HADRON CALIBRATION

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JME@HLT MEETING

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Introduction

- PF hadron calibration on 1003 single pion sample[1] with CMSSW_10_0_3.
- This sample is still “production” state. So I can’t used full dataset. But I use more than 95%.
- This is “no aging” sample.
- Configuration file was created from “scenario B”.
- Particle ID : -211; pi-
- Endcap region eta is 1.5 ~ 3.

[1] /SinglePion_PT0to200/RunIISpring18DR-NoPUNoAging_1003_upgrade2018_realistic_forJetMetHLT-v1/GEN-SIM-RAW

Calibration Coefficients

EH hadrons : $E_{corrected} = a(E_t) * E_{rawEcal} + b(E_t) * E_{rawHcal} + o_{EH}$

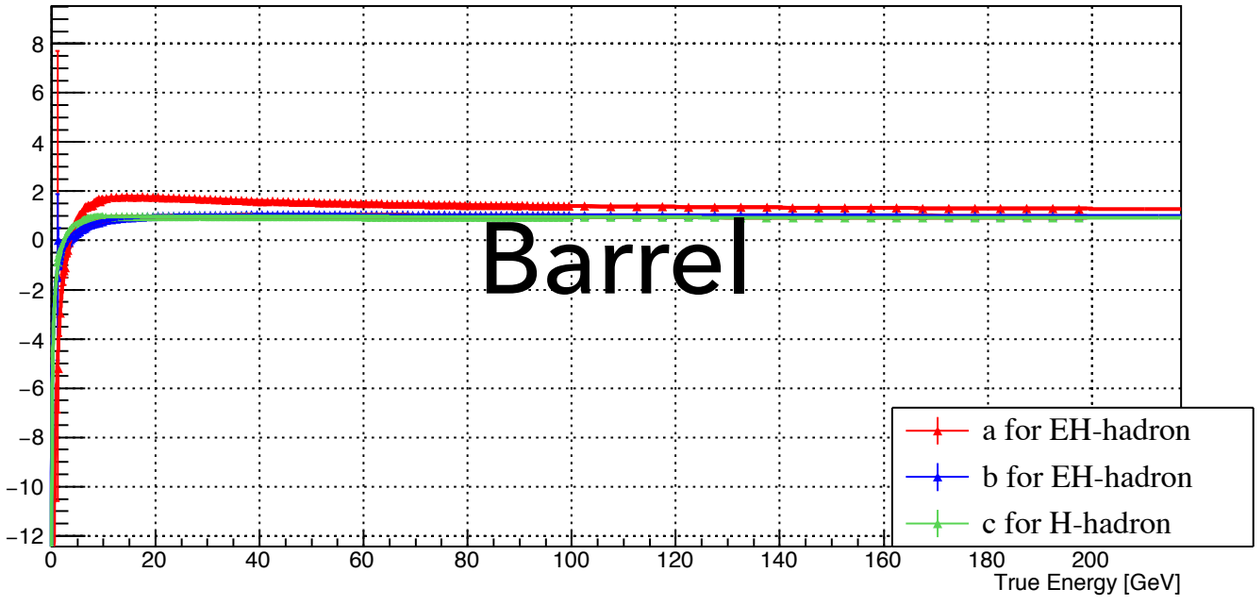
H hadrons : $E_{corrected} = c(E_t) * E_{rawHcal} + o_{H}$

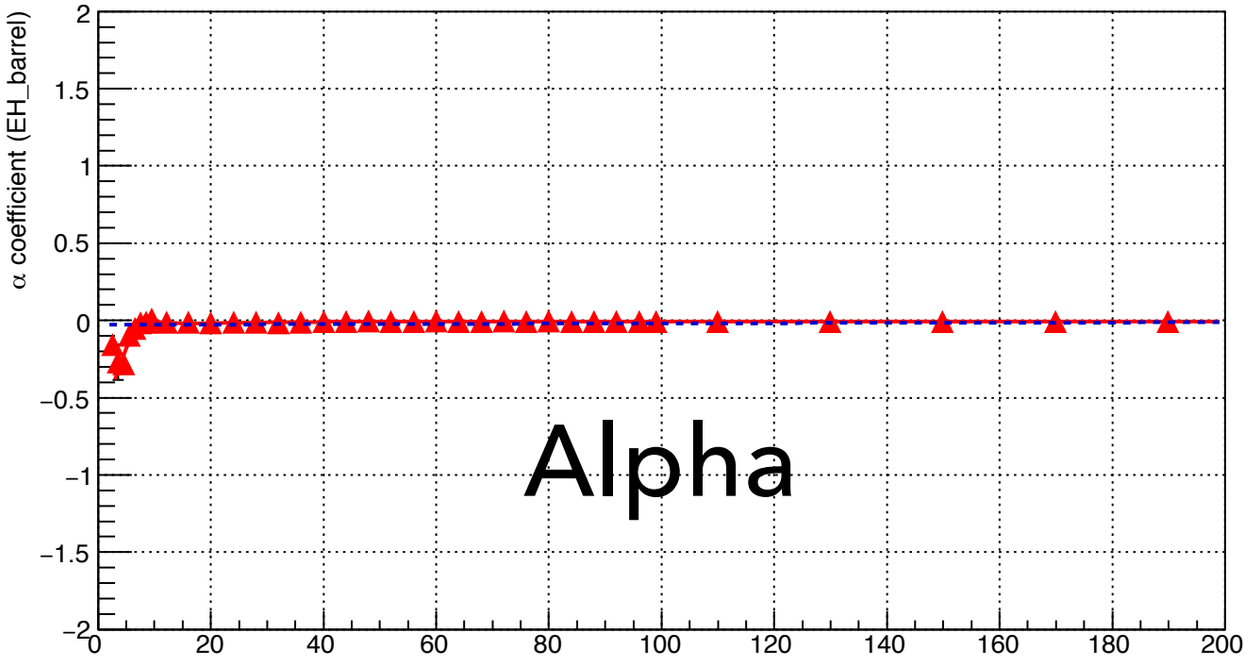
For EH Hadrons (start their shower in ECAL):

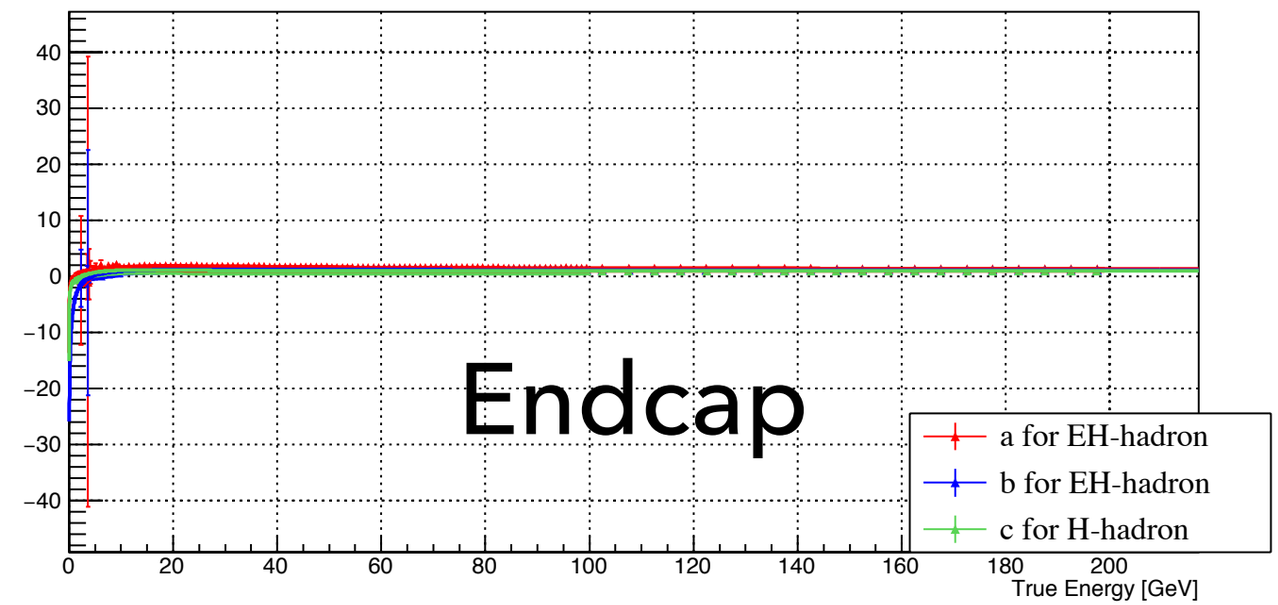
- Barrel : $E_{corr} = (1 + \alpha(E_t) + 1.3*\beta(E_t)*|\eta|^2) * E'_{ecal} + E'_{hcal}$
- EndCap($1.5 < |\eta| < 2.5$): $E_{corr} = (1 + \alpha(E_t)) * E'_{ecal} + E'_{hcal}$
- EndCap($|\eta| > 2.5$): $E_{corr} = (1 + \alpha(E_t) + 1.3*\beta(E_t)*((|\eta| - 1.5)^2 + 0.6)) * E'_{ecal} + E'_{hcal}$

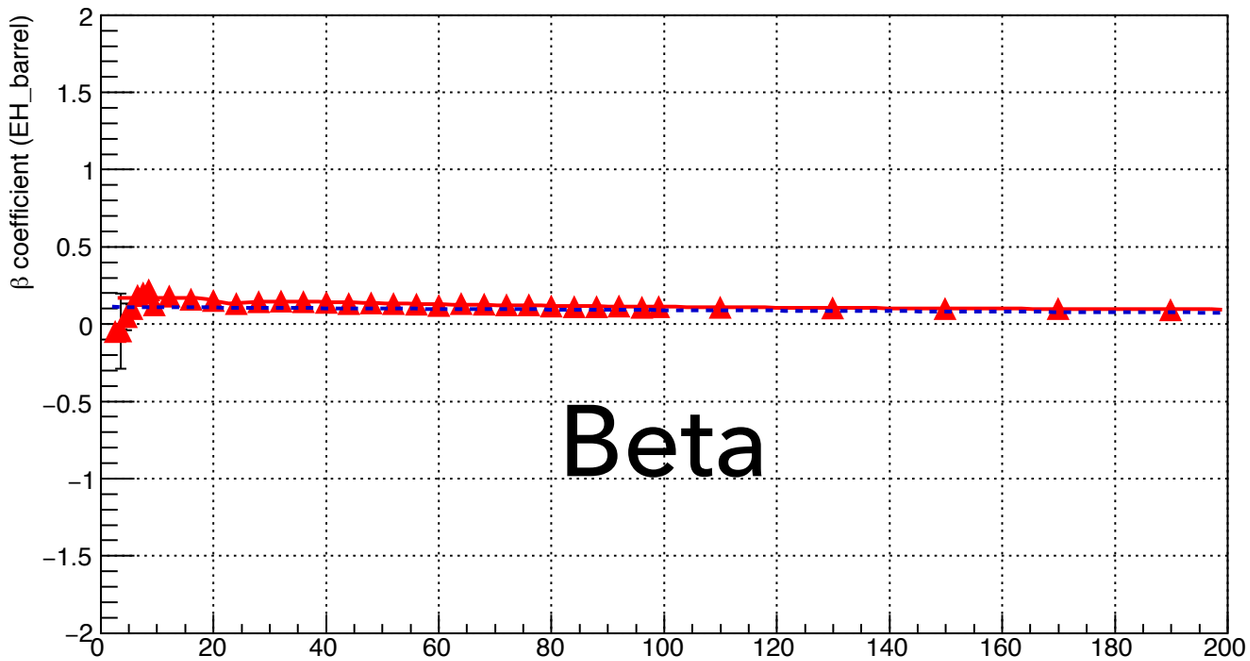
For H Hadrons (start their shower in HCAL):

- Barrel : $E_{corr} = (1 + \alpha(E_t) + \beta(E_t)*|\eta|^2) * E'_{hcal}$
- EndCap ($1.5 < |\eta| < 2.5$): $E_{corr} = (1 + \alpha(E_t) + \beta(E_t)* 0.05) * E'_{hcal}$
- EndCap ($|\eta| > 2.5$): $E_{corr} = (1 + \alpha(E_t) + \beta(E_t)*((|\eta| - 1.5)^4 - 1.1)) * E'_{hcal}$

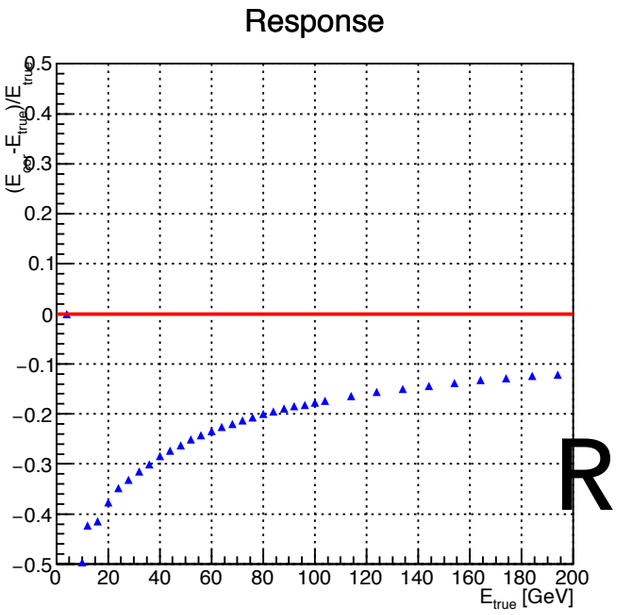


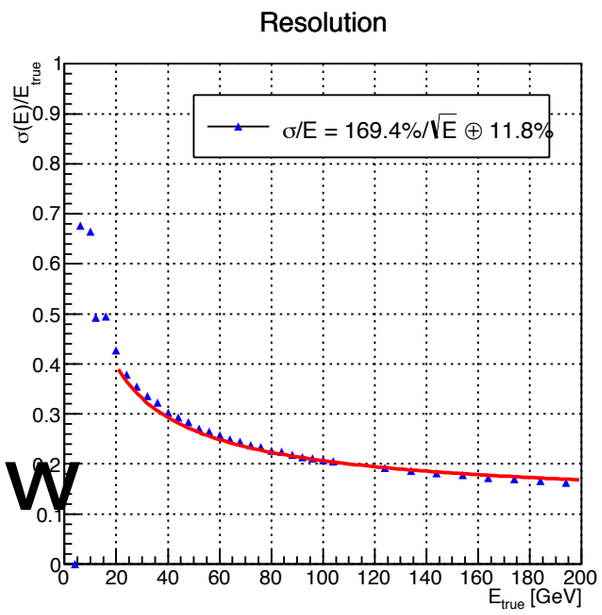






EH Barrel





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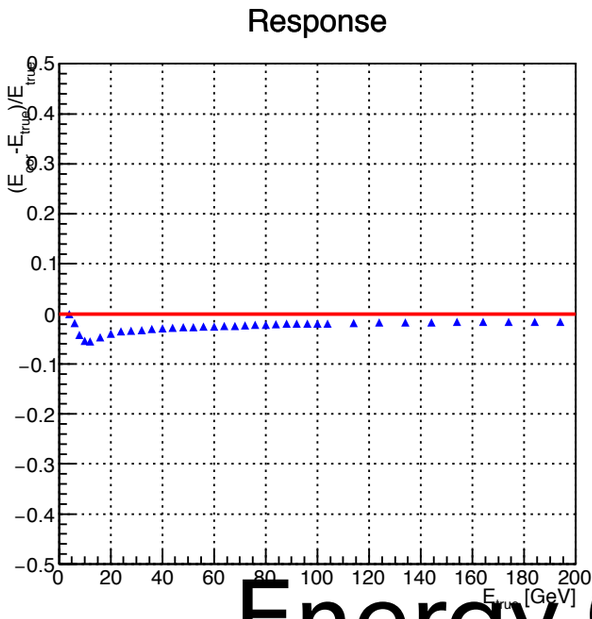
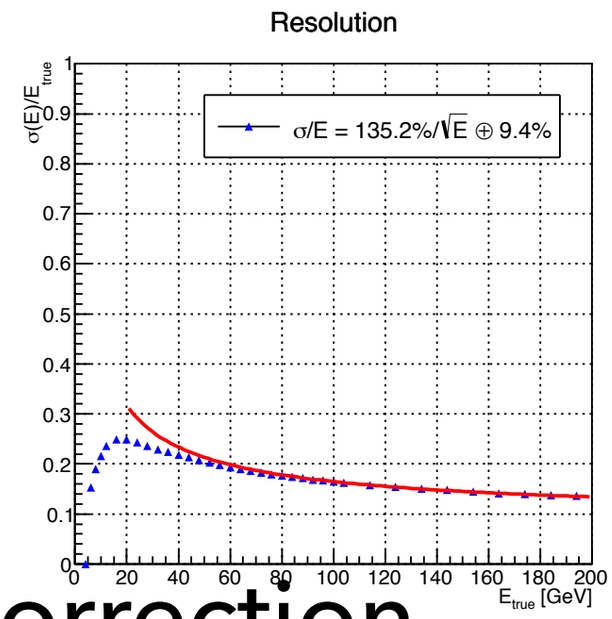
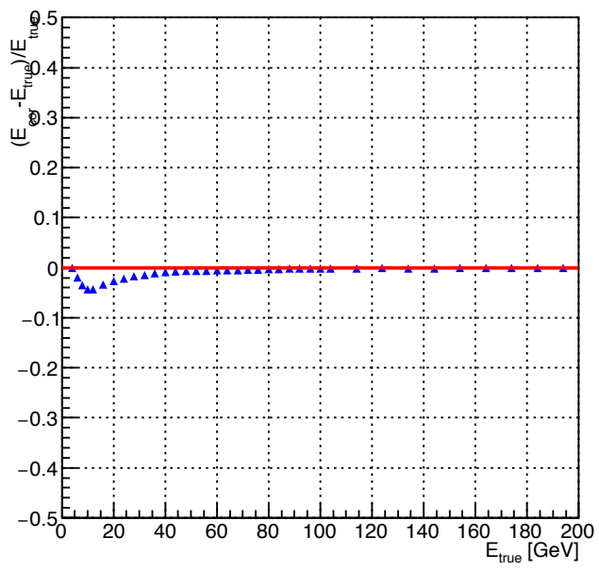
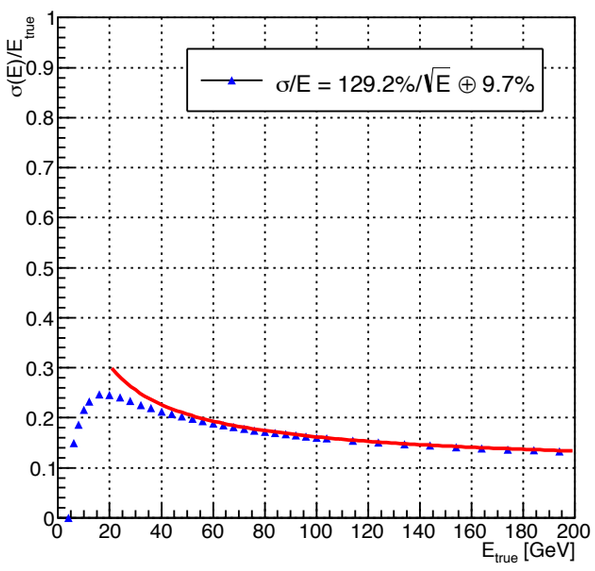




Energy Correction

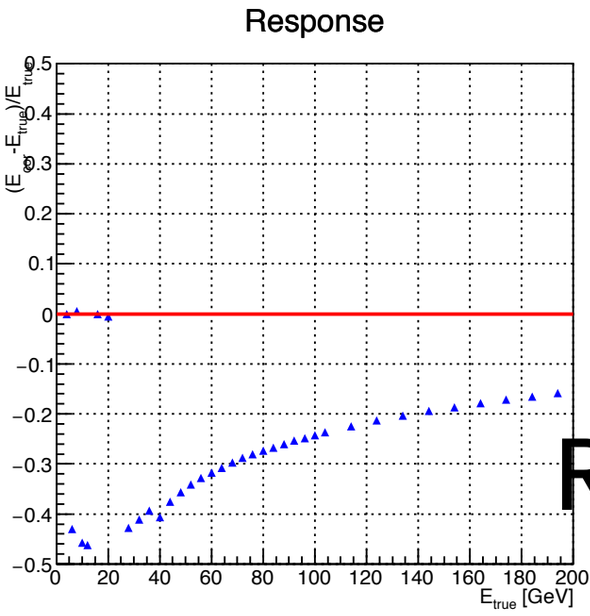


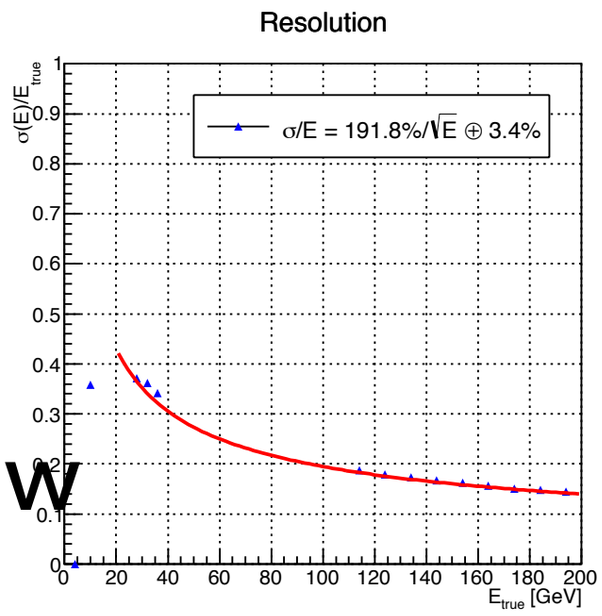


Eta dependence Correction

Response is improved after eta correction

EH Endcap





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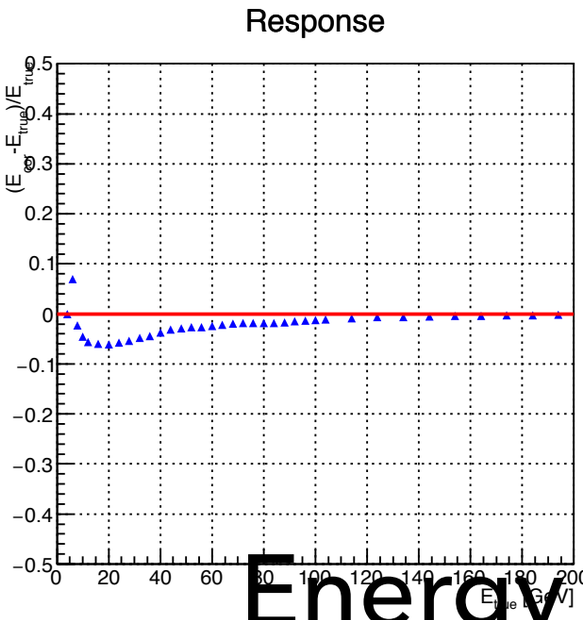

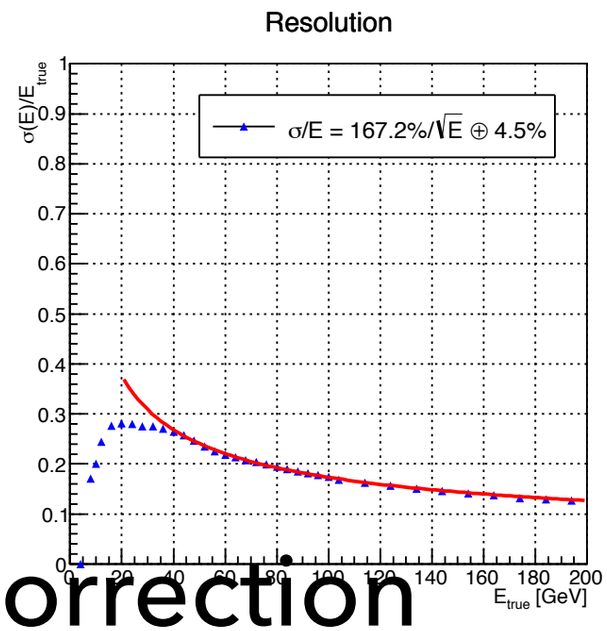

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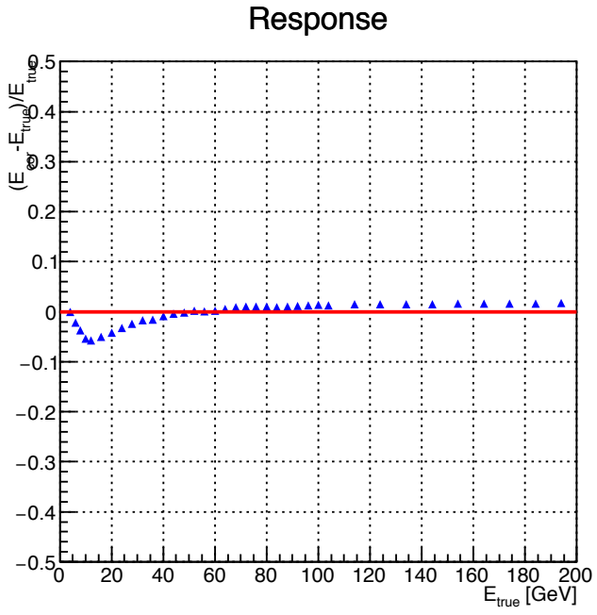

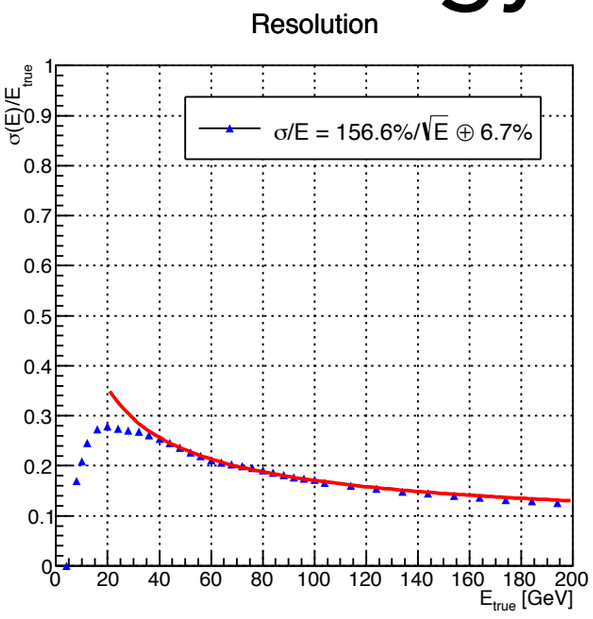

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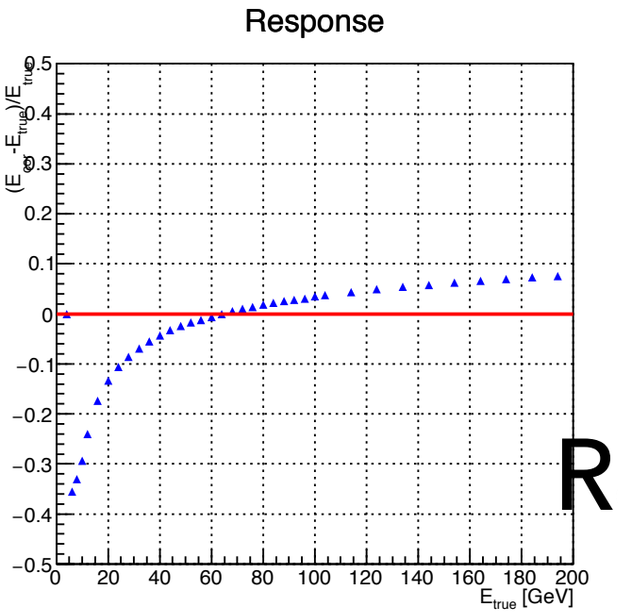

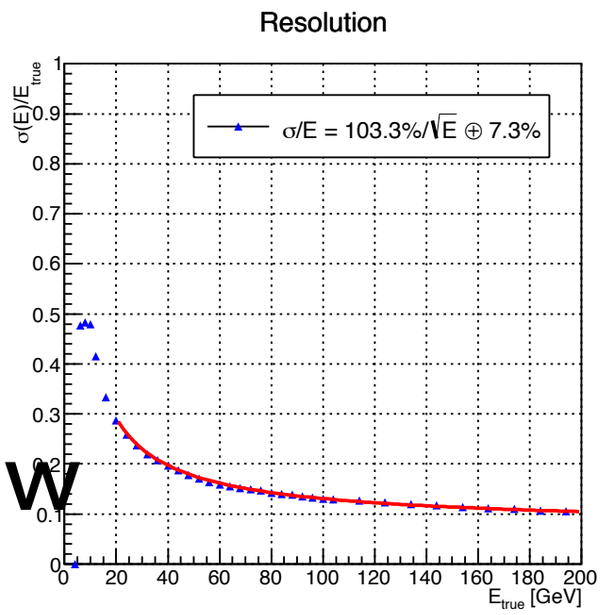

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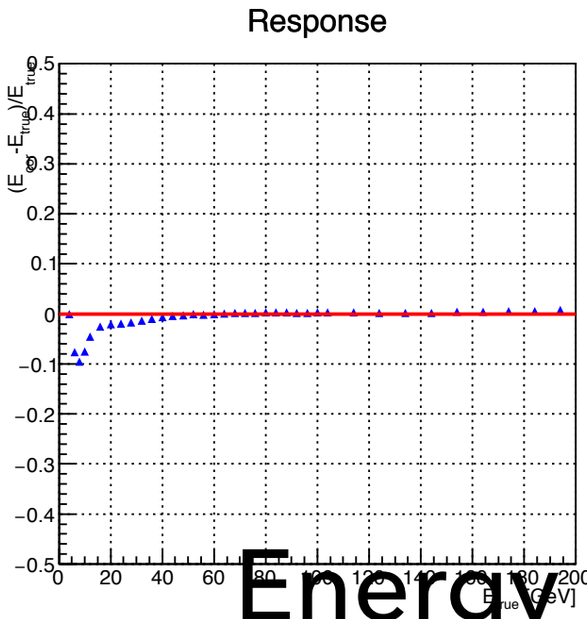

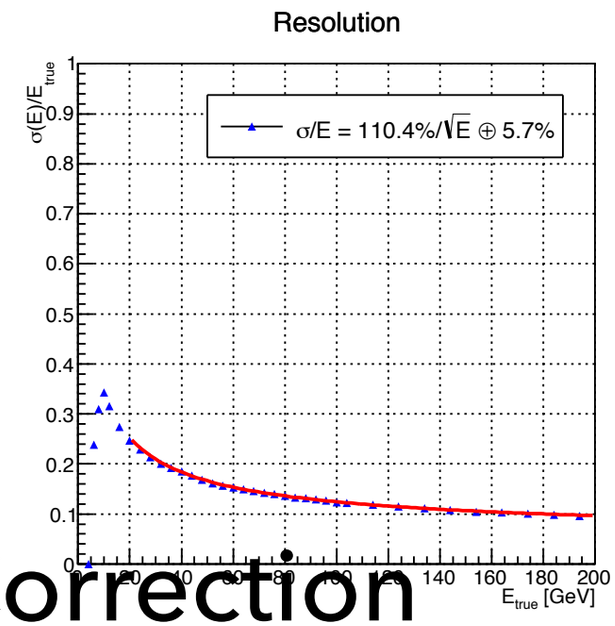

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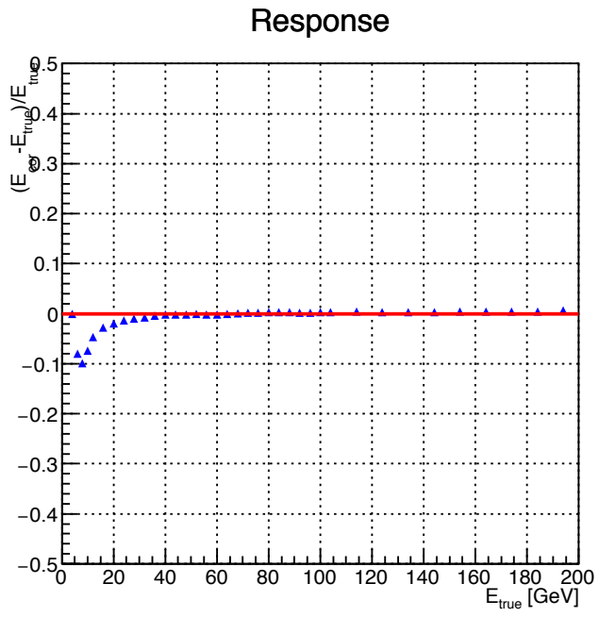
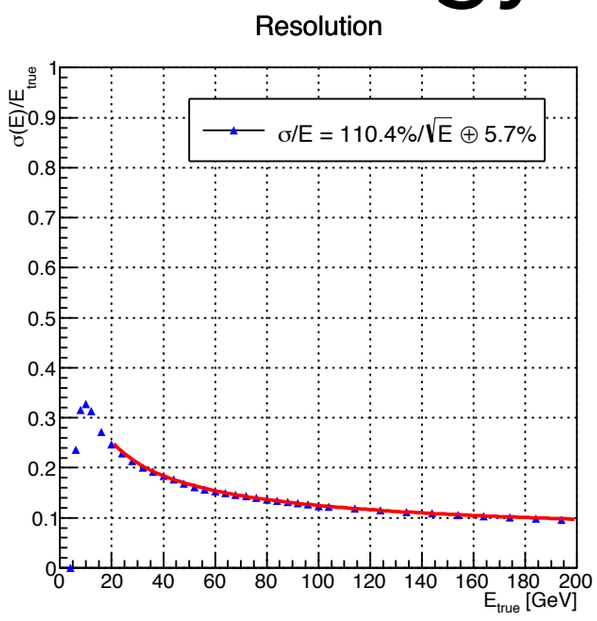
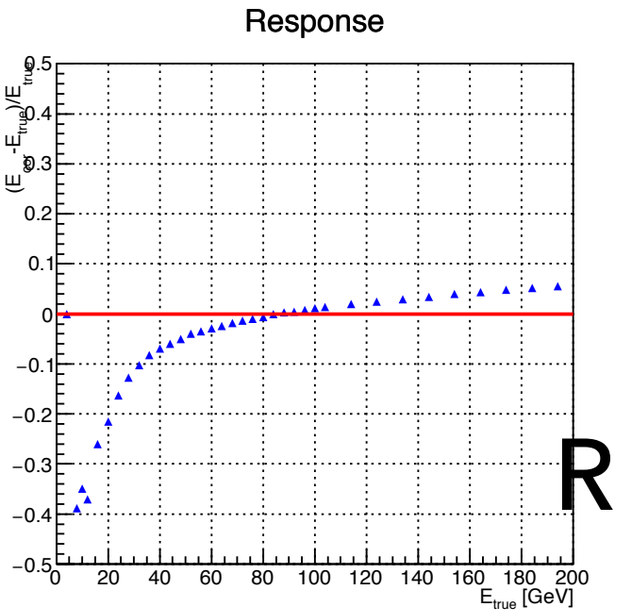


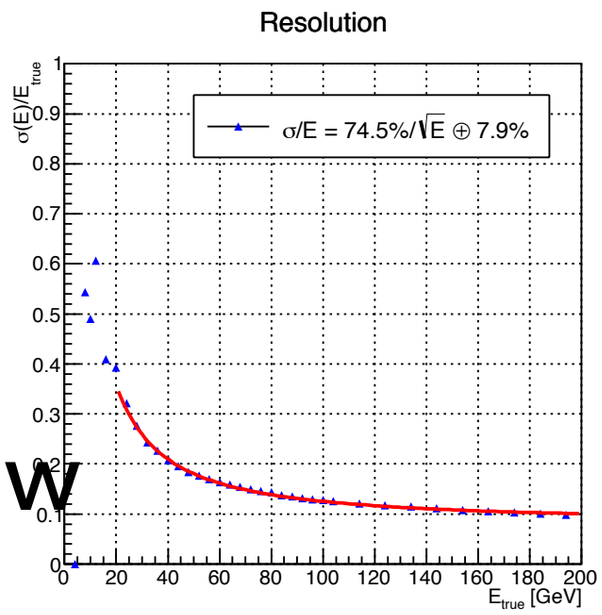


Eta dependence Correction

Response is no big difference after eta correction

H Endcap





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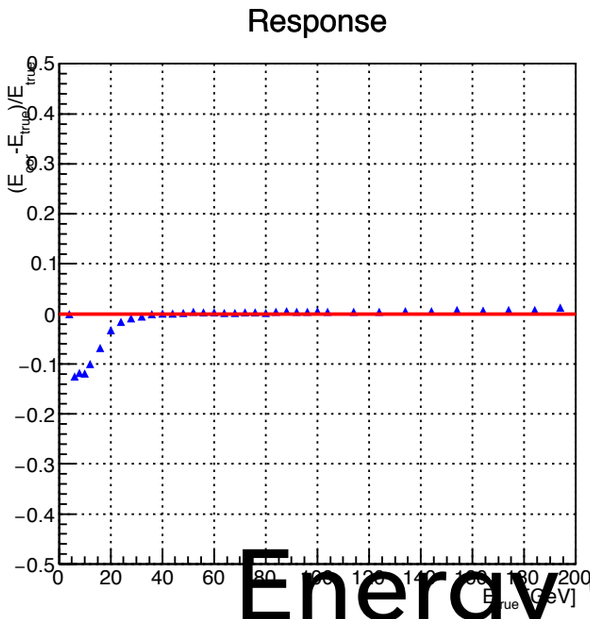
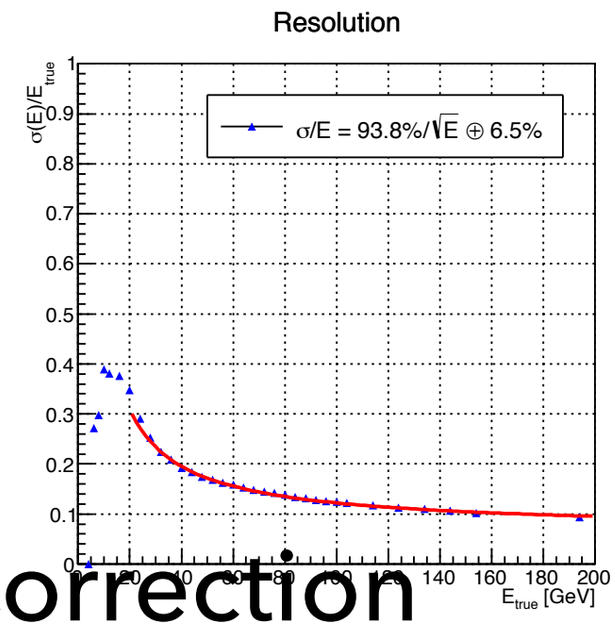
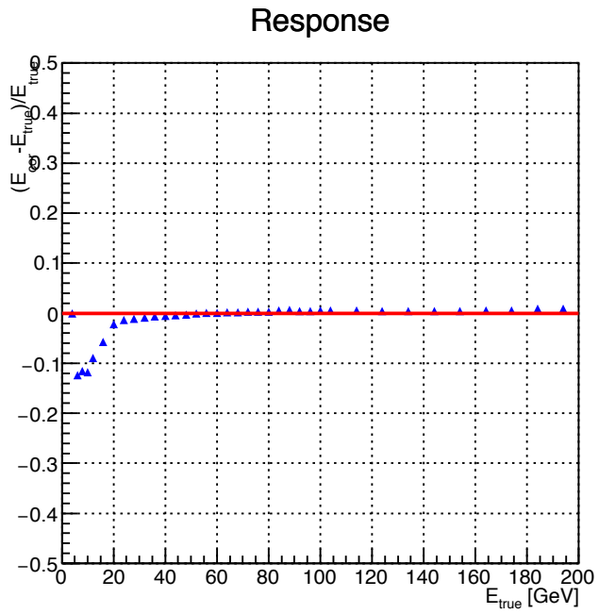
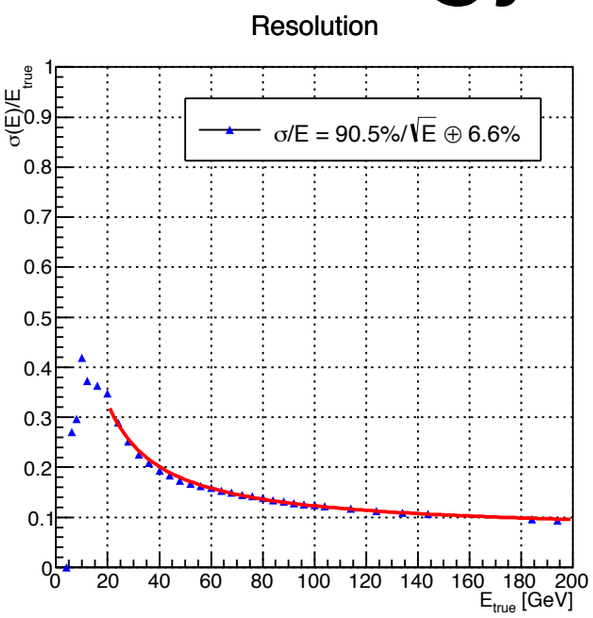




Energy Correction

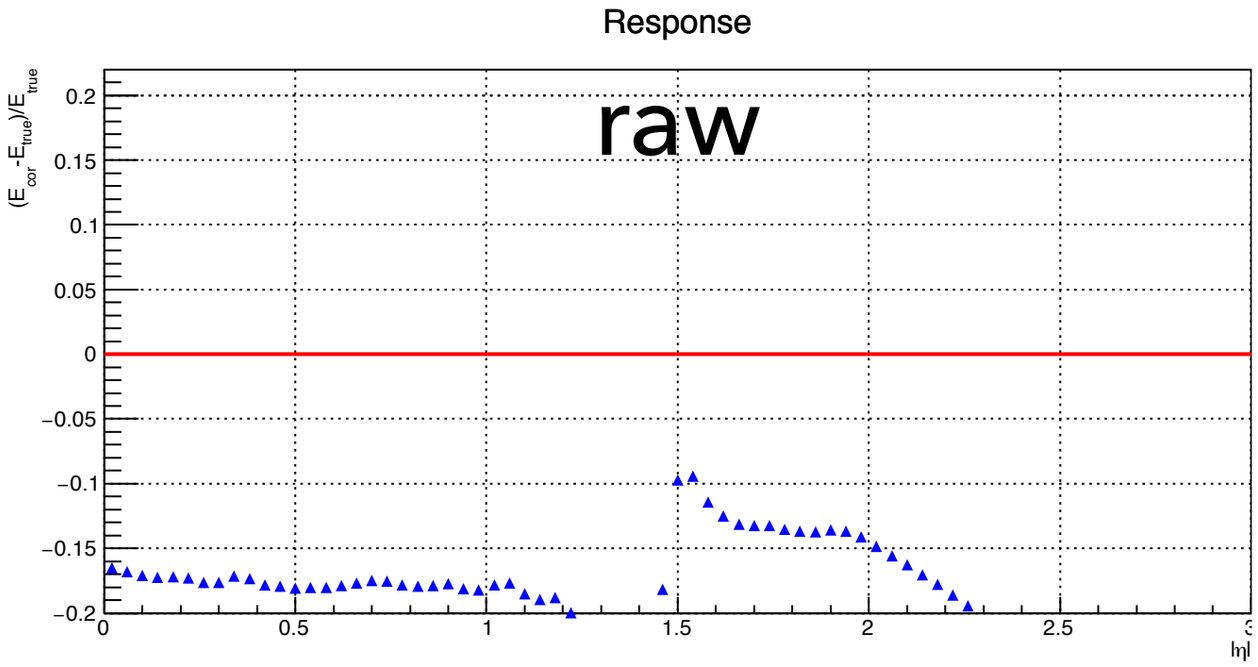


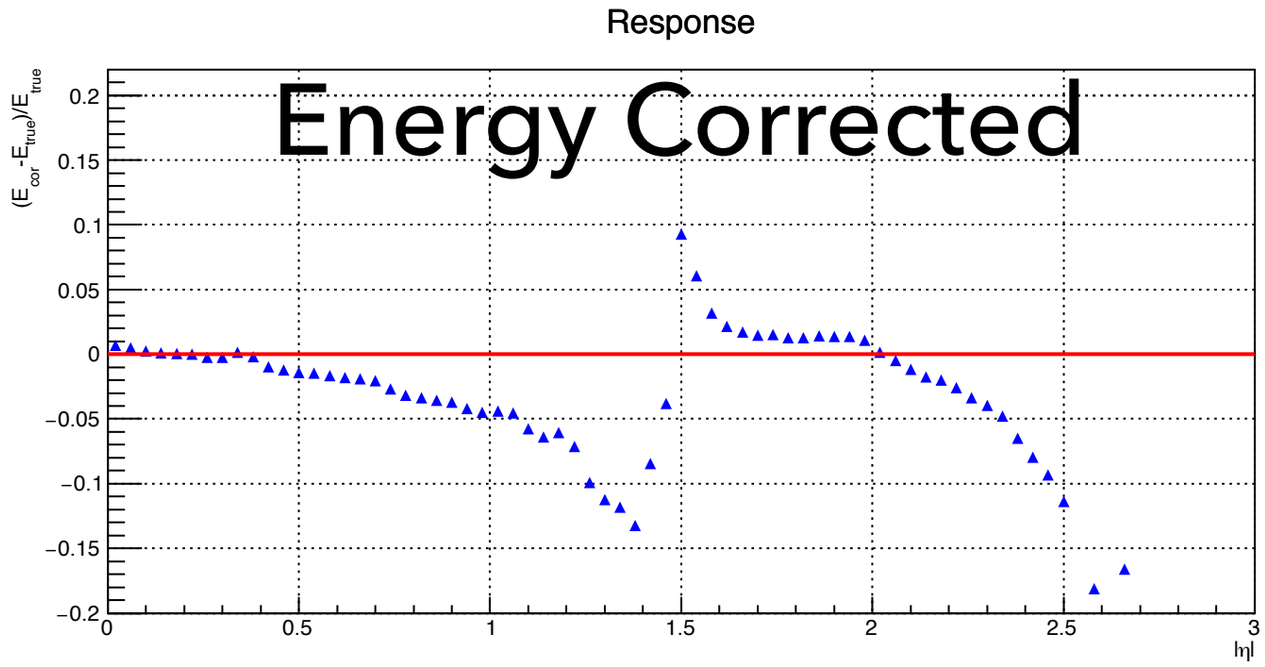


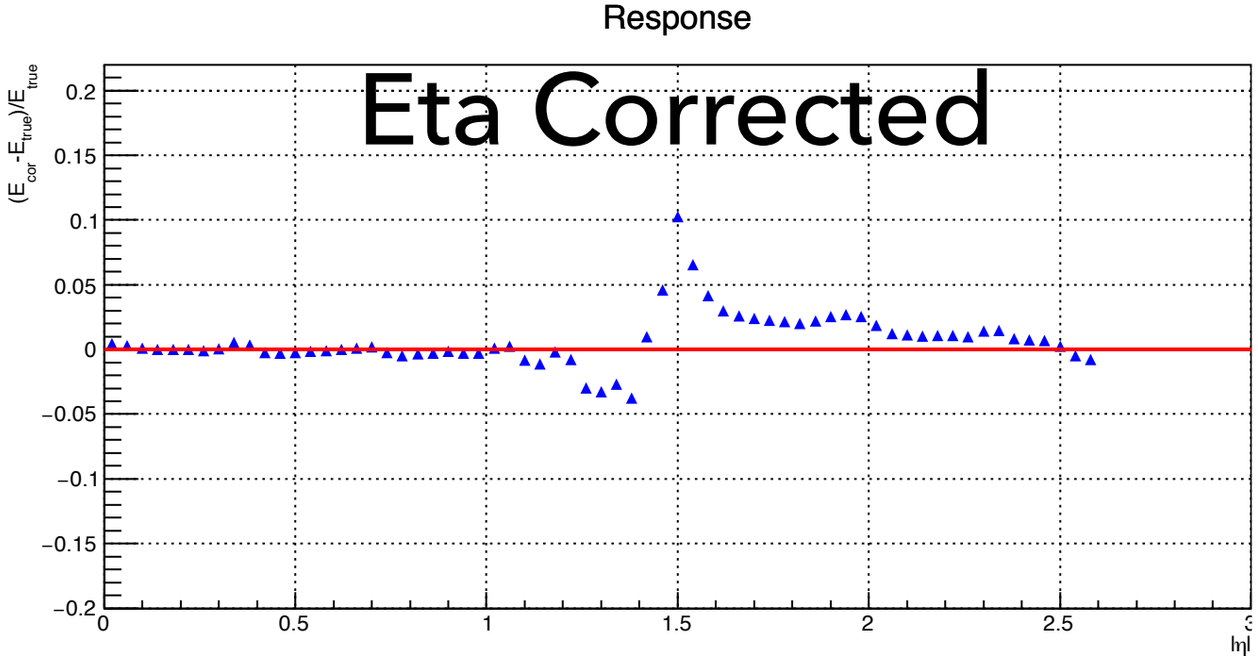
Eta dependence Correction

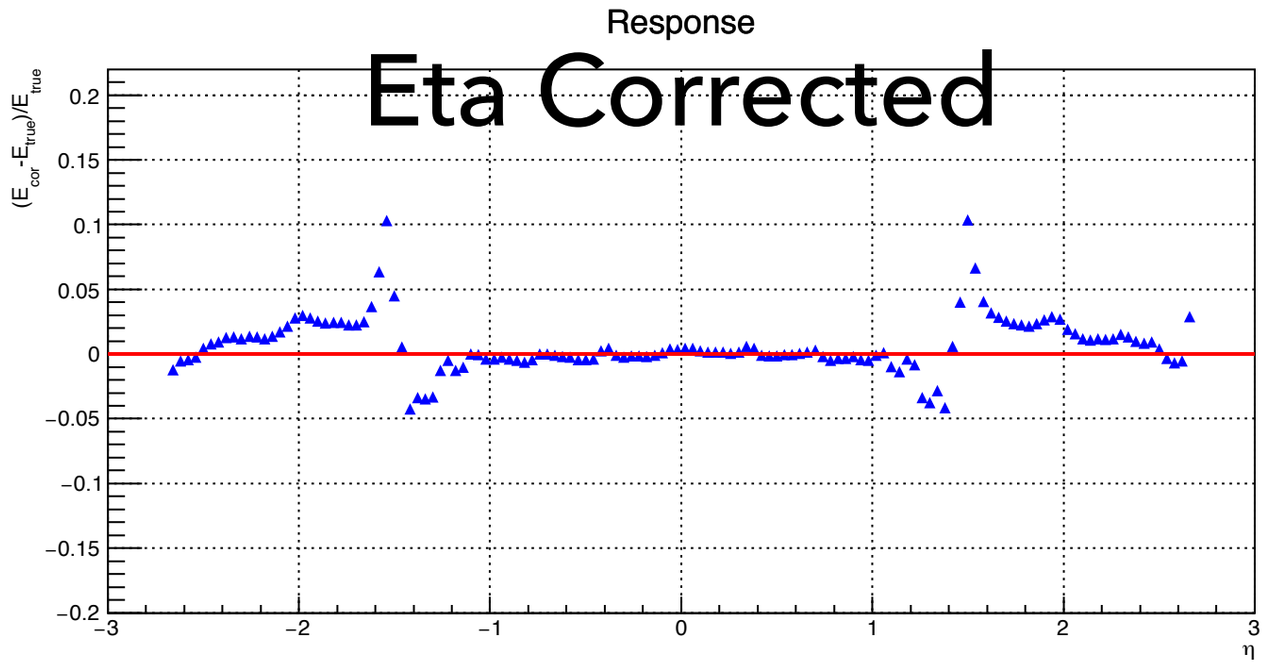
Response is no big difference after eta correction

Response vs eta, EH hadron

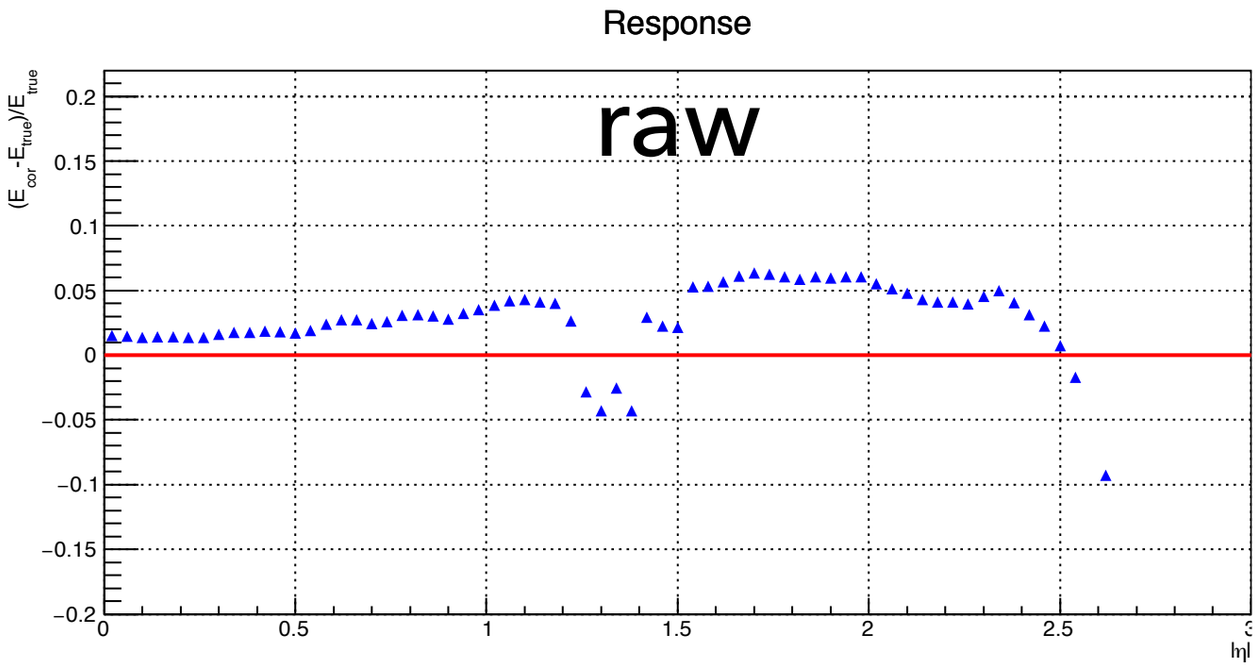


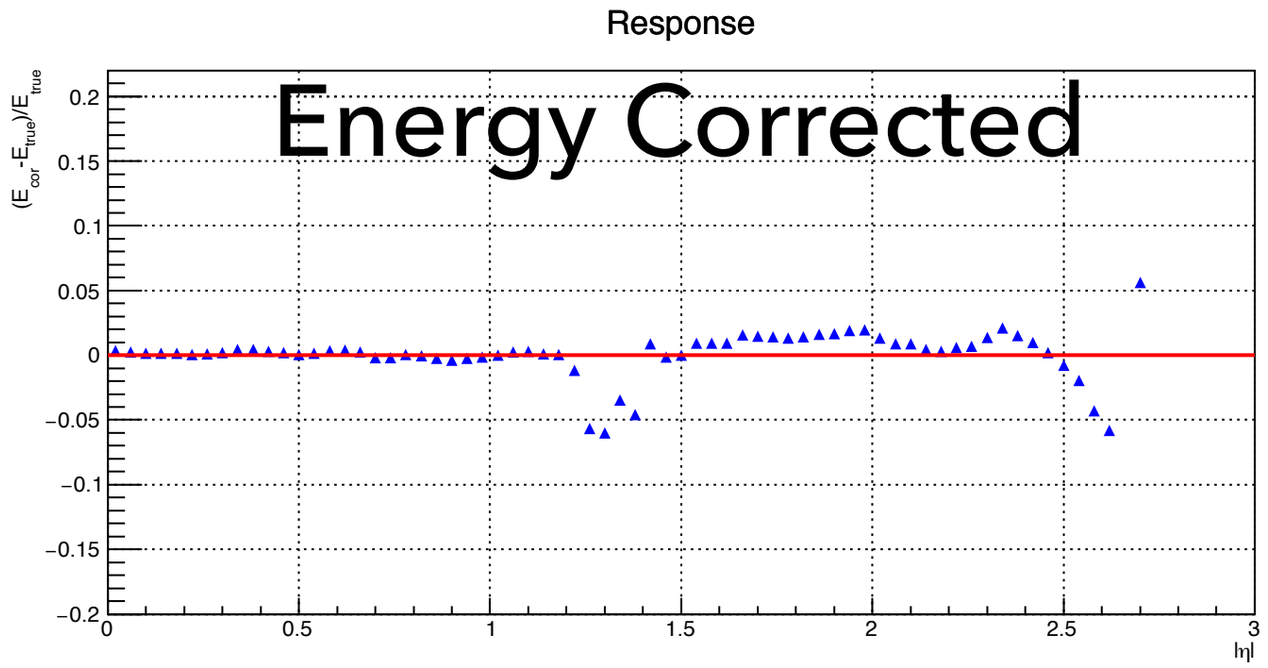


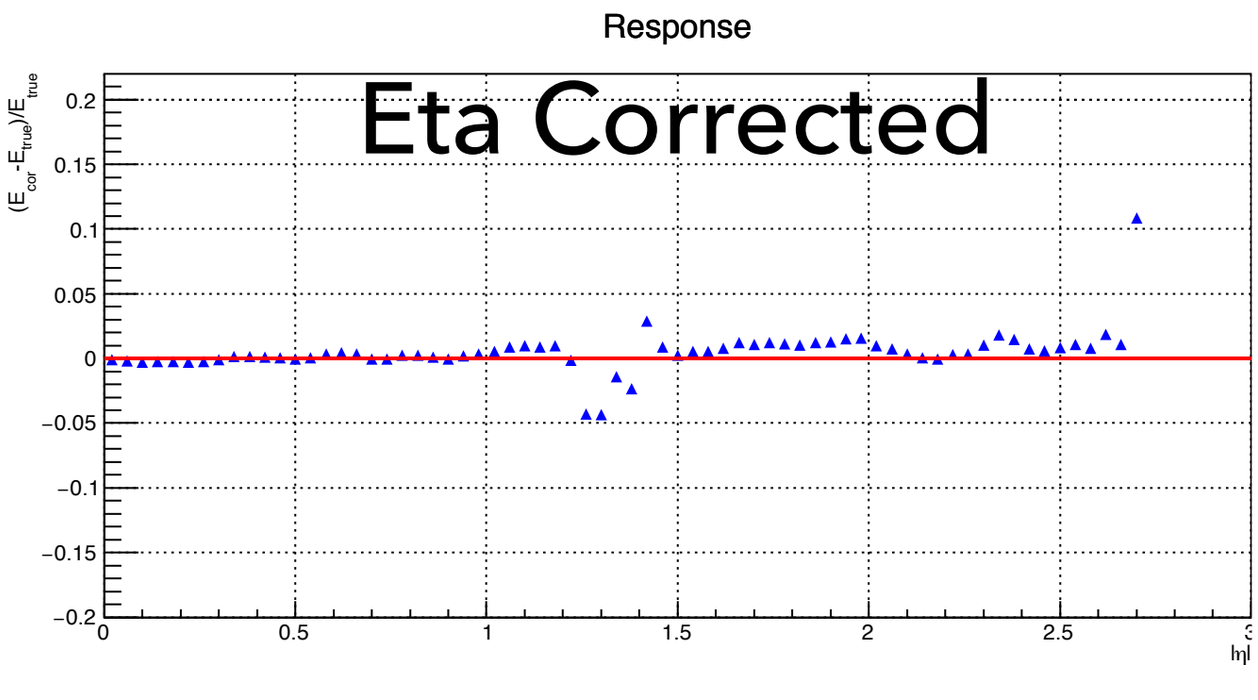


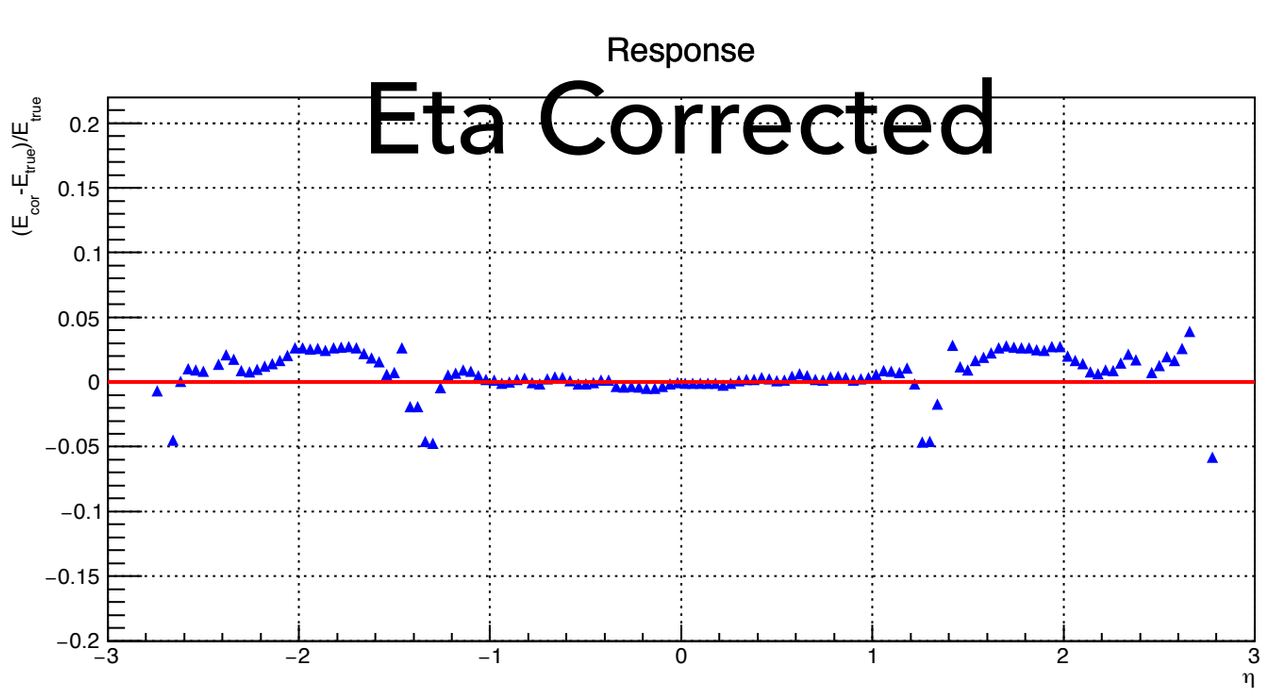


Response vs eta, H hadron









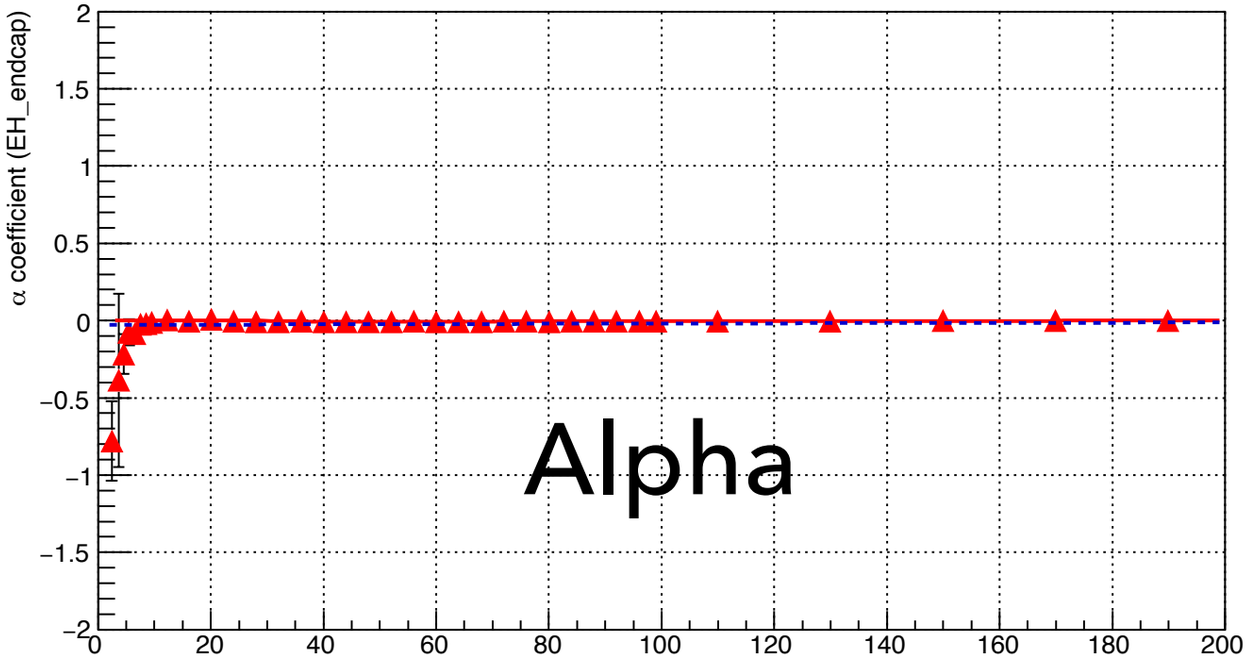
Summary

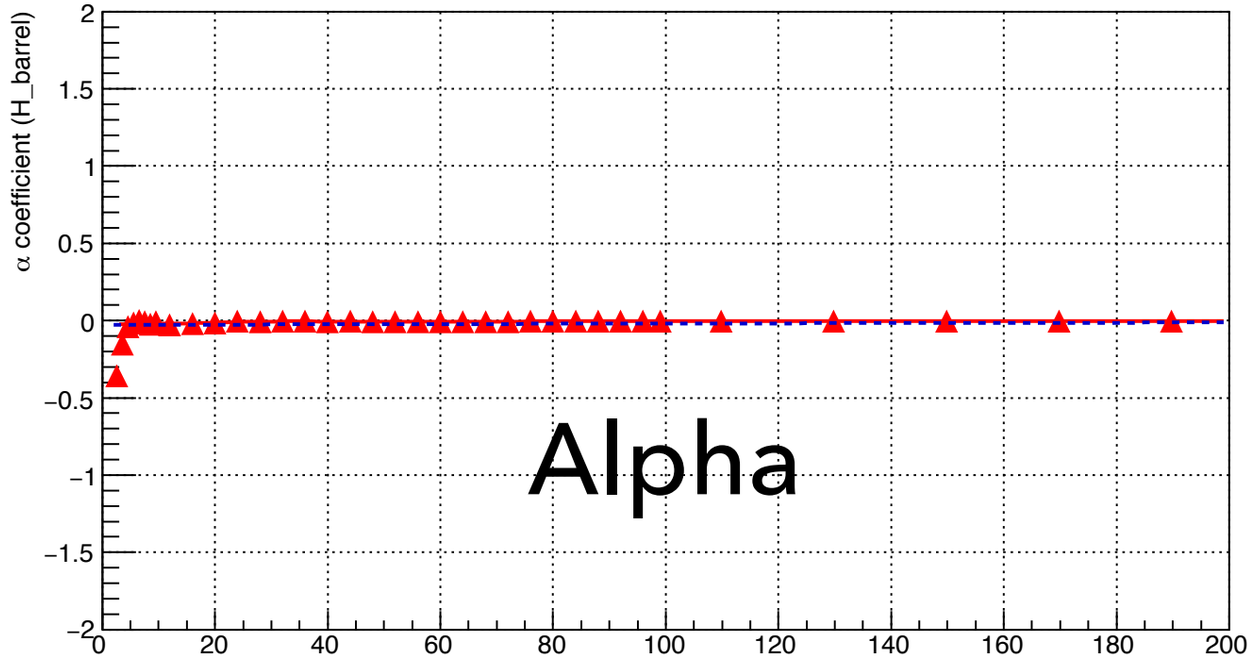
- Results of PF hadron calibration with 1003 single pion sample with CMSSW_10_0_3.
- The response is improved after eta correction in whole region.
- I made db file [1].

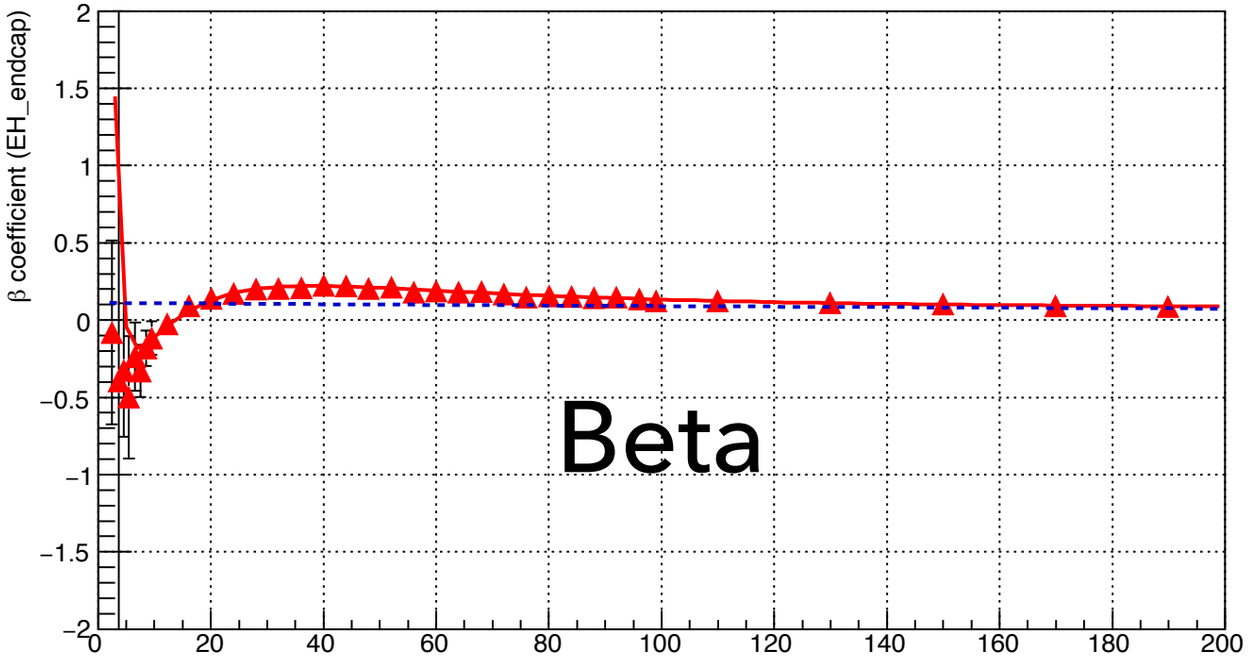
[1] /afs/cern.ch/user/c/chuh/public/PFCalibration/PFCalibration_HLT_2018_25ns_Spring18_V6.db

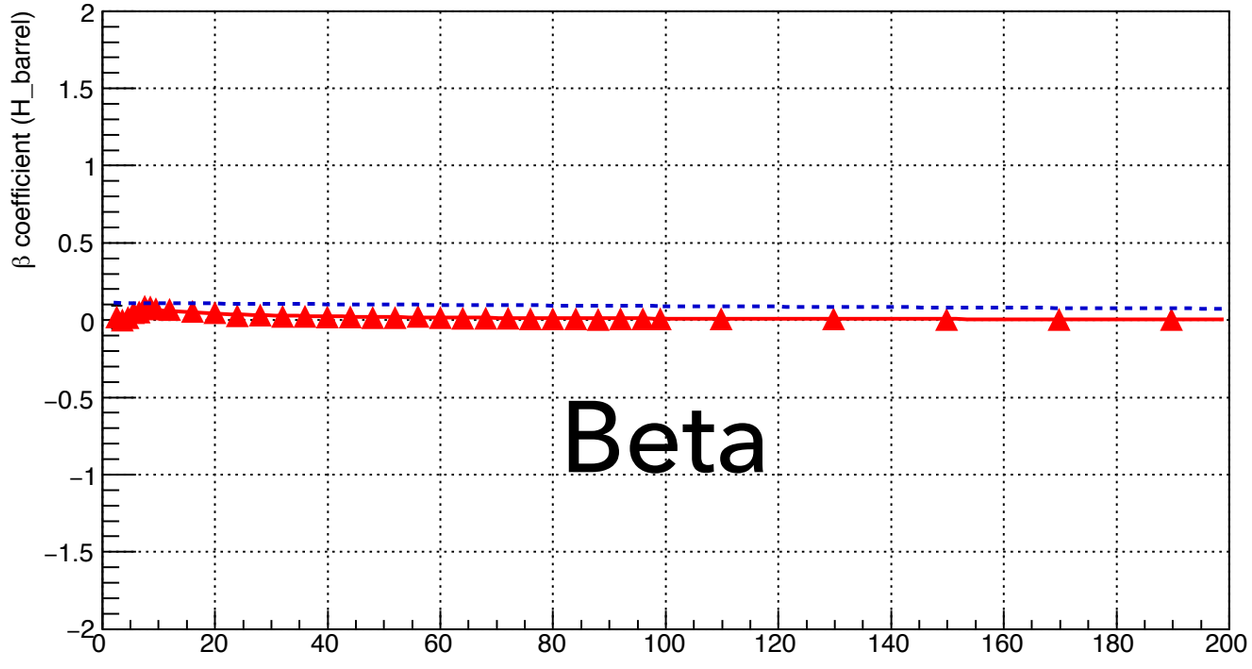
BACKUP

Calibration Coefficients









Calibration Coefficients