

Fun4All Calorimeter Plots: Solving Pion Energy Calibration Problem

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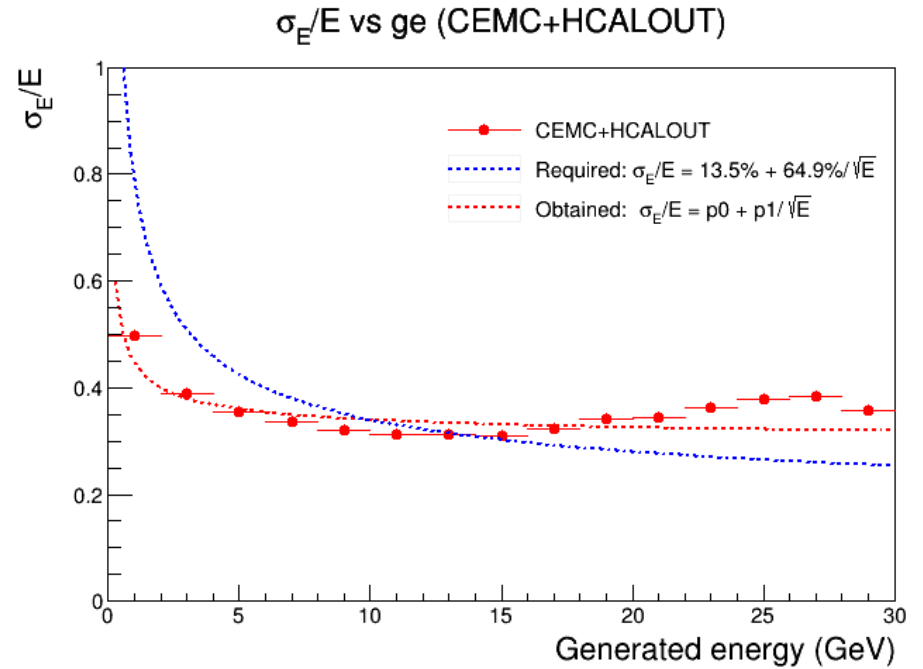
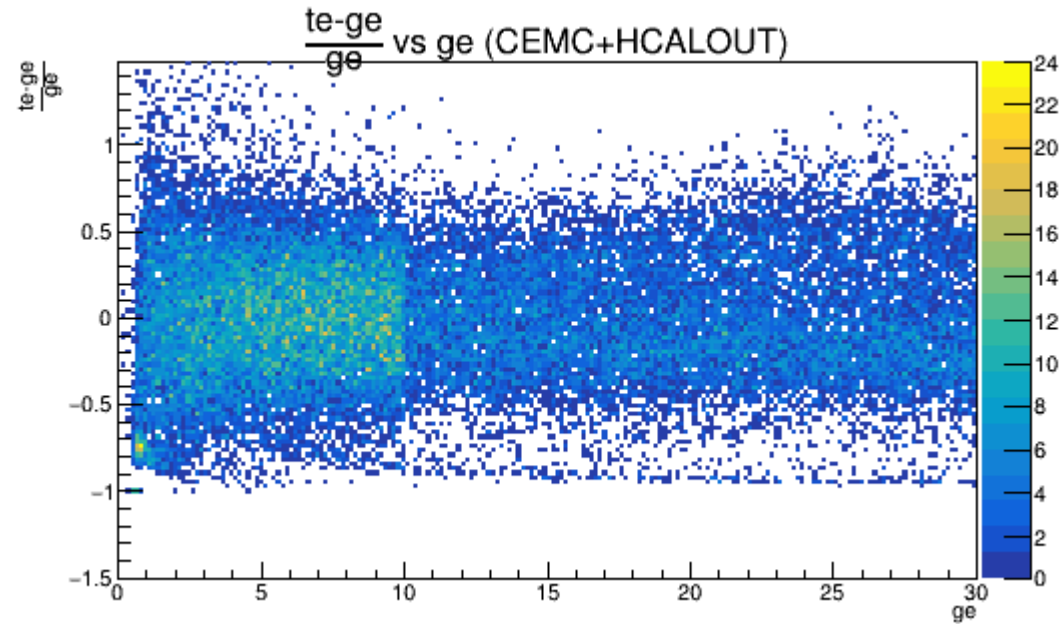
Fun4All QA Biweekly Meeting
October 8, 2021

Main Changes in the code:

- Aggregate cut: 100 MeV for each calorimeter
- Individual tower cut: **200 MeV** only for **CEMC & FEMC**

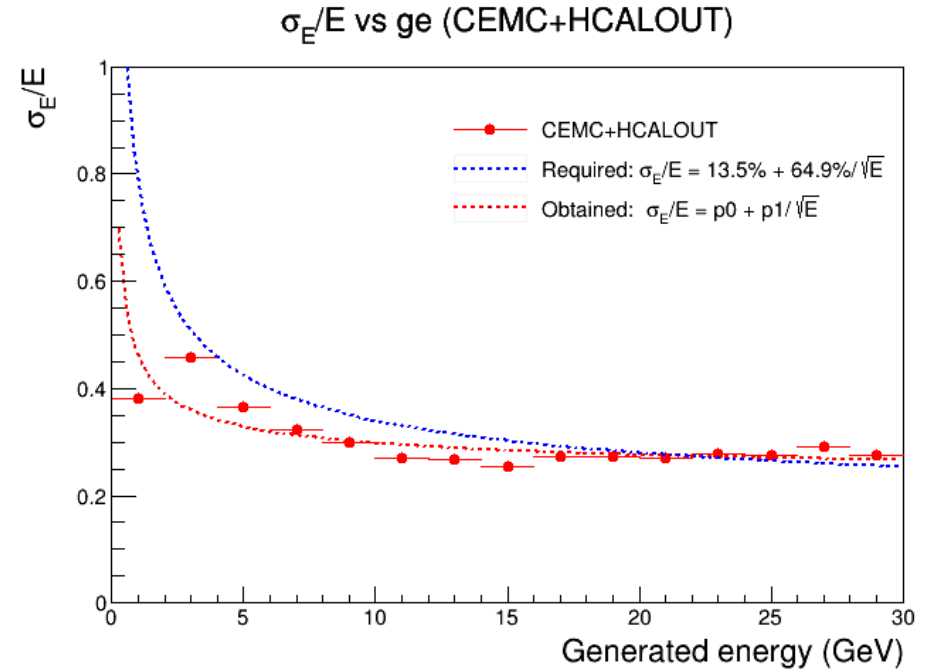
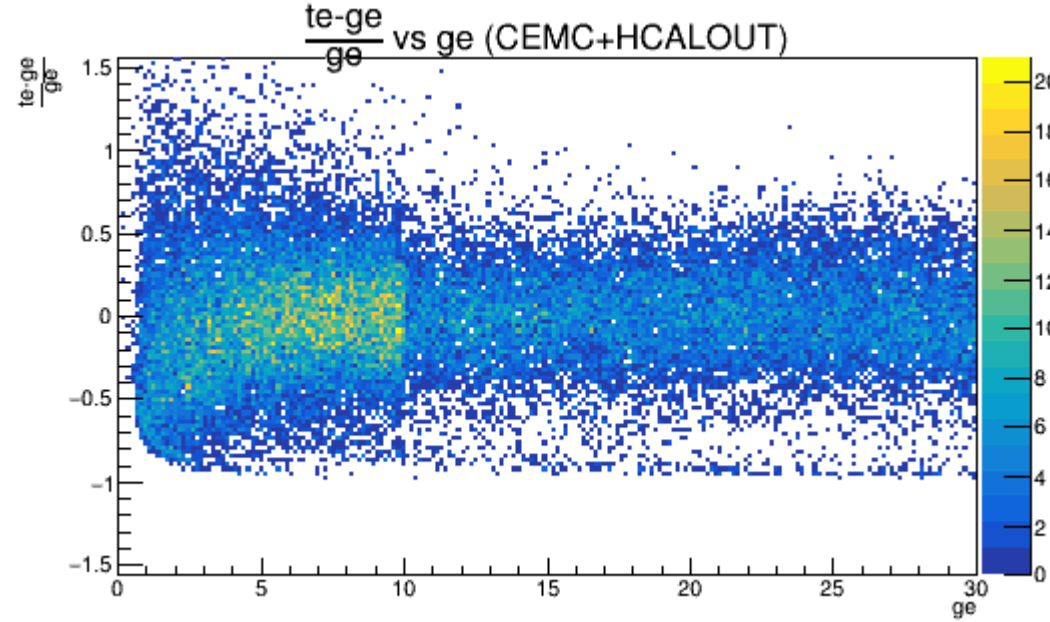
CEMC+HCALOUT

Previous results



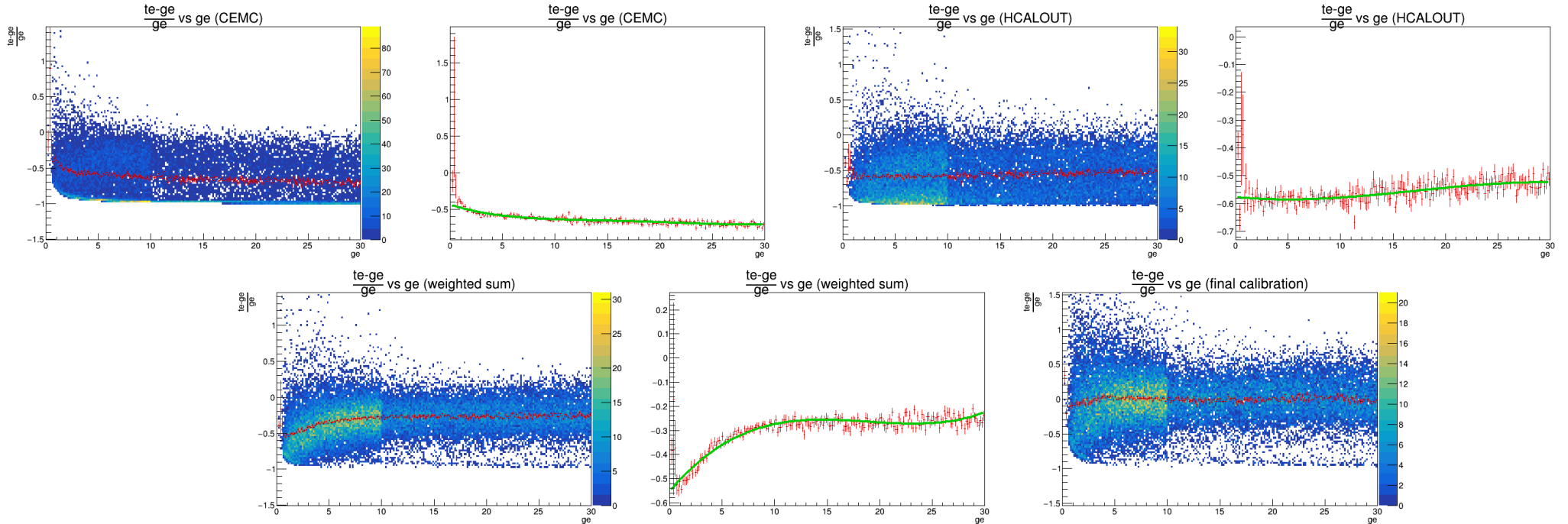
CEMC+HCALOUT

After implementing 200MeV cut on individual towers



$$\sigma_E/E = 22\% + 23.7\%/\sqrt{E}$$

CEMC+HCALOUT: Calibration steps

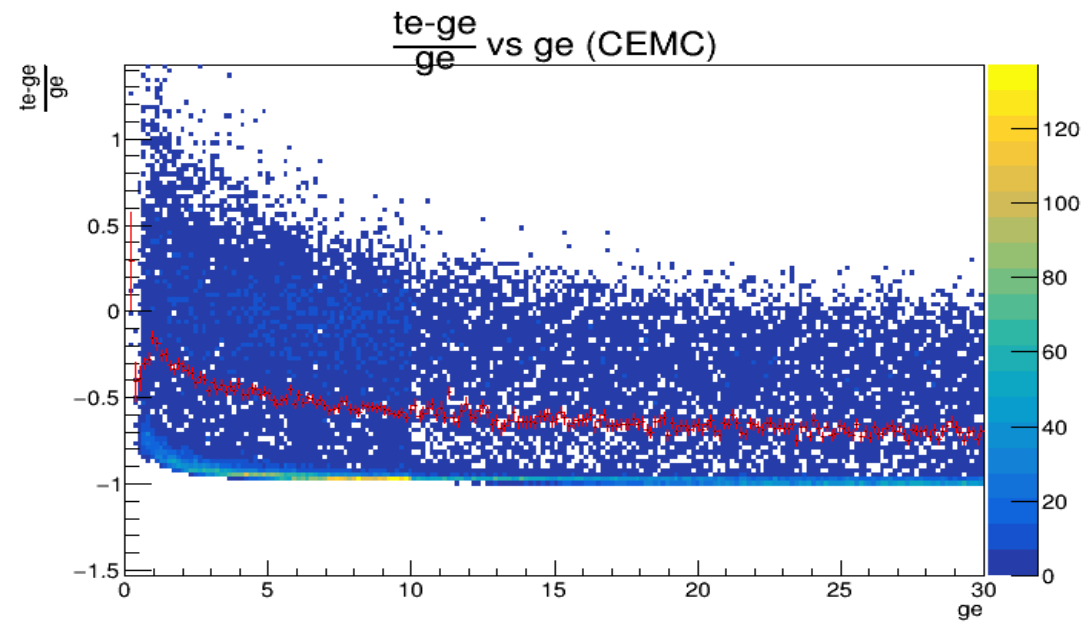


Weight for CEMC = 0.3737397

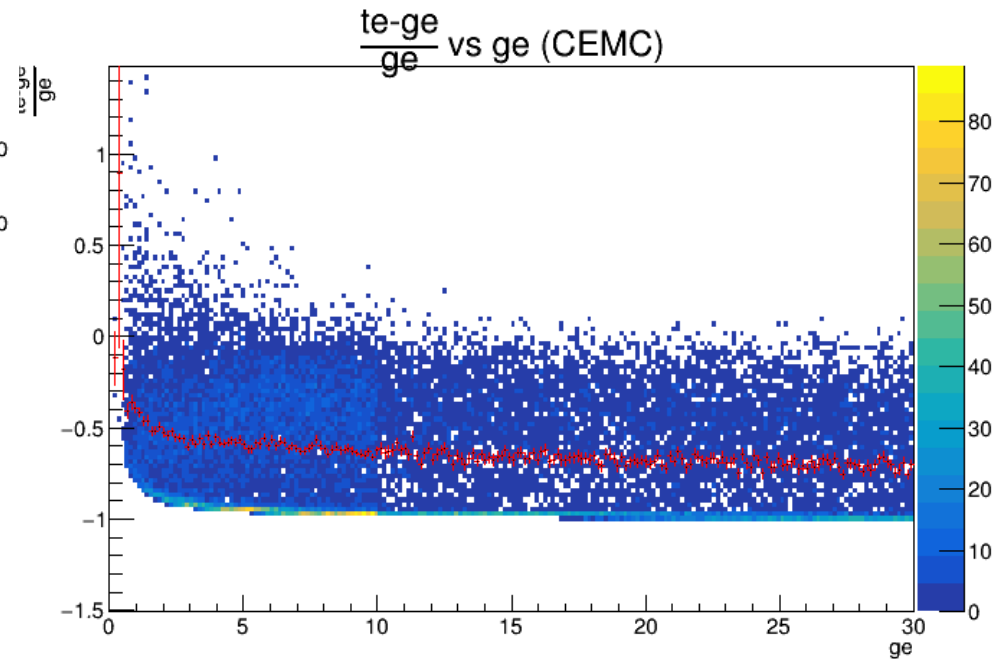
Weight for HCALOUT = 0.436801

Sum of weights is $0.373797 + 0.436801 = 0.810598$

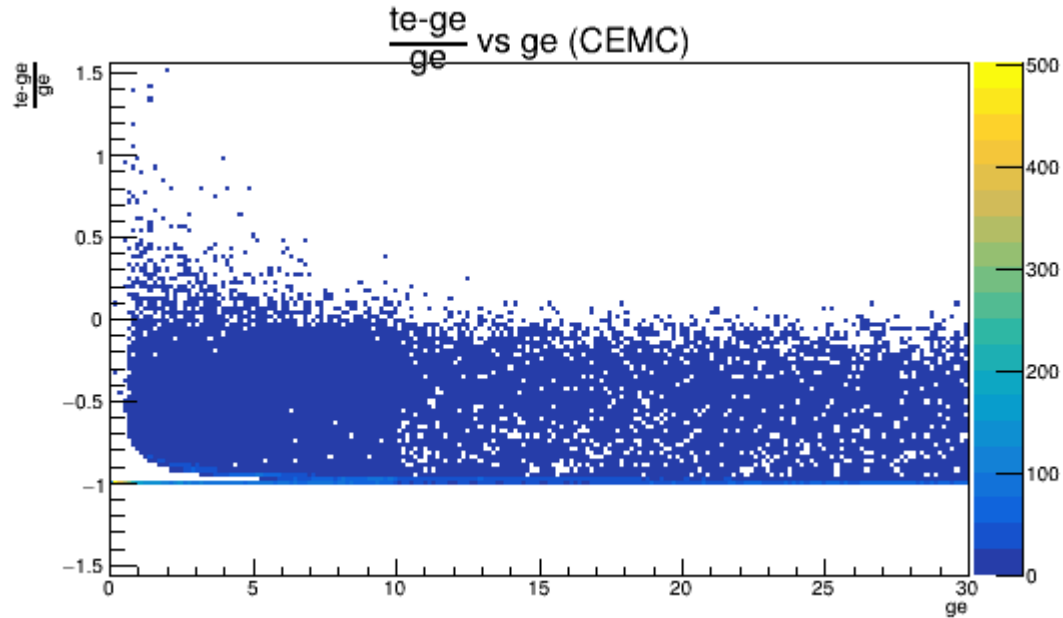
Before 200 MeV cut



After 200 MeV cut

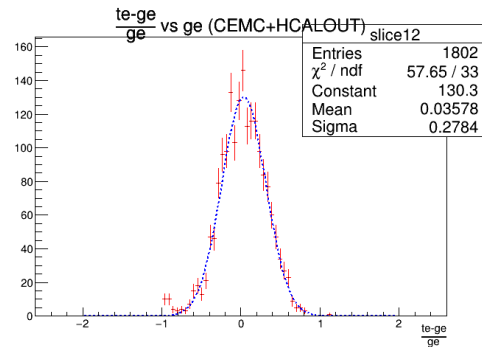
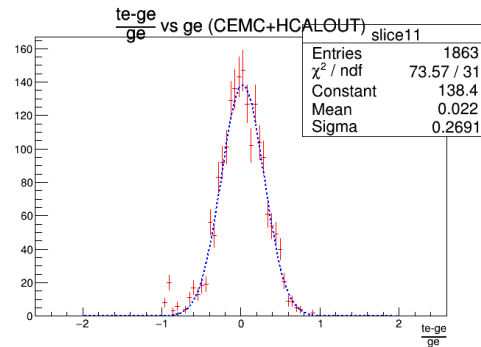
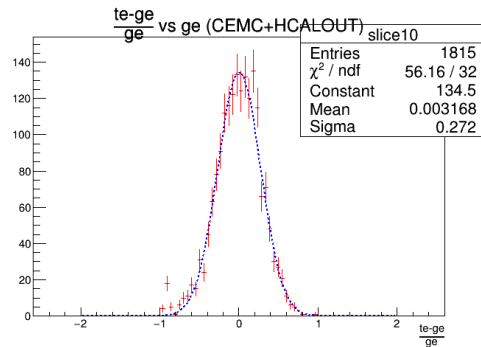
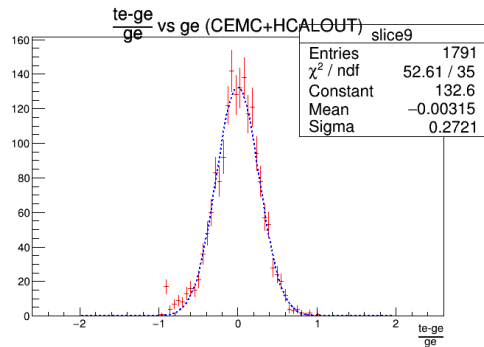
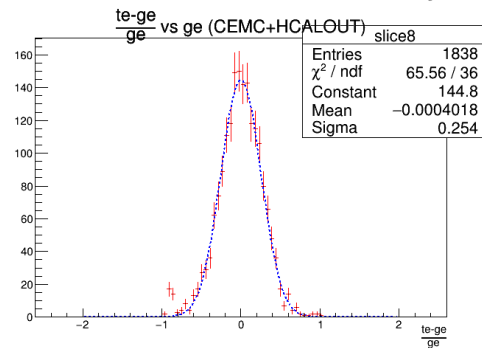
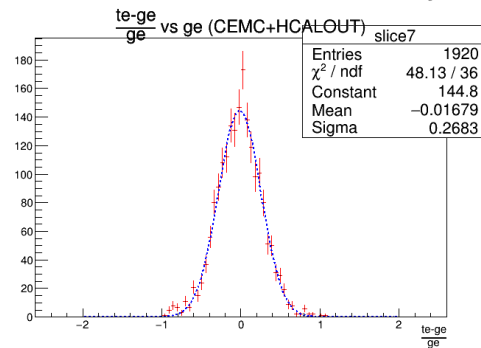
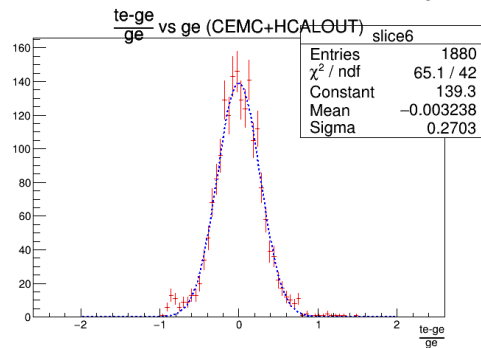
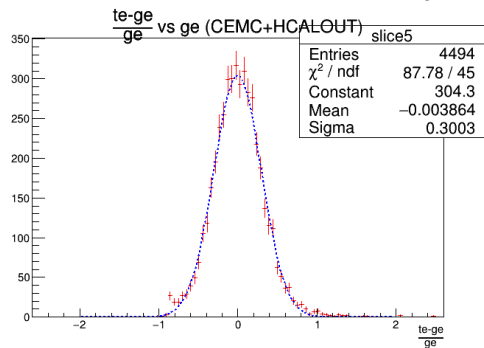
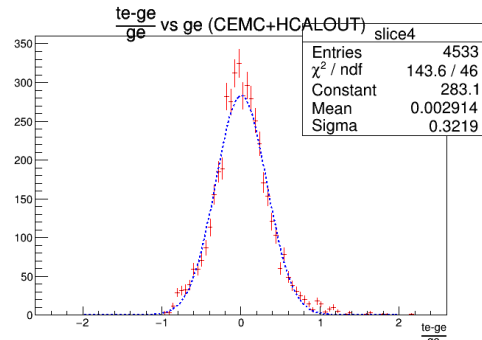
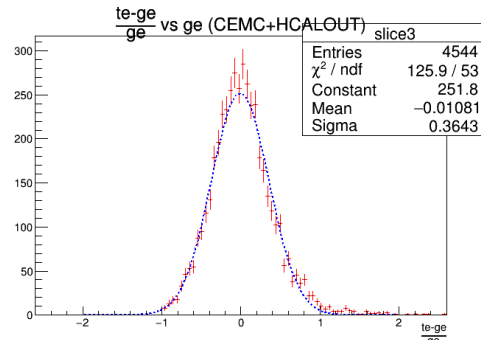
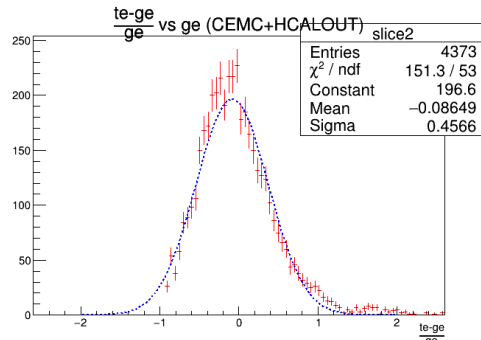
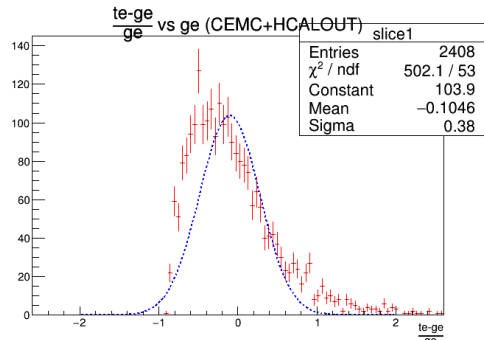


Checking whether 100MeV aggregate cut becomes redundant after implementing the 200MeV individual tower cut

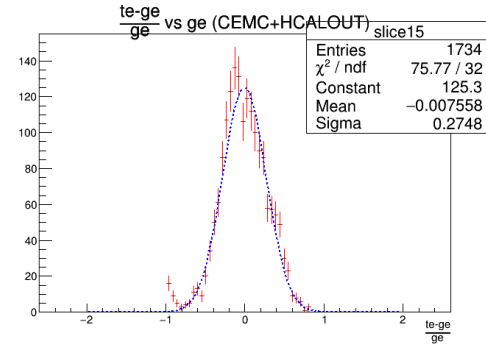
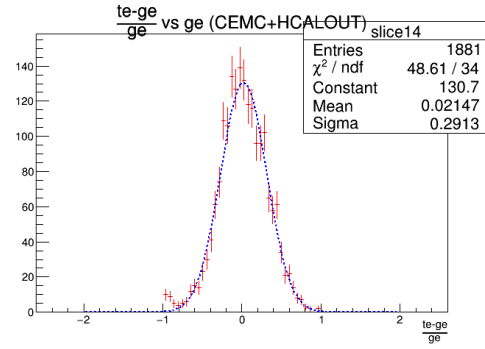
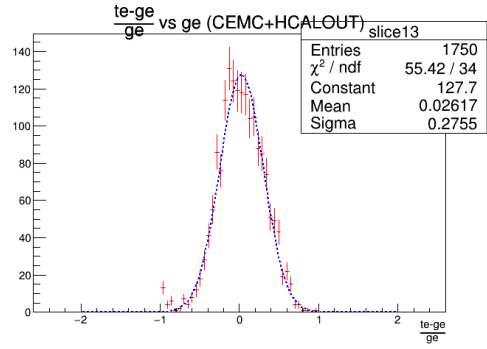


Only 200MeV cut on individual towers implemented in above plot & 100MeV aggregate cut is removed

CEMC+HCALOUT: Gaussian fits (after calibration):

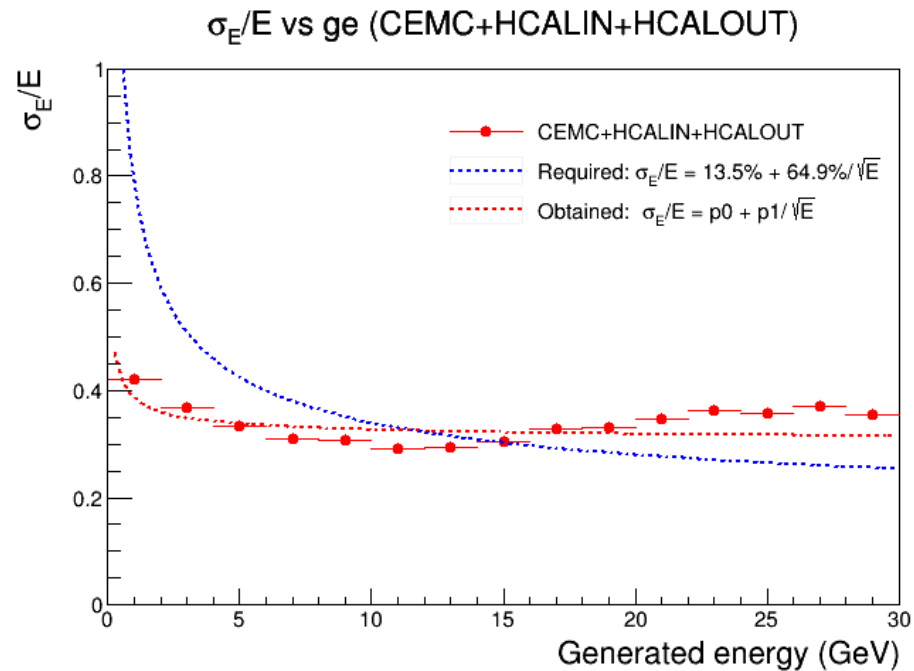
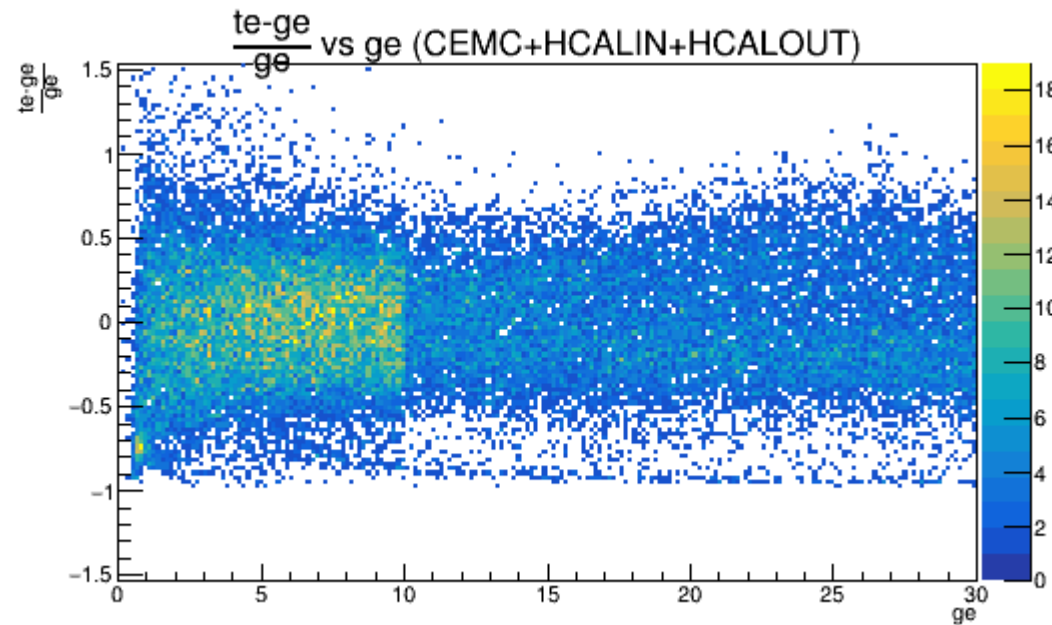


CEMC+HCALOUT: gaussian fits (after calibration):



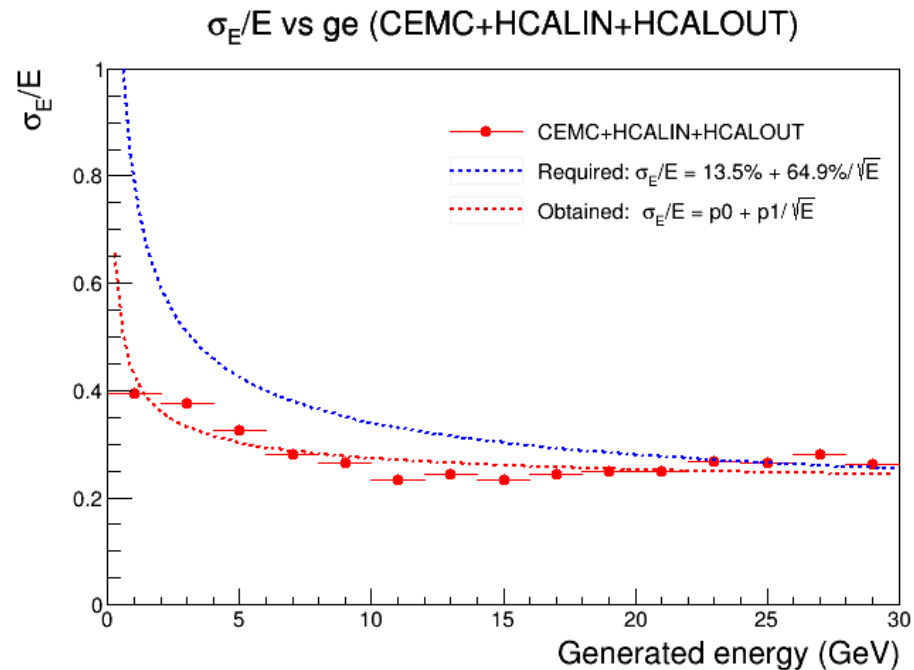
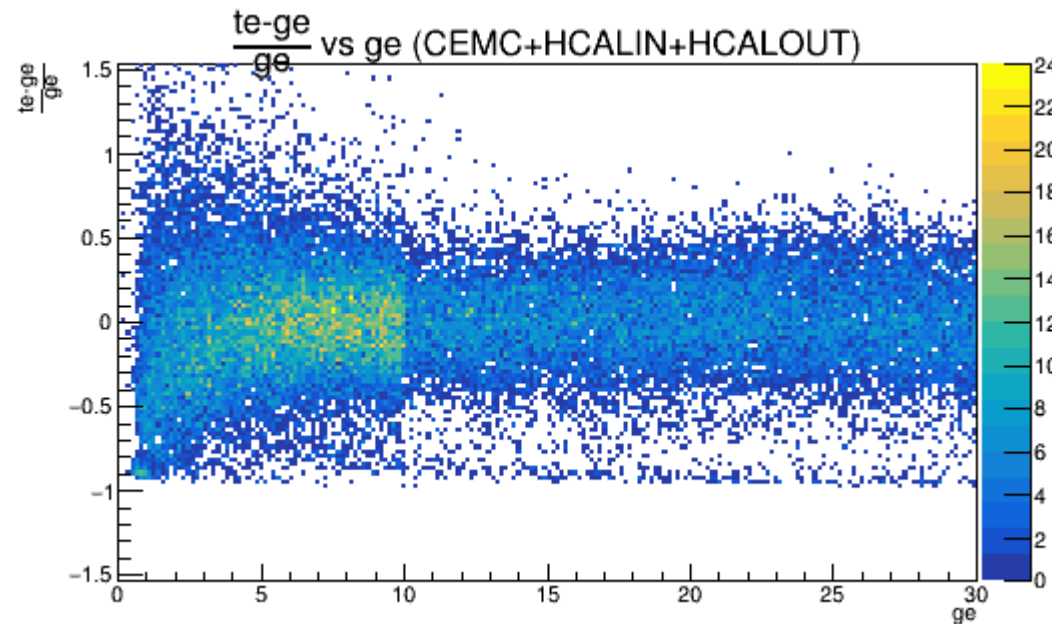
CEMC+HCALIN+HCALOUT

Previous Results



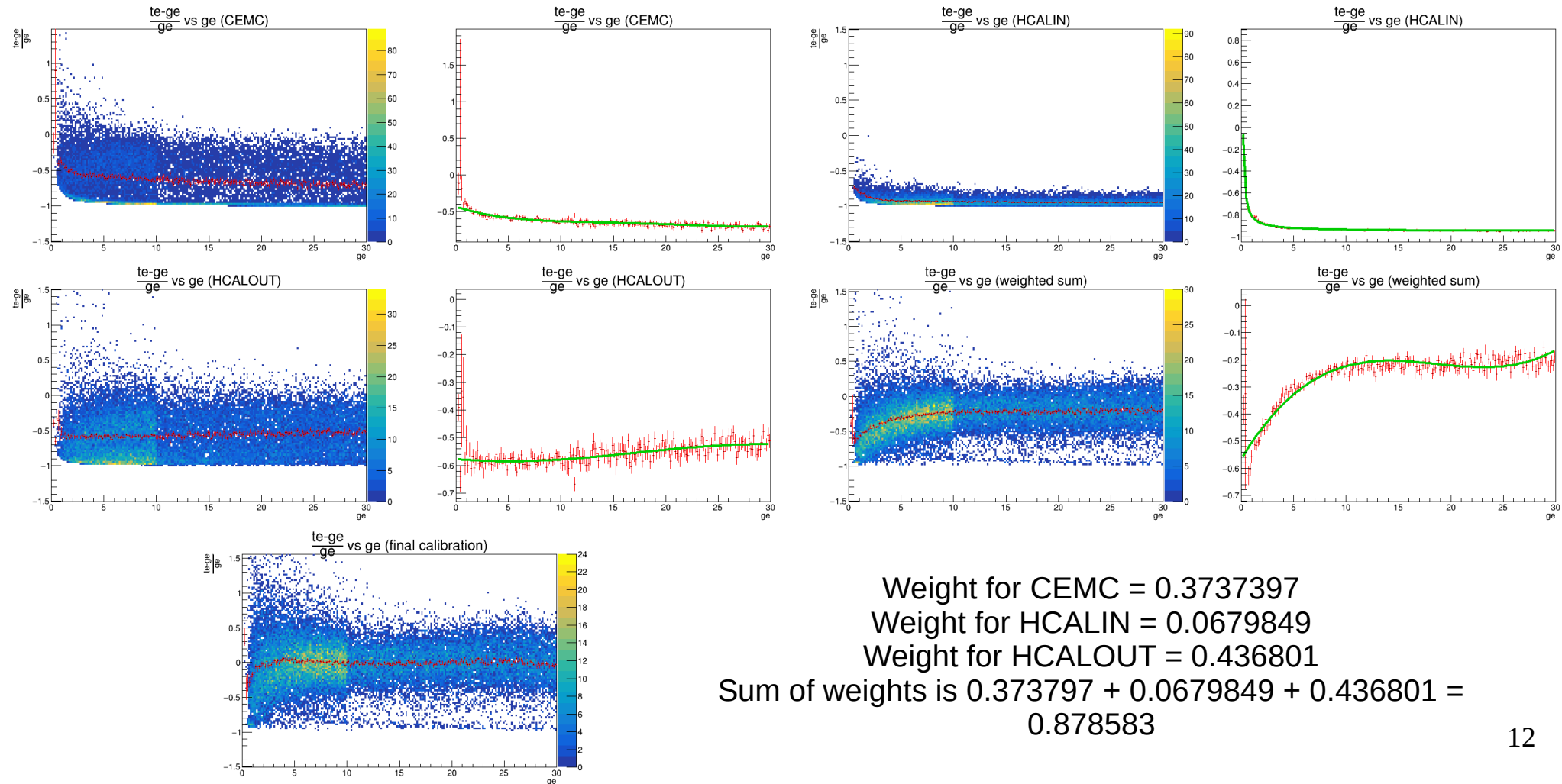
CEMC+HCALIN+HCALOUT

After implementing 200MeV cut on individual towers



$$\sigma_E/E = 20.1\% + 22.6\%/\sqrt{E}$$

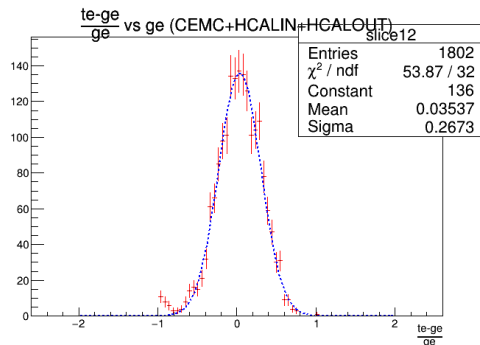
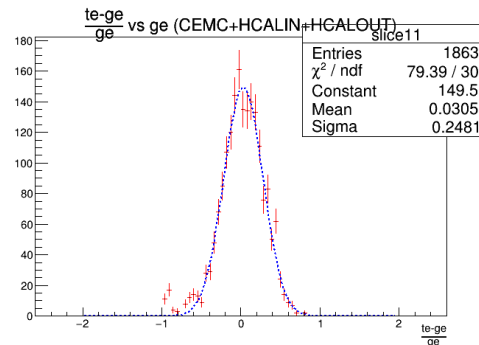
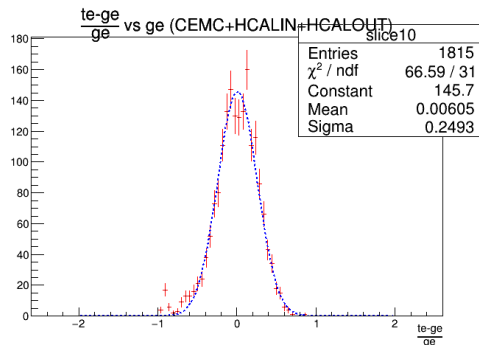
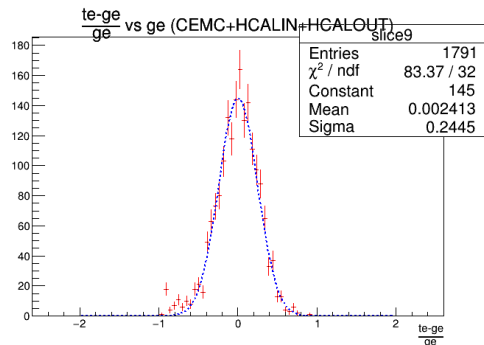
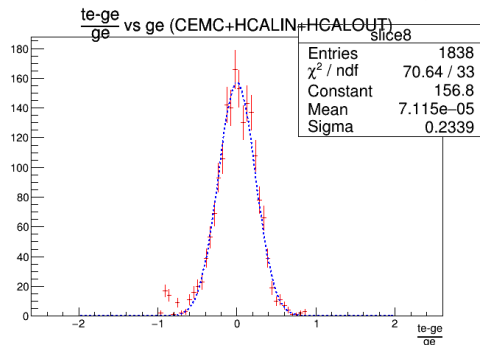
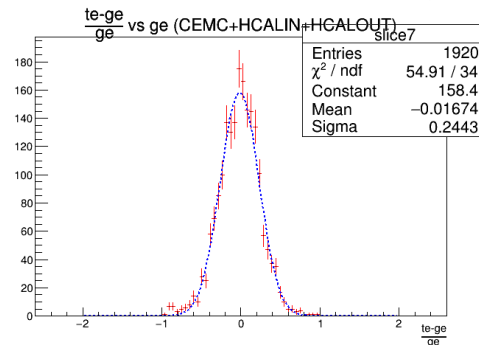
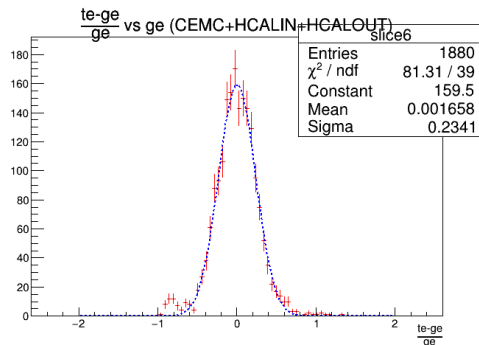
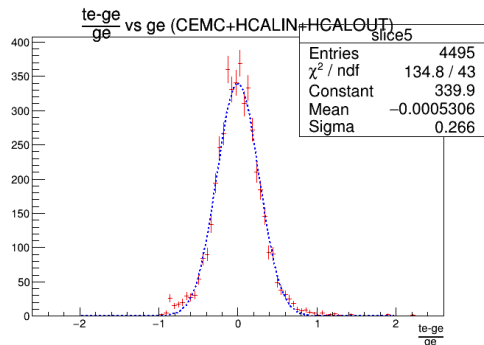
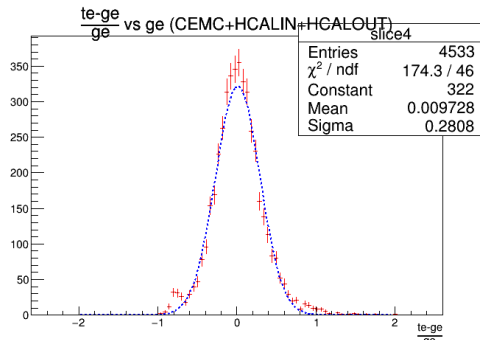
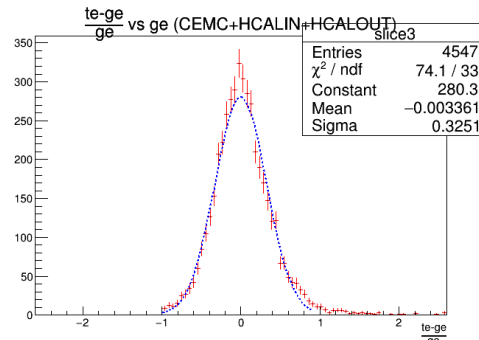
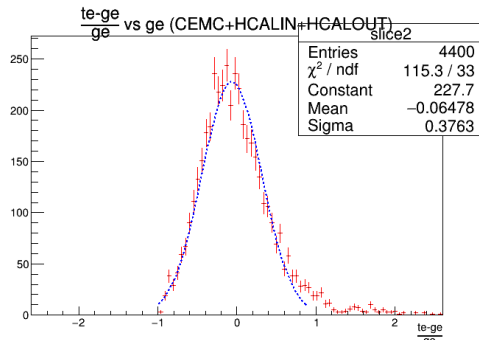
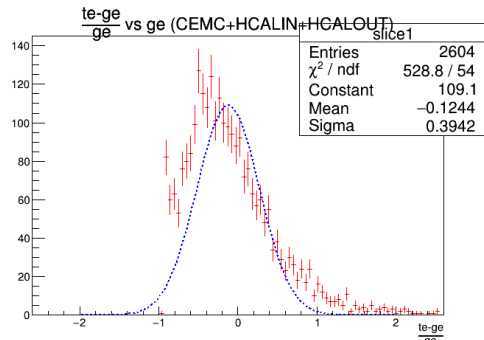
CEMC+HCALIN+HCALOUT: Calibration steps



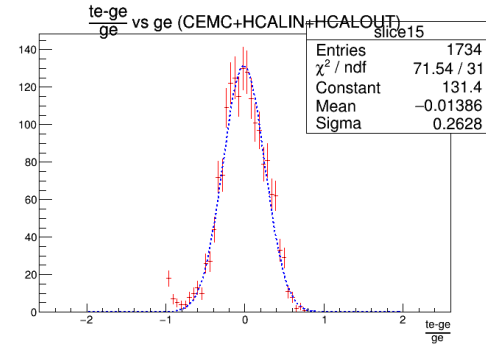
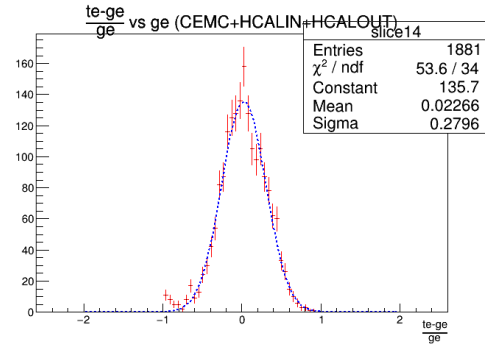
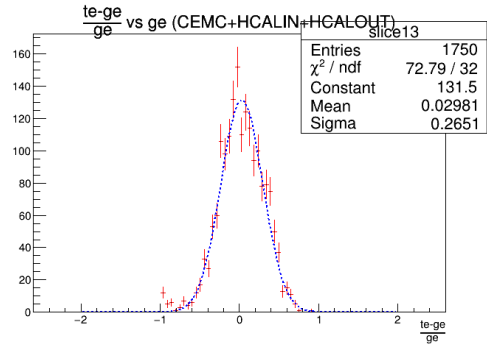
Weight for CEMC = 0.3737397
Weight for HCALIN = 0.0679849
Weight for HCALOUT = 0.436801

Sum of weights is $0.373797 + 0.0679849 + 0.436801 = 0.878583$

CEMC+HCALIN+HCALOUT: Gaussian fits (after calibration):

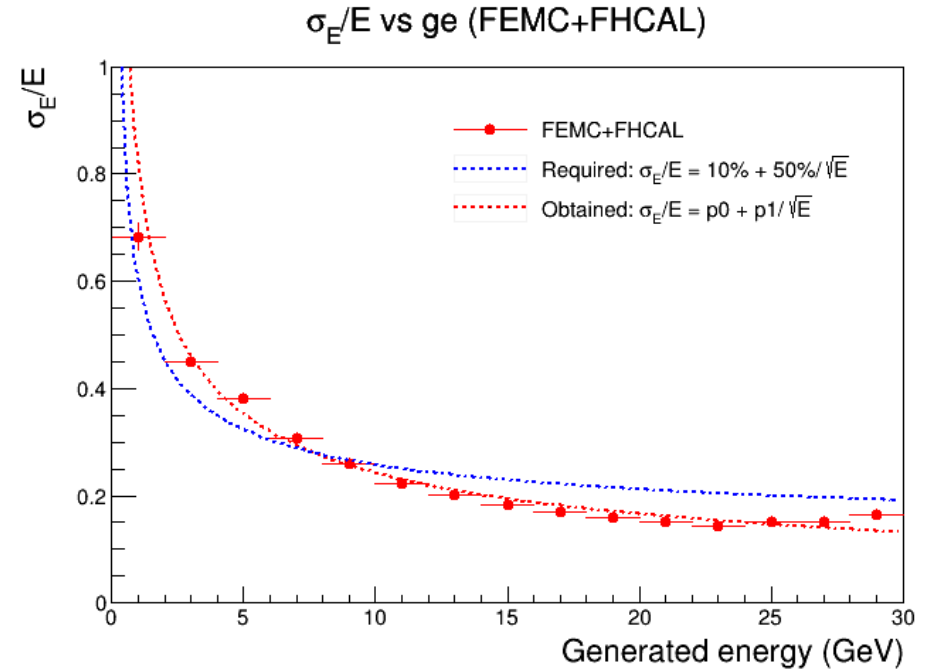
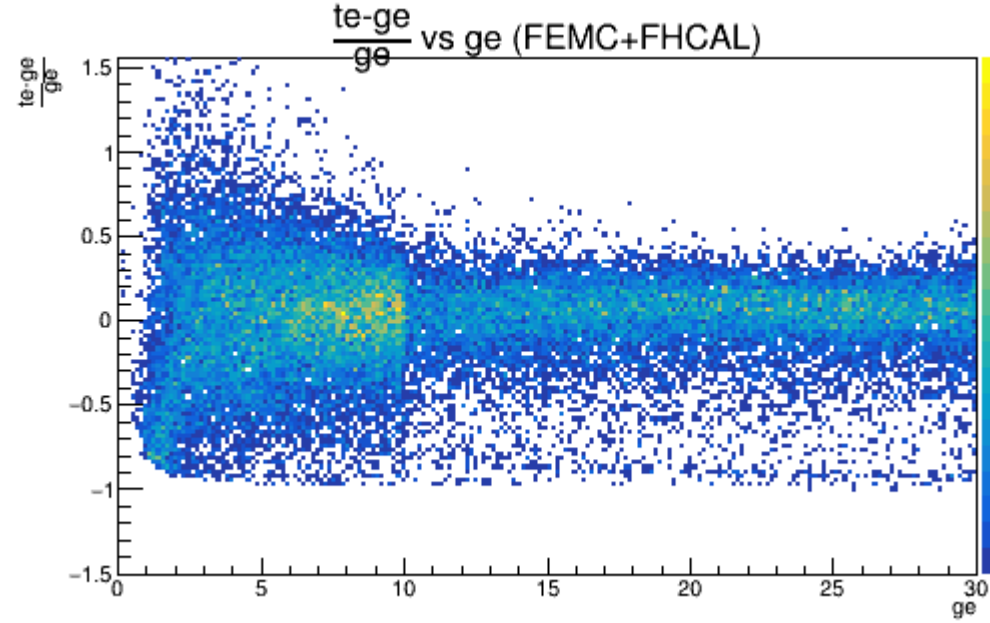


CEMC+HCALIN+HICALOUT: gaussian fits (after calibration):

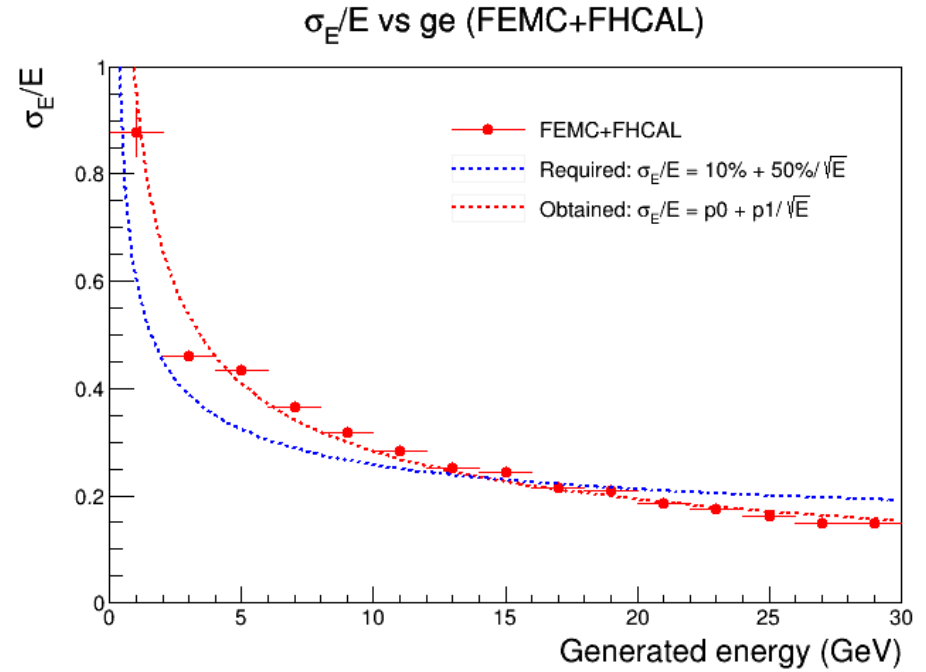
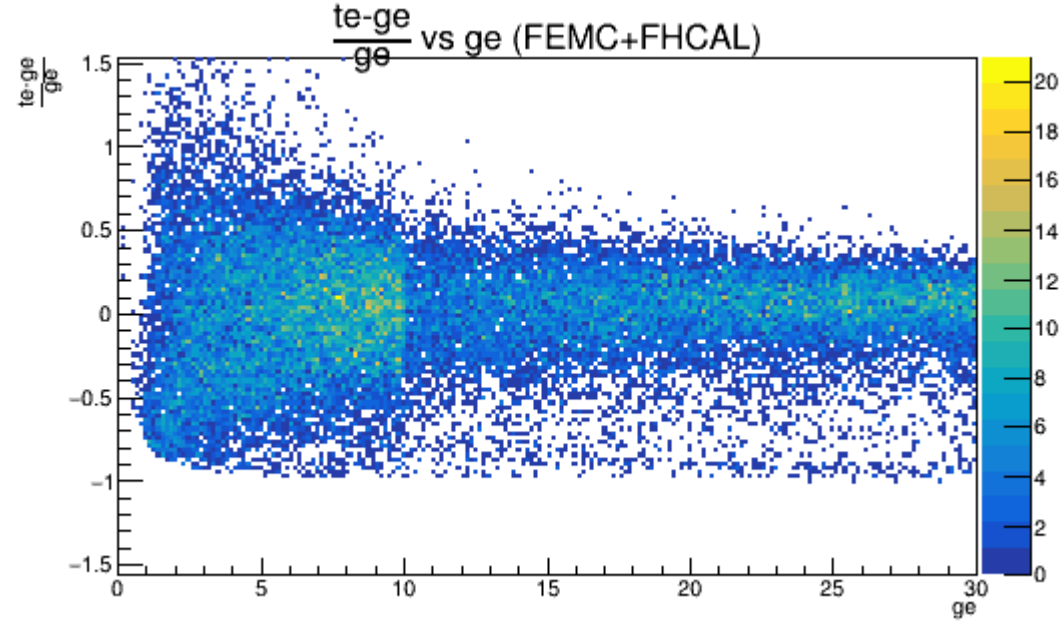


FEMC+FHICAL

Previous Results

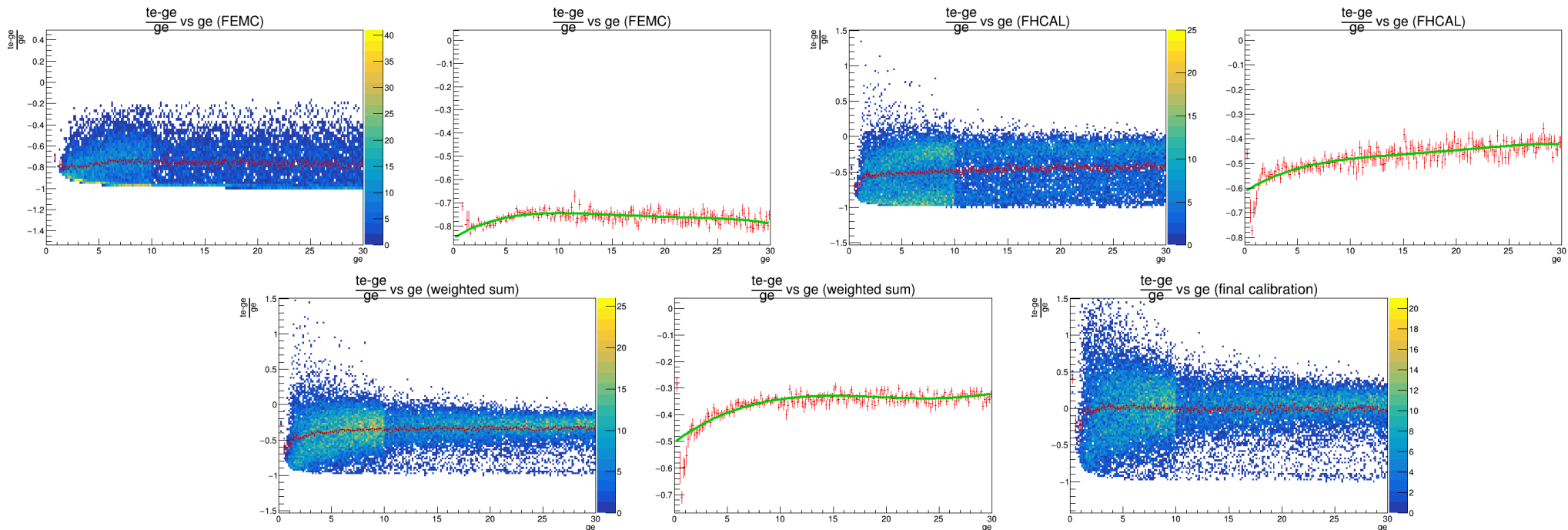


FEMC+FHICAL After Calibration



$$\sigma_E/E = -2.3\% + 96.7\%/ \sqrt{E}$$

FEMC+FHICAL: Calibration steps

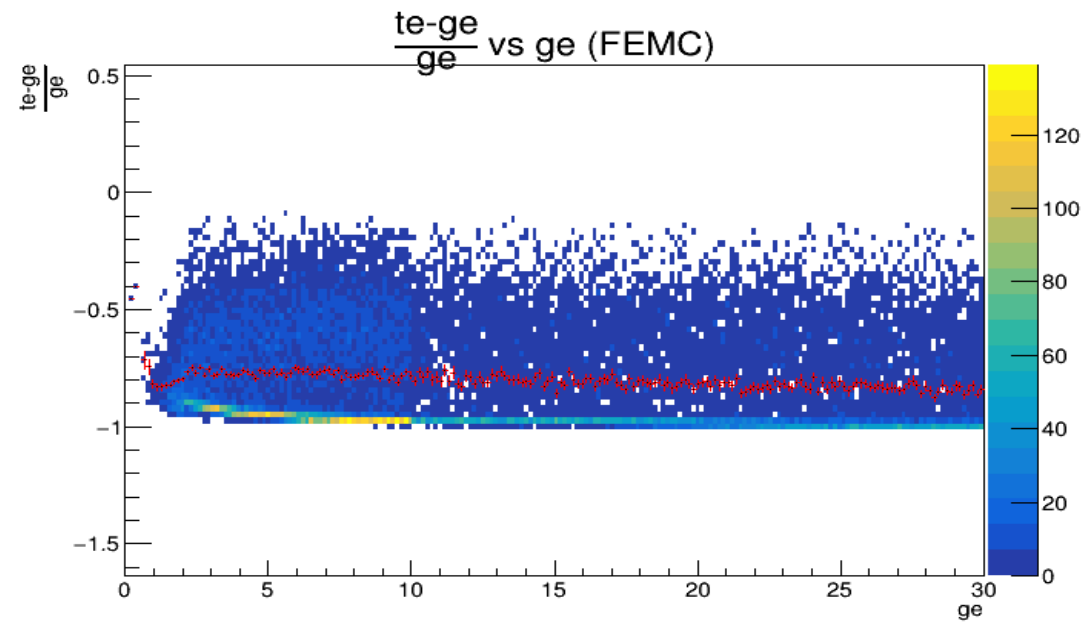


Weight for FEMC = 0.239468

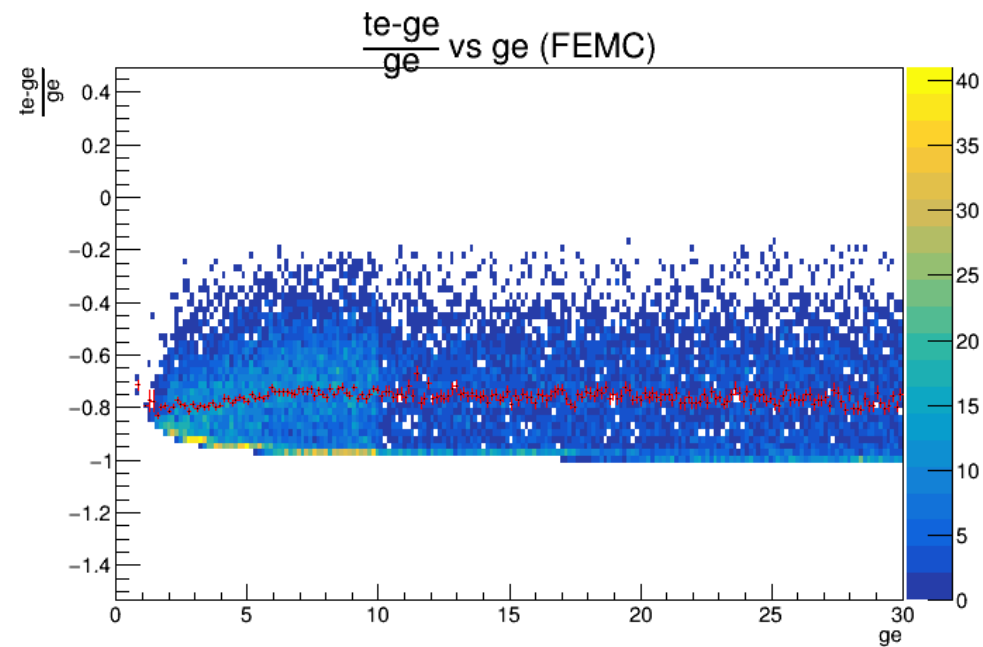
Weight for FHICAL = 0.519019

Sum of weights is $0.239468 + 0.519019 = 0.758486$

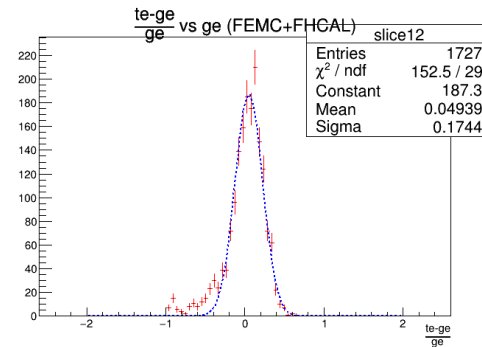
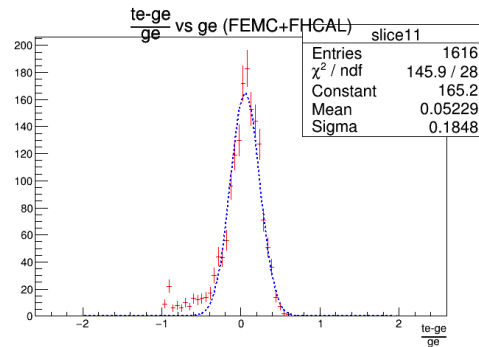
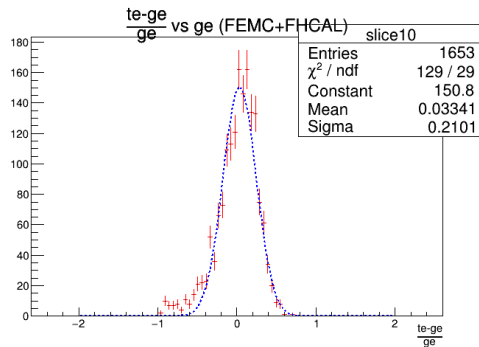
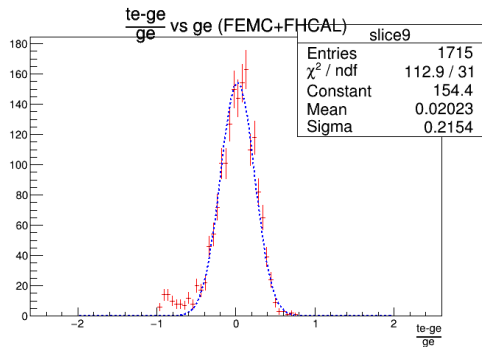
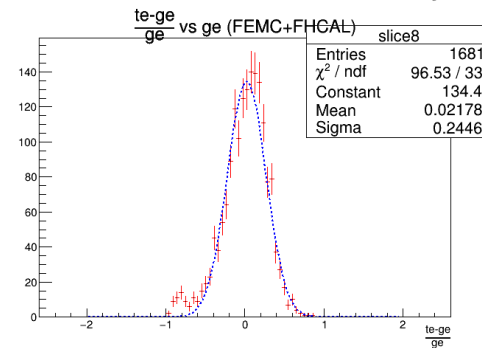
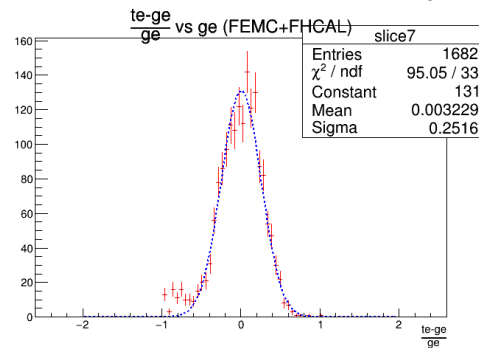
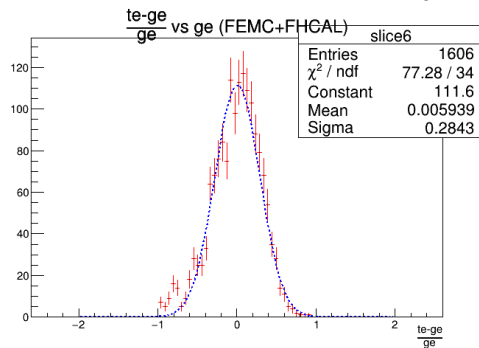
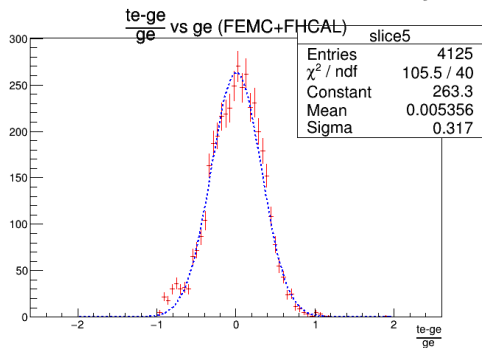
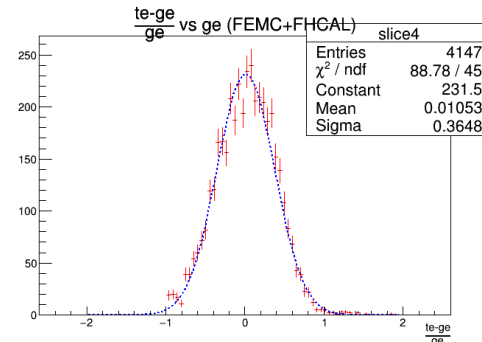
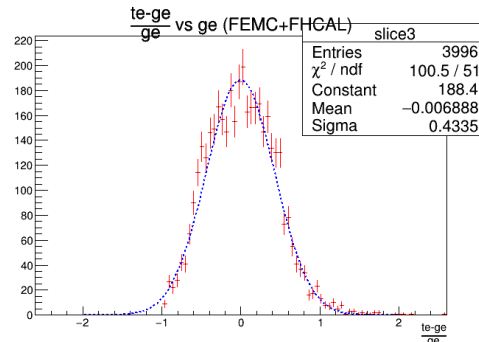
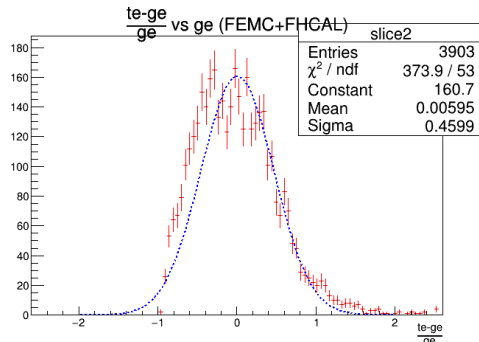
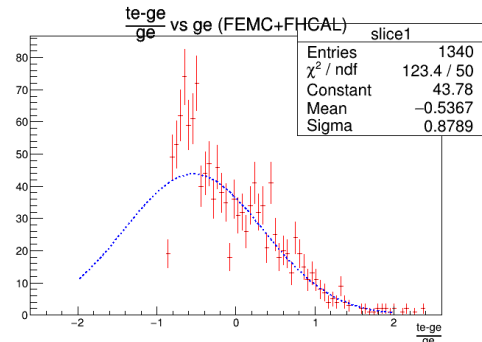
Before 200 MeV cut



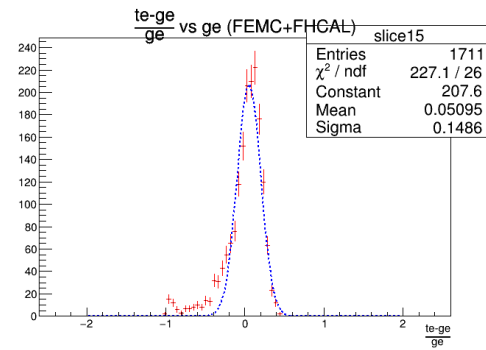
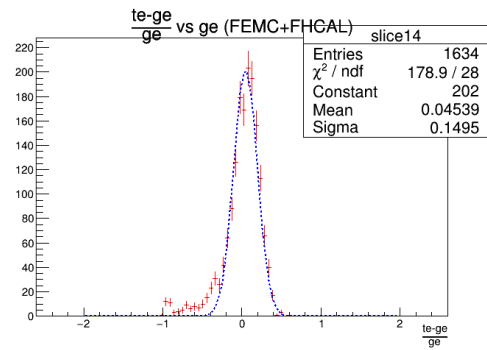
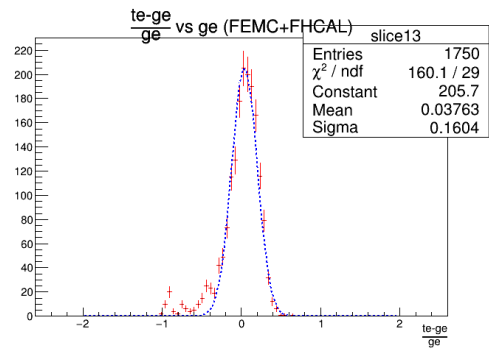
After 200 MeV cut



FEMC+FHGAL: Gaussian fits (after calibration):



FEMC+FHGAL: gaussian fits (after calibration):



THE END