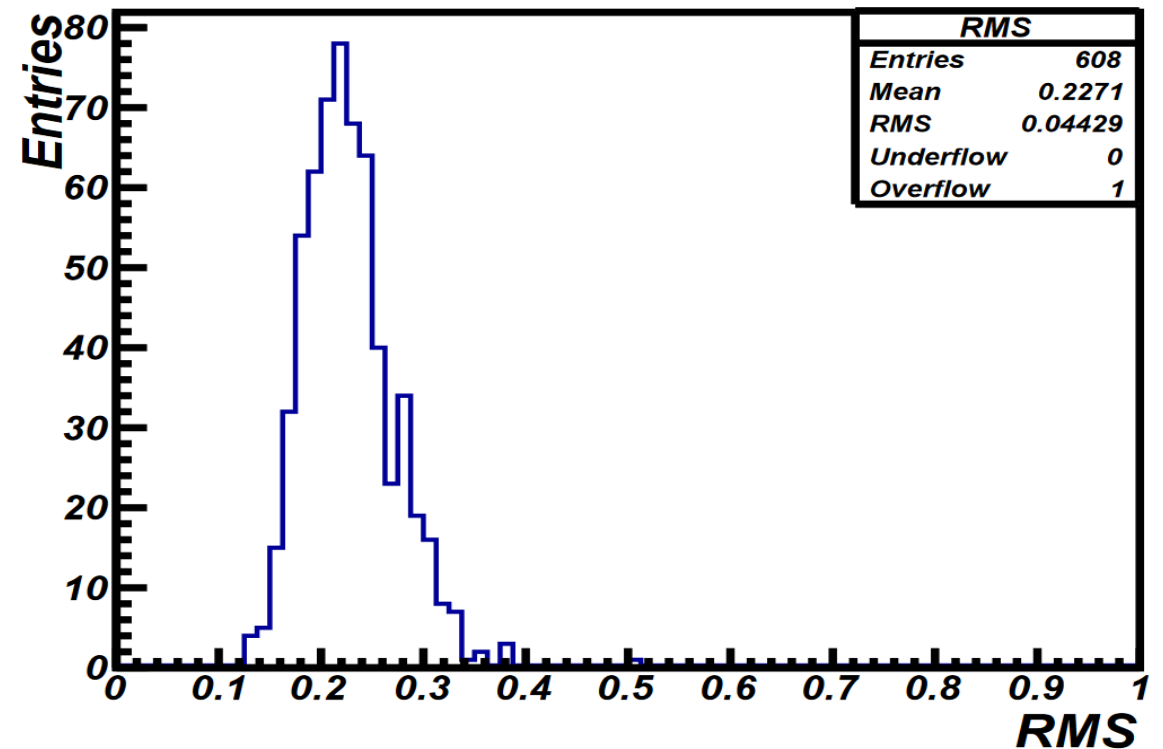
May: Short LED - no power pulsing run.

- Gain distribution for May which consists only AHCAL(21, 888 channels).  **94% channels fitted**
- Remaining 1373 channels - acquire gain value from the mean of the corresponding chip.

Total Gain Distribution



RMS of the gains from chips



Gain Calibration

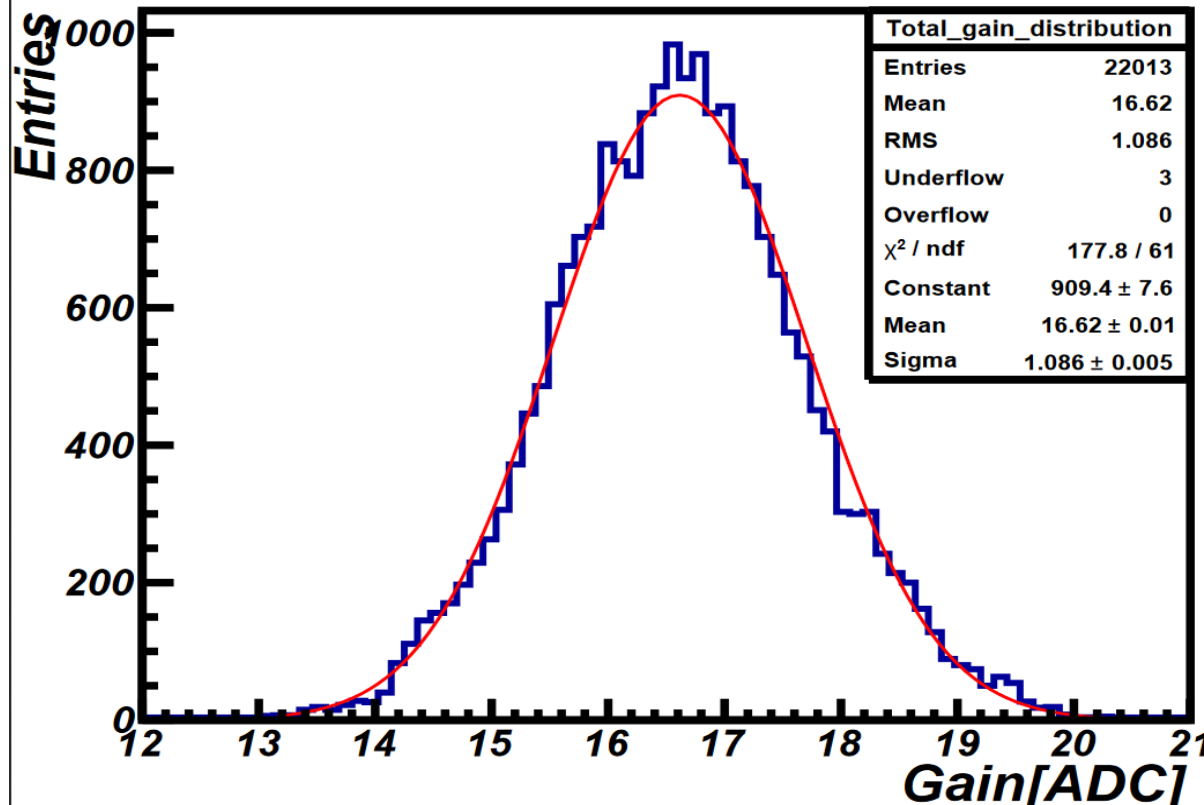
June 2018

- Gain distribution from June, includes the Tokyo layer (22464 channels).
- Long LED no power pulsing run on 25.06.2018

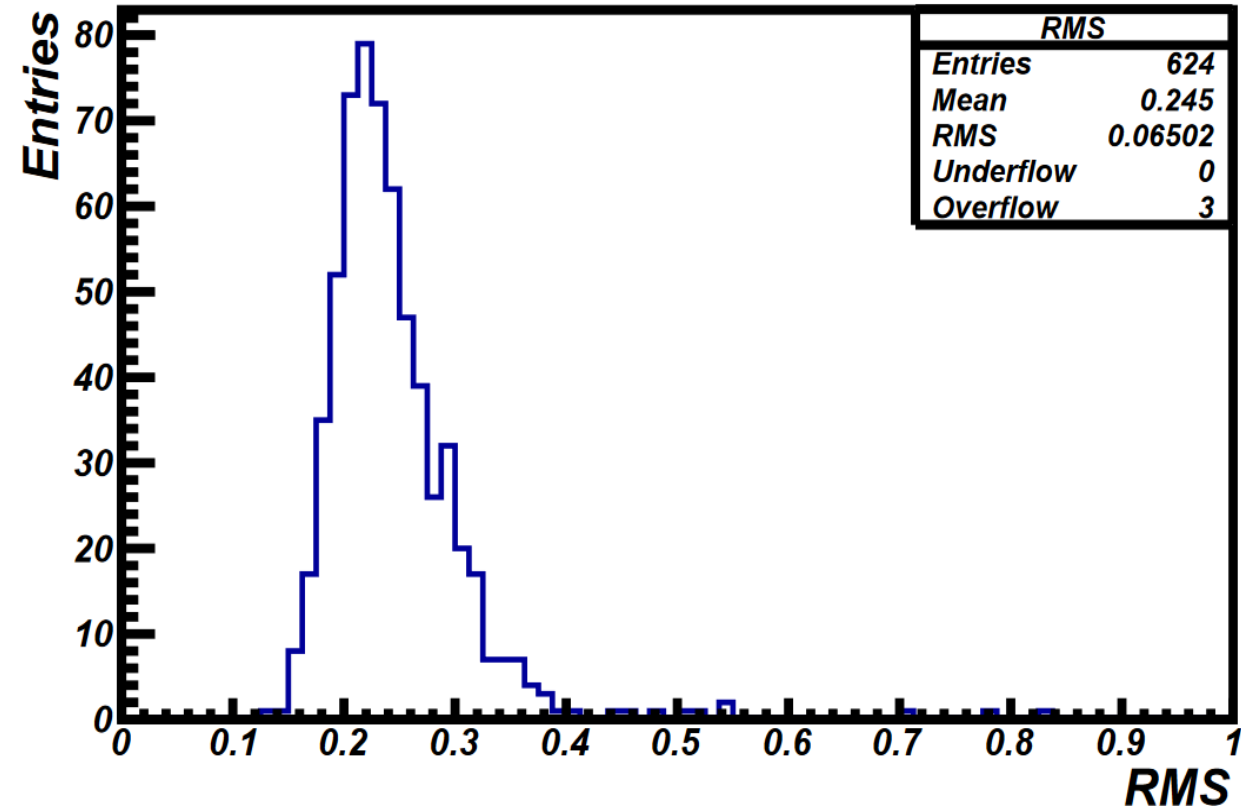


98% channels fitted

Total Gain Distribution



RMS of the gains from chips



Gain Calibration

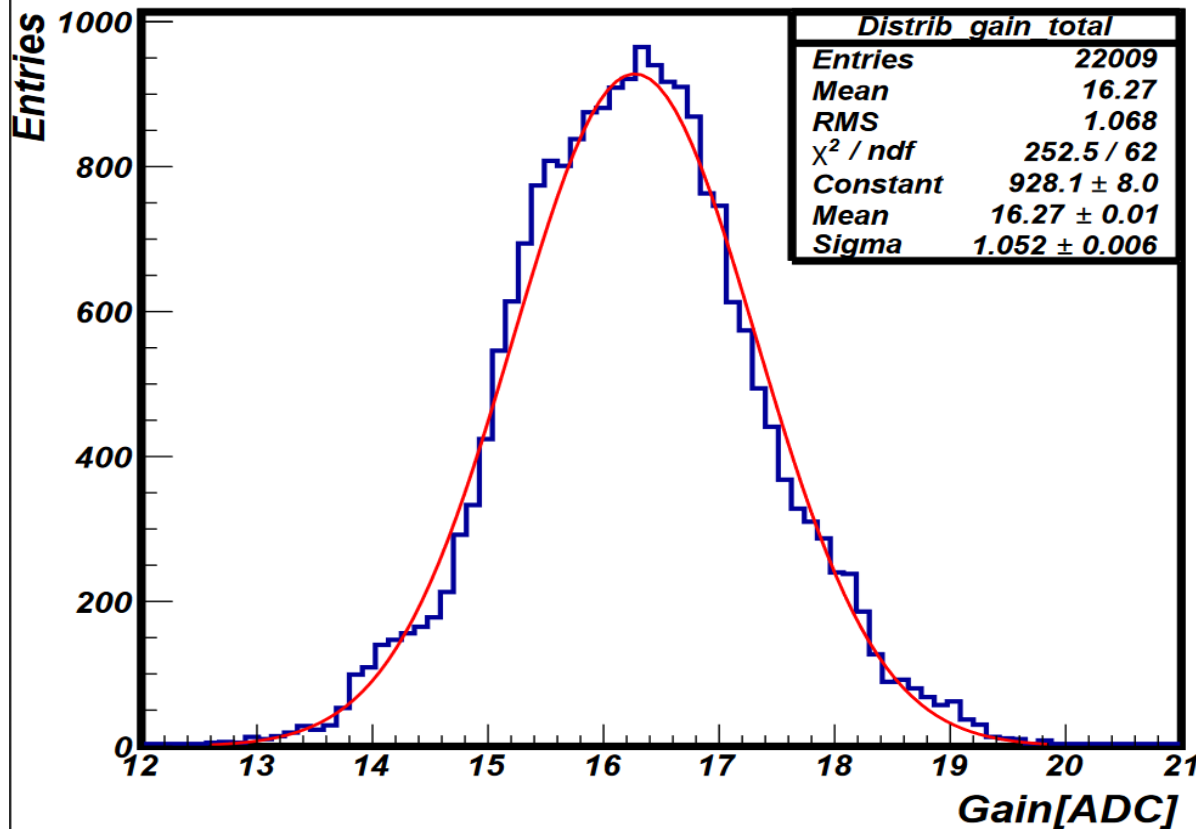
October 2018

- AHCAL + Tokyo layer.
- Long LED - power pulsing run on 17.10.2018
- 20 mV steps with 2000 cycles each run.

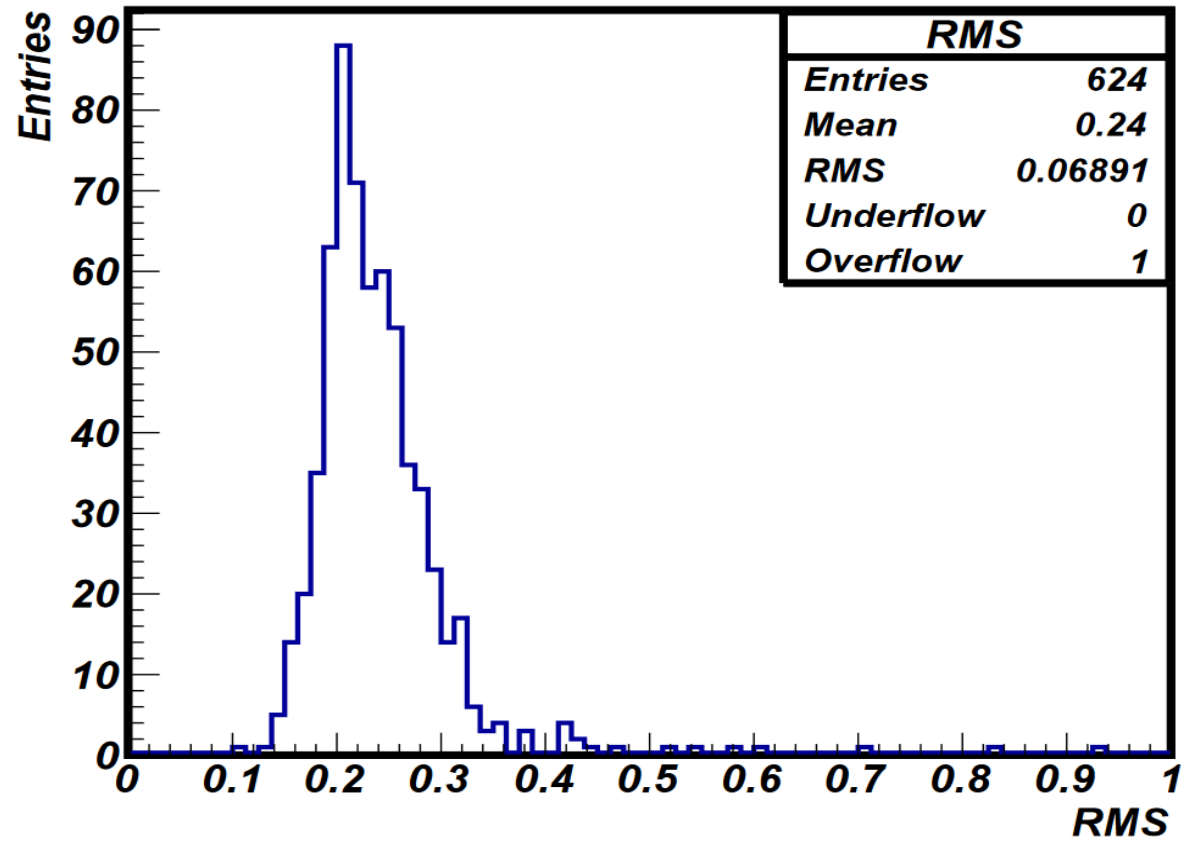


98% channels fitted

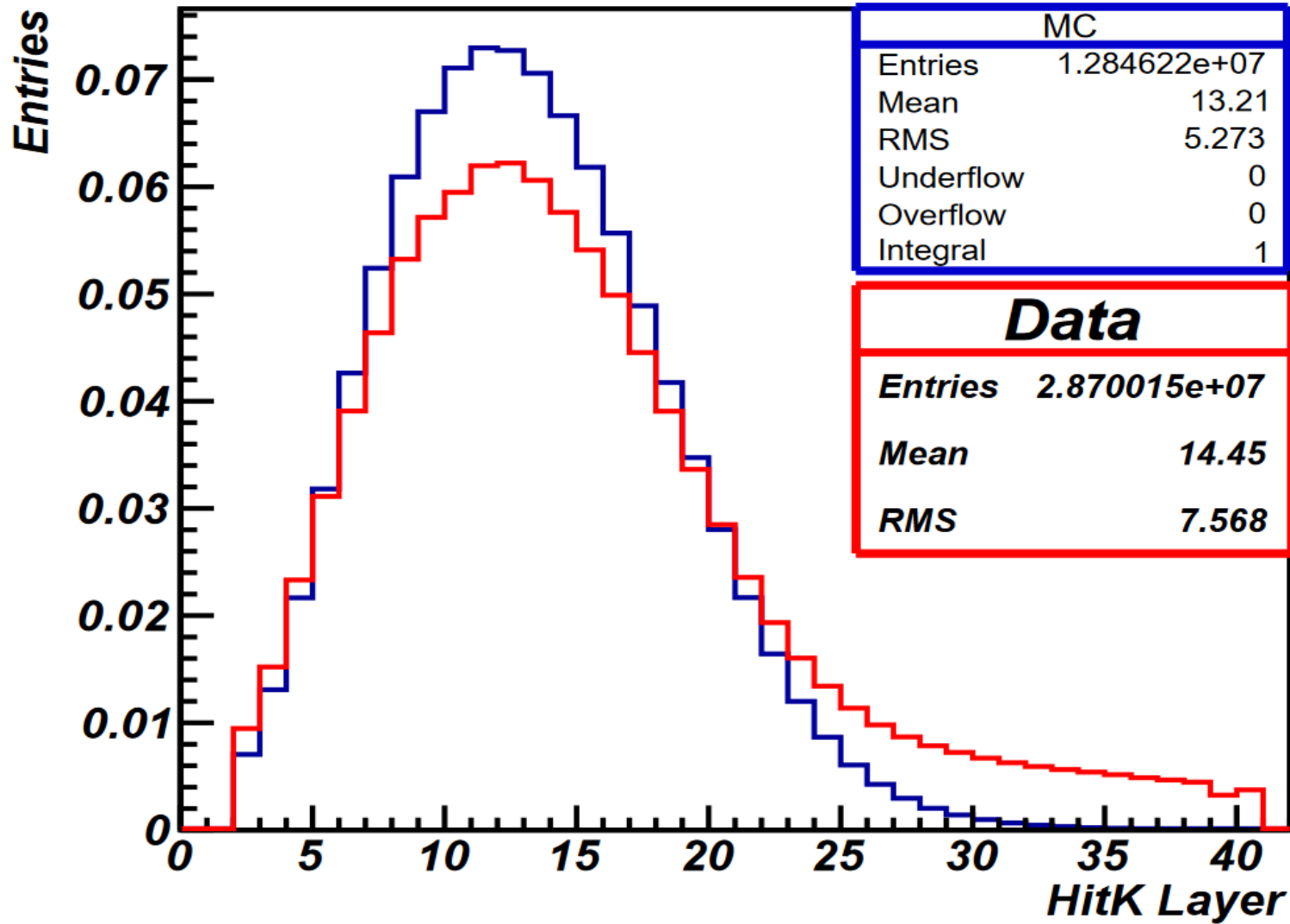
Total Gain Distribution



RMS of the gains from chips

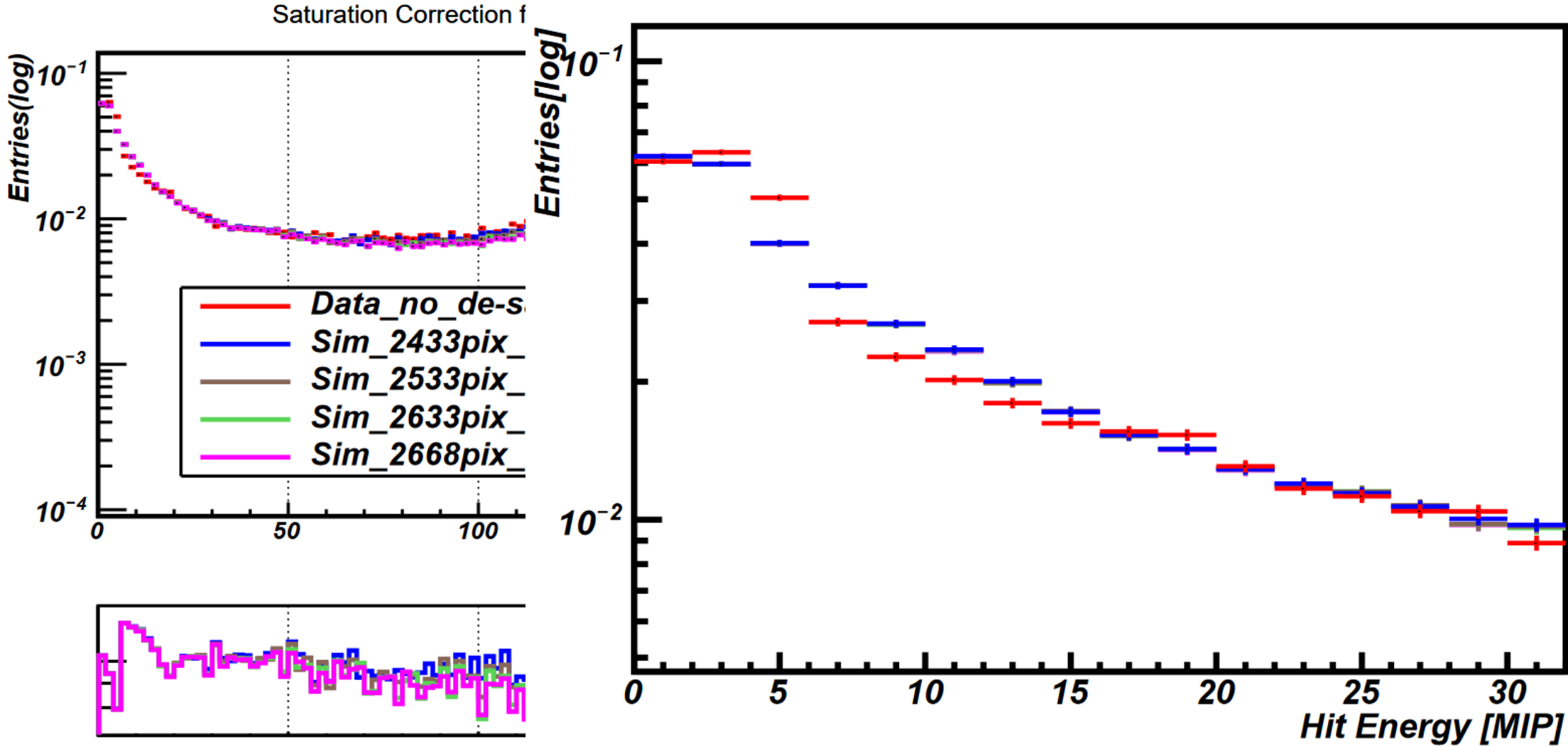


HitK Data and MC



Hit energy

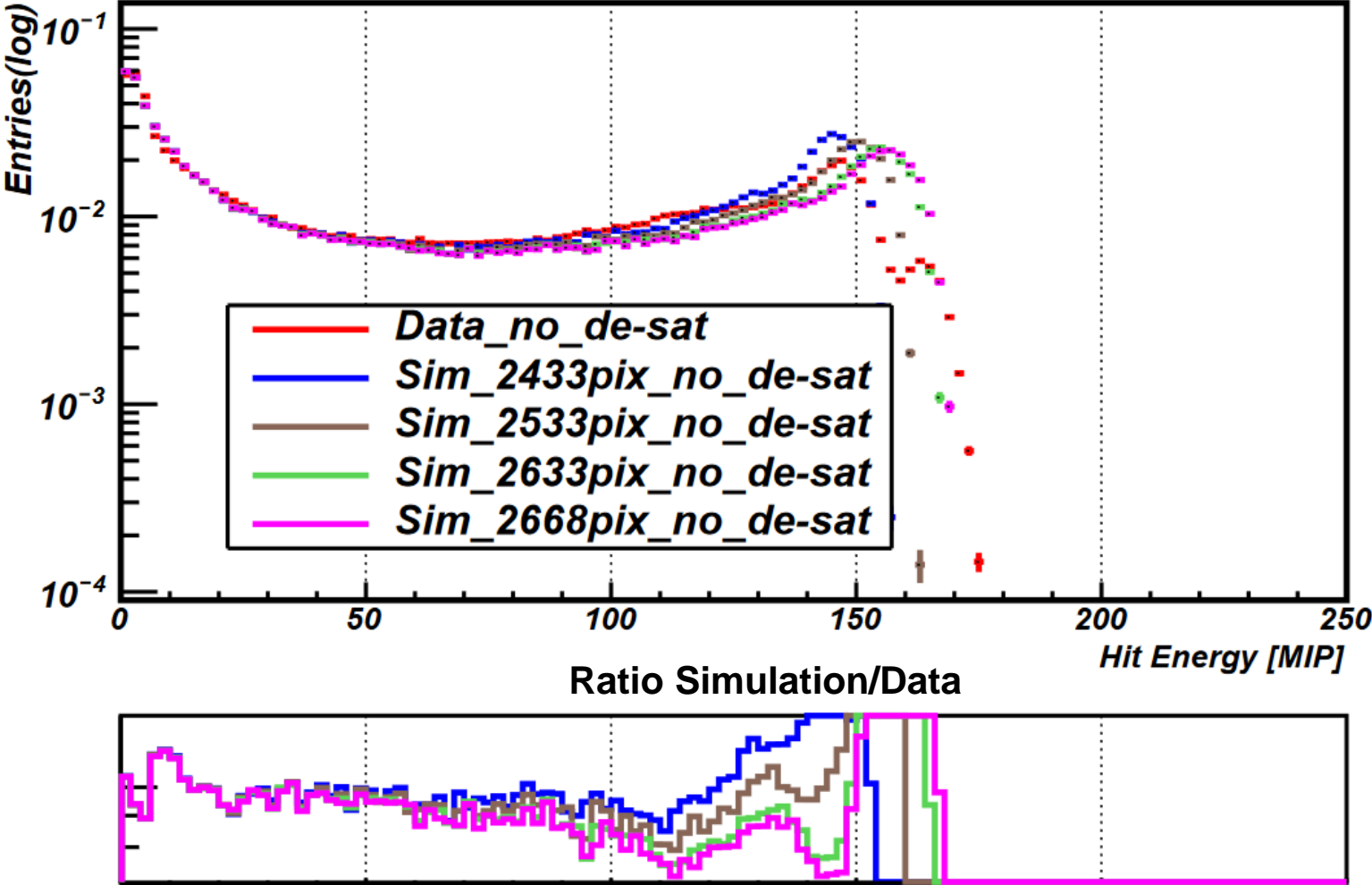
At lower MIP values



Saturation Correction

100 GeV electron June data, Run number: 61217

Saturation Correction for 100 GeV electron - June data

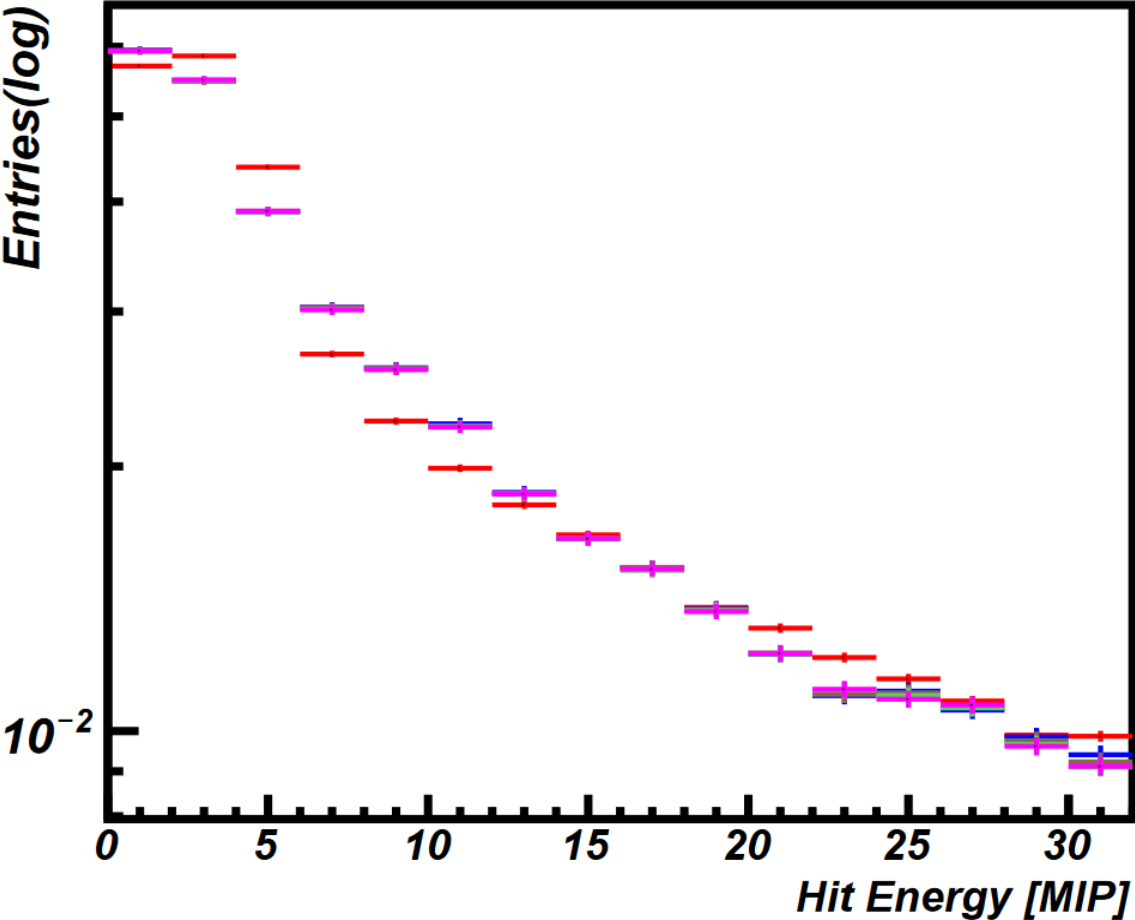


Saturation Correction

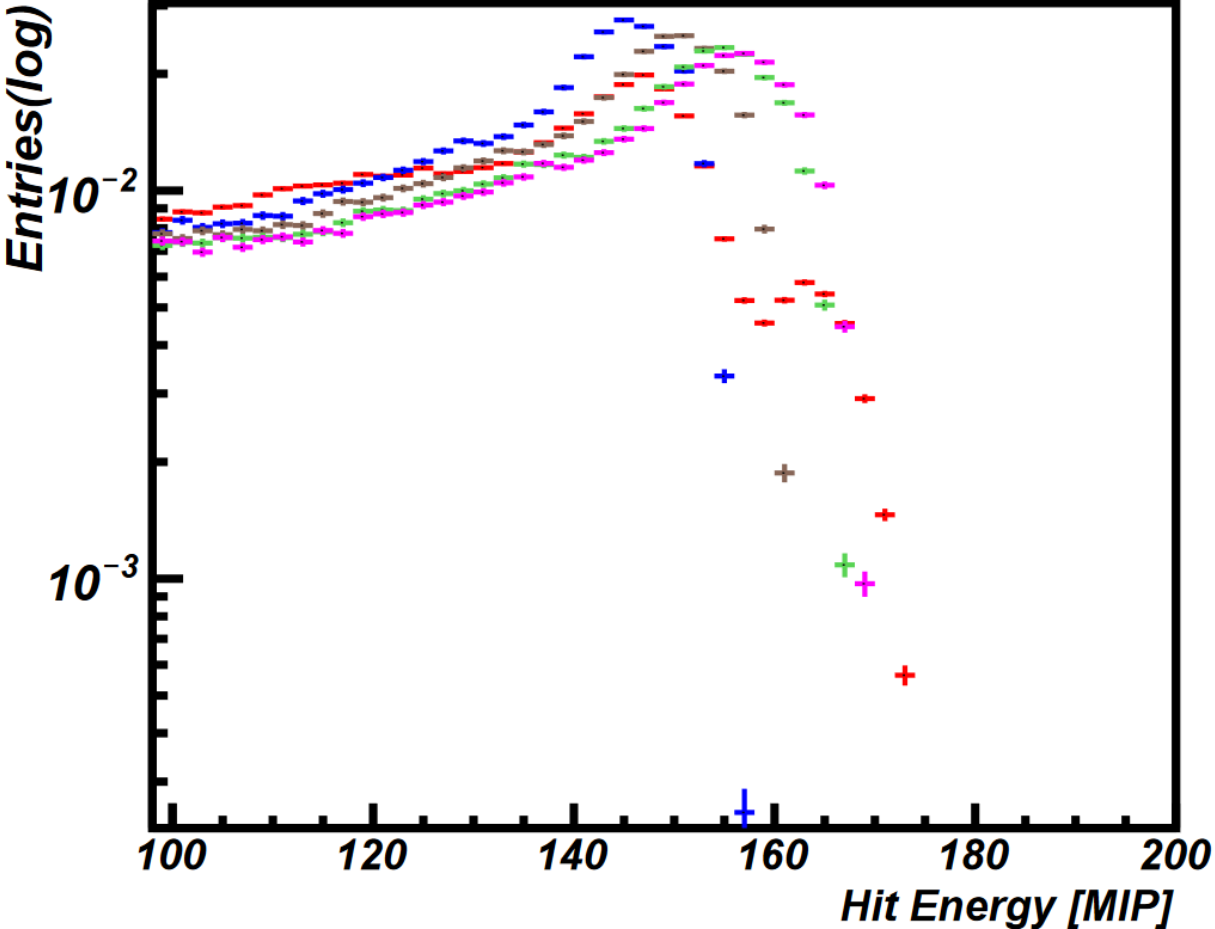
100 GeV electron June data, Run number: 61217



Saturation Correction for 100 GeV electron - June data



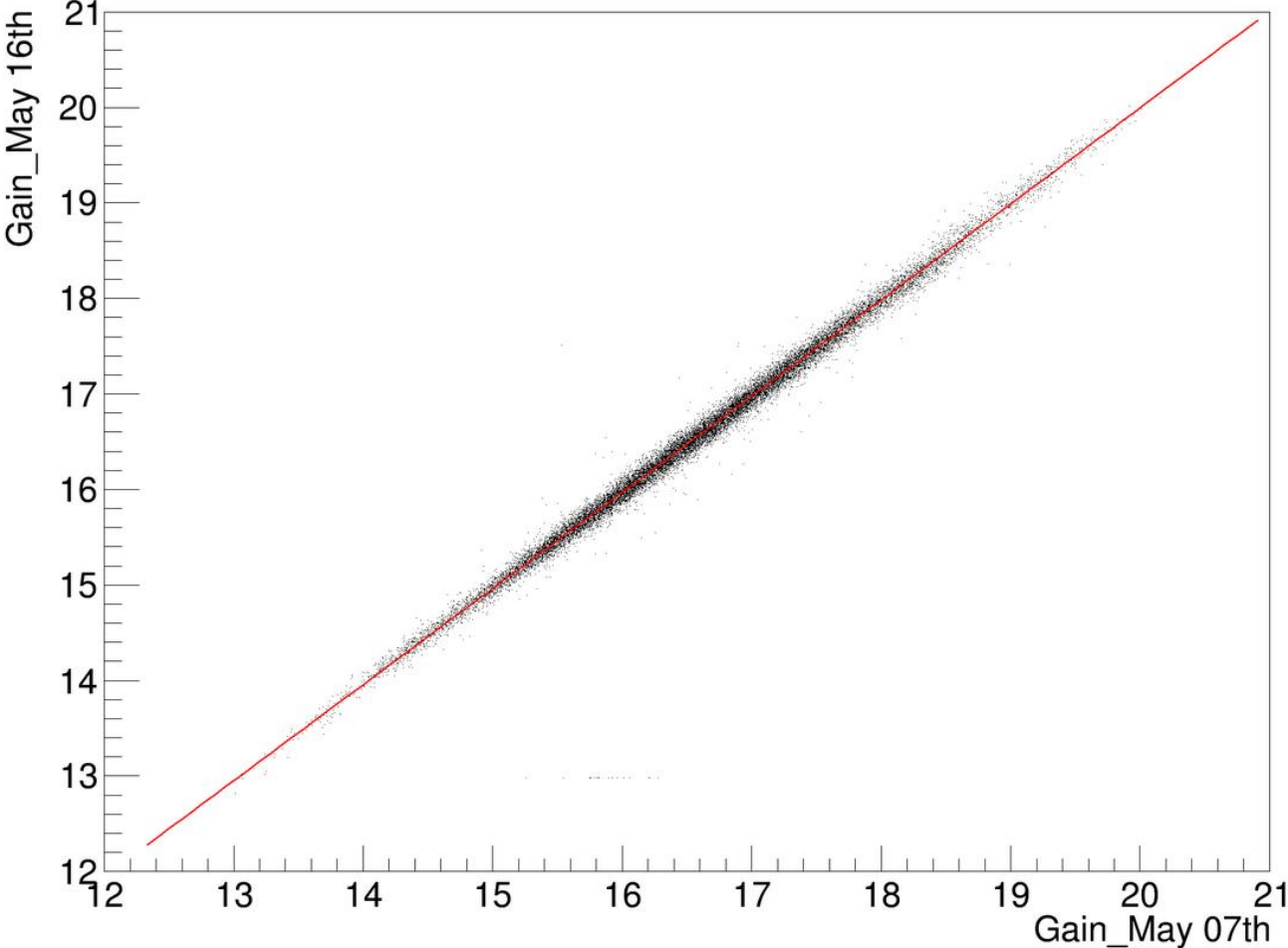
Saturation Correction for 100 GeV electron - June data



Gain Correlation

Between two days

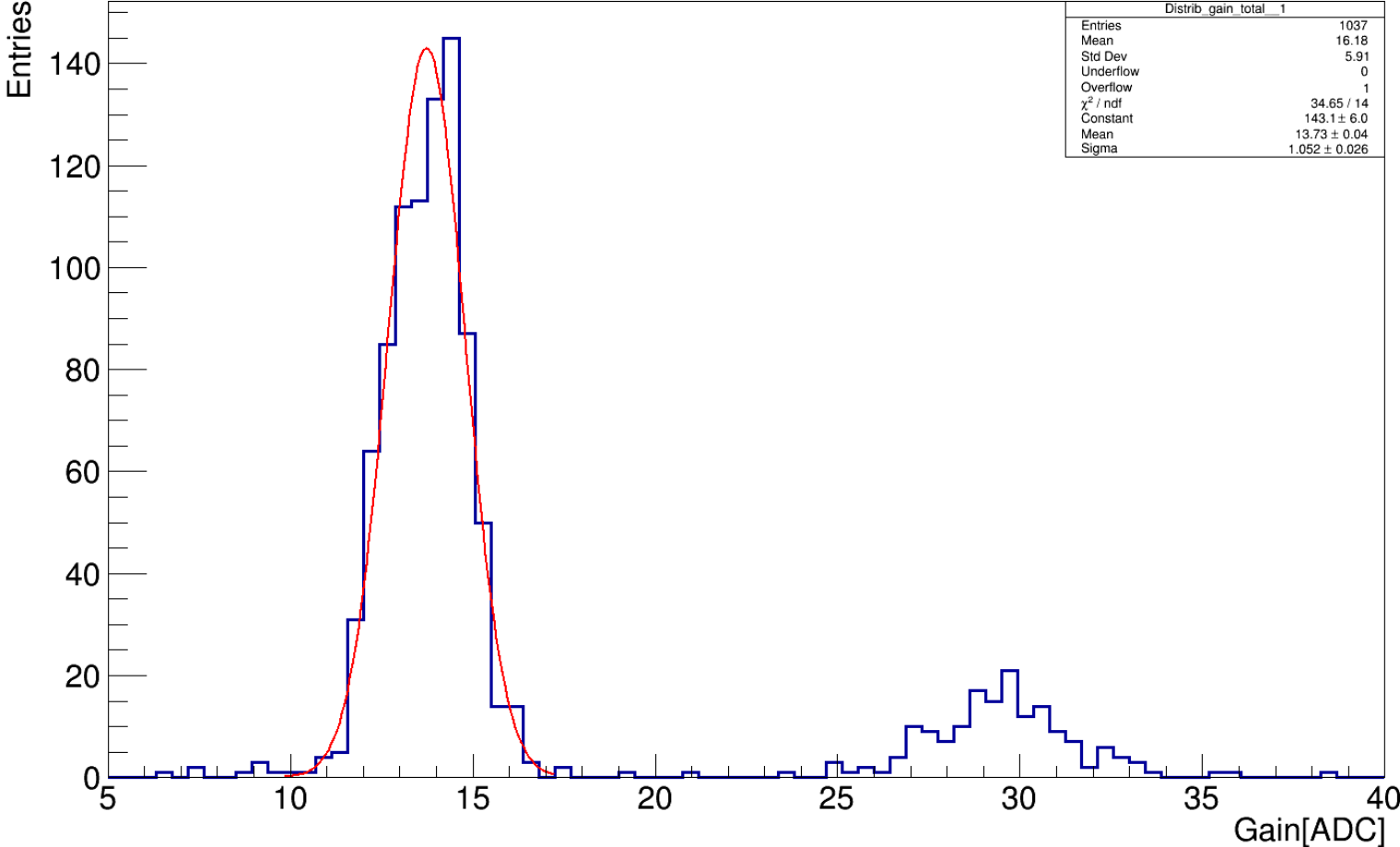
Gain Correlation of May_07th and May_16th



Gain of Tail Catcher

Module 43 to 54

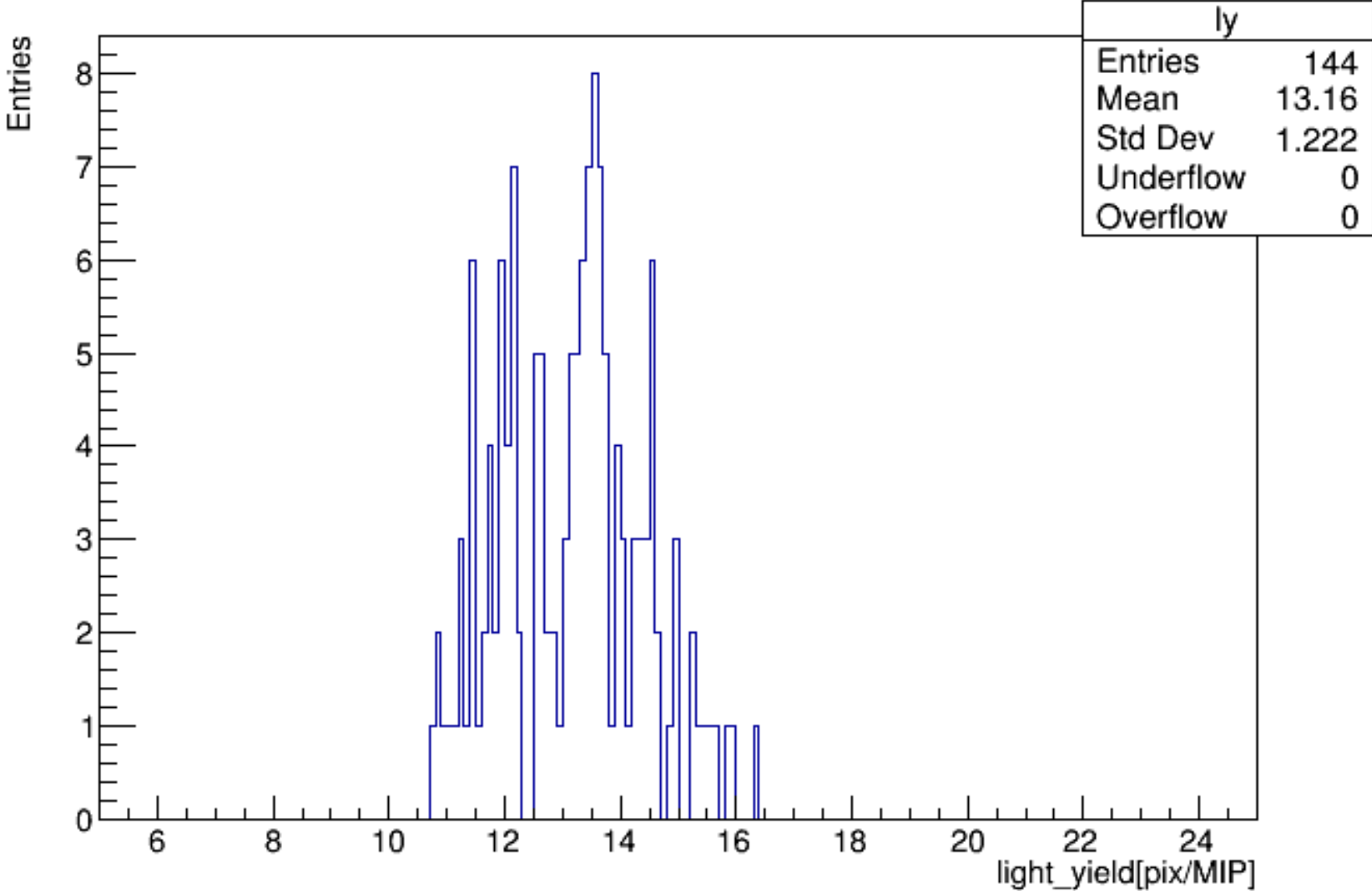
Total Gain Distribution



Light Yield

Pre-shower

light yield of module_42

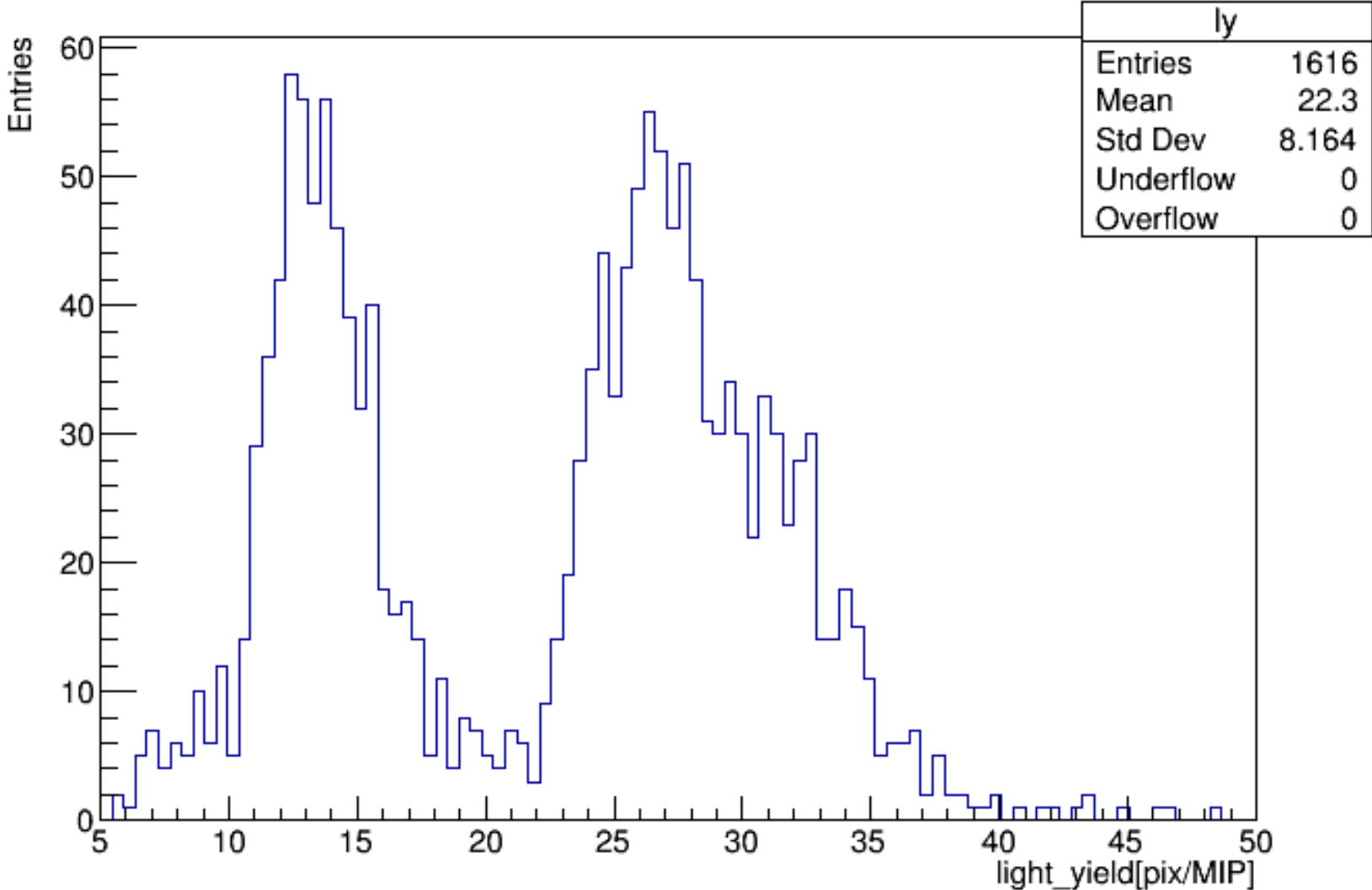


Light Yield

Tail Catcher

New one here

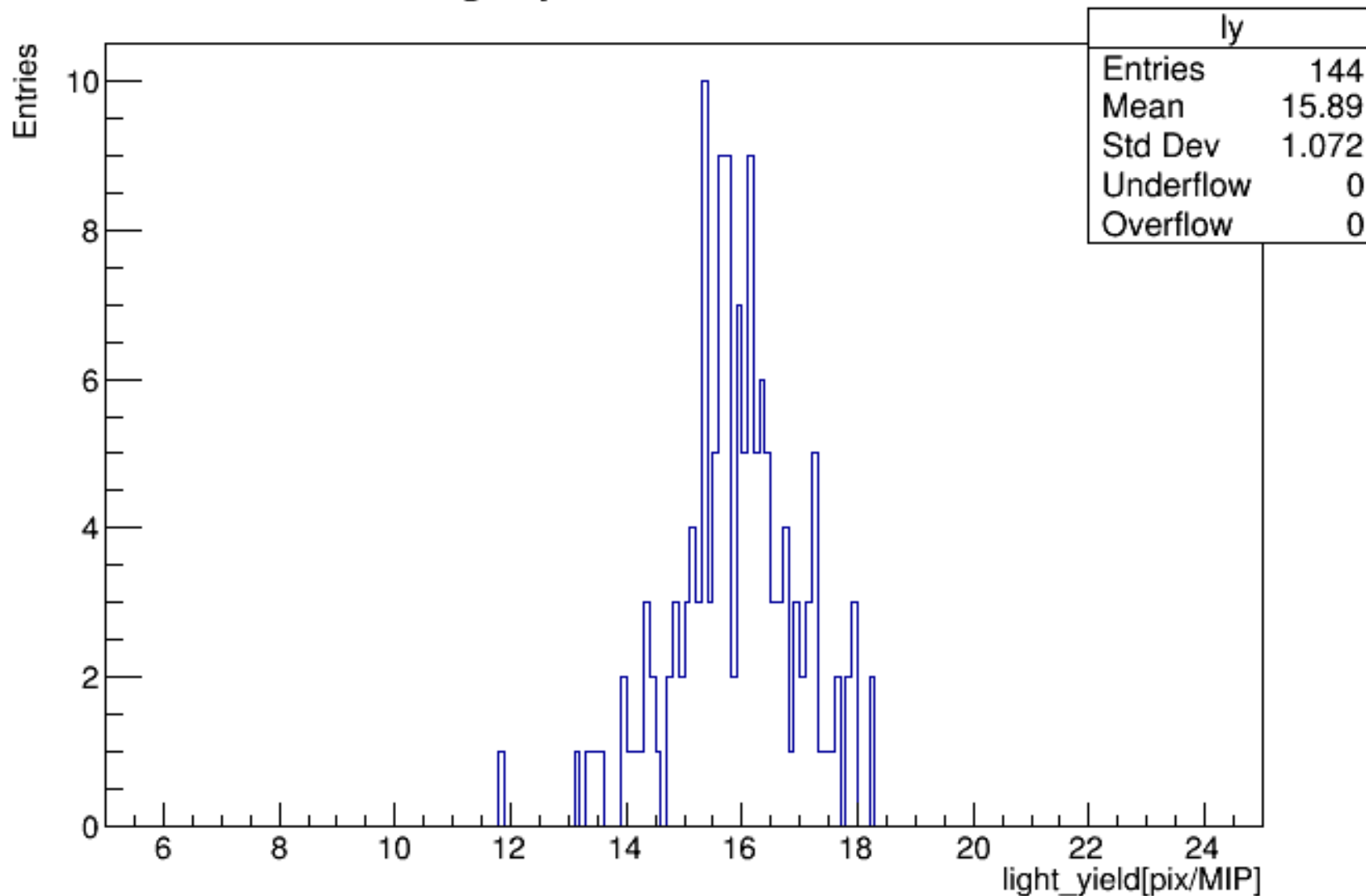
light yield of Tail catcher



Light Yield

Tokyo layer

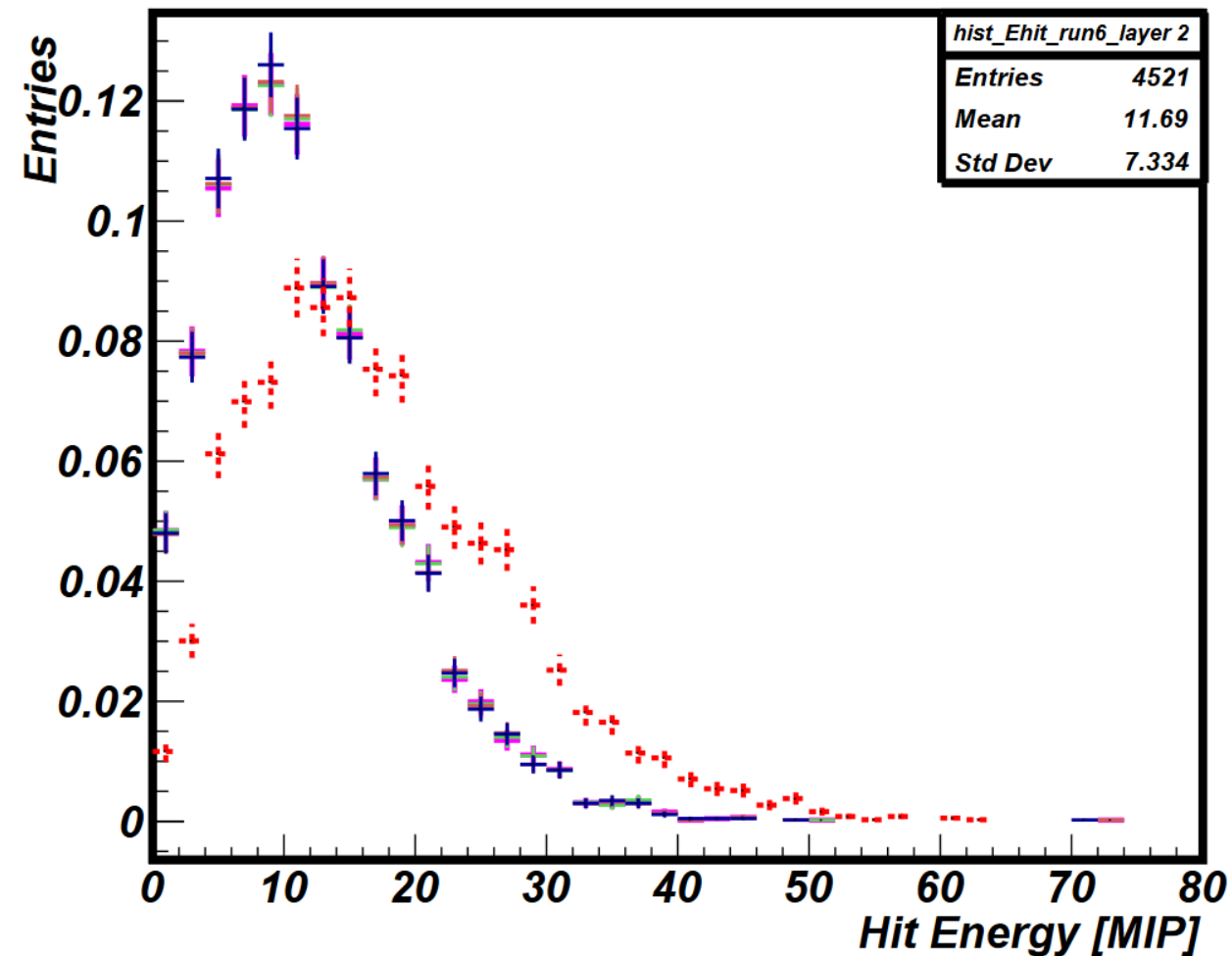
light yield of module_41



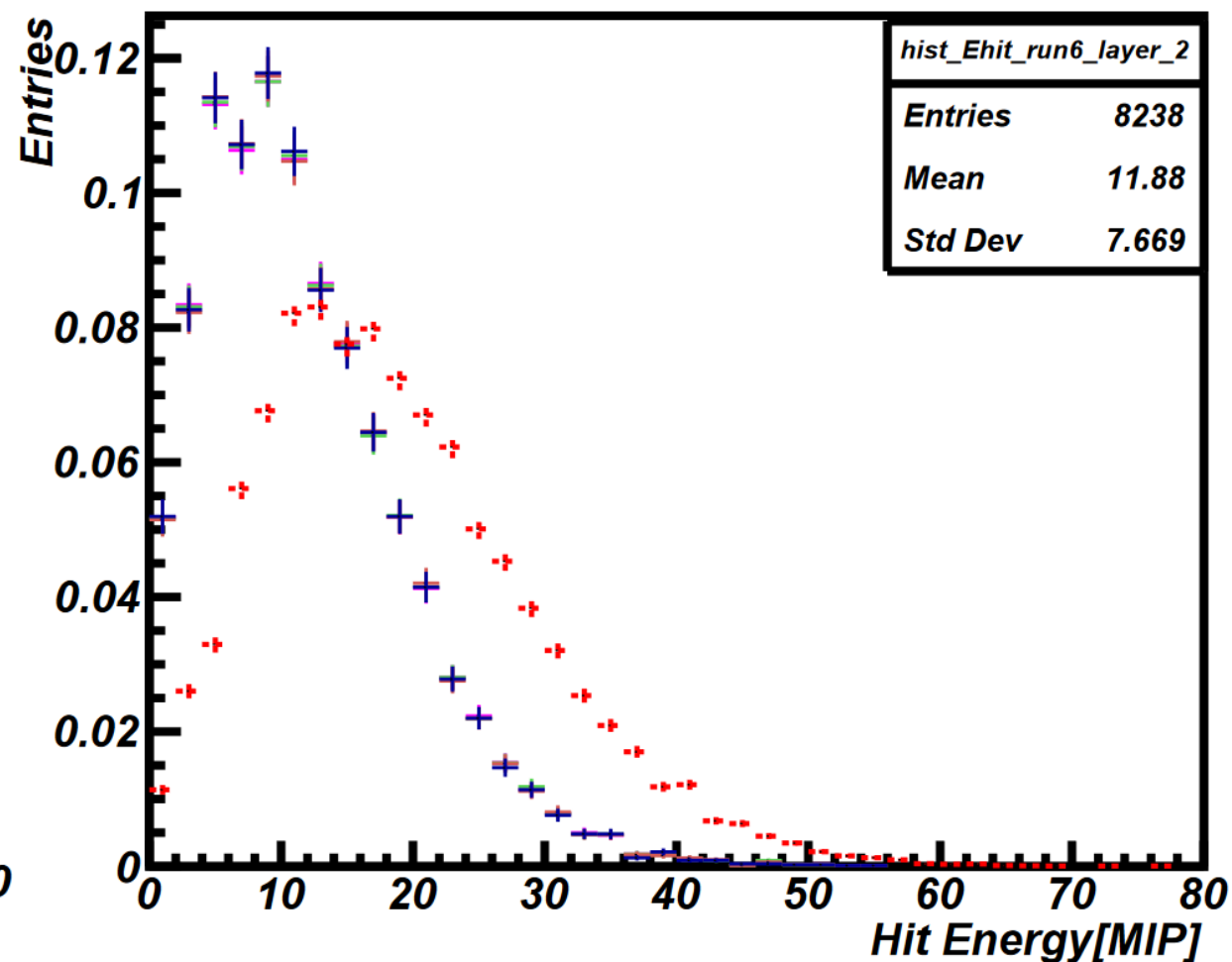
Hit energy for 80 GeV and 100 GeV electron

Layer 2

Layer 2 Hit Energy 80GeV



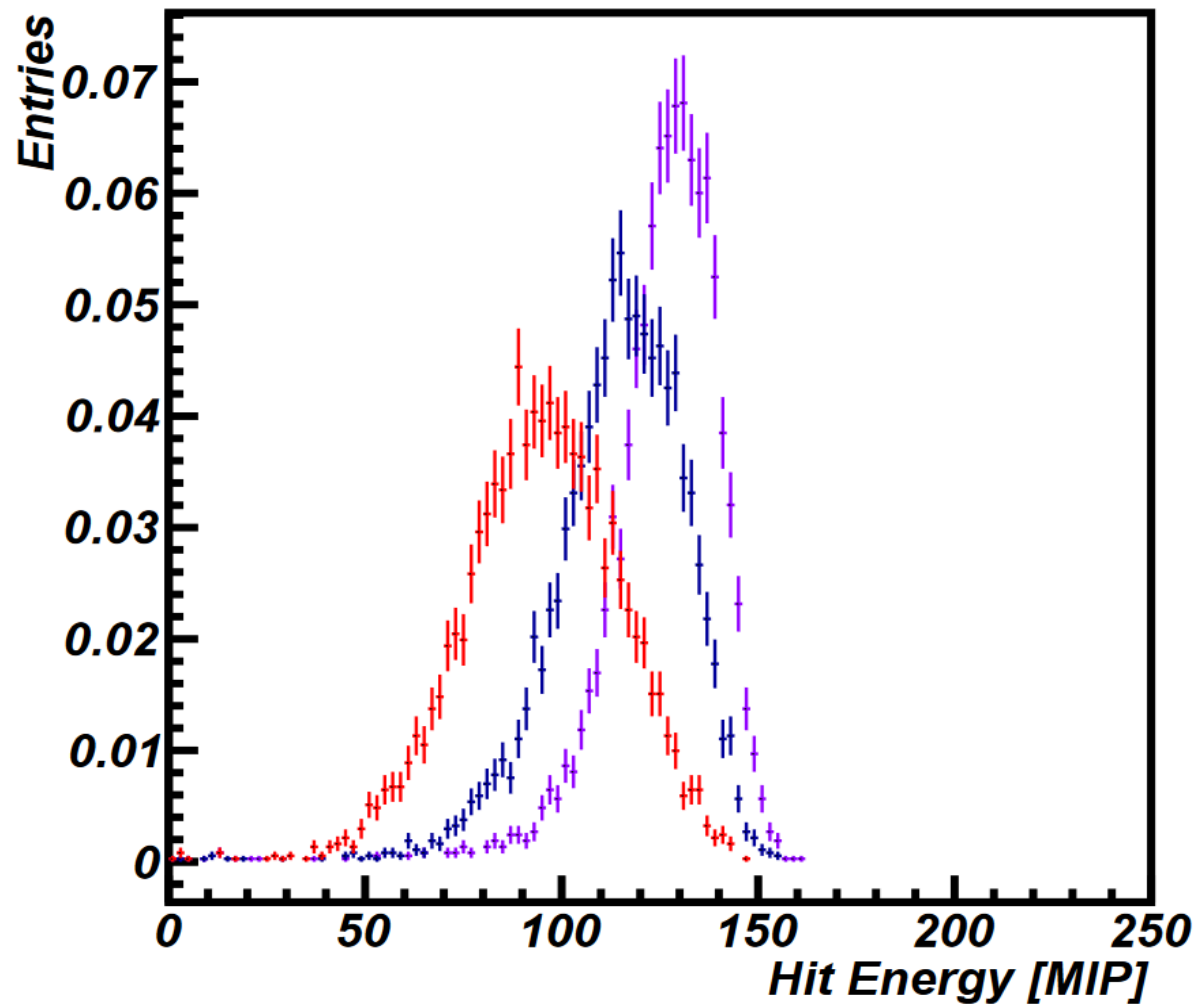
Layer 2 Hit Energy 100GeV



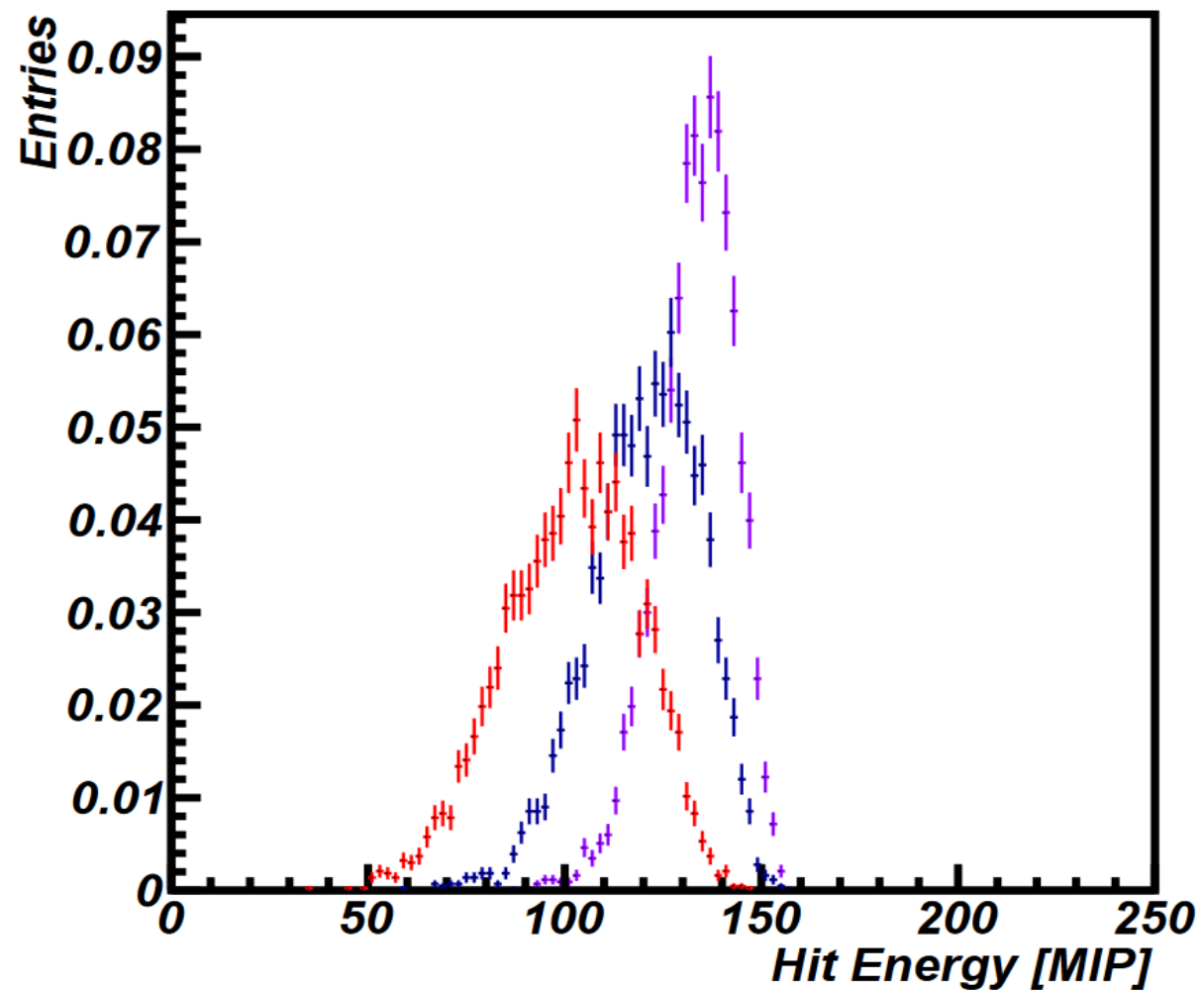
Hit energy layer wise

80 GeV electron

Data Layer-wise



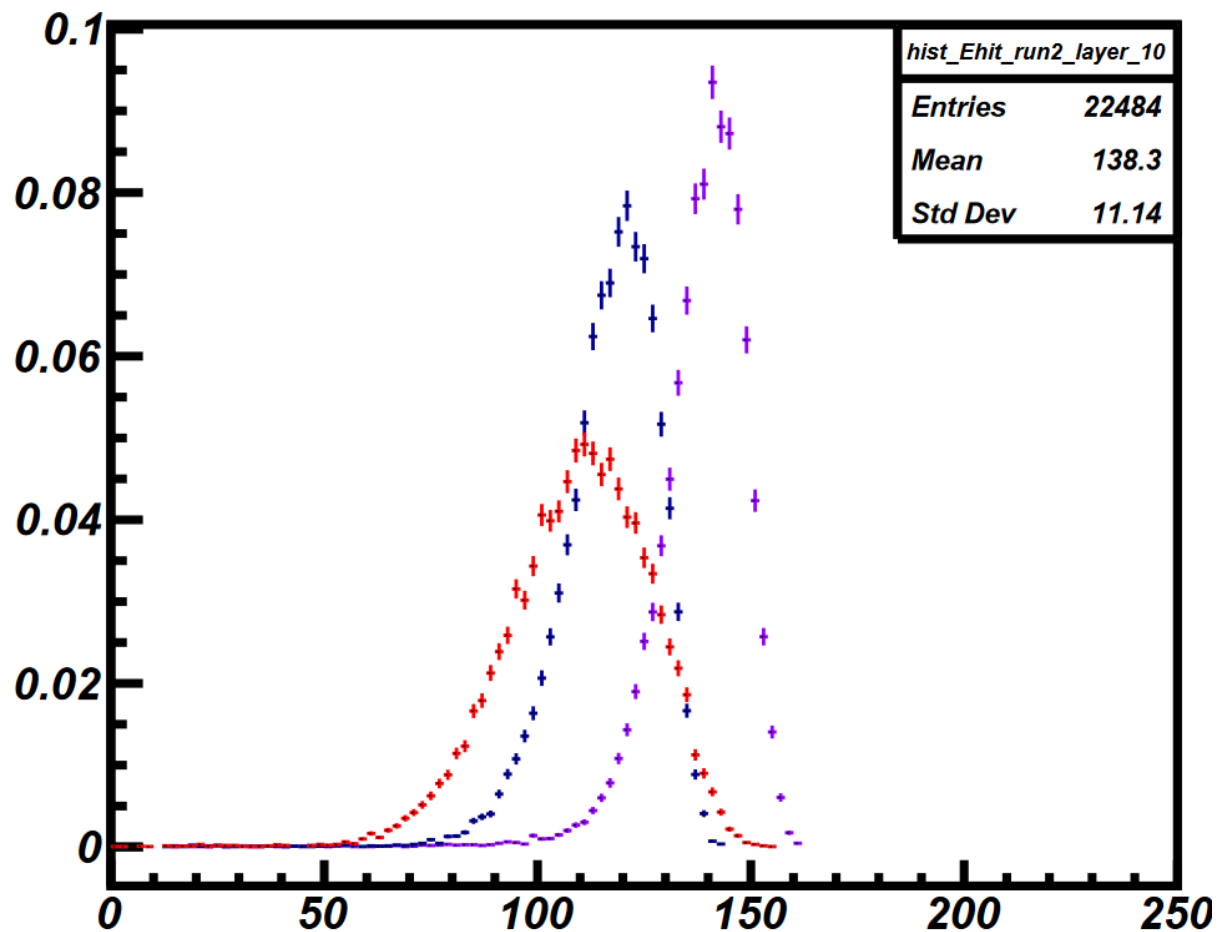
Simulation Layer-wise



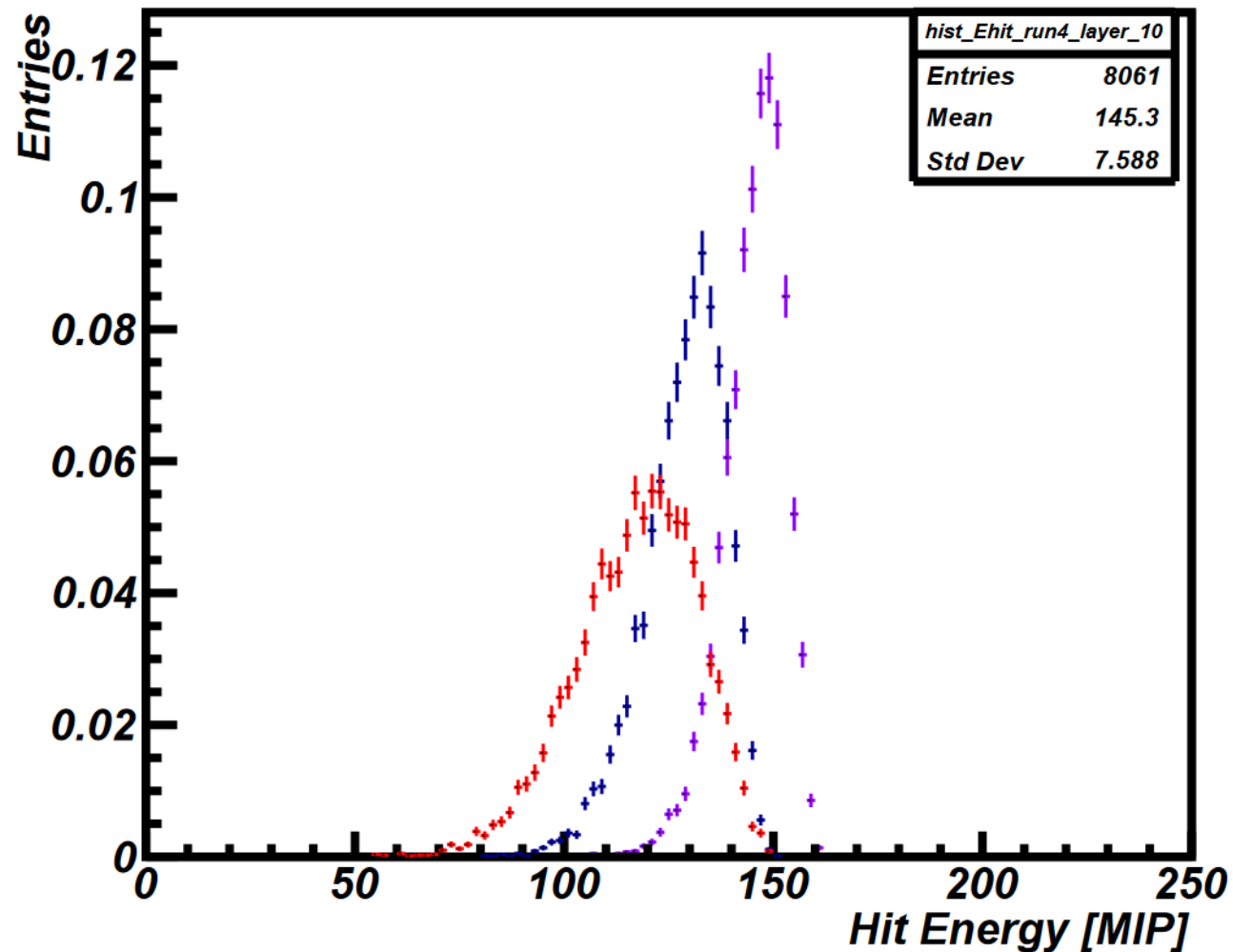
Hit energy layer wise

100 GeV electron

Data layer-wise



Simulation Layer-wise



Conclusion

	Gain	
AHCAL	Pre-Shower	Tail Catcher
~16 ADC	Varying from ~15-16 ADC	~15 and ~30 ADC
	Light Yield	
AHCAL	Pre-Shower	Tail Catcher
~14 pix/MIP	Varying from ~14 pix/MIP	~13 and ~27 pix/MIP
	Saturation Correction	
2433	2533 and 2668	2533
Under-estimates the data	Over-estimates the data	Agrees to certain extent with data