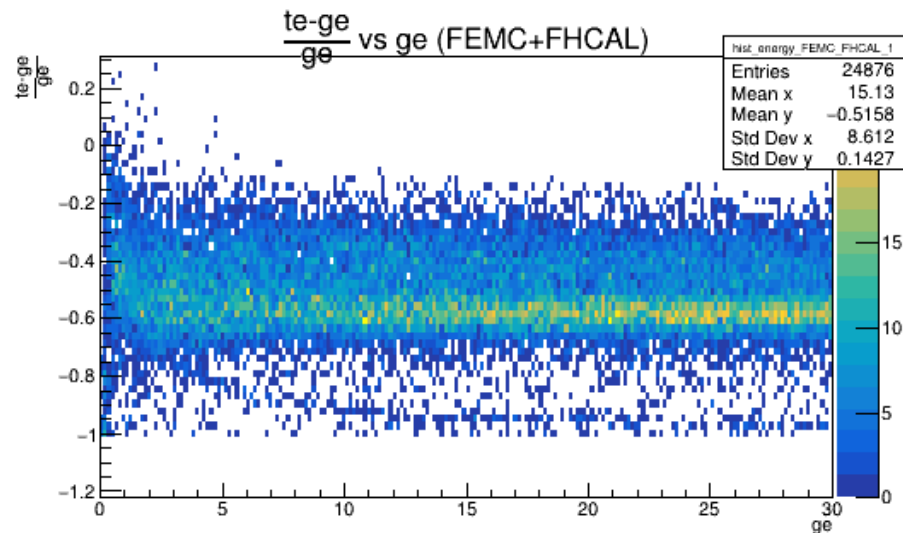
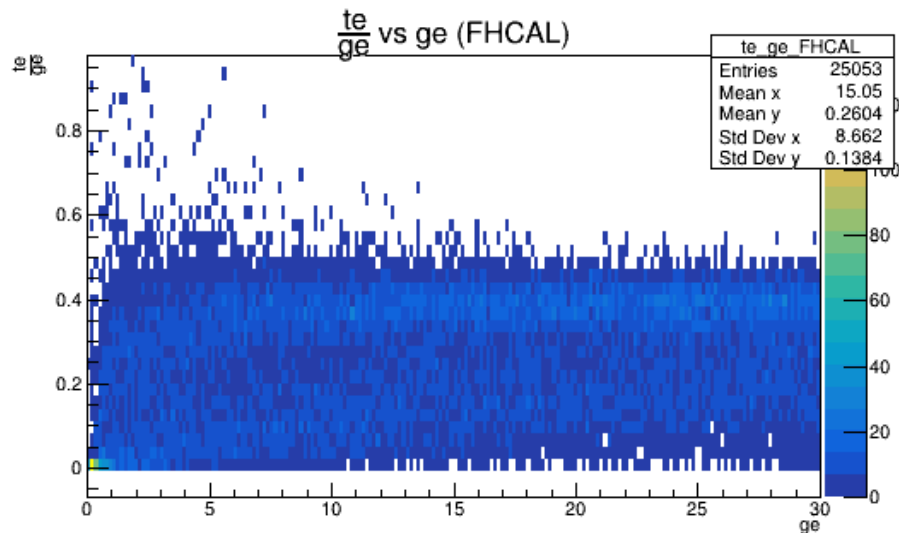


Fun4All Calorimeter Plots – Energy Calibration Check

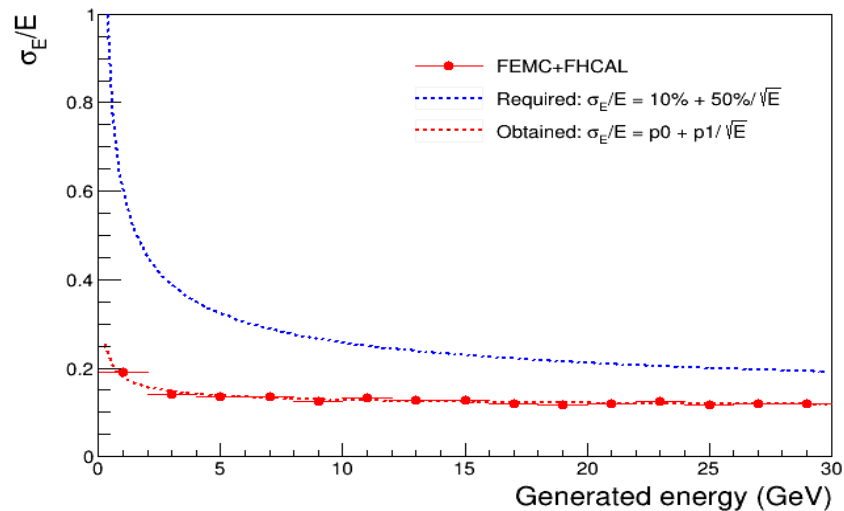
Simran
Lokesh Kumar
Panjab University, Chandigarh, INDIA

Fun4All QA Biweekly Meeting
28 May 2021

Without calibration (Without circular cuts)



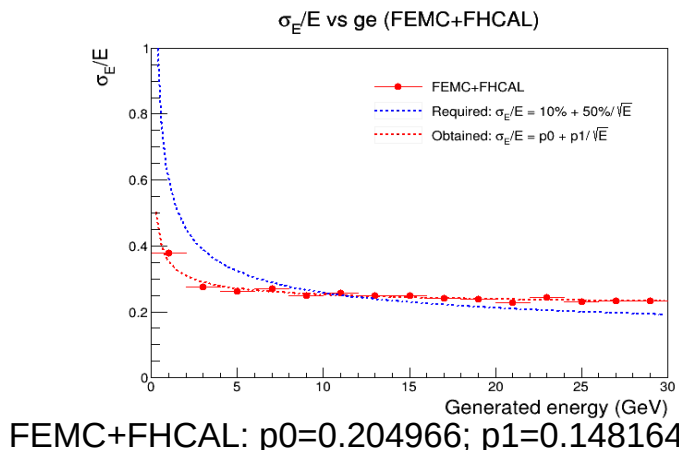
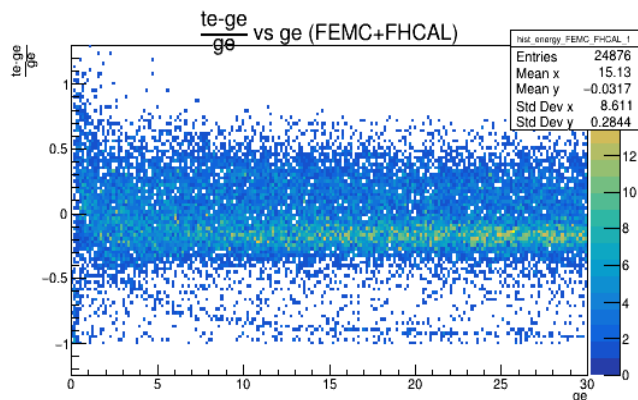
σ_E/E vs ge (FEMC+FHCAL)



FEMC+FHCAL: $p_0=0.104094$; $p_1=0.0756058$

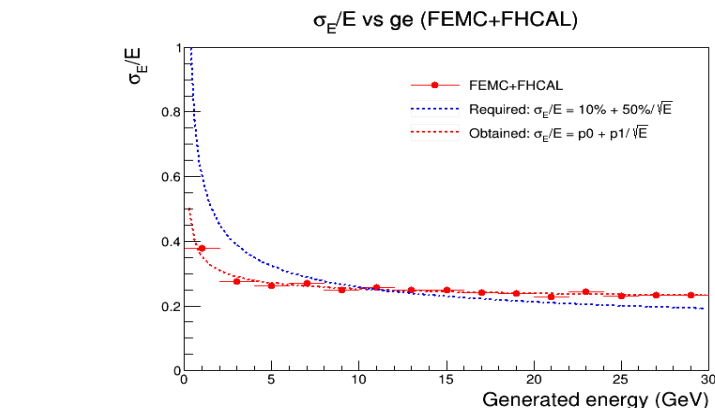
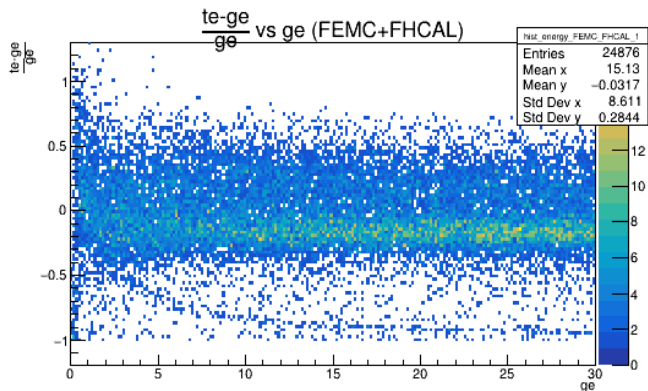
FEMC+FHCAL Calibration (without circular cut)

$te(FEMC+FHCAL) \cdot (100/35)$



- Here I multiply the factors with the total tower energy of FEMC and FHCAL. So, the change can be seen only in FEMC+FHCAL plots.

$te(FEMC+FHCAL) \cdot (100/40)$

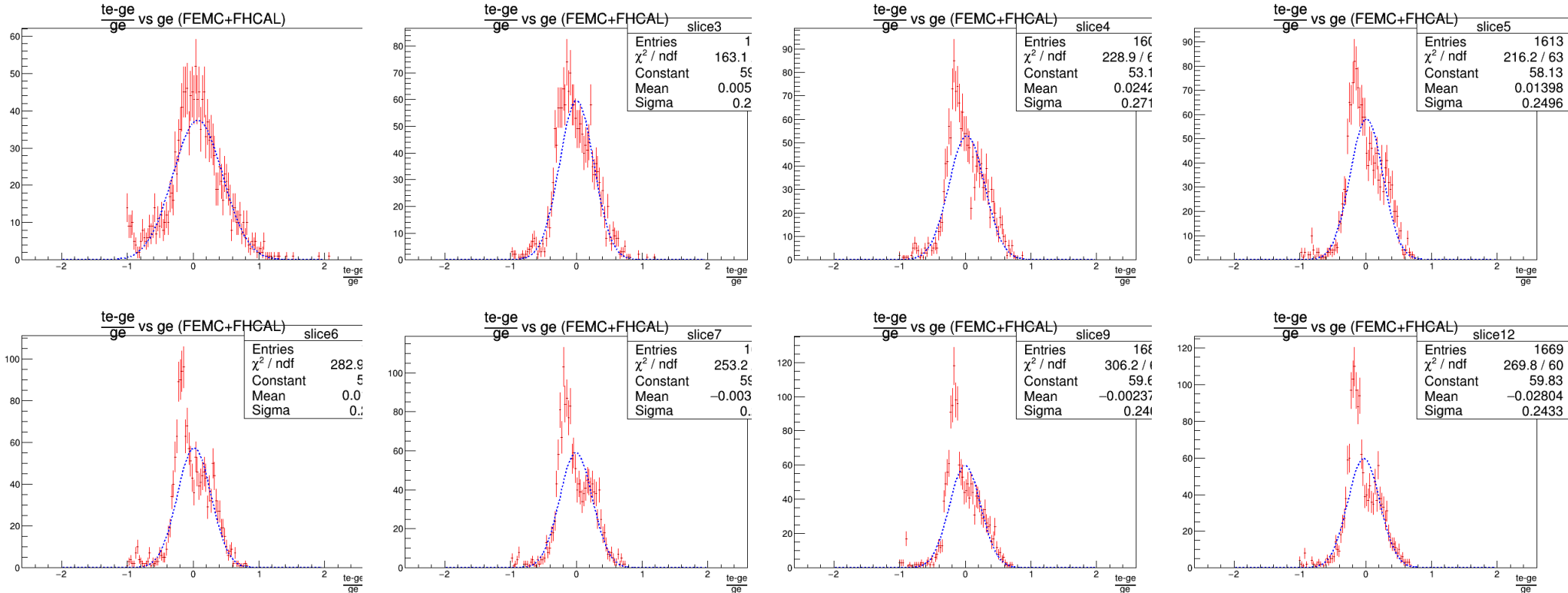


- There isn't much difference in the two cases and energy resolution parameters also come equal.
- However, there is some problem with the distribution in the gaussian fits in these two cases.

FEMC+FHCAL: p0=0.204966; p1=0.148164

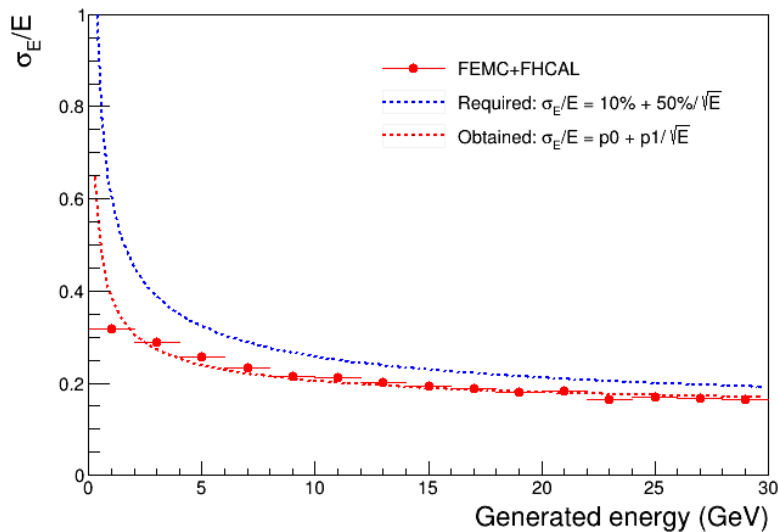
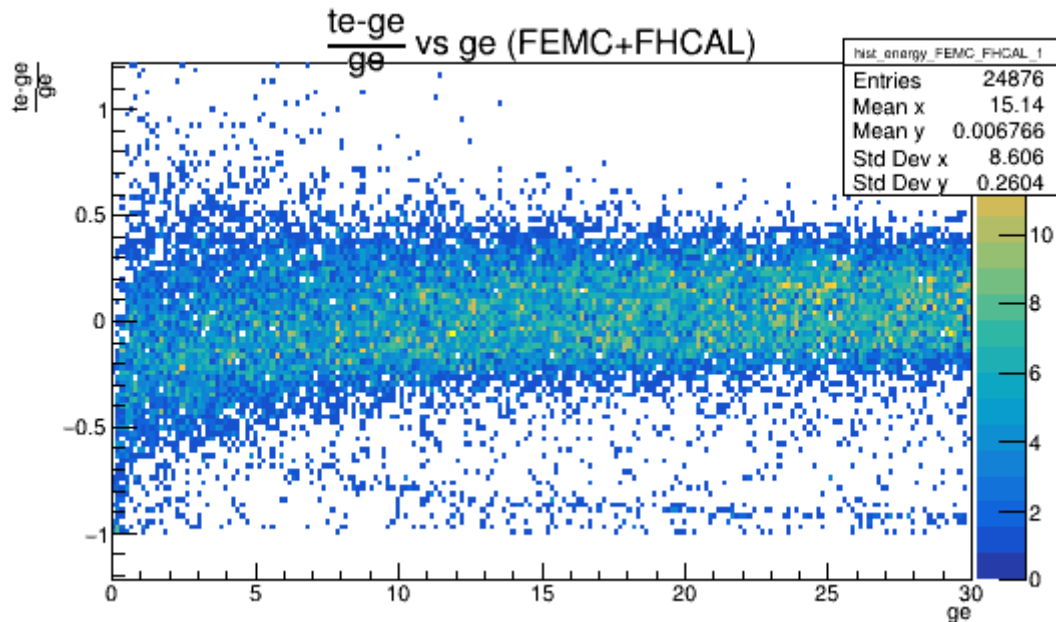
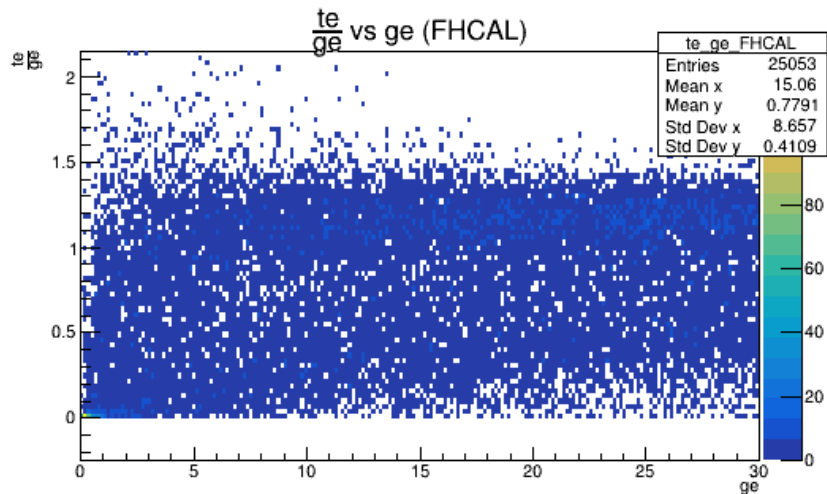
Gaussian Fits obtained during FEMC+FHCAL calibration:

The distribution and gaussian fits in case of FEMC+FHCAL calibration come as follows (at high energies): There are two peaks here because of greater density of points on right side of zero.



- This behaviour is not seen if I calibrate only FHCAL energies. (Next slide)

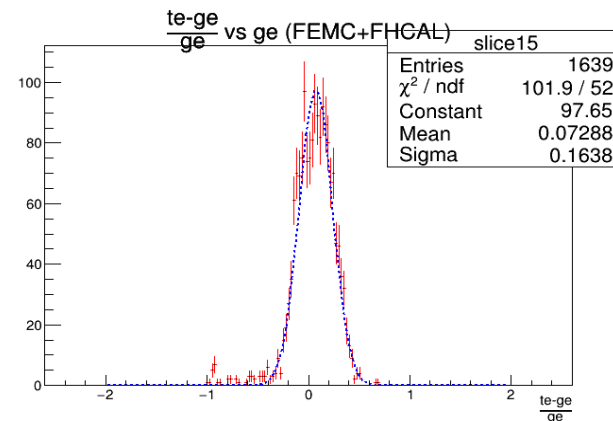
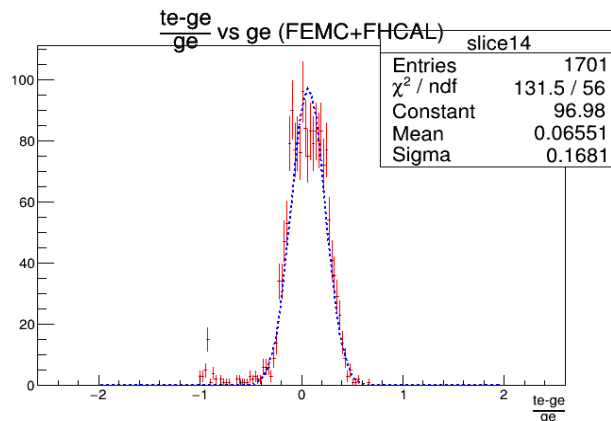
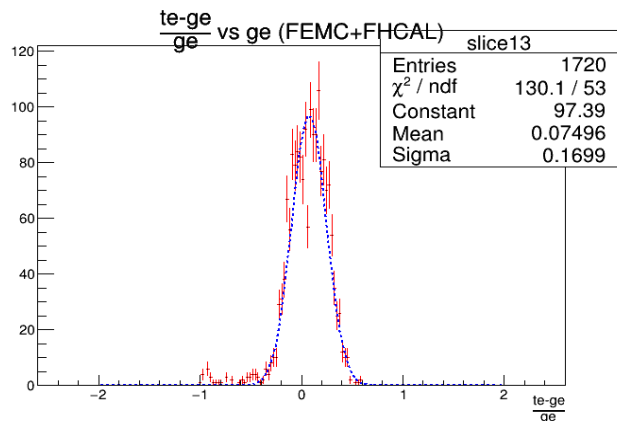
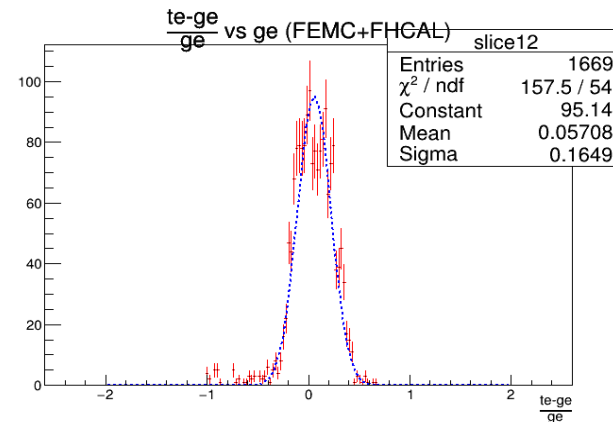
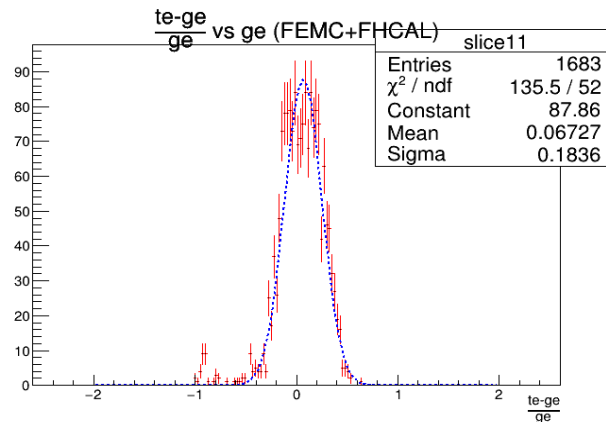
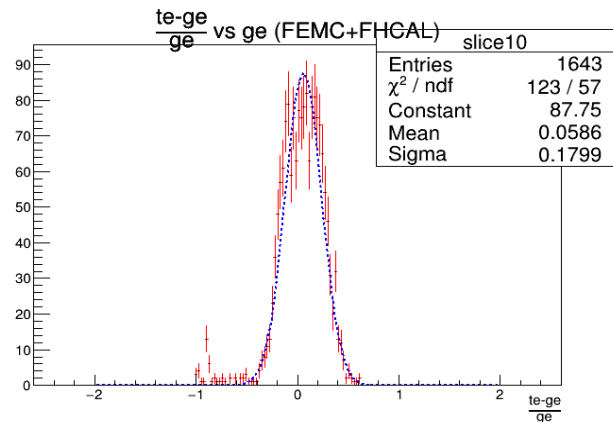
FHCAL Calibration: for($te(FHCAL) \geq 5\text{GeV}$) $te = te * (100/40)$;
 for($te(FHCAL) < 5\text{GeV}$) $te = te * (100/30)$;



FEMC+FHCAL: $p_0=0.104094$; $p_1=0.0756058$

- Motivation: In the first slide, in te/ge plot, we can see some structure which is aligned along 0.4 above 5GeV and falls close to 0.3 below 5GeV.
- Here these factors are used with the tower energy of FHCAL so the change can be seen in te/ge plot of FHCAL as well.

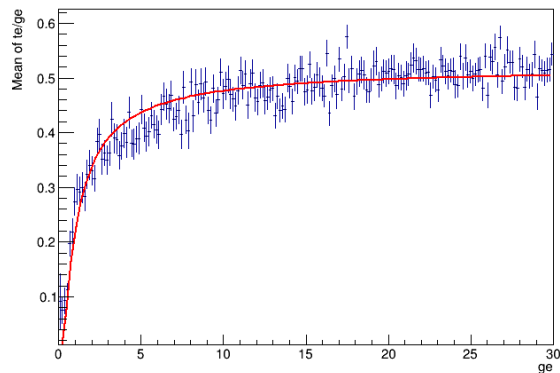
Gaussian Fits obtained during FHCAL calibration:



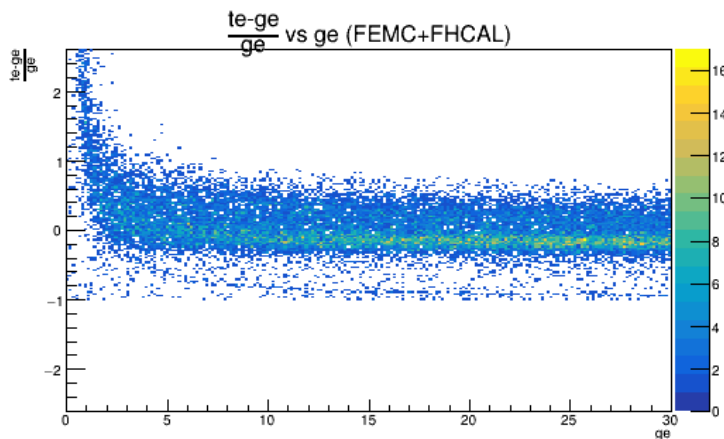
In these, there is some flatness at the top of the peak. But there are no twin peaks due to somewhat uniform distribution.

FEMC+FHCAL calibration: Using fit equation from Tprofile plot for $te(FEMC+FHCAL)$

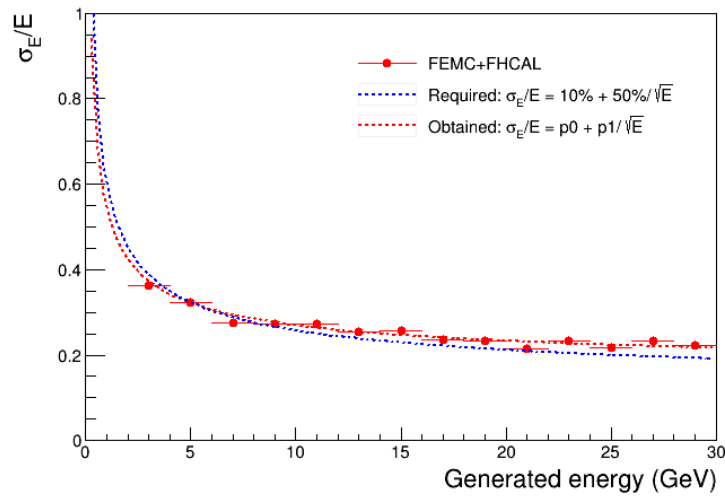
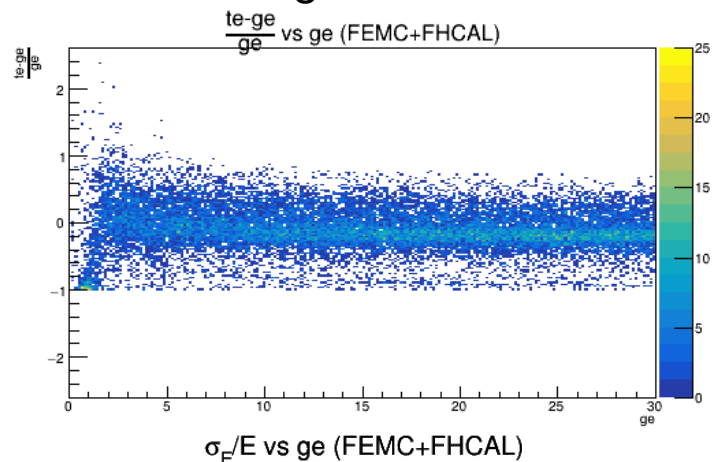
Without circular cut



$$Y = A \cdot \exp(-B/x)$$
$$A = 0.519328 \quad B = 0.861177$$

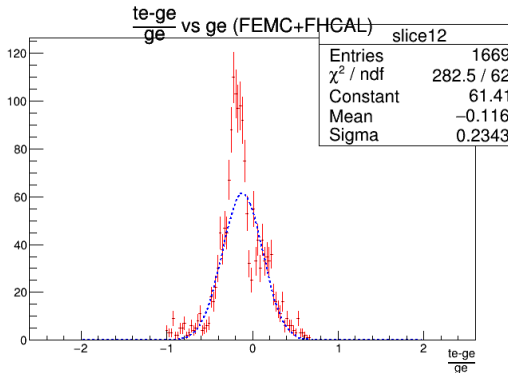
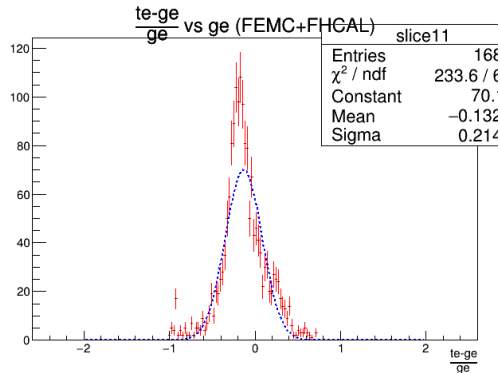
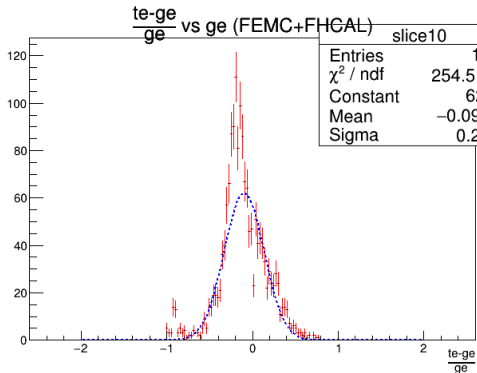
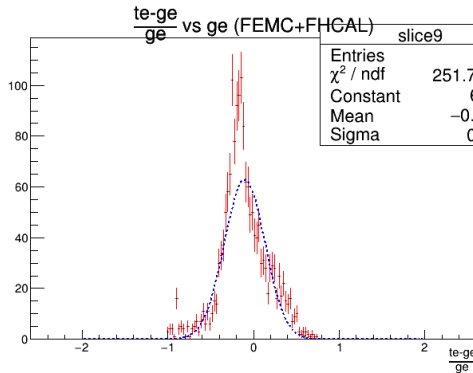
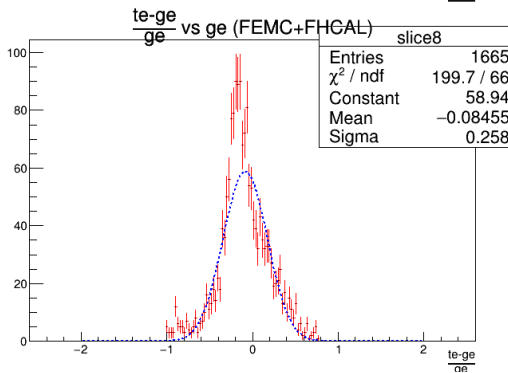
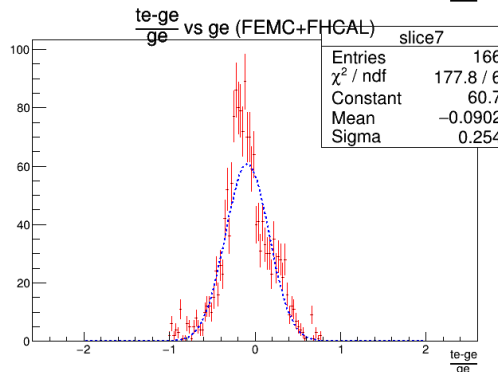
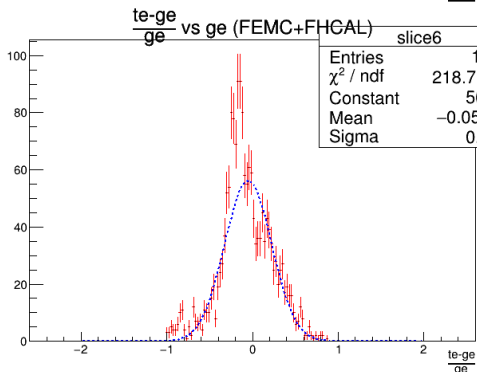
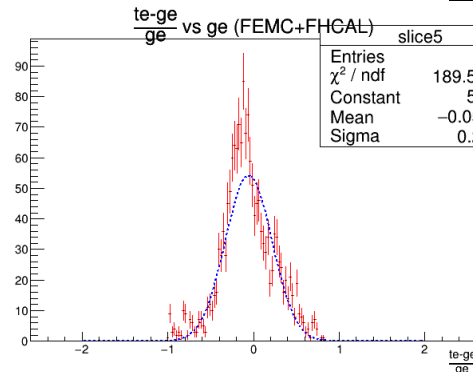
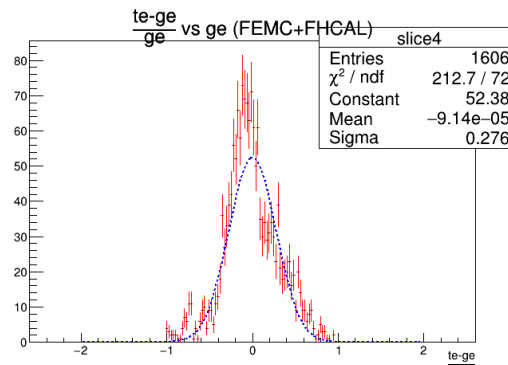
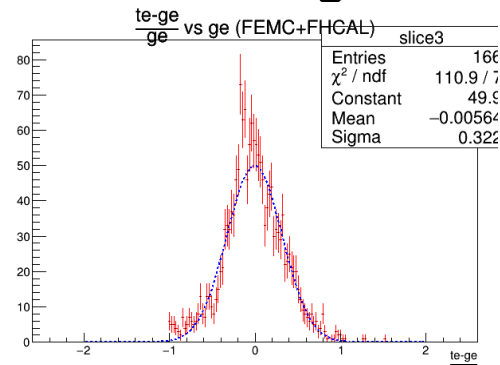
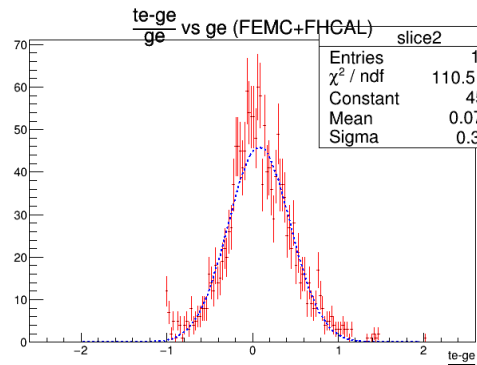
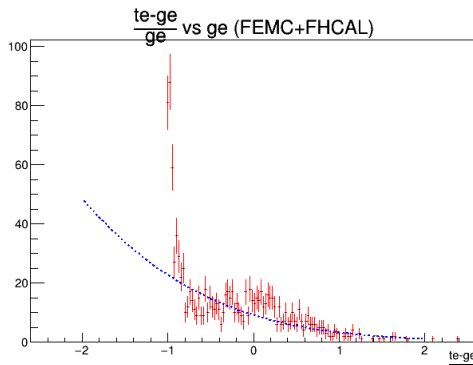


With a tight circular cut



$$p_0 = 0.144059;$$
$$p_1 = 0.398525$$

Gaussian Fits for calibration using TProfile



THE END