Fun4All Calorimeter Plots: Pion: FEMC behaviour and Barrel resolution without magnetic field

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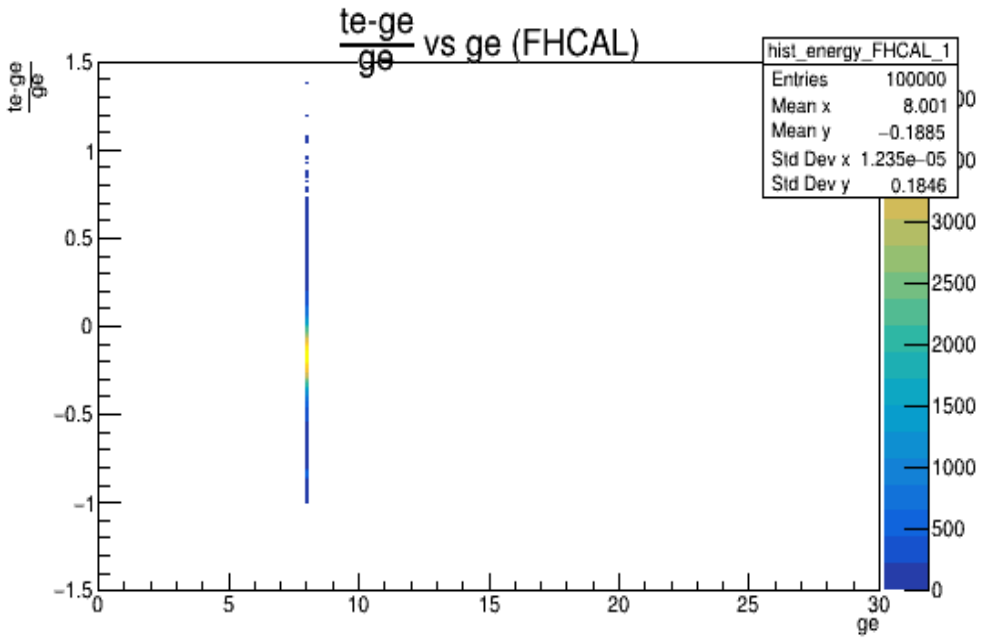
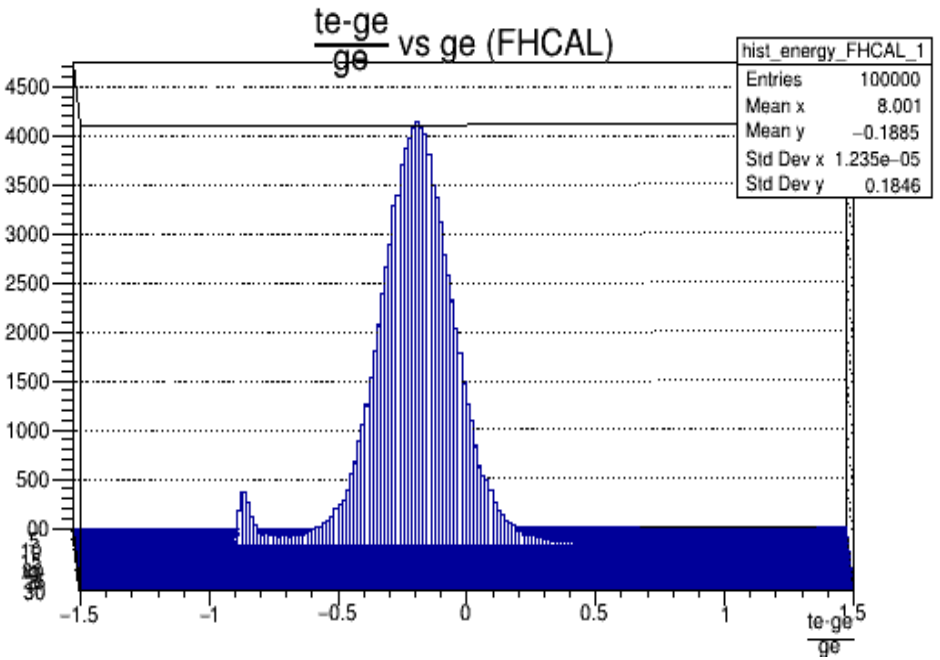
Specifications:

SIMULATION & ANALYSIS DETAILS FOR PION:

- Particles: pi-
- Magnetic field: ON
  - Forward region: Events: 100000 (0-30 GeV) [geta: 1.4 to 3] (NEWLY GENERATED)
- Magnetic field: OFF
  - Barrel region: Events: 100000 (0-30 GeV), 50000(0-10GeV) [geta: -4 to 4]
- **Various Cuts used:**
  - **NEW** pseudorapidity cuts on calorimeters:
    - Pion:
      - CEMC, HCALIN, HCALOUT: η = -0.98 to 0.99
      - FEMC, FHCAL: η = 1.32 to 3.14
  - Clustering cut based on theta and phi values
  - Theta-dependent energy cut on individual tower energies
  - 0 cut on aggregated tower energies for each event

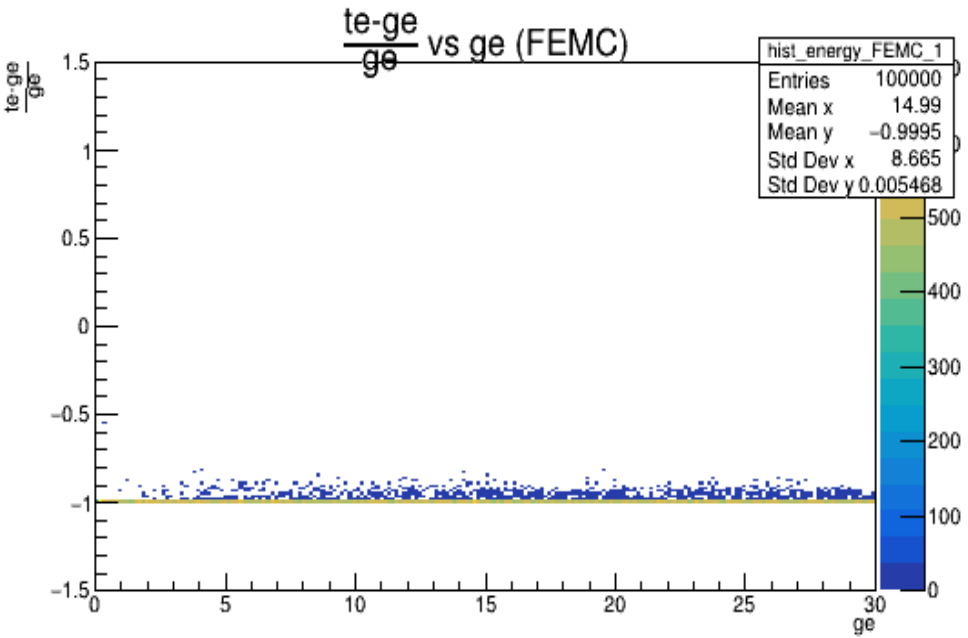
8 GeV pions in FHCAL
(Magnetic Field: ON)
Generated by simulating only FHCAL

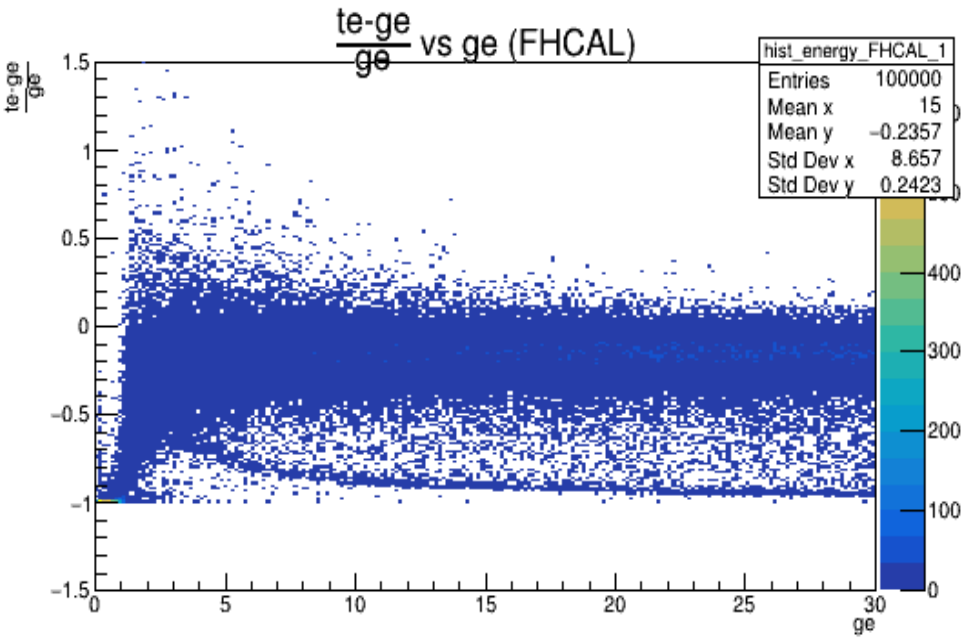




(uncalibrated)

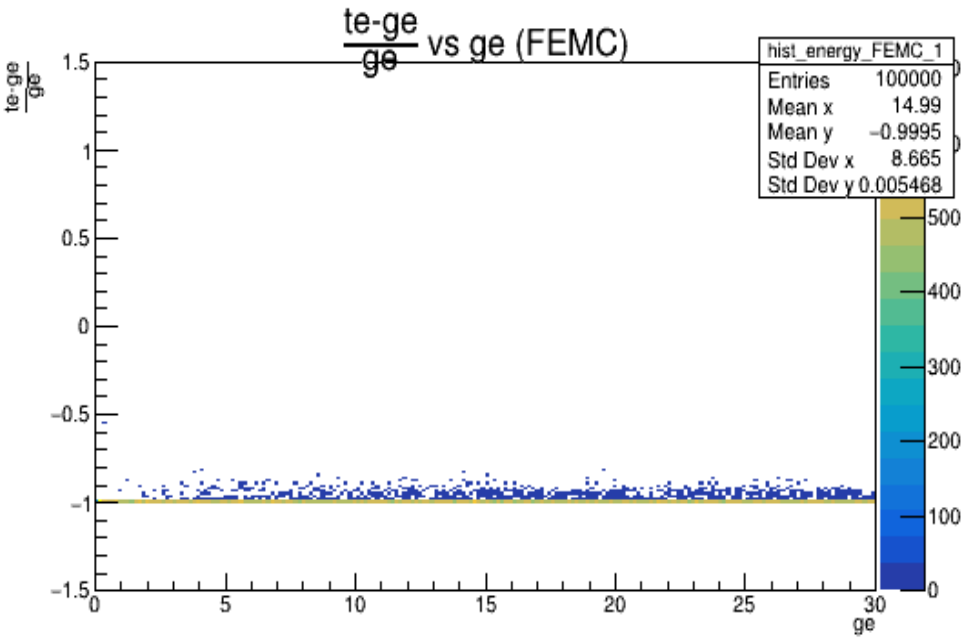
0-30 GeV pions in FEMC & FHCAL
(Magnetic Field: ON)
Generated from separate simulations



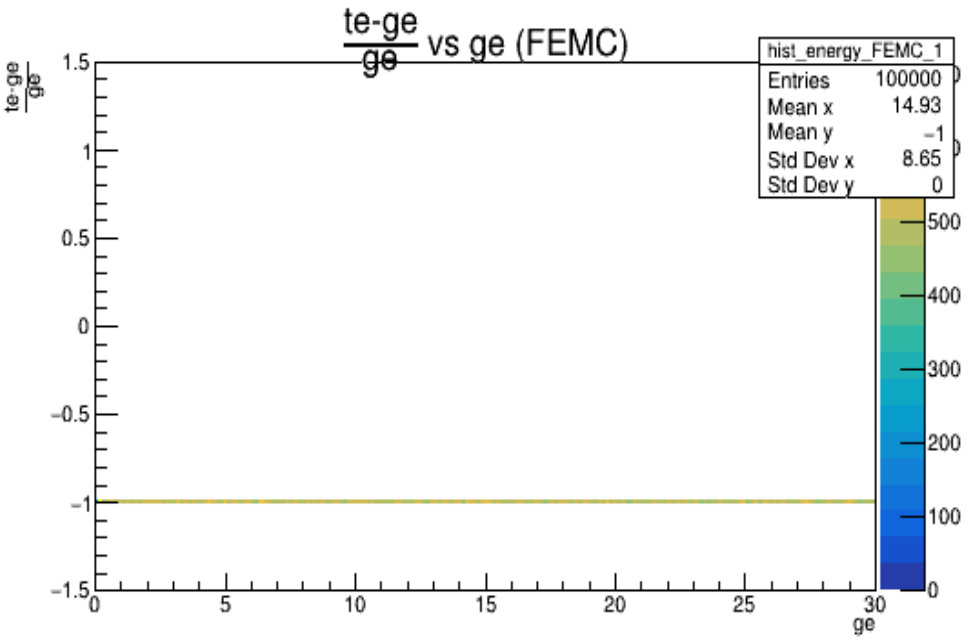


0-30 GeV pions in FEMC

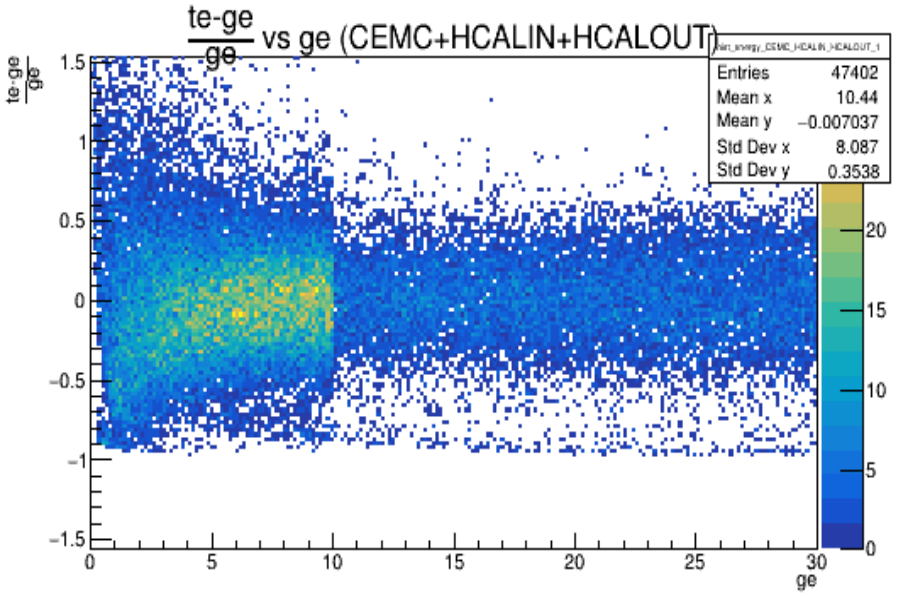
(Magnetic Field: ON)

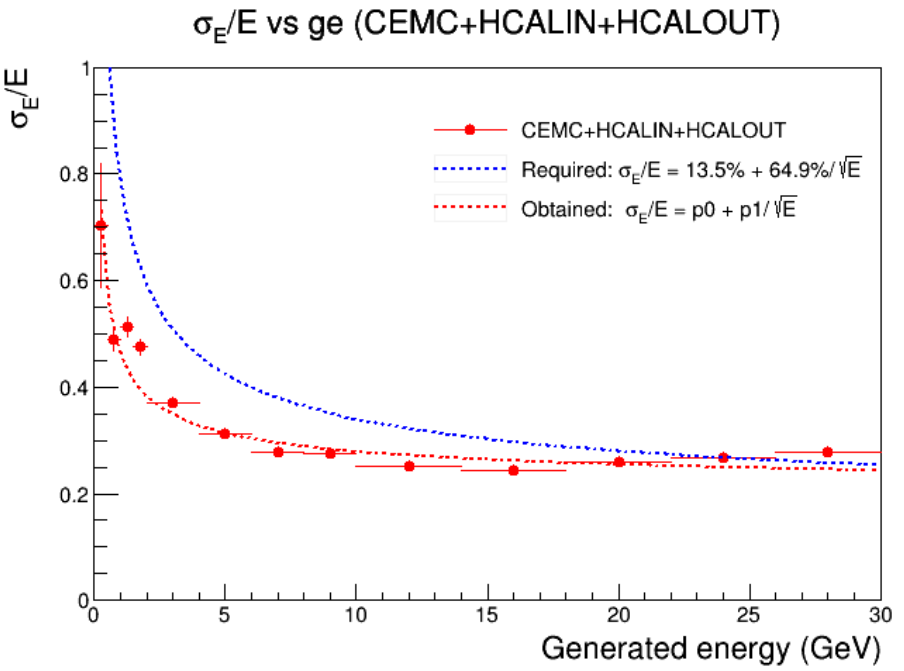


(Magnetic Field: OFF)



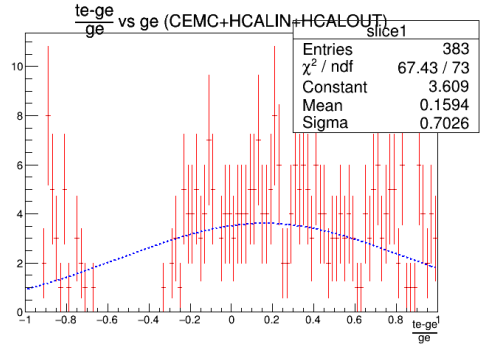
Barrel Resolution (CEMC+HCALIN+HCALOUT)
Magnetic field: OFF
Variable binning

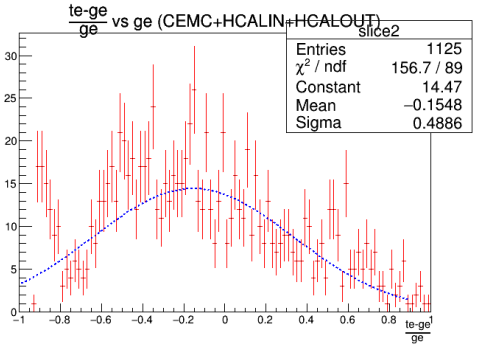


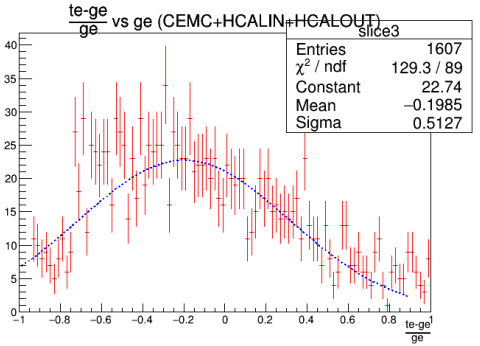


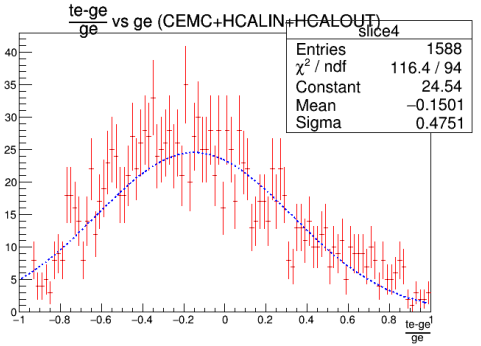
$\sigma_E/E = 19.47\% + 26.8\%/\sqrt{E}$

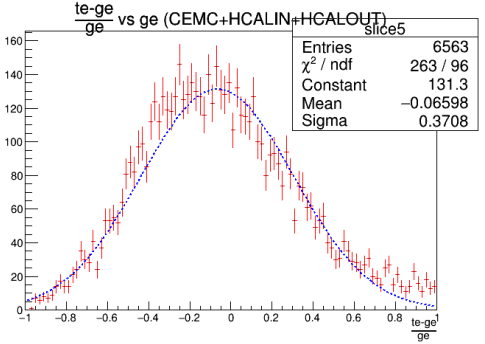
CEMC+HCALIN+HCALOUT: Gaussian fits

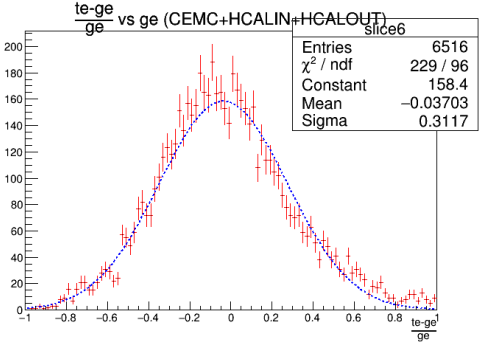


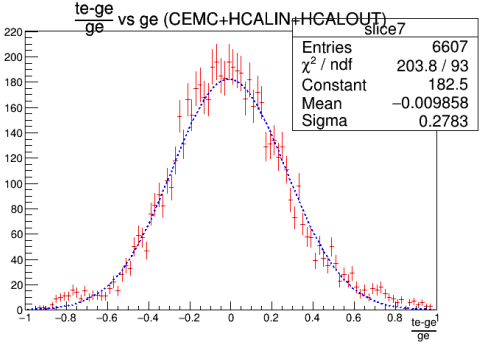


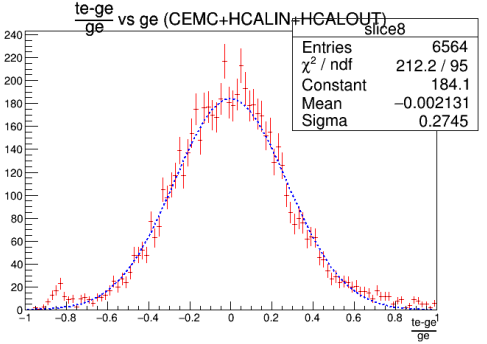


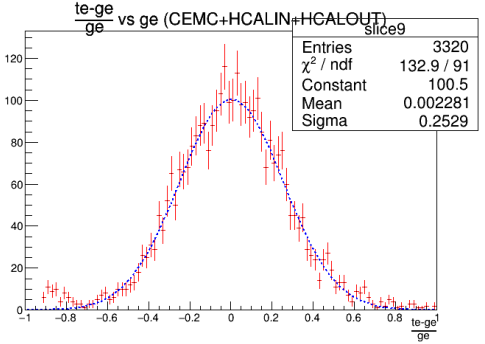


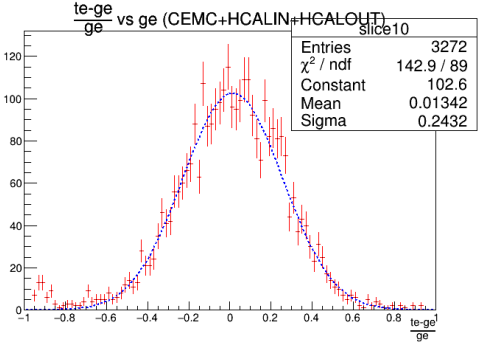


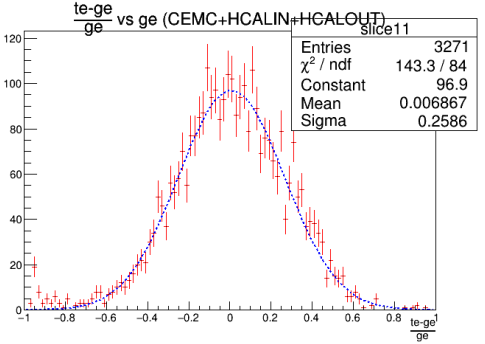


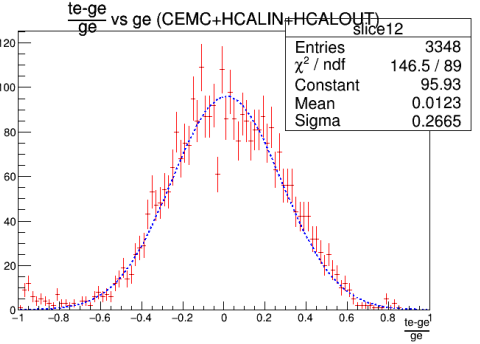




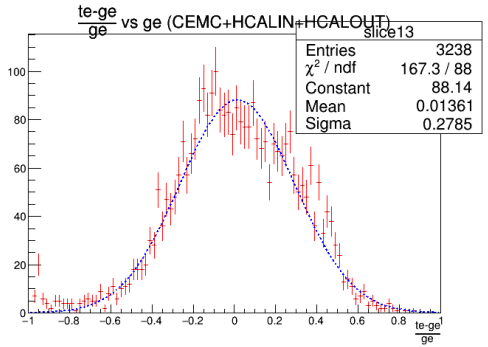




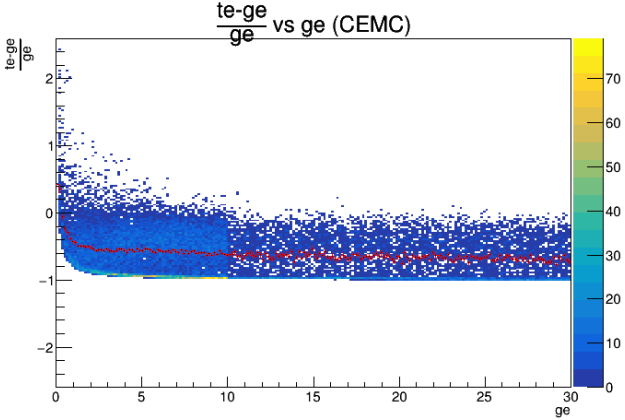


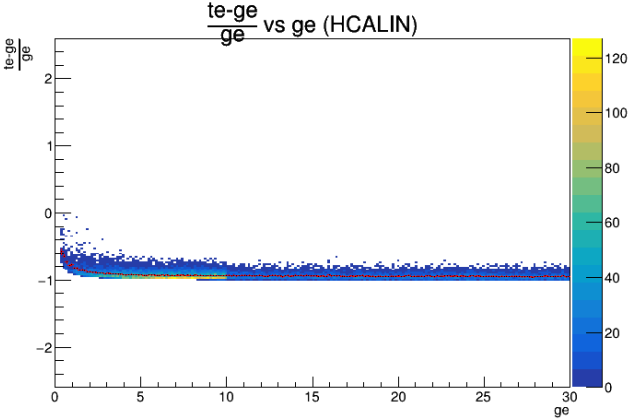


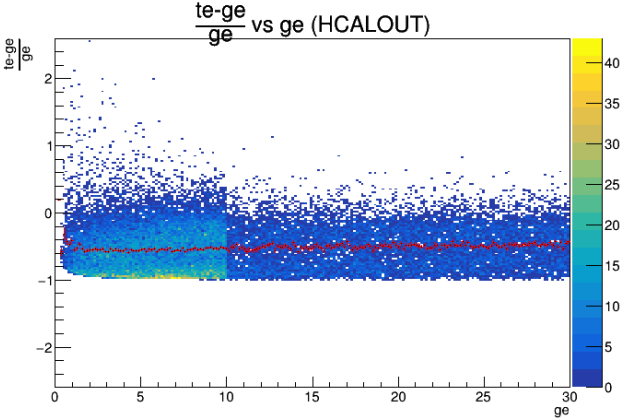
CEMC+HCALIN+HCALOUT: gaussian fits

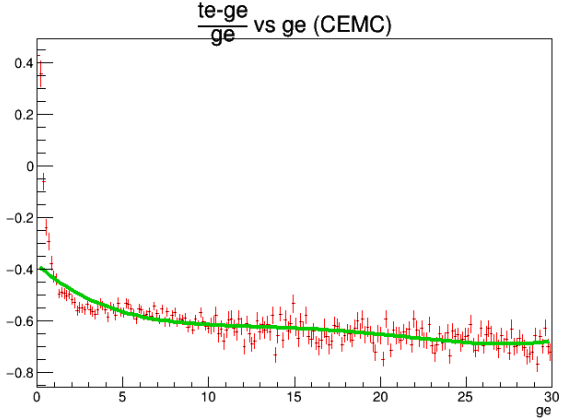


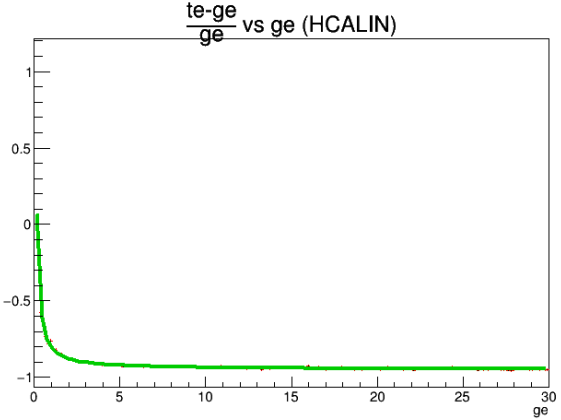
Barrel Resolution (CEMC+HCALIN+HCALOUT)
Magnetic field: OFF
Calibration Steps

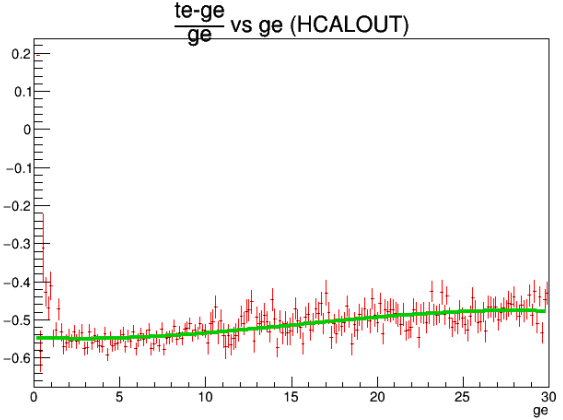












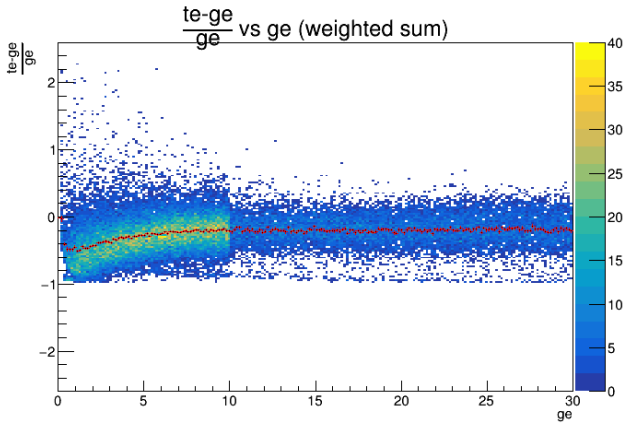
CEMC weight = 0.413856

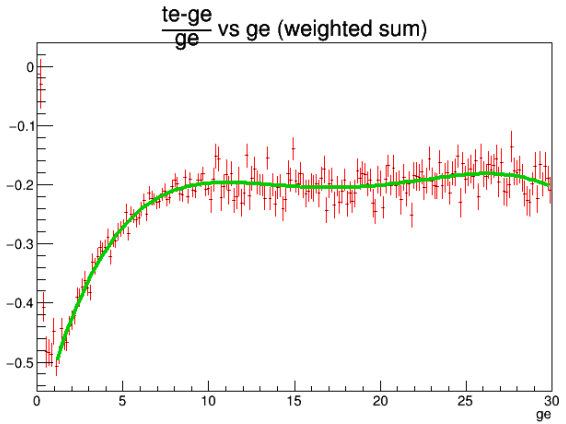
HCALIN weight = 0.0732445

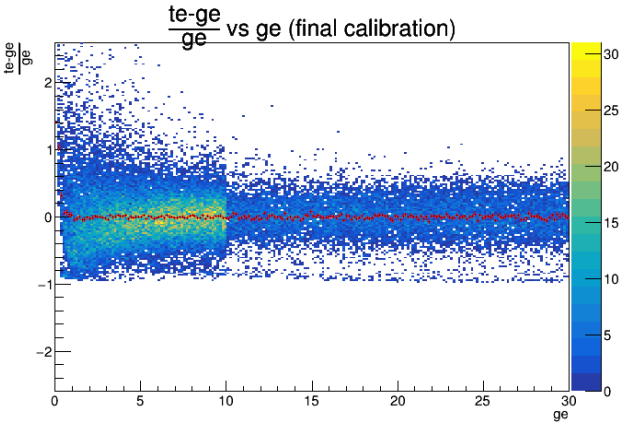
HCALOUT weight = 0.475179

Sum of weights = 0.96228

Barrel Resolution (CEMC+HCALIN+HCALOUT)
Magnetic field: OFF
Calibration steps:







THANKS!