Simulation Statistics

By Sagar and Siddhant
Under the guidance of Dr. Ankhi Roy

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IIT Indore

Contents

Histograms for verification of energy conservation (energy resolution, variation of aggregate cluster energy and aggregate tower energy with generated energy) for the following detector-particle pairs:

- FEMC: pion and electron
- FHCAL: pion
- FEMC + FHCAL: pion

Simulation Parameters

- Particle: e^-, pi^-
- Events: 100,000 per particle
- momentum (p): 0 to 30 GeV/c
- Pseudorapidity (η): -4 to 4
- Azimuth (Φ): -π to π

Cuts:

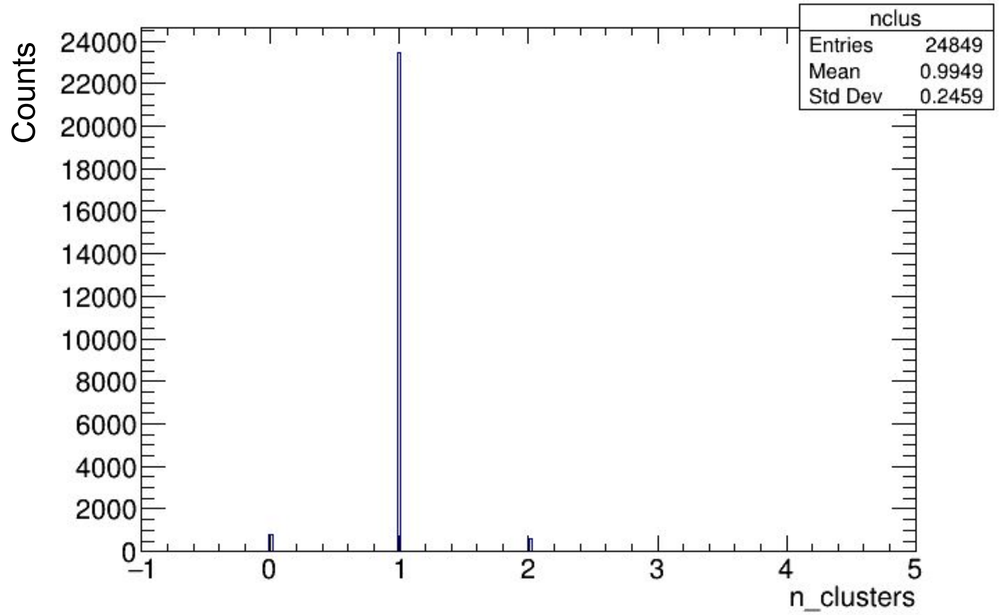
- detector-wise η cuts (intersection of η ranges in case of detector combinations)
- energy cuts in some plots

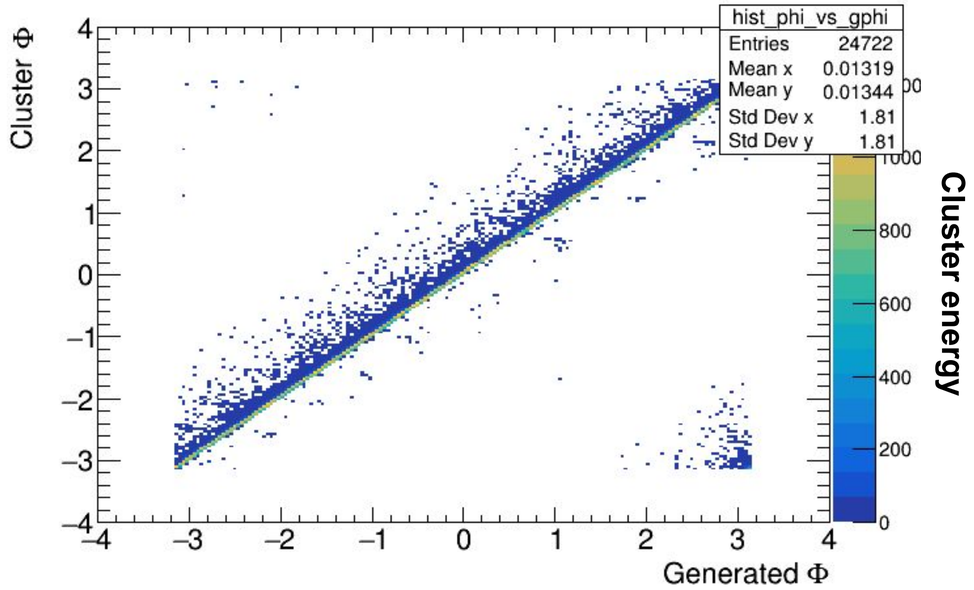
FEMC (e^-)

FEMC (e^-)

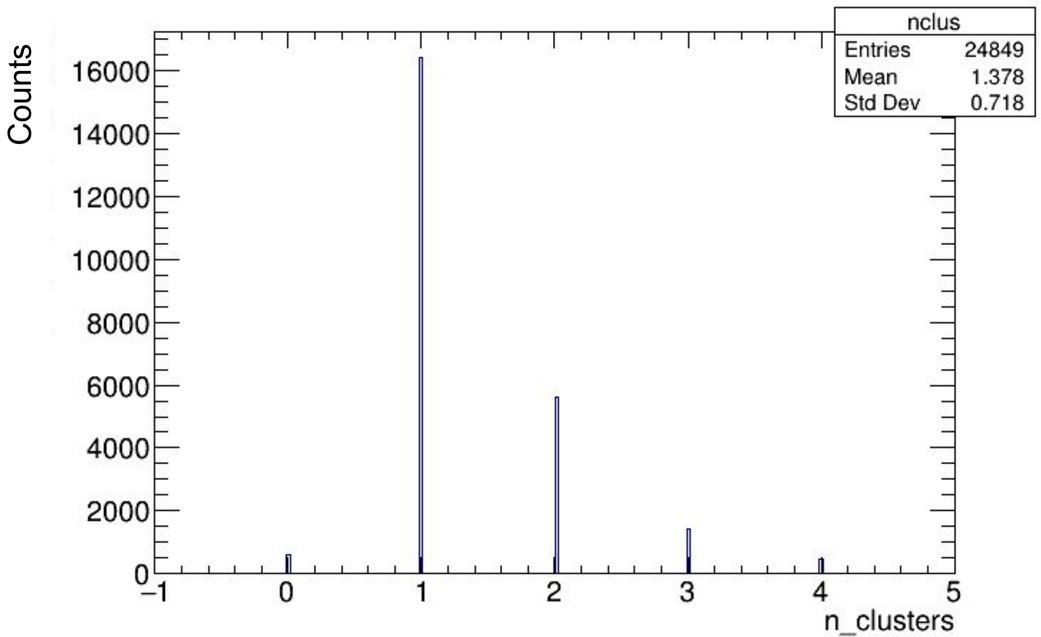
Explicit η cut: 1.3 to 3.3

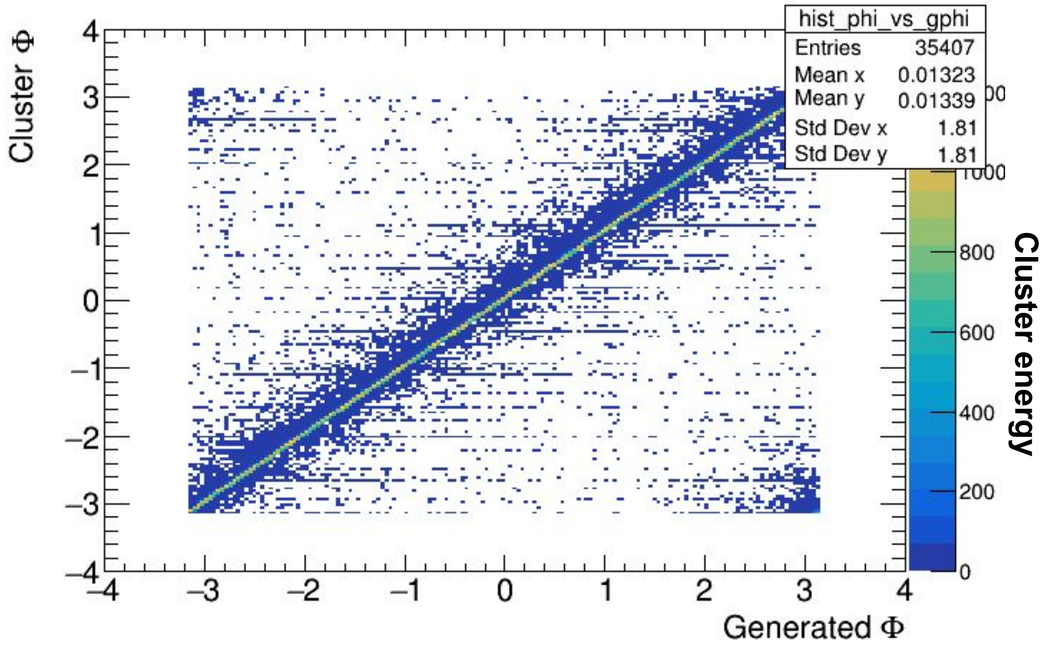
energy cut: ce > 0.2 GeV





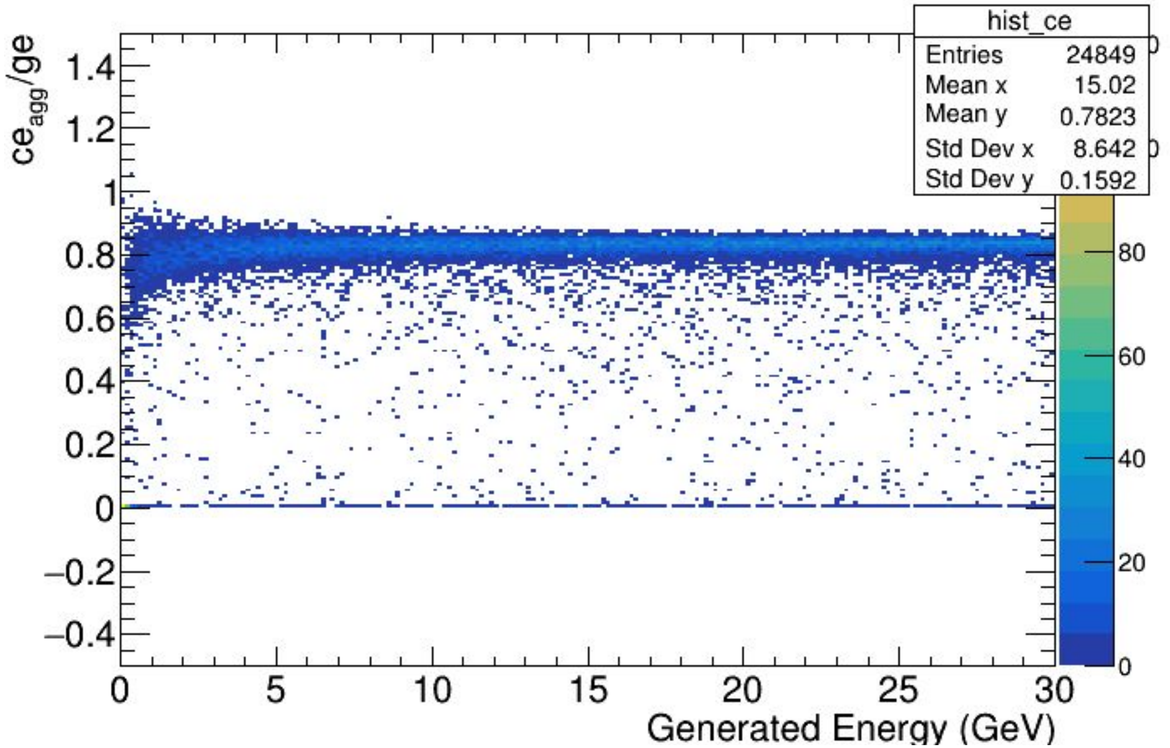
no energy cut

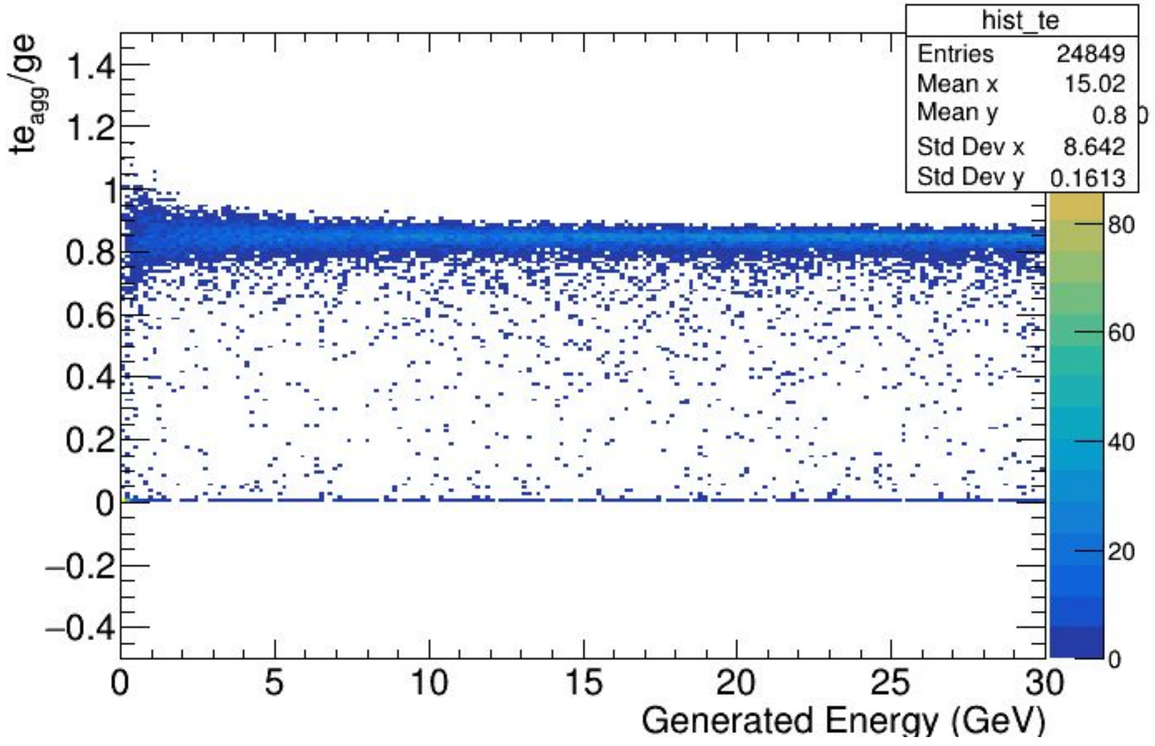




FEMC (e^-)

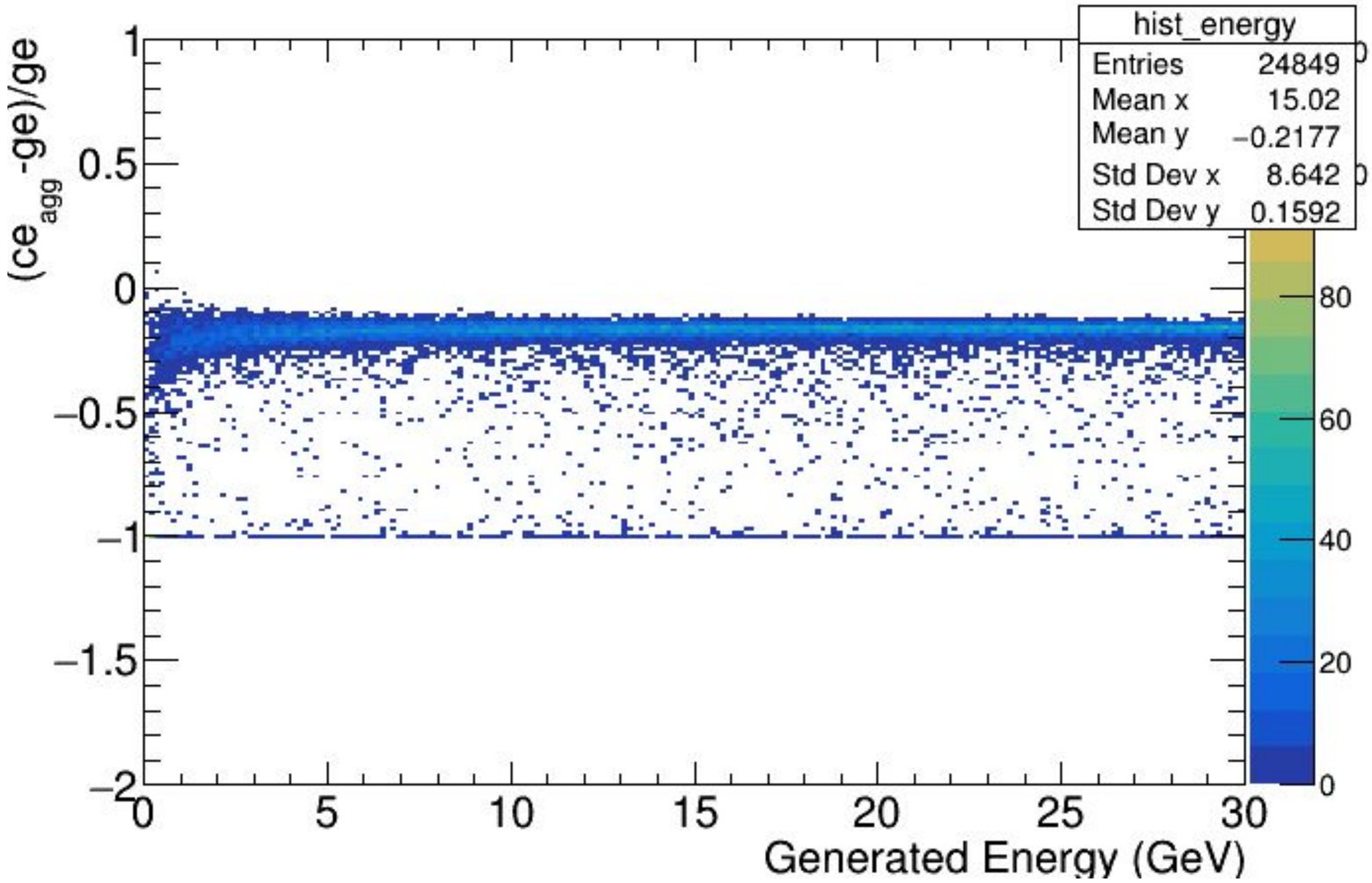
Explicit η cut: 1.3 to 3.3
no energy cut





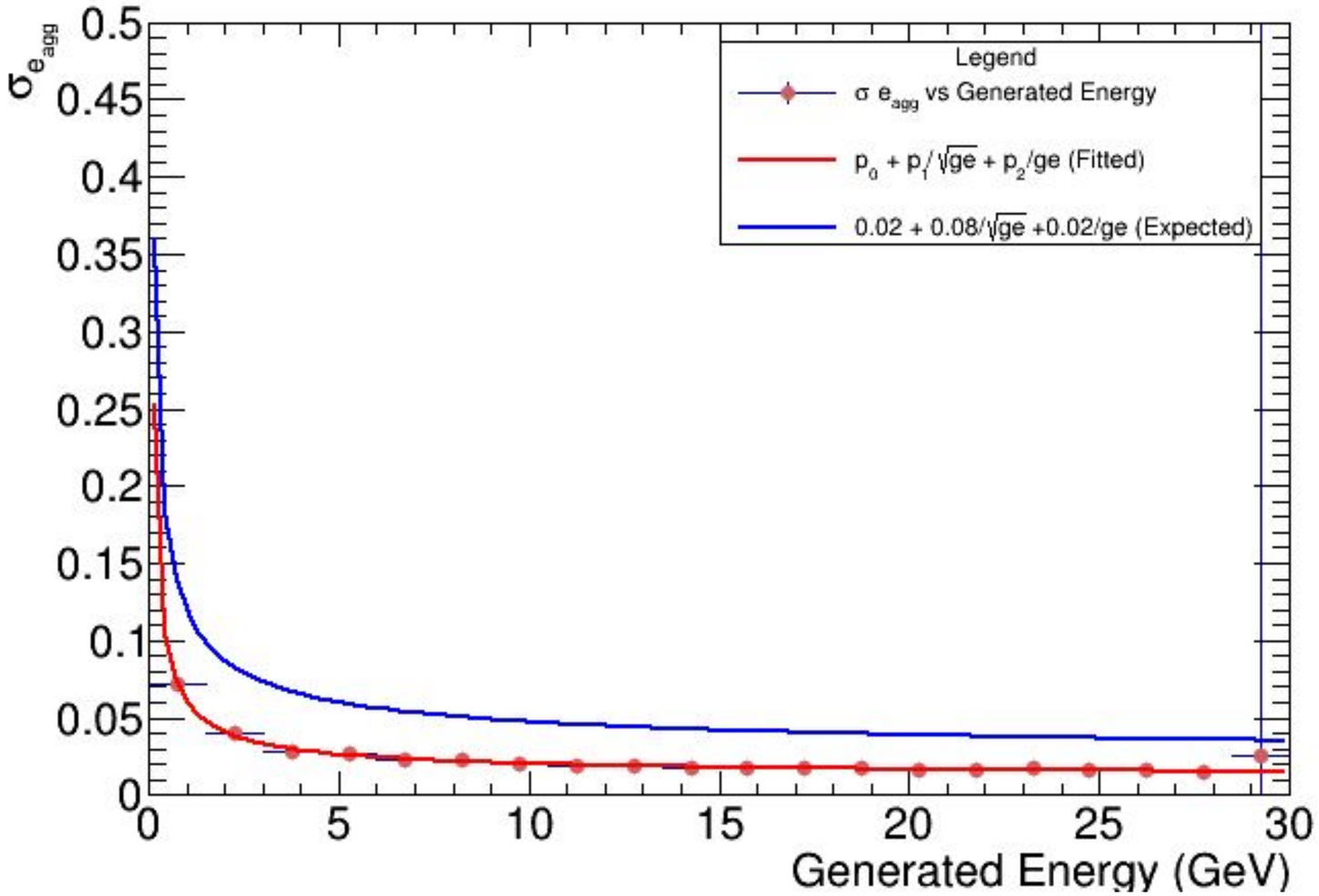
FEMC (e^-)

(ce-ge)/ge vs ge
Explicit η cut: 1.3 to 3.3
no energy cut



FEMC (e^-)

(ce-ge)/ge vs ge
Explicit η cut: 1.3 to 3.3



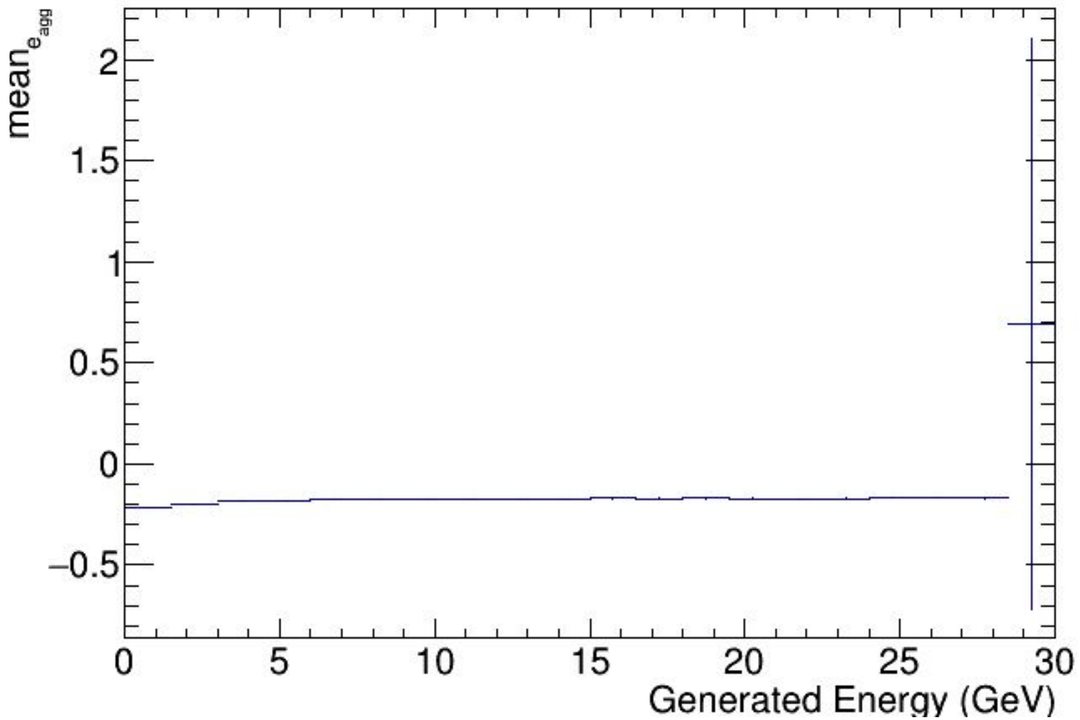
`σe` refers to the standard deviation of the Gaussian fitted to a slice of the `(ce-ge)/ge vs ge` plot. (shown on the previous slide)

Number of bins = 20
Bin Width = 1.5 GeV

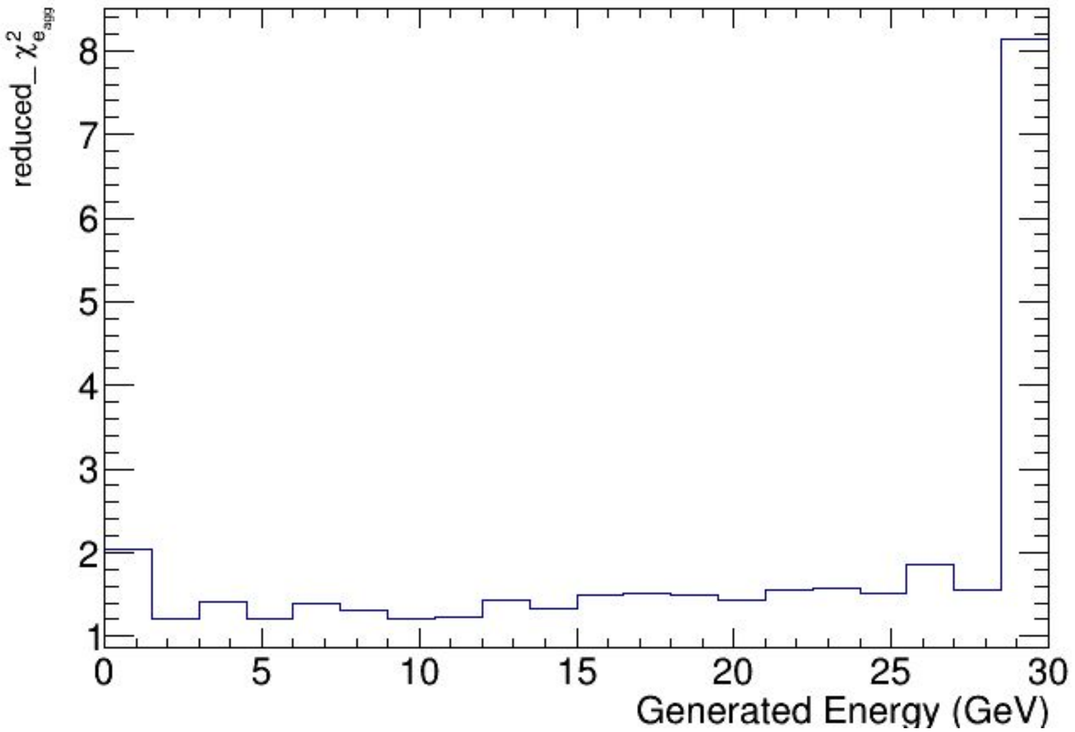
Fit Parameters:
p_o = (0.00989952 +- 0.000836325)
p_1 = (0.0241553 +- 0.00462100) $GeV^{0.5}$
p_2 = (0.0268757 +- 0.00559569) GeV

FEMC (e^-)

Explicit η cut: 1.3 to 3.3



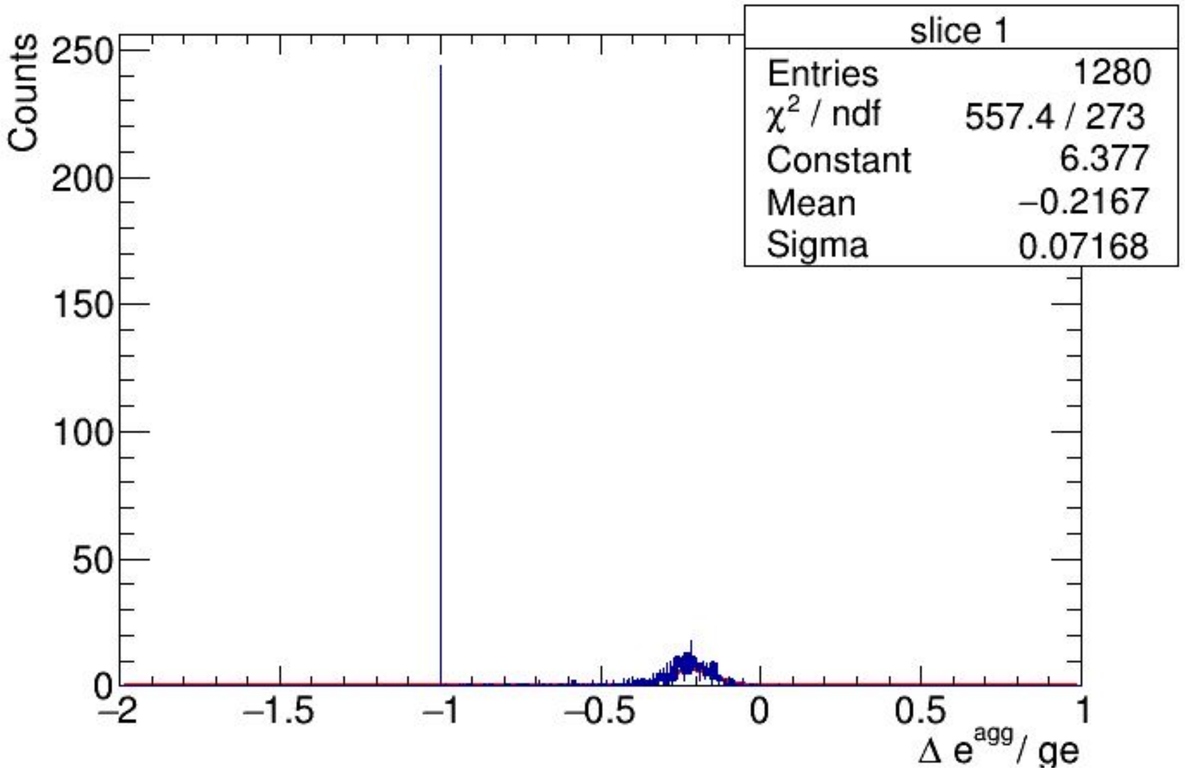
Mean of the Gaussians fitted to the slices of the `(ce-ge)/ge vs ge` plot.

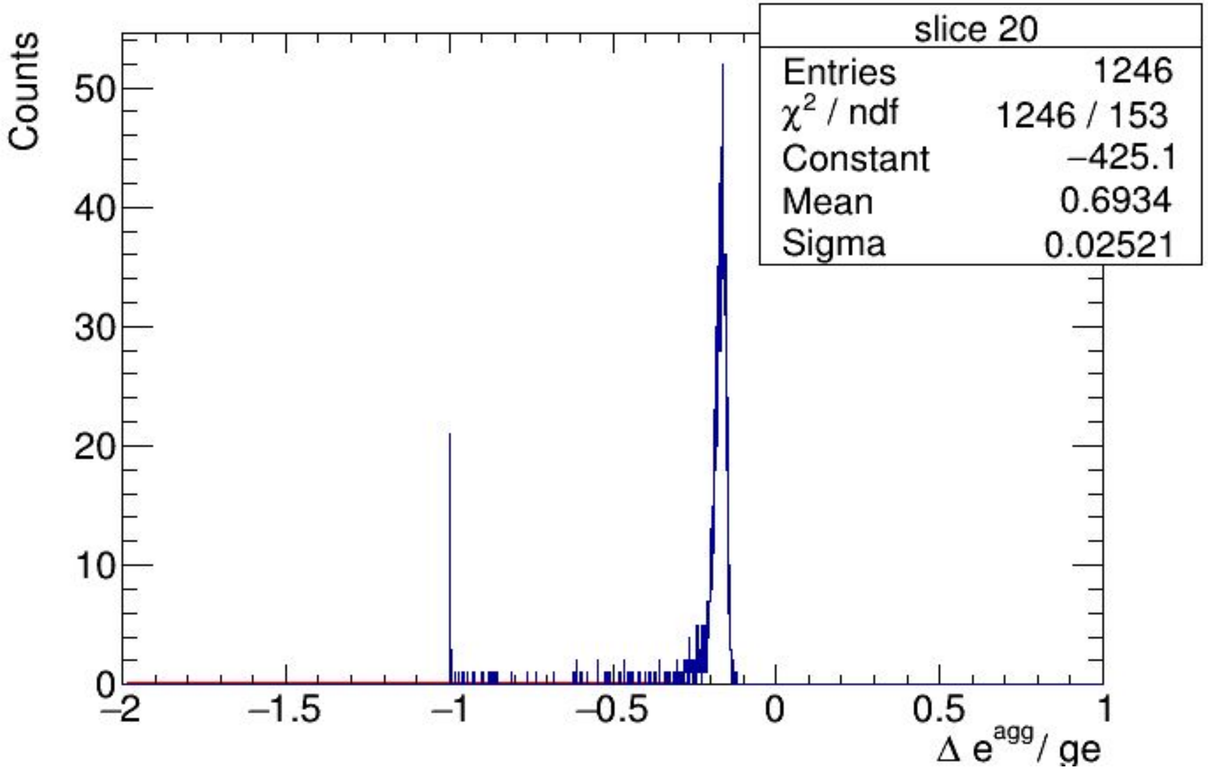


reduced_χ2 of the Gaussians fitted to the slices of the `(ce-ge)/ge vs ge` plot.

FEMC (e^-)

Some of the fitted Gaussians

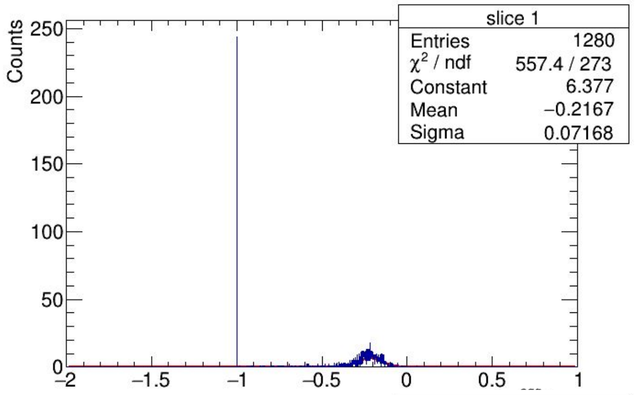


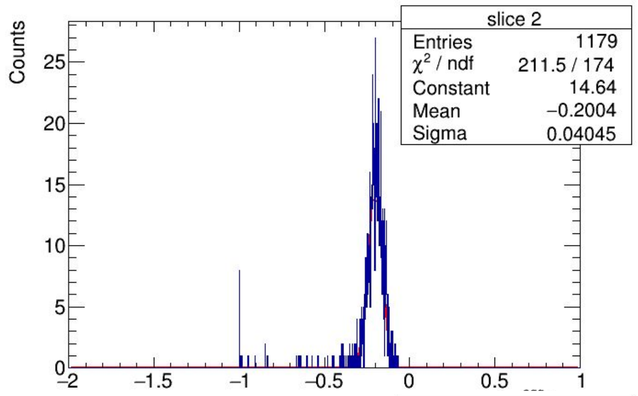


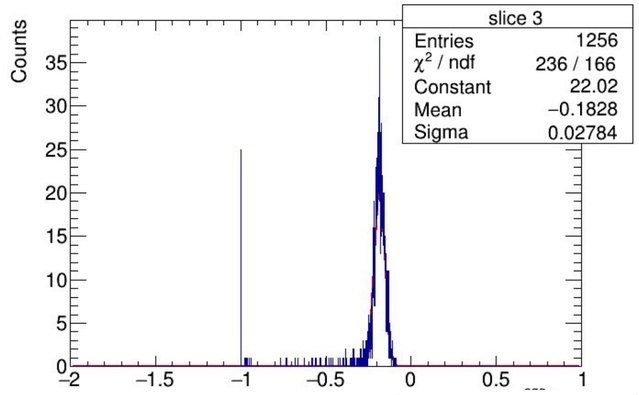
Number of bins = 2000 from -2 to +1

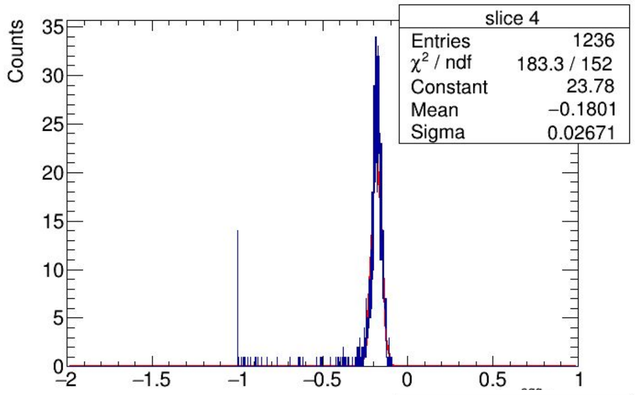
FEMC (e^-)

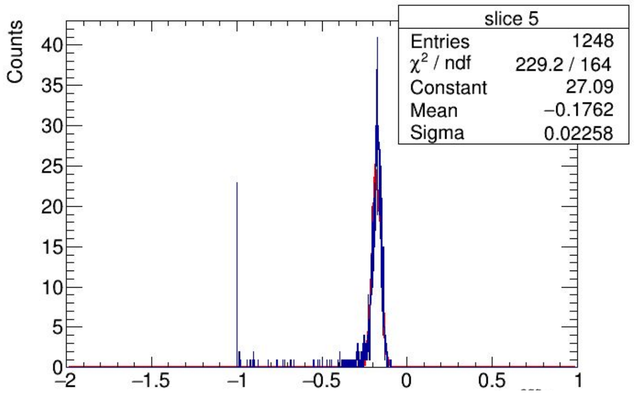
Fitted Gaussians

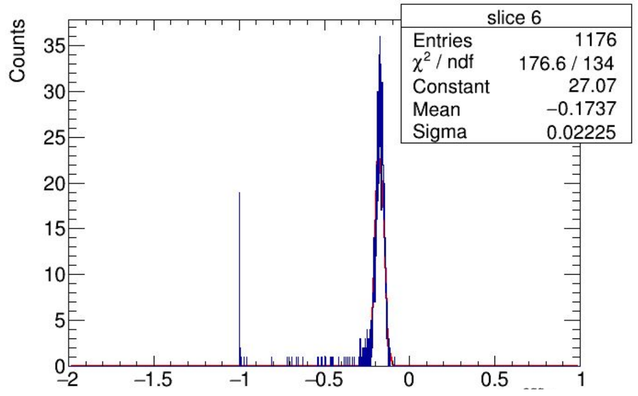


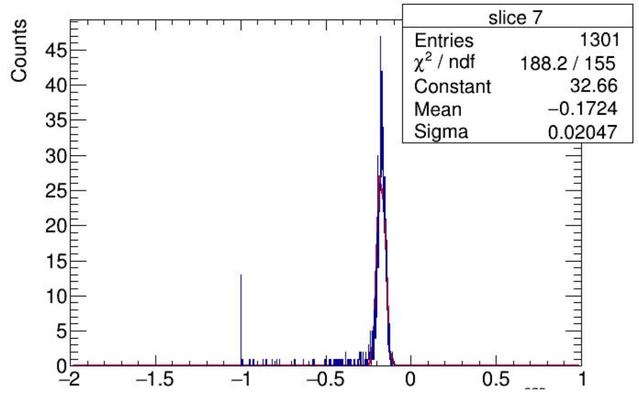


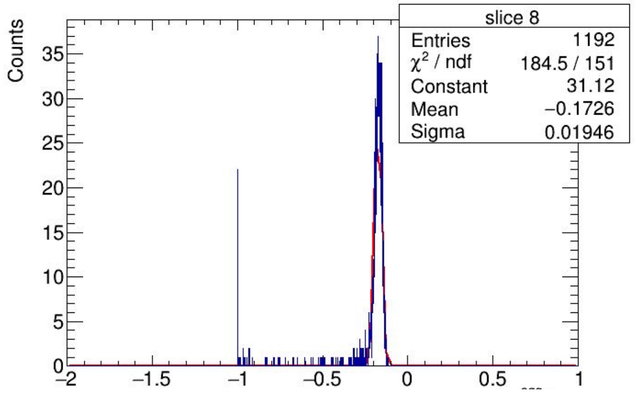


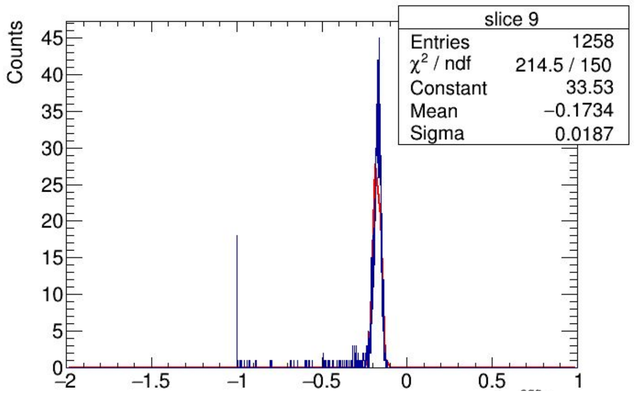


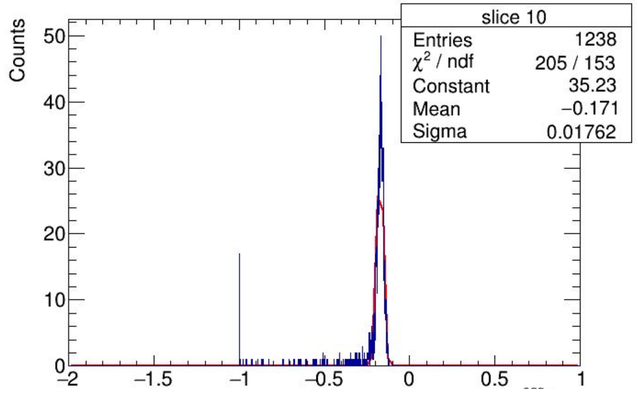


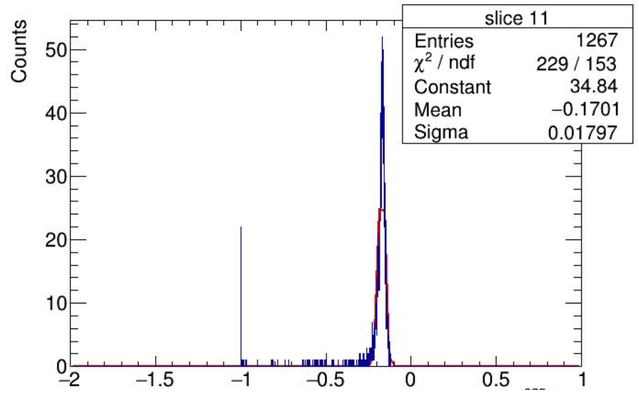


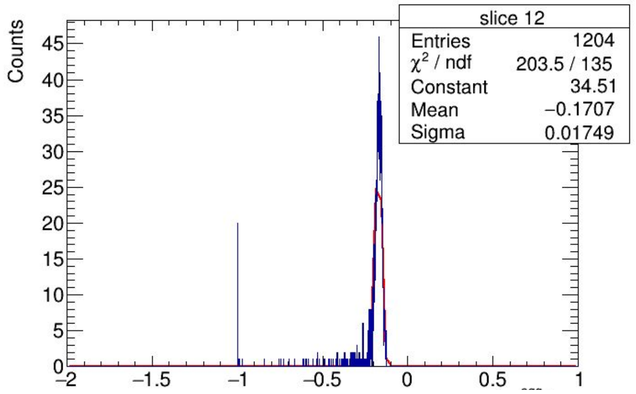








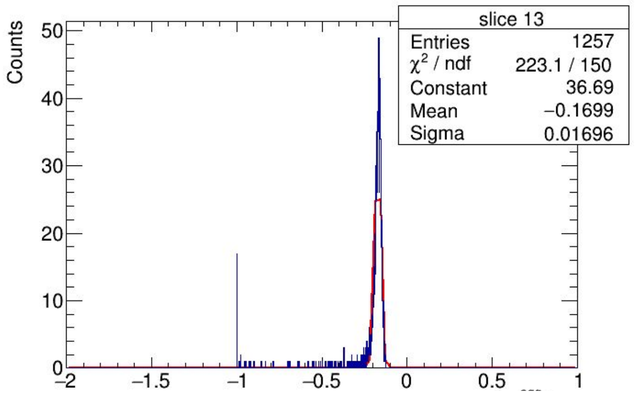


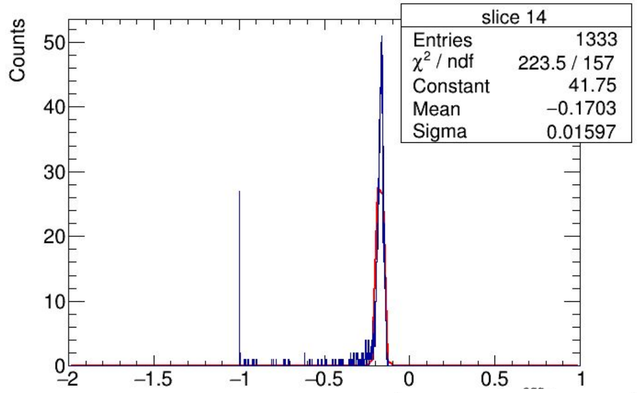


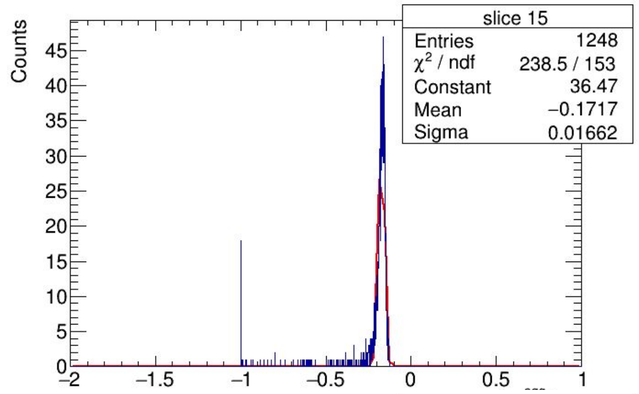
The x-axes denote $\Delta e_{agg}/ge$

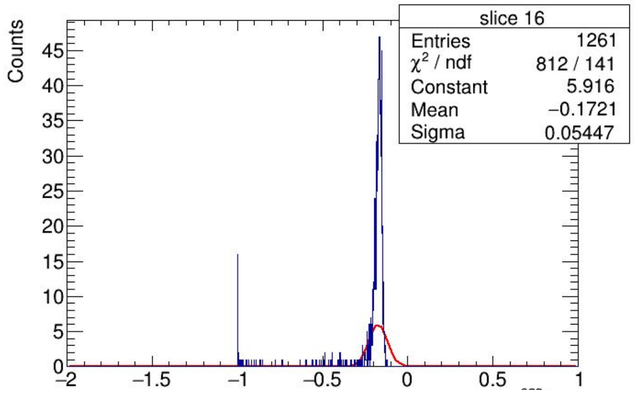
FEMC (e^-)

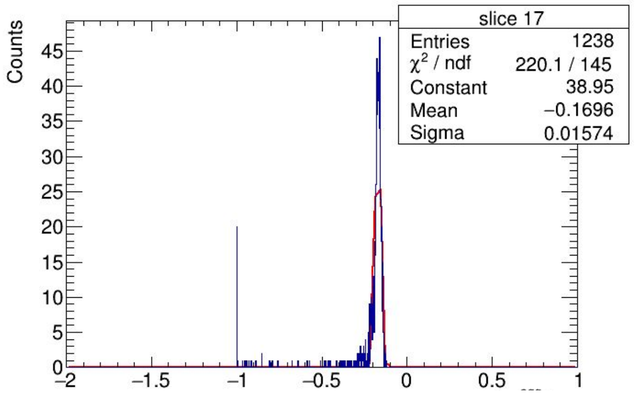
Fitted Gaussians

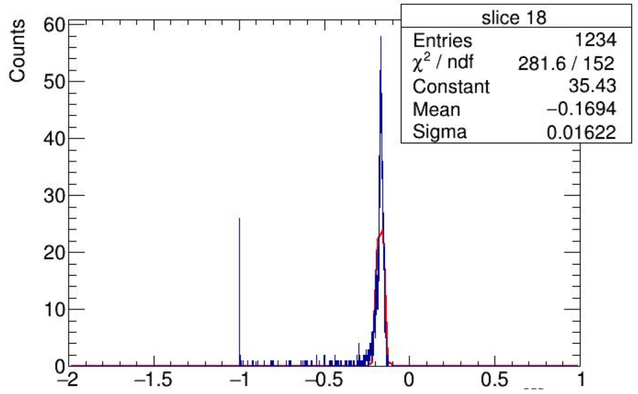


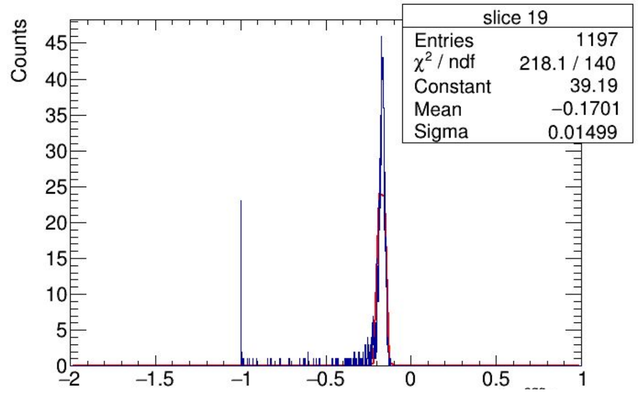


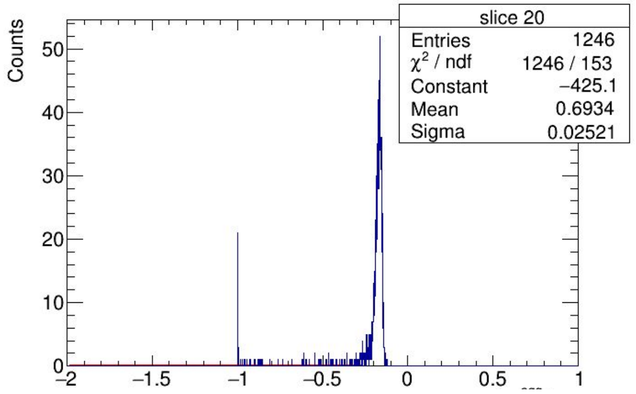












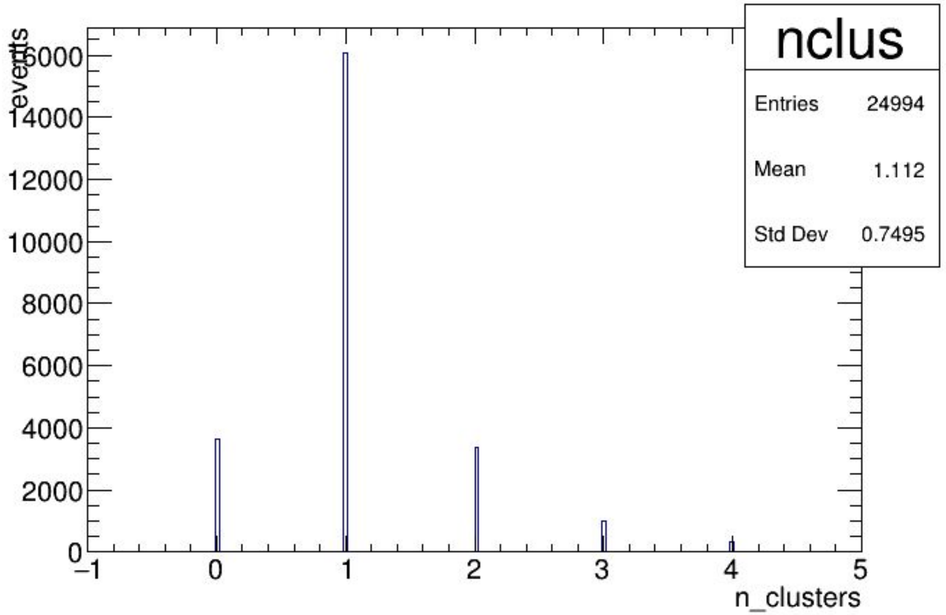
The x-axes denote $\Delta e_{agg}/ge$

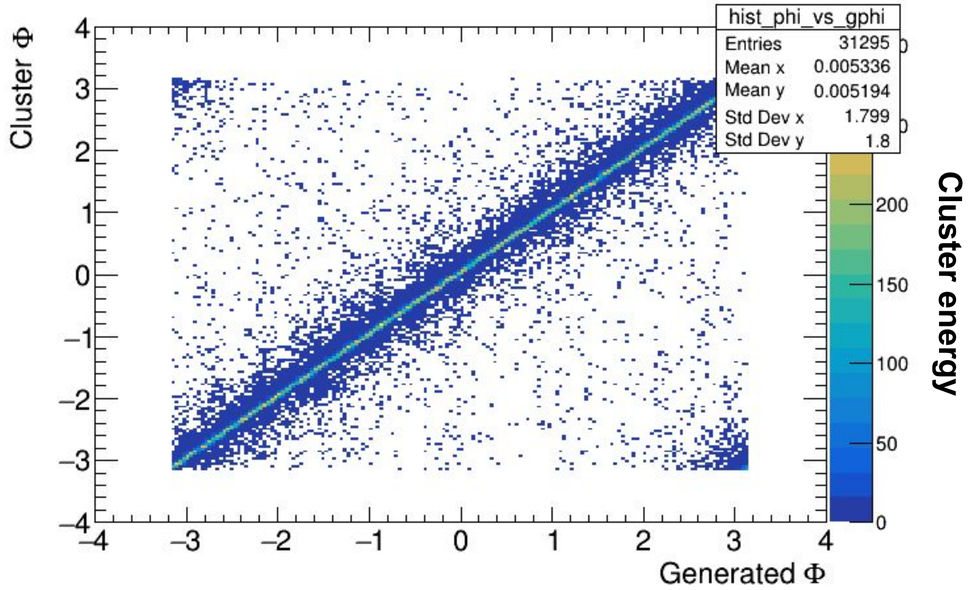
FEMC (pi^-)

FEMC (pi^-)

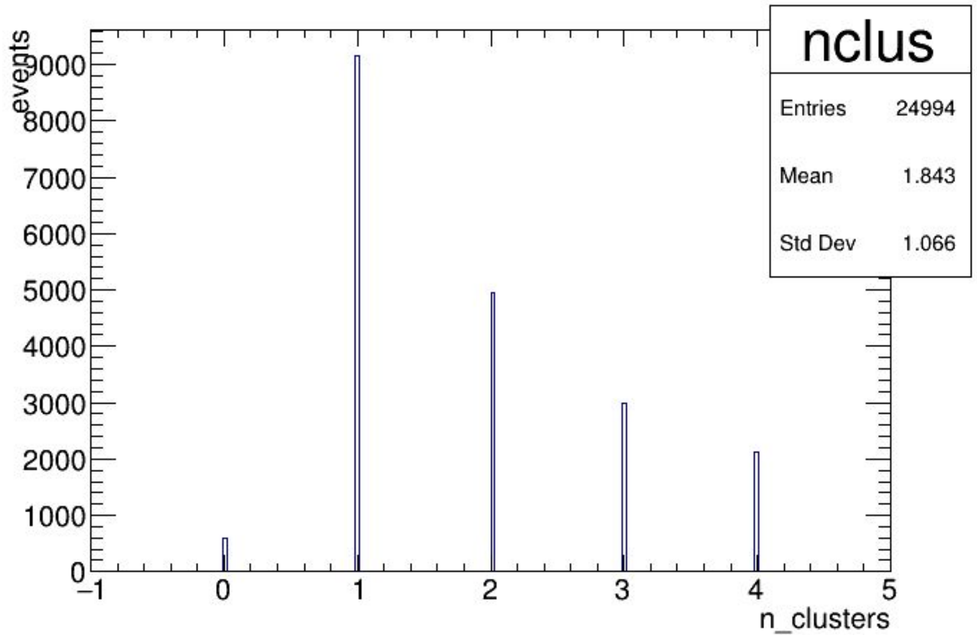
Explicit η cut: 1.3 to 3.3

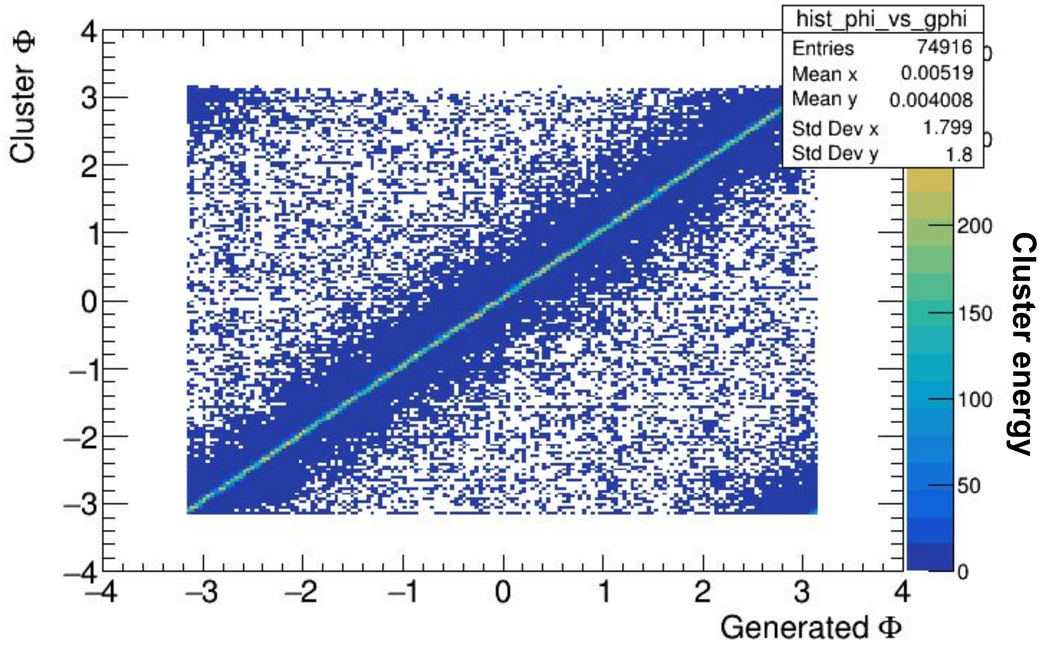
energy cut: ce > 0.2 GeV





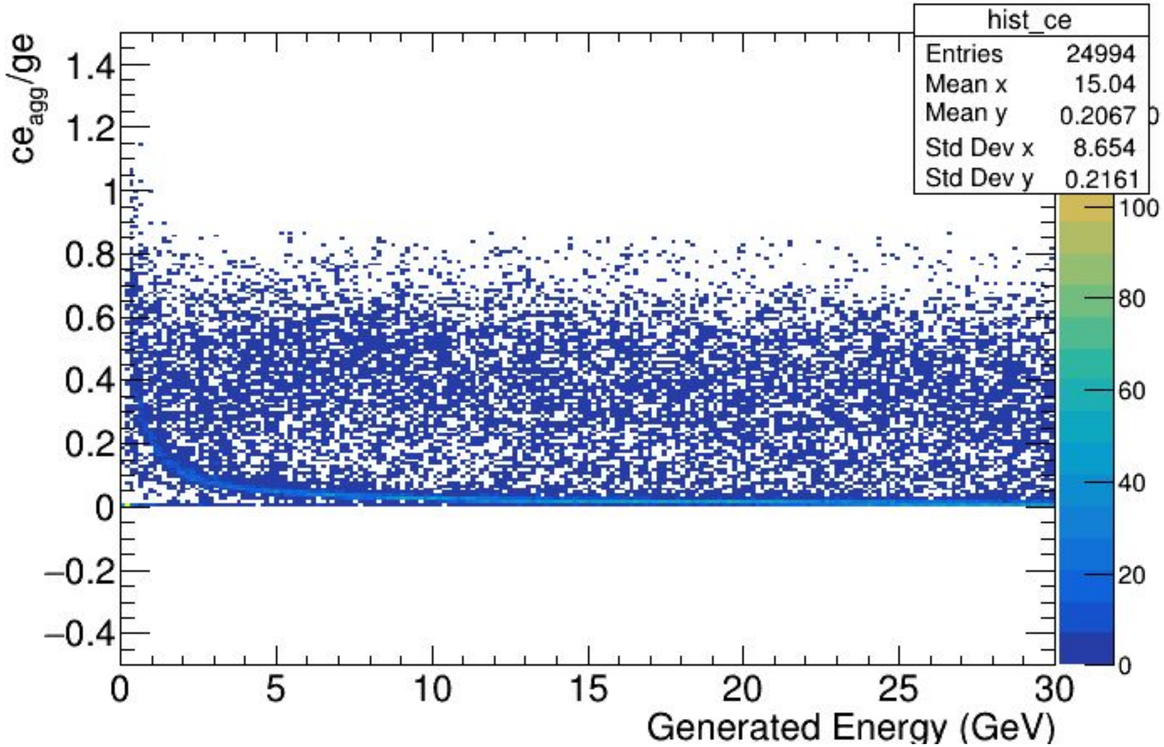
no energy cut

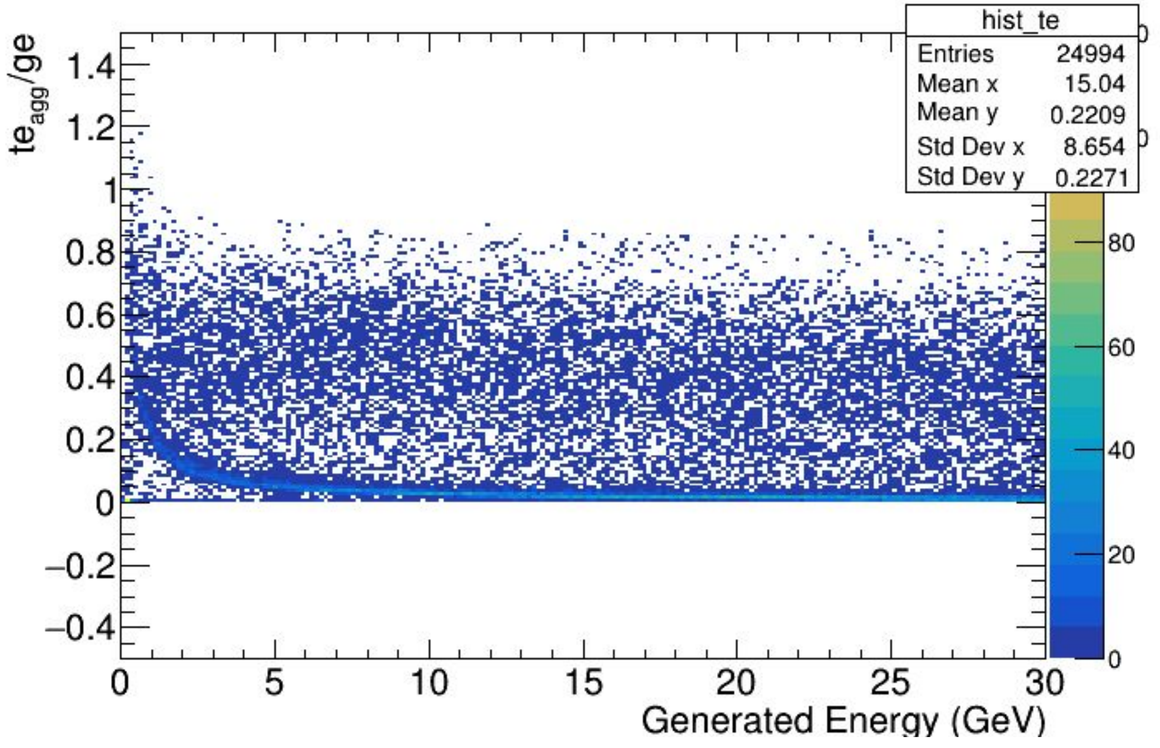




FEMC (pi^-)

Explicit η cut: 1.3 to 3.3
no energy cut



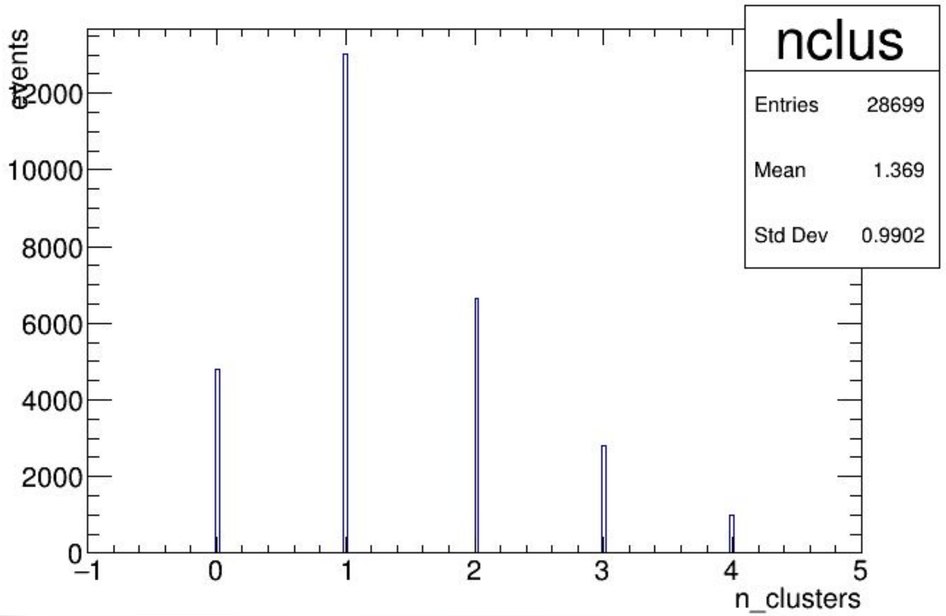


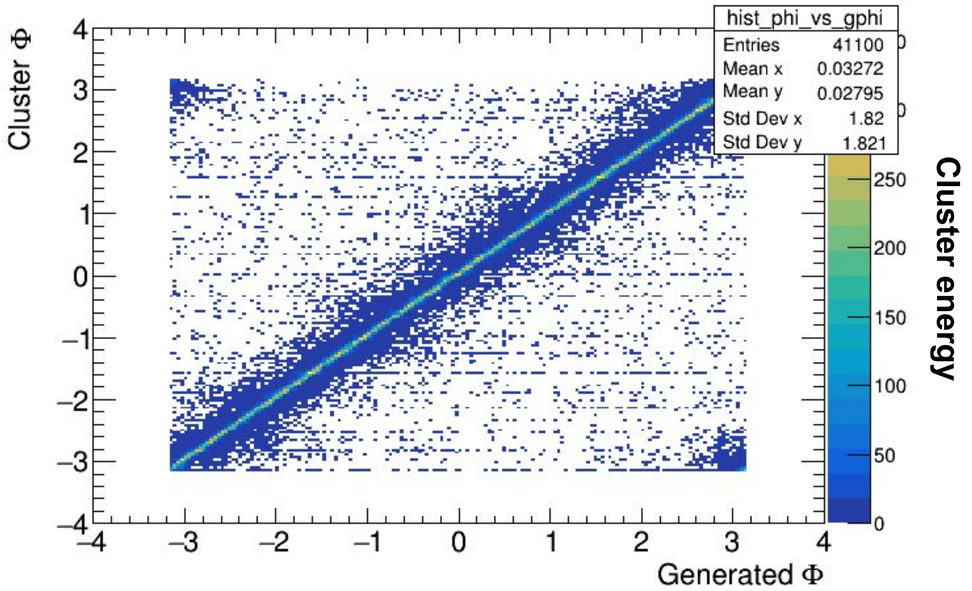
FHCAL (pi^-)

FHCAL (pi^-)

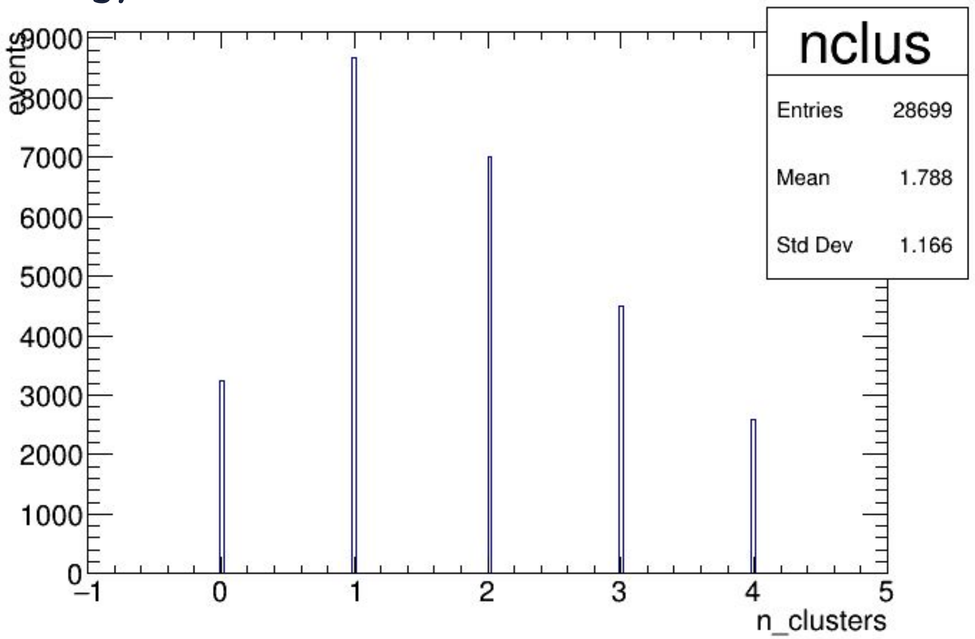
Explicit η cut: 1.2 to 3.5

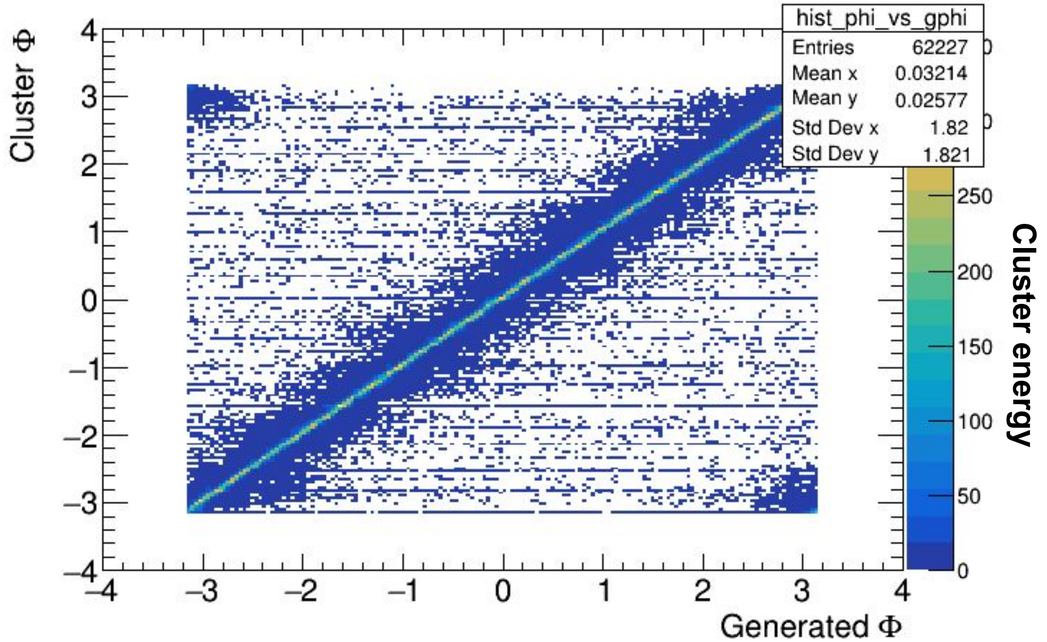
energy cut: ce > 0.2 GeV





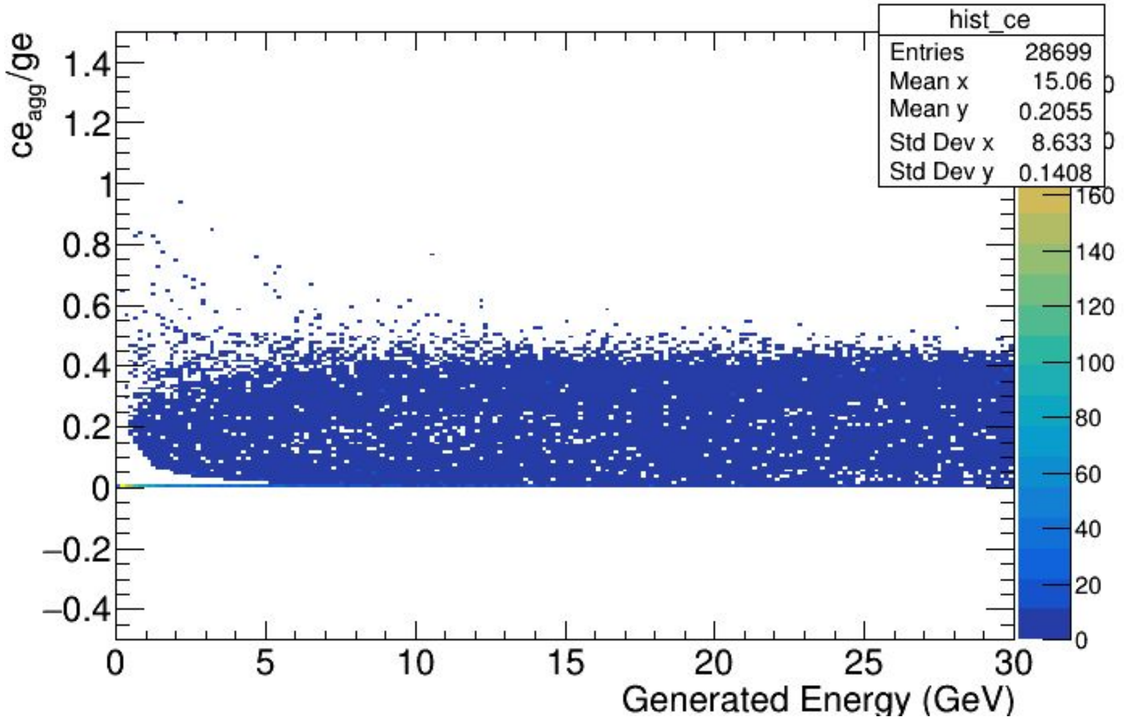
no energy cut

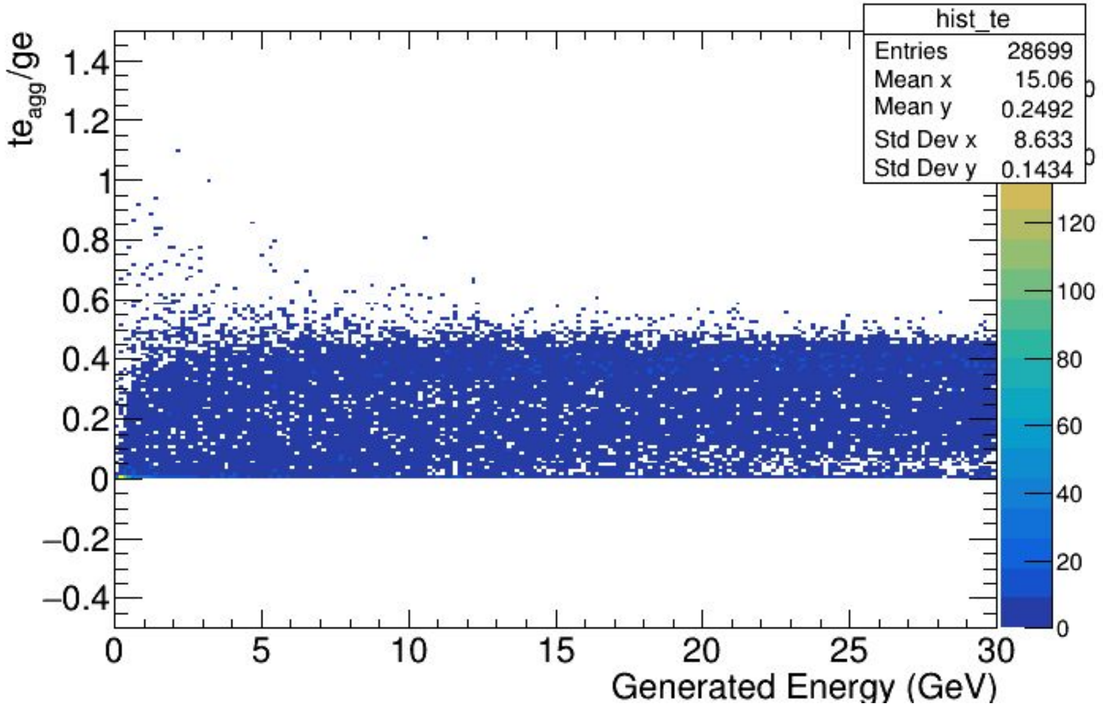




FHCAL (pi^-)

Explicit η cut: 1.2 to 3.5
no energy cut

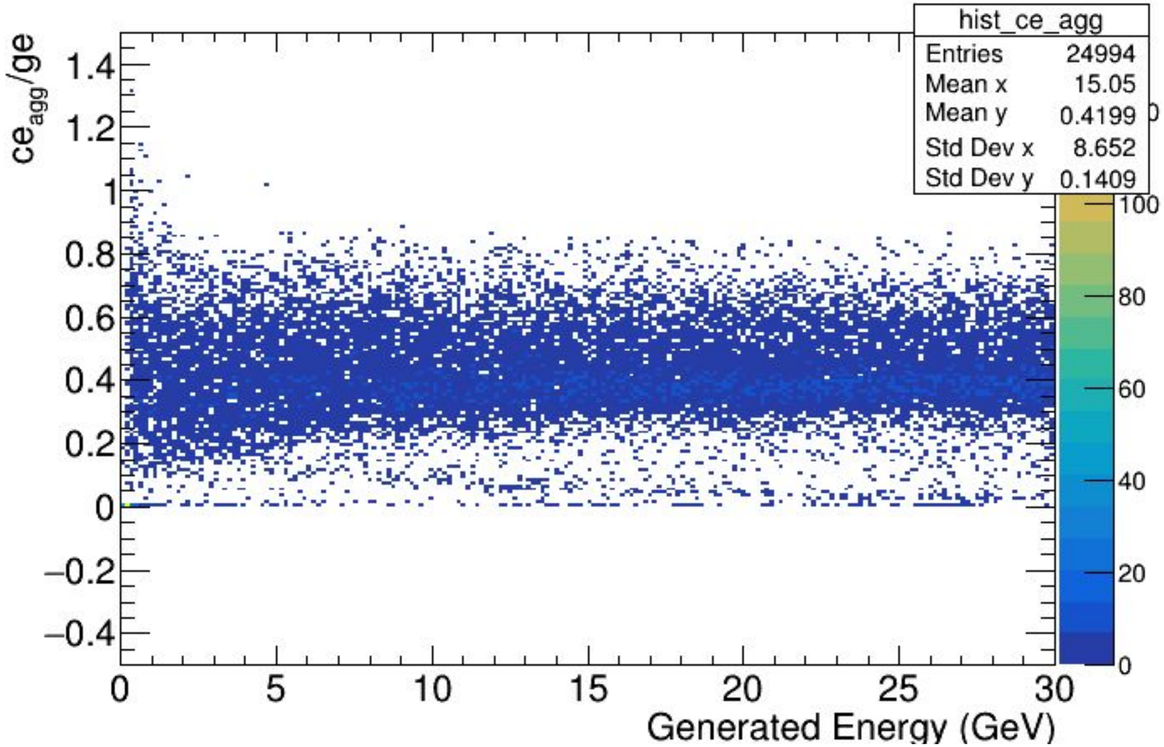


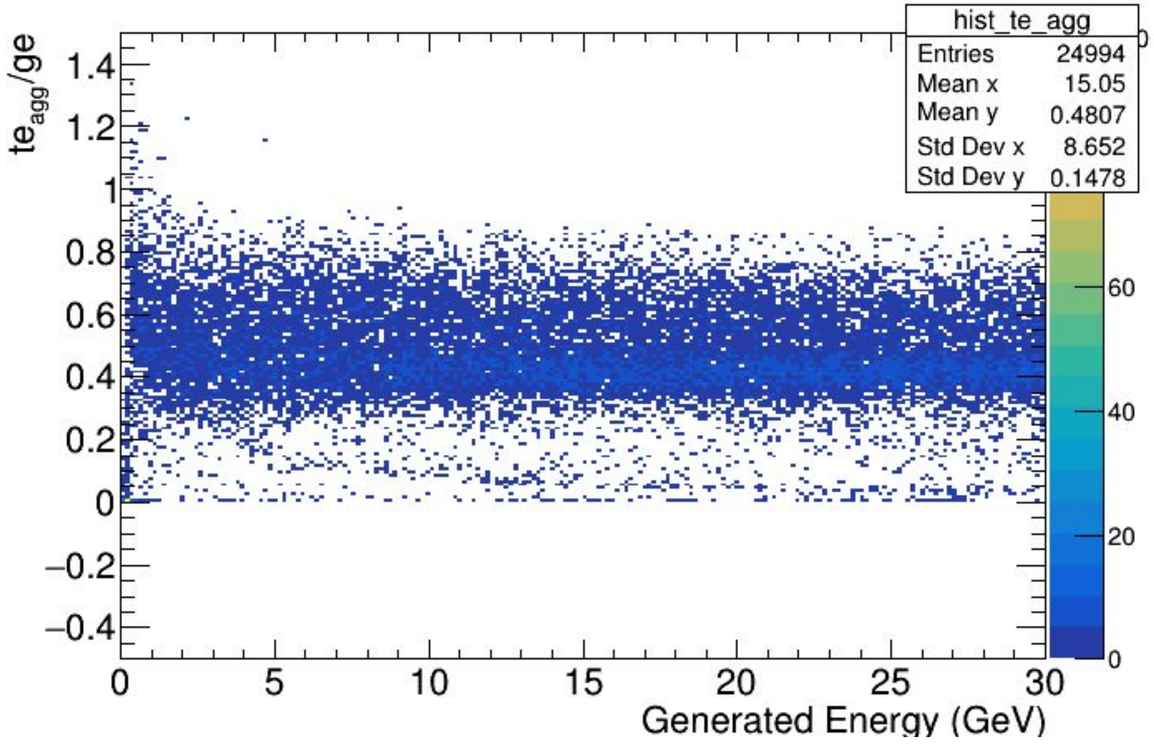


FEMC + FHCAL (pi^-)

FEMC + FHCAL (pi^-)

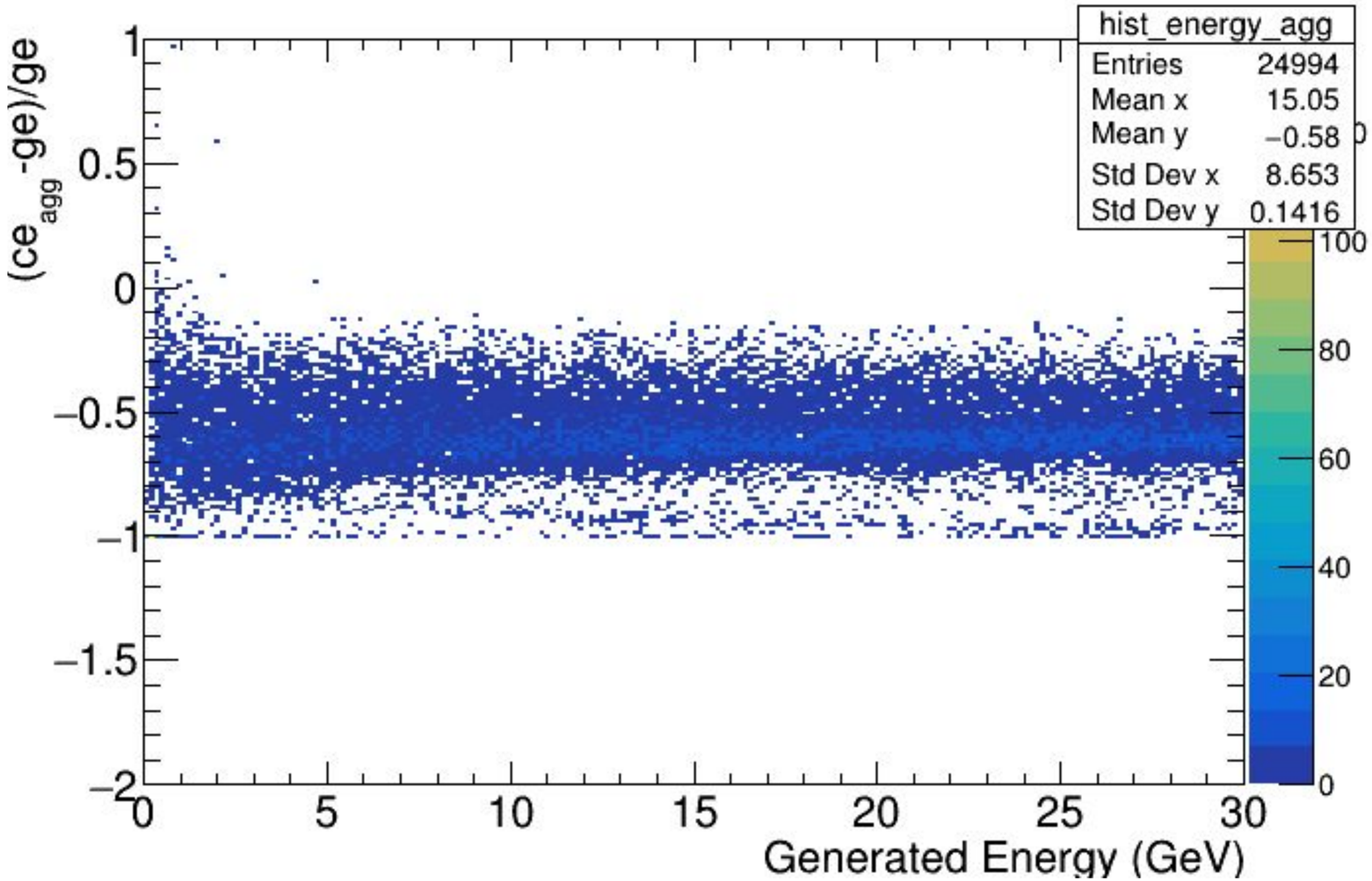
Explicit η cut: 1.3 to 3.3
no energy cut





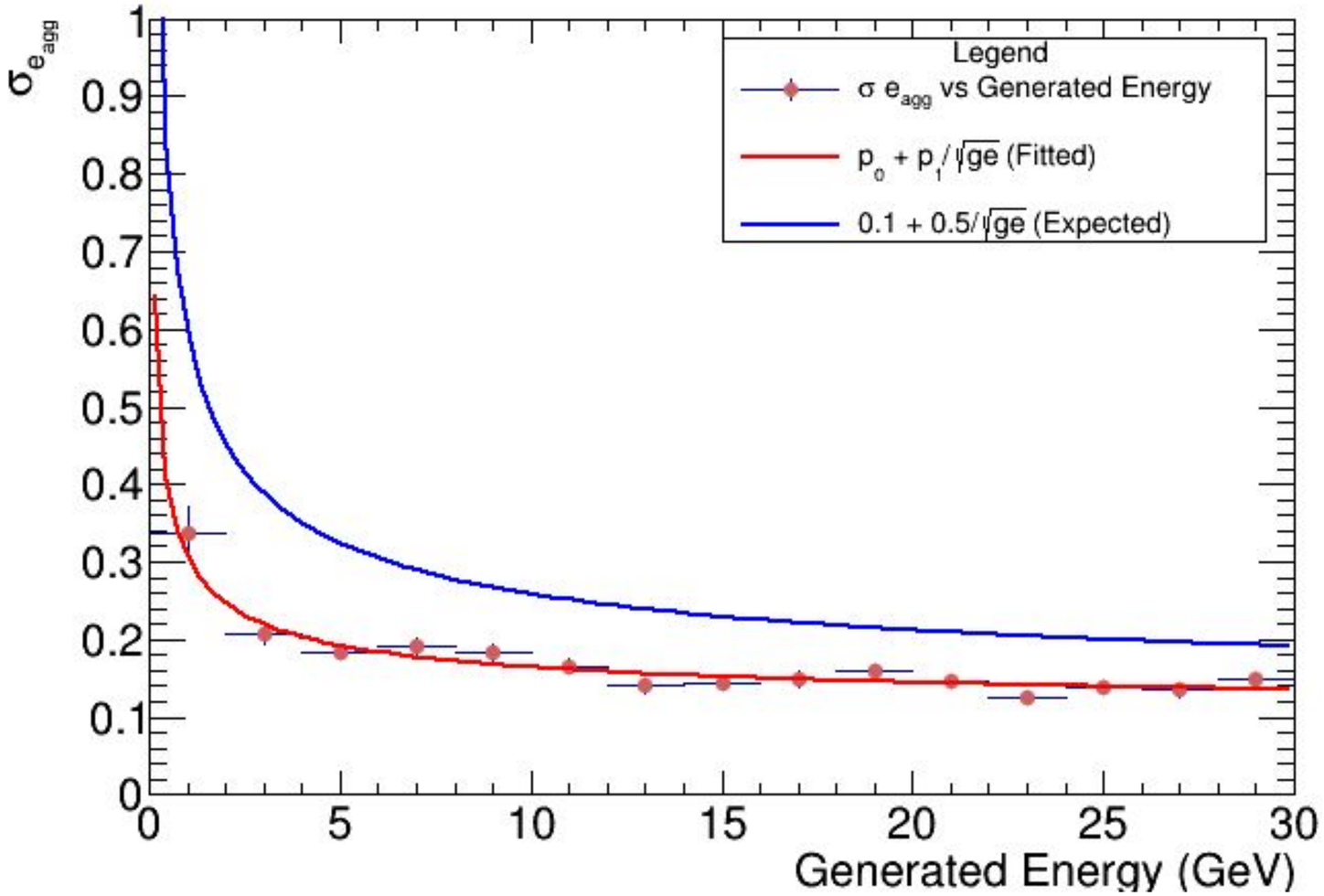
FEMC + FHCAL (pi^-)

(ce-ge)/ge vs ge
Explicit η cut: 1.3 to 3.3
no energy cut



FEMC + FHCAL (pi^-)

(ce-ge)/ge vs ge
Explicit η cut: 1.3 to 3.3



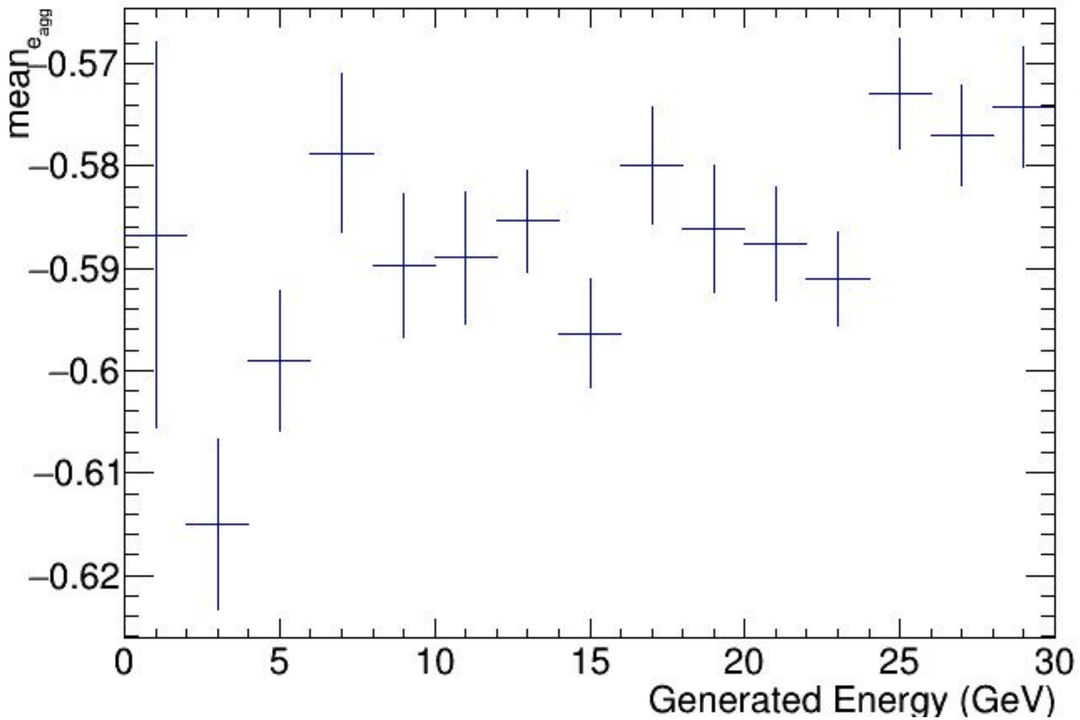
`σe` refers to the standard deviation of the Gaussian fitted to a slice of the `(ce-ge)/ge vs ge` plot. (shown on the previous slide)

Number of bins = 15
Bin Width = 2 GeV

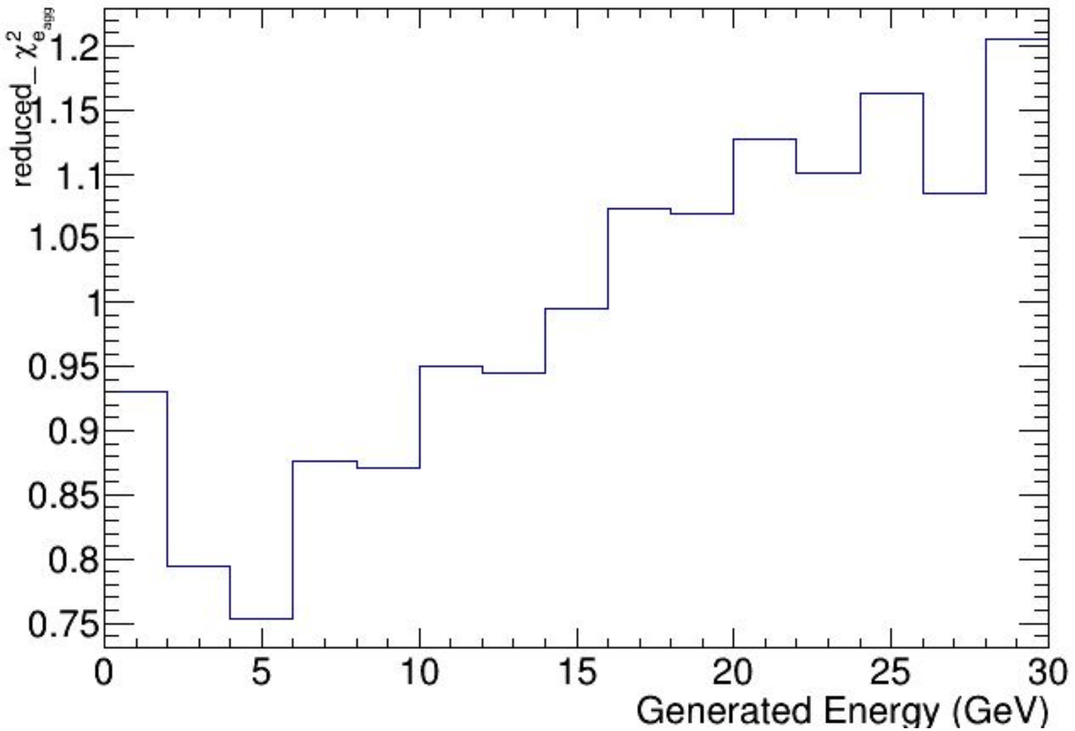
Fit Parameters:
p_o = (0.0972296 +- 0.00668992)
p_1 = (0.211140 +- 0.0222952) $GeV^{0.5}$

FEMC + FHCAL (pi^-)

Explicit η cut: 1.3 to 3.3



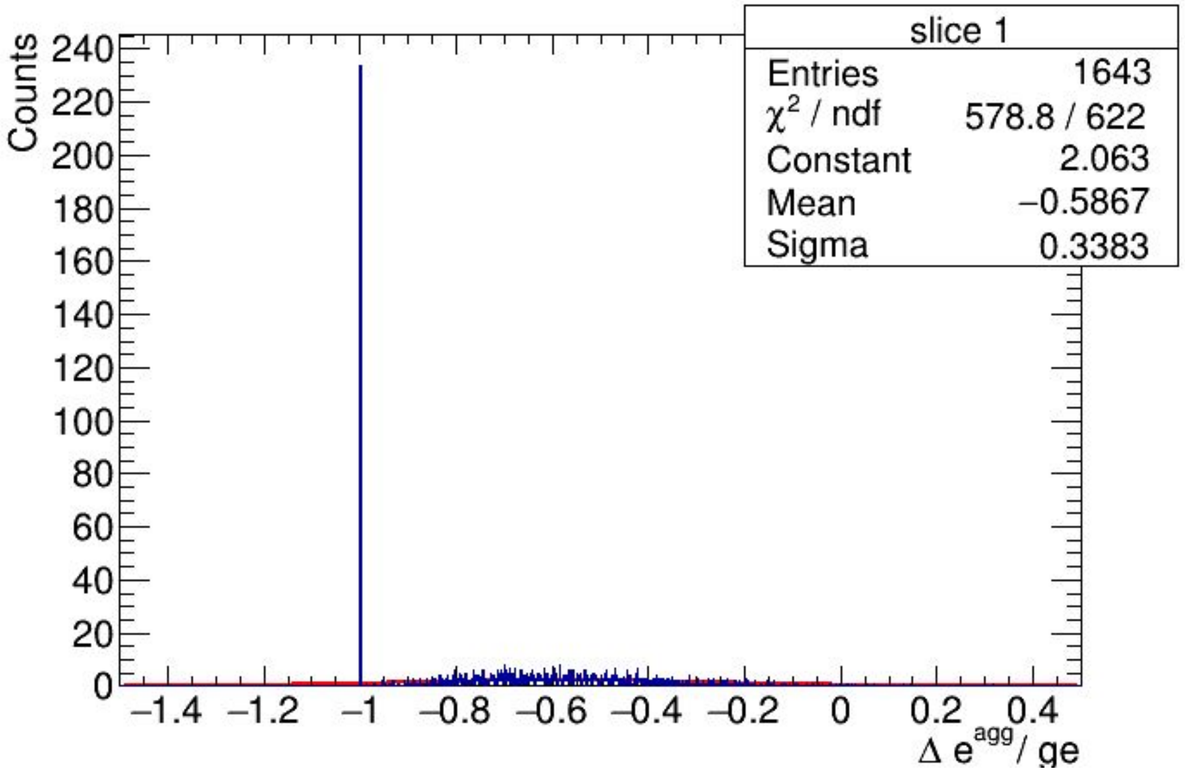
Mean of the Gaussians fitted to the slices of the `(ce-ge)/ge vs ge` plot.

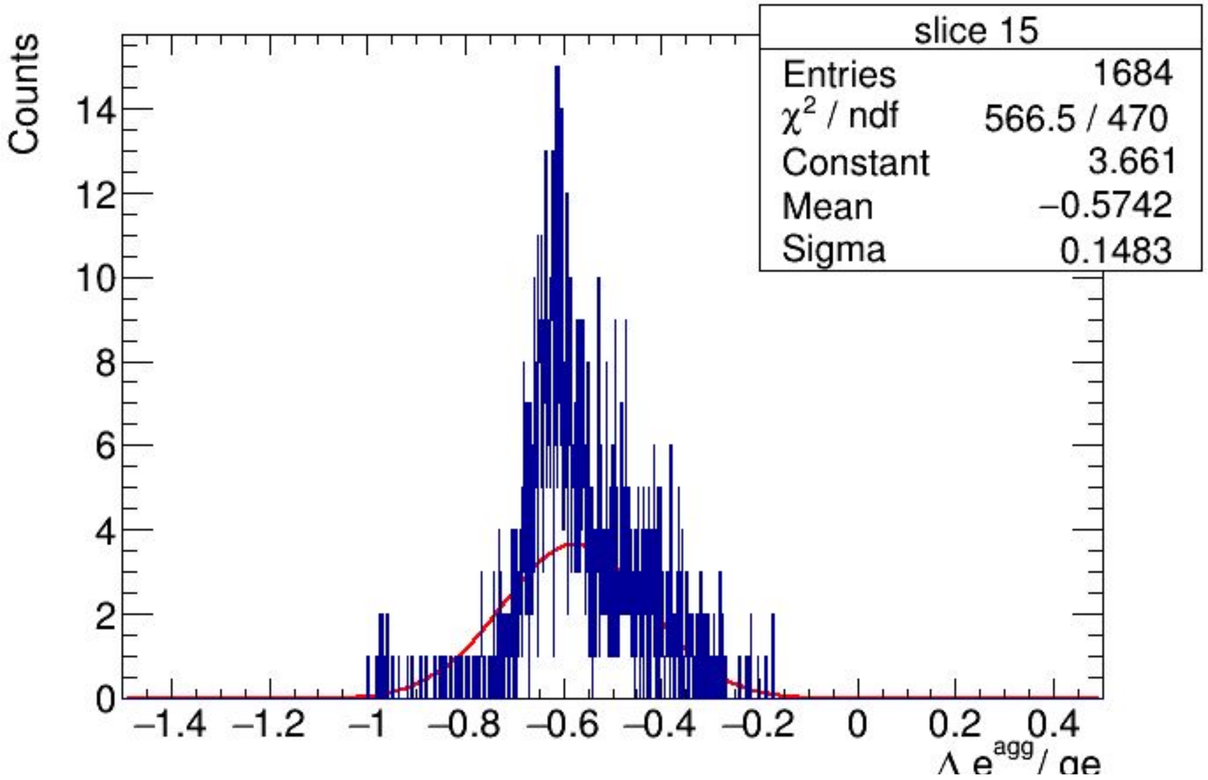


reduced_χ2 of the Gaussians fitted to the slices of the `(ce-ge)/ge vs ge` plot.

FEMC + FHCAL (pi^-)

Some of the fitted Gaussians

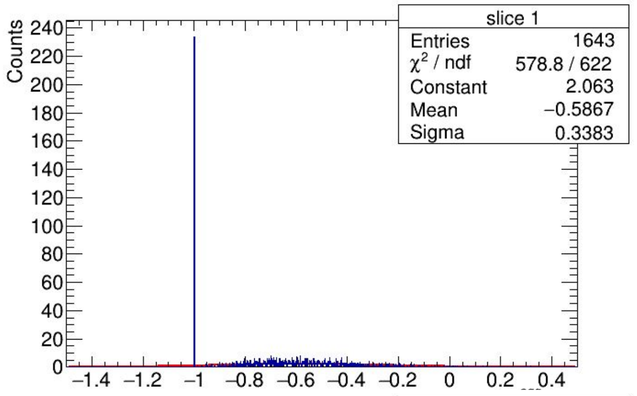


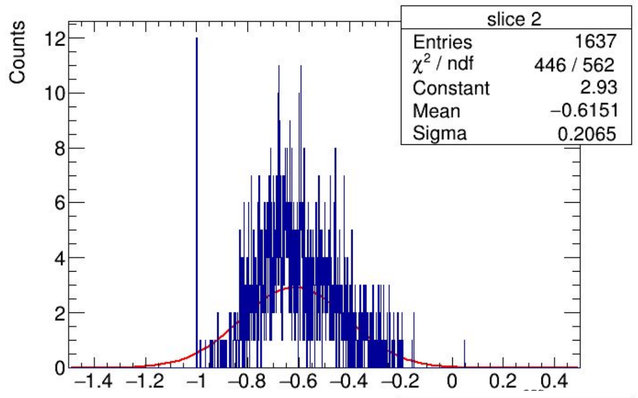


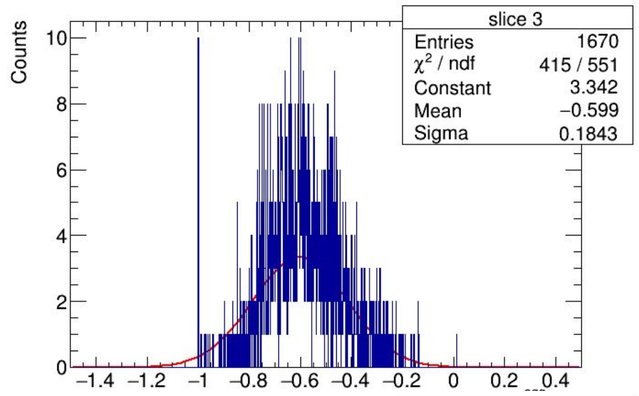
Number of bins = 2000 from -1.5 to +0.5

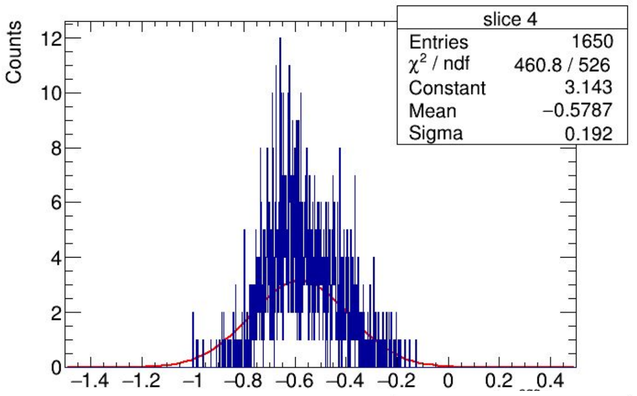
FEMC + FHCAL (pi^-)

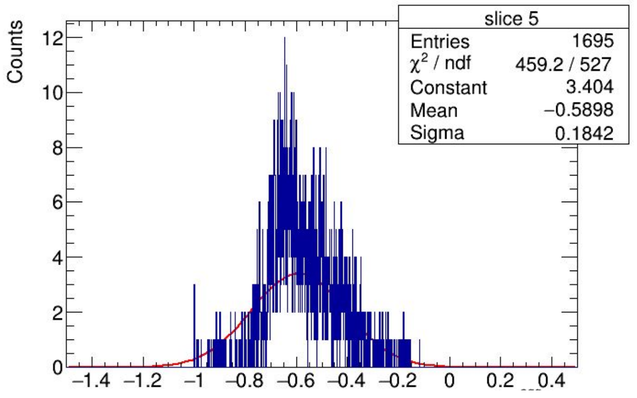
Fitted Gaussians

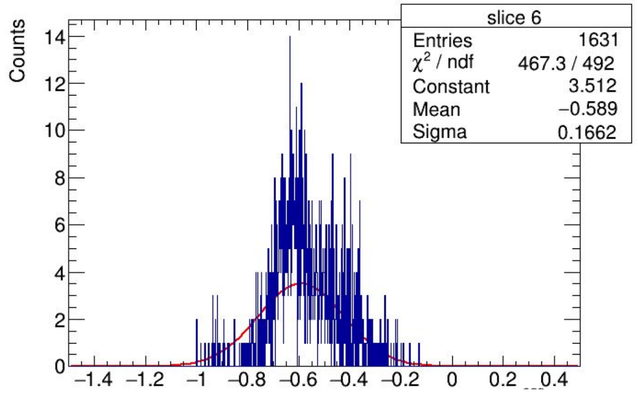


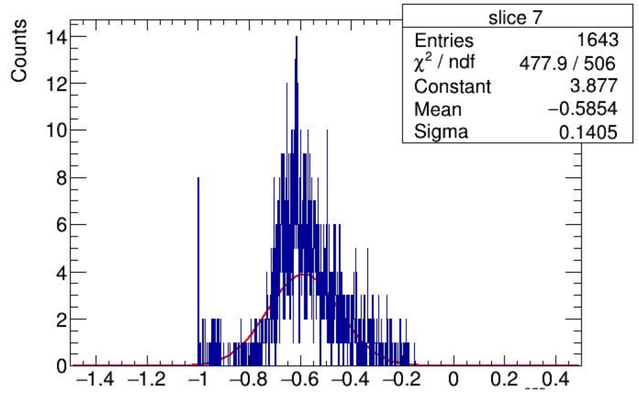


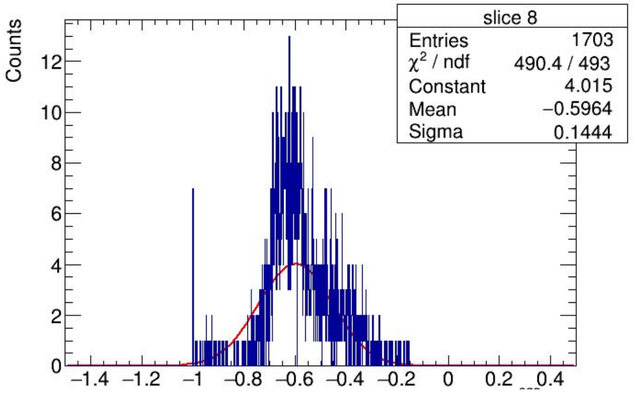


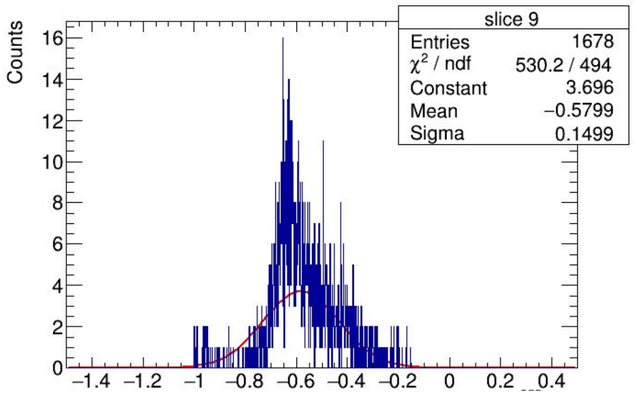


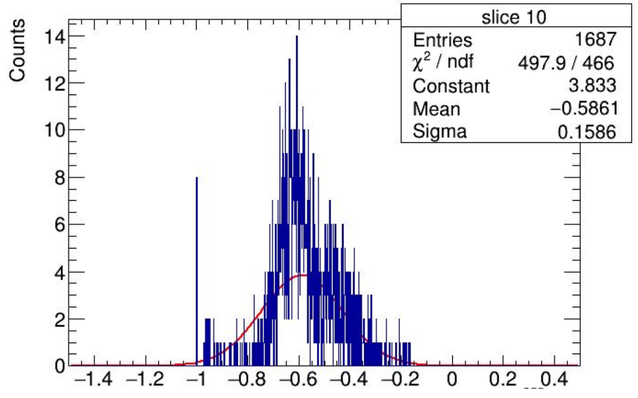


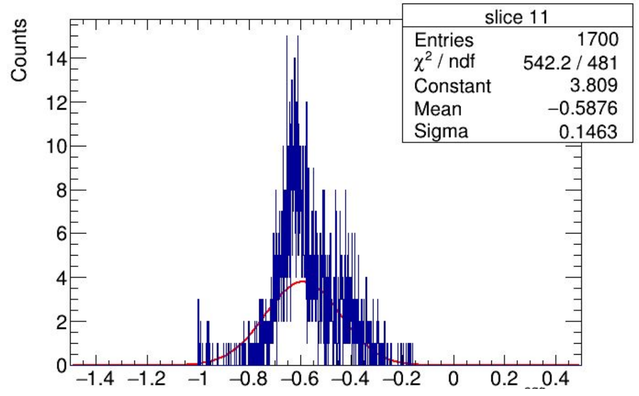


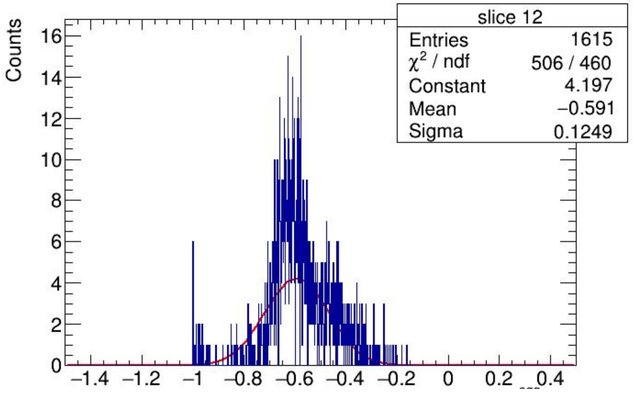








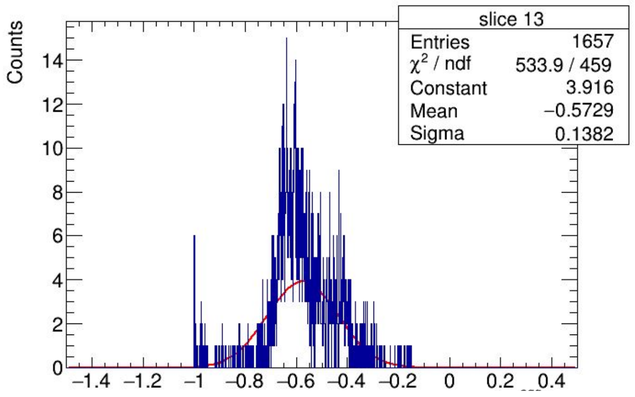


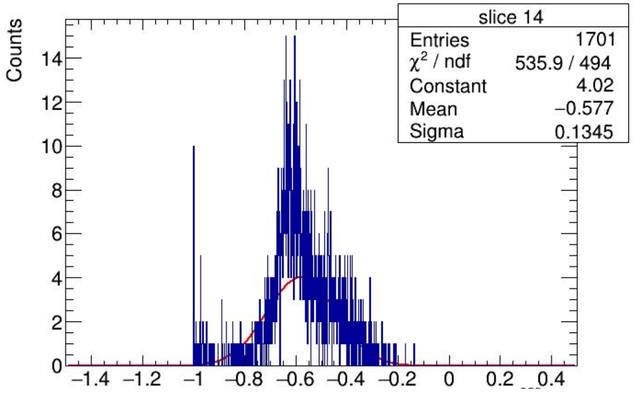


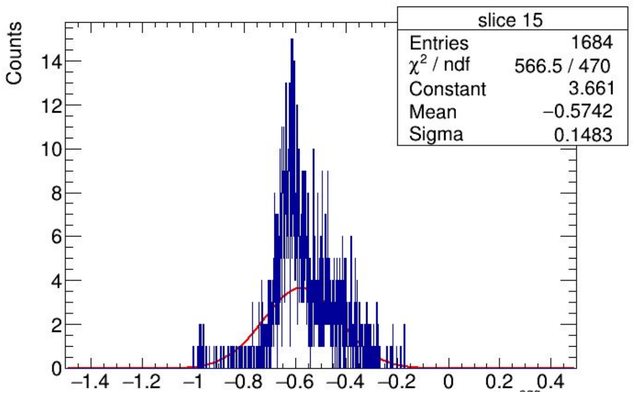
The x-axes denote $\Delta e_{agg}/ge$

FEMC + FHCAL (pi^-)

Fitted Gaussians







The x-axes denote $\Delta e_{agg}/ge$