The University Of Sheffield.

Update on Data vs MC comparison

- 5 energies: 20, 50, 100, 180, 250GeV
- Description of cuts and MC scales
- Comparison: Data vs MC
- Appendix: detailed plots (not presented)

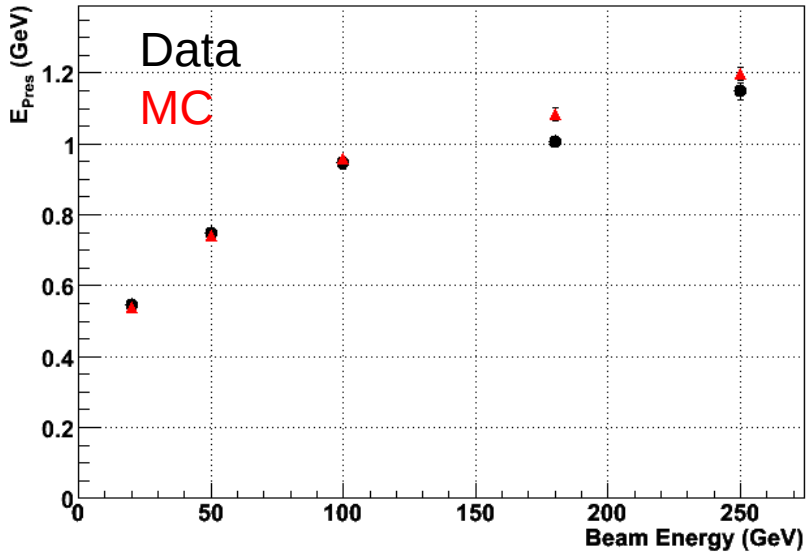
Cuts applied

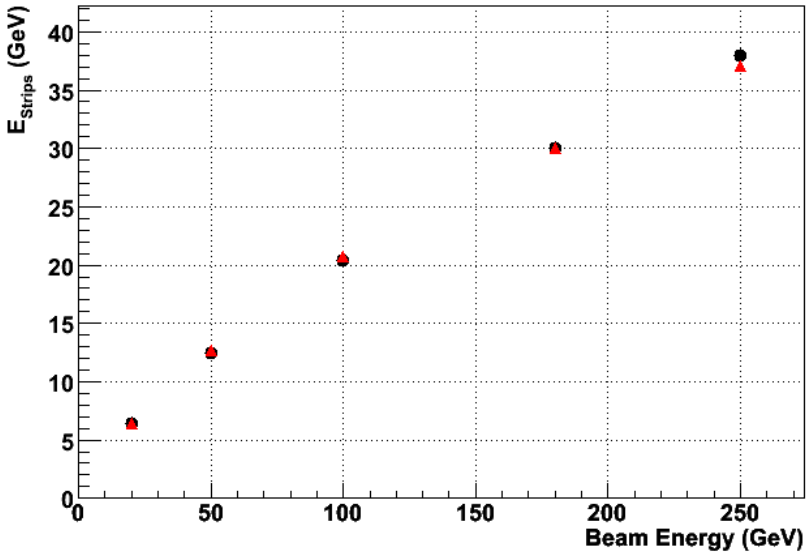
- Release 10.5.0, OFC-9, latest tags from Marco et al.
- 3x3 EMTB cluster with ncells>66
- Clock>2ns (except for 100GeV, 3-16ns)
- MC scale factors:
  - Eps_scaled = 0.8*11/13*Eps
  - Etot_scaled = 0.98*Etotal
- Data scale factors:
  - $E_{stips\_corrected} = 0.92*E_{strips}$
- Ecell_tile < 1.5GeV
- MuTag < 500 counts
- MuHalo < 700 counts (for 180GeV, 250GeV runs no effect)
- eta/phi cuts (next page)

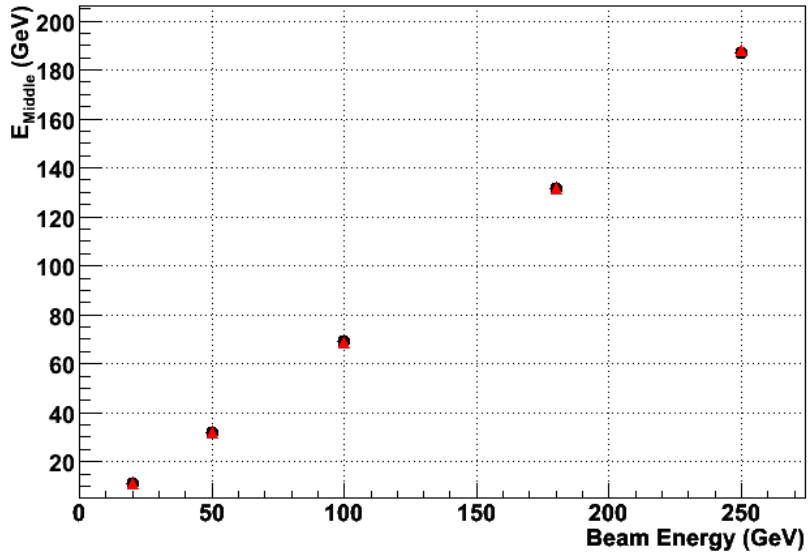
eta/phi cuts (see appendix)

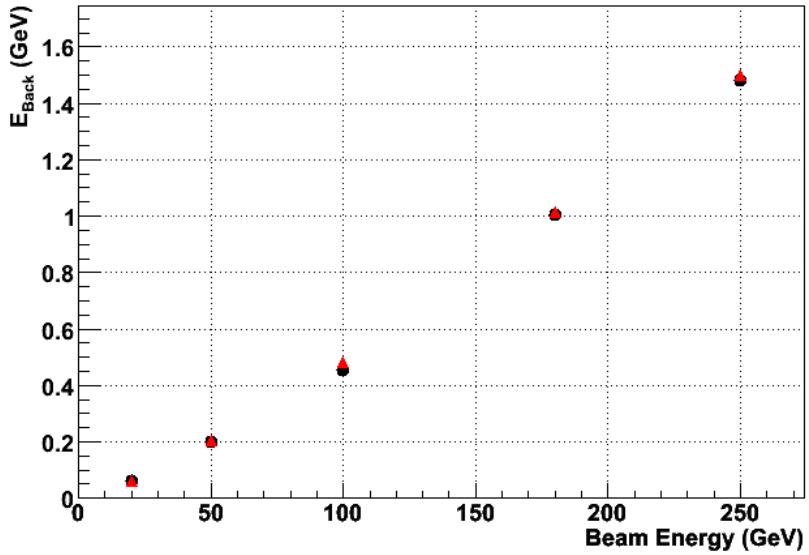
- 20GeV:
  - 0.360<eta<0.375 && 0.005<phi<0.025
- 50GeV
  - 0.362<eta<0.373 && 0.004<phi<0.020
- 100GeV
  - 0.362<eta<0.373 && 0.004<phi<0.017
- 180GeV
  - 0.378<eta<0.383 && 0.002<phi<0.008
- 250GeV
  - 0.375<eta<0.381 && 0.002<phi<0.012

Sampling Layer <Erec> vs Beam Energy









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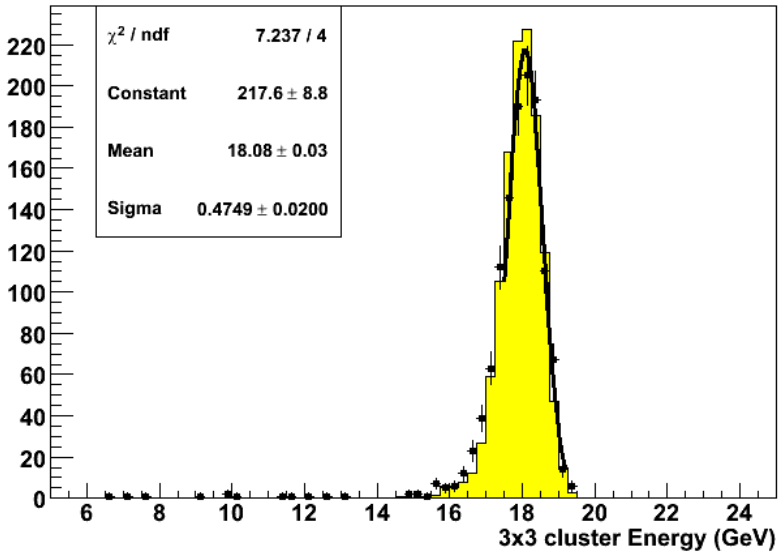
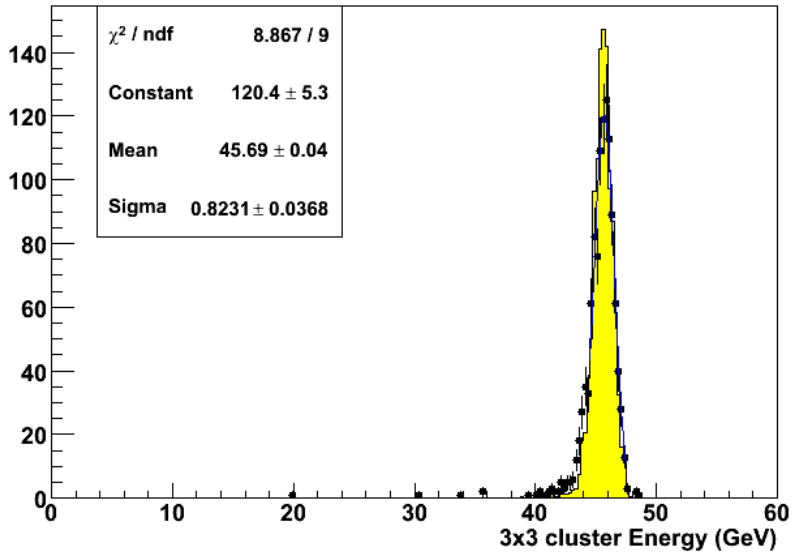
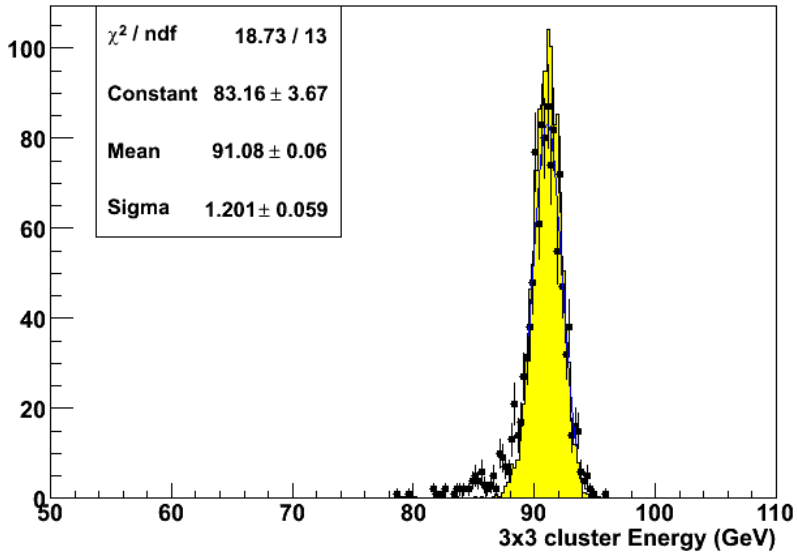
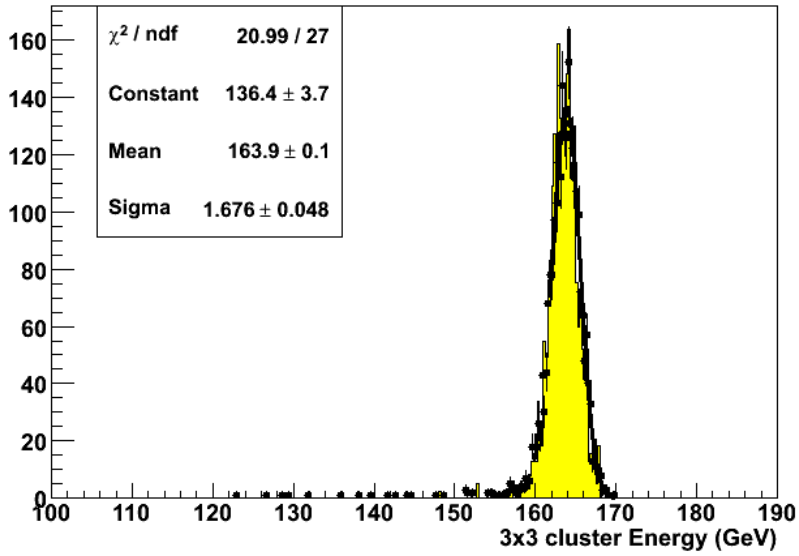
Period 5: 20, 50, 100, 180GeV









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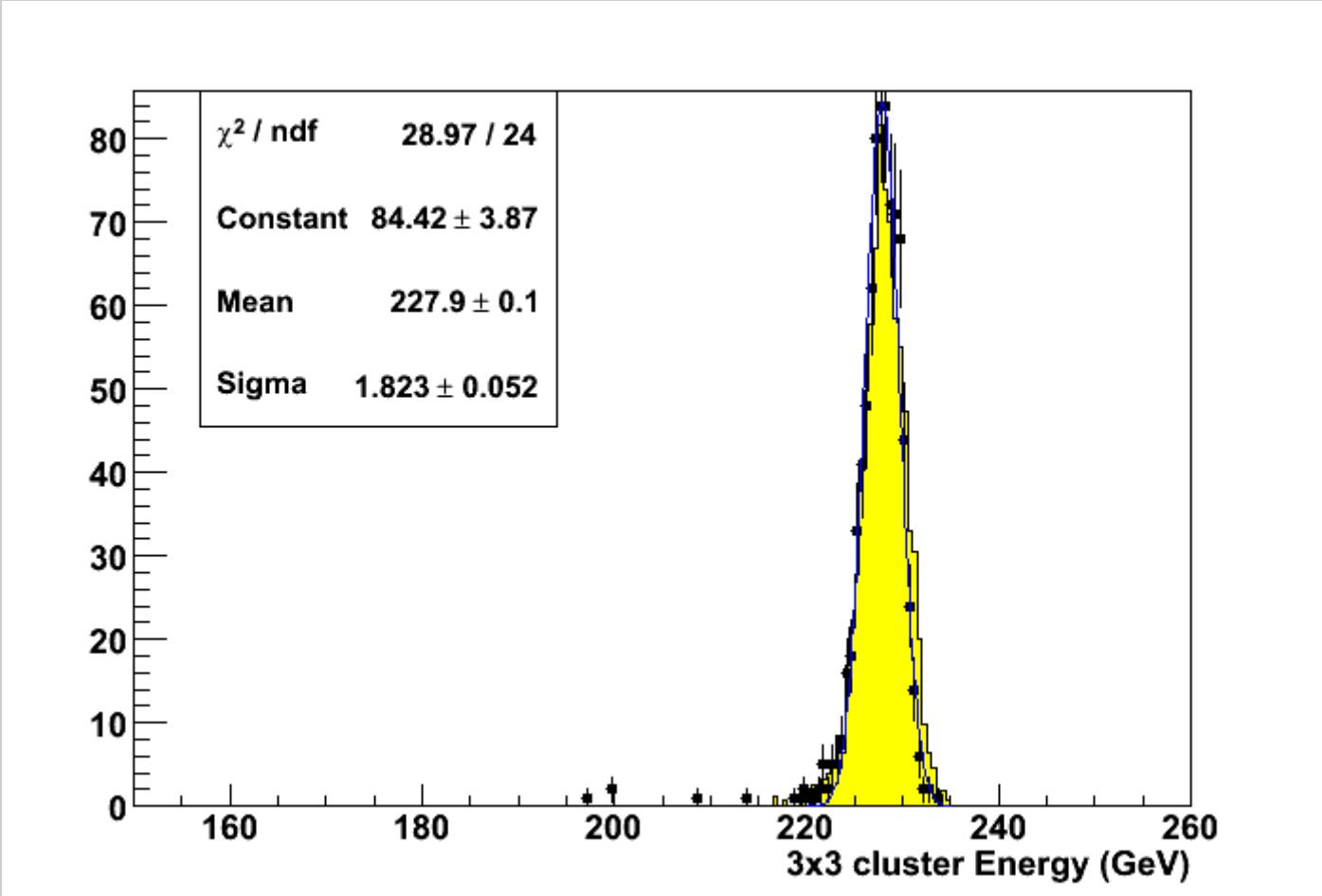
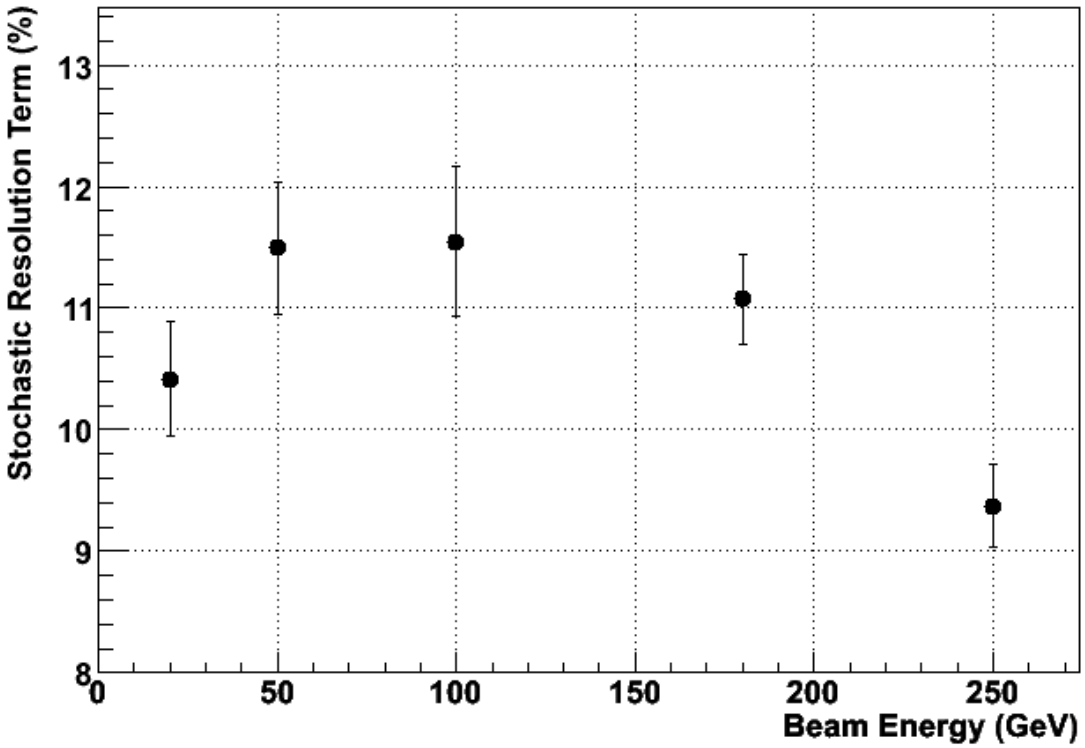
250 GeV from period 6

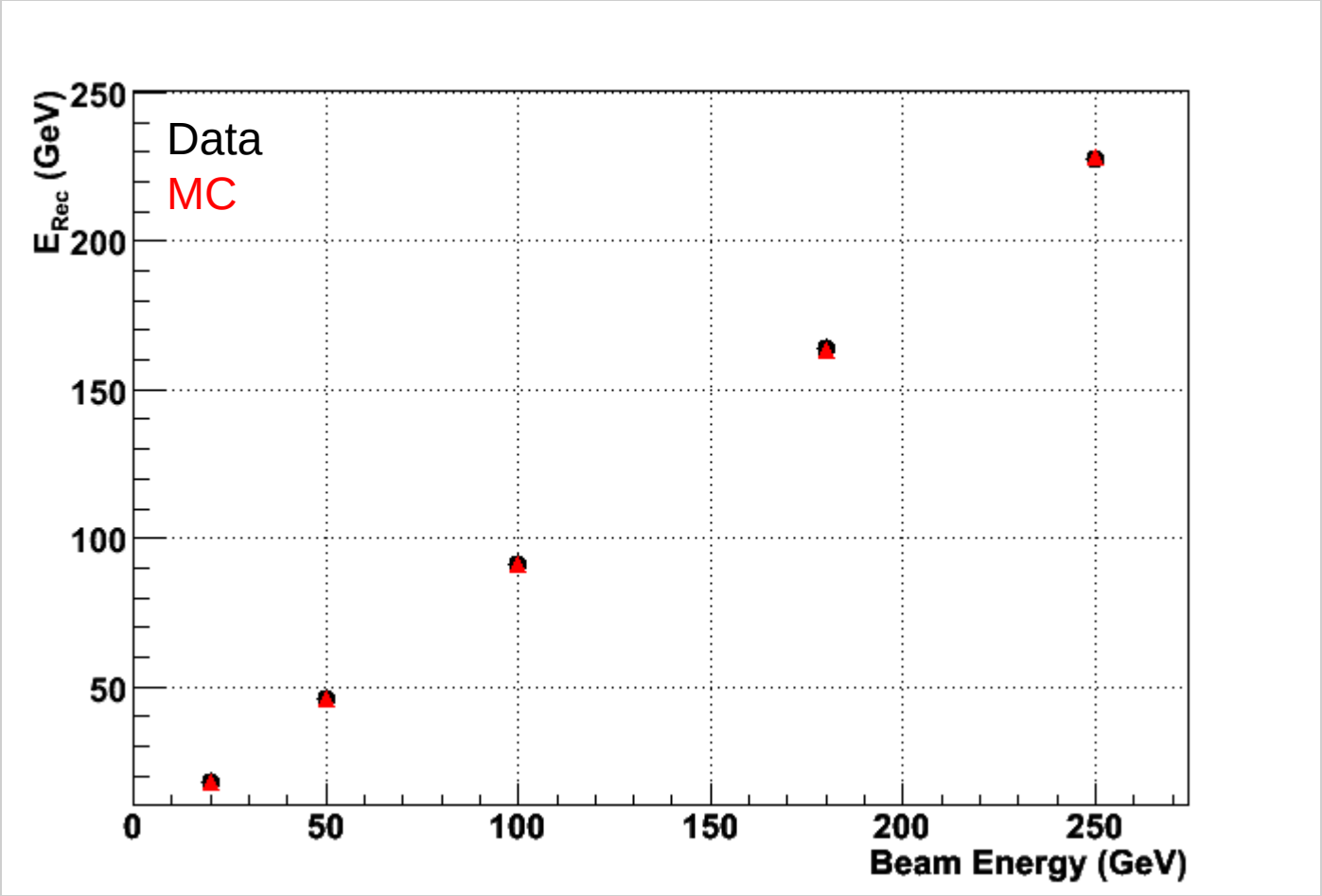


Resolution stochastic term

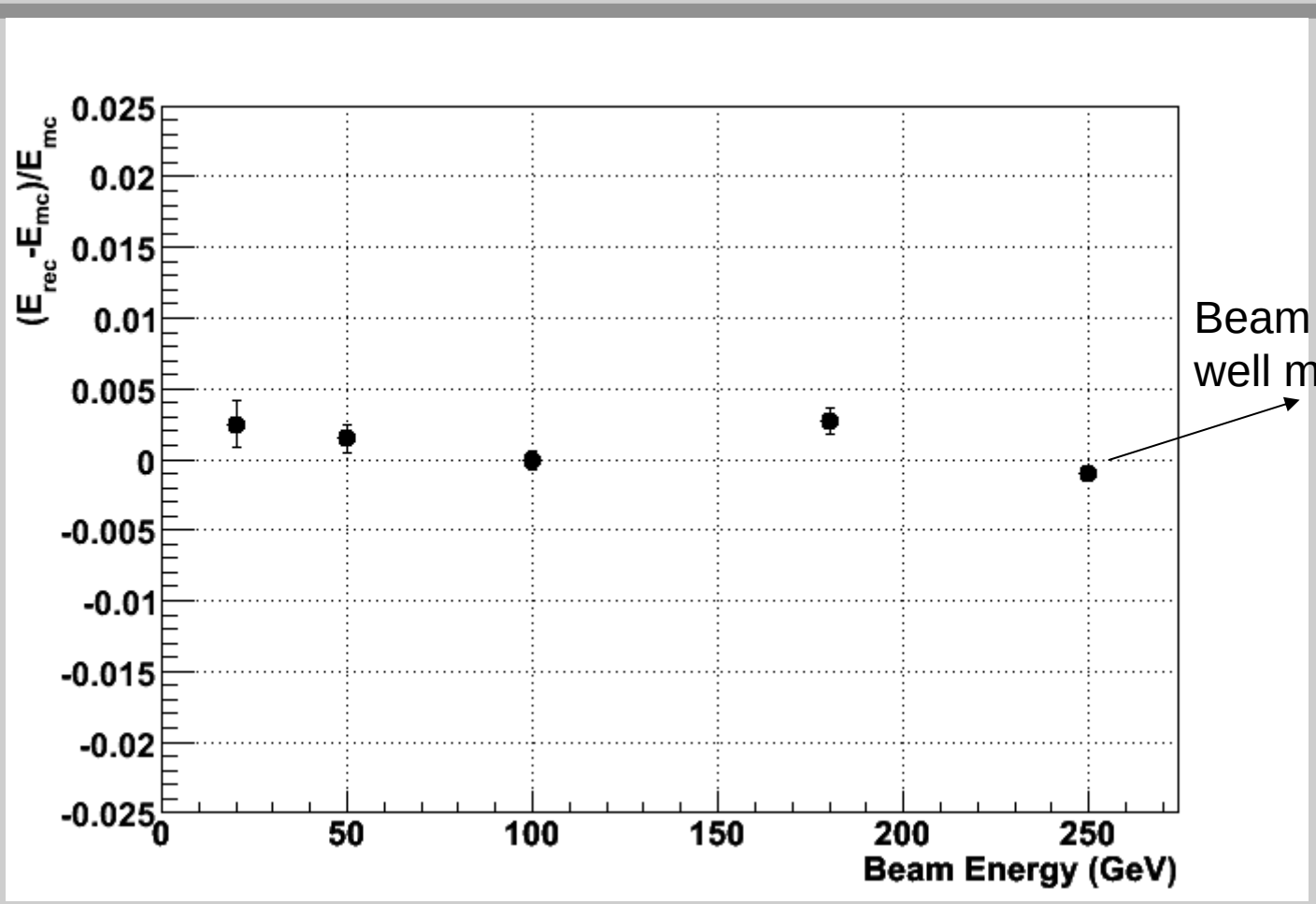


- Const = 0.5% (assumed)
- Noise = 145MeV (low gain)
- E vs Clock effect was not included!

<Erec> vs Beam energy



Data vs MC difference of mean Energy



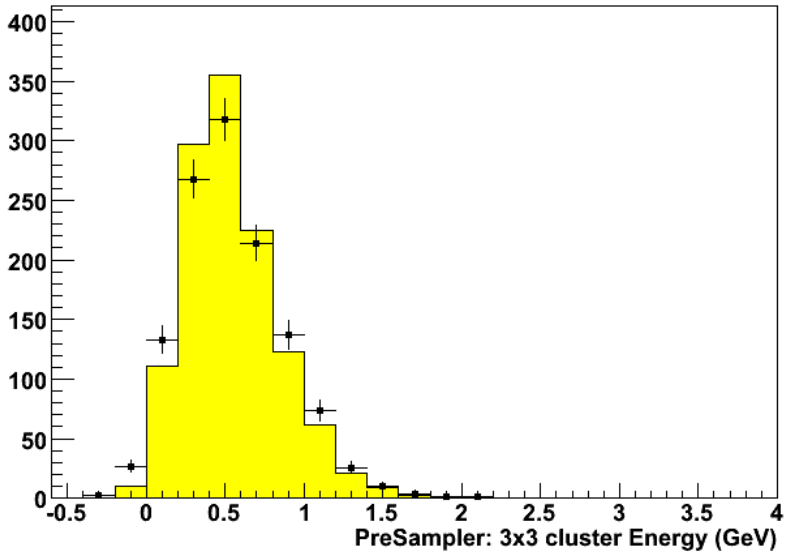
Beam profiles not well matched

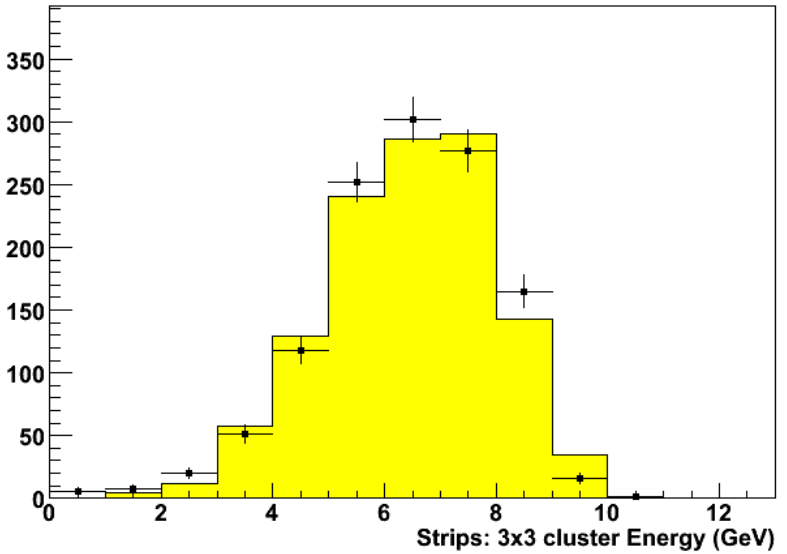
Summary

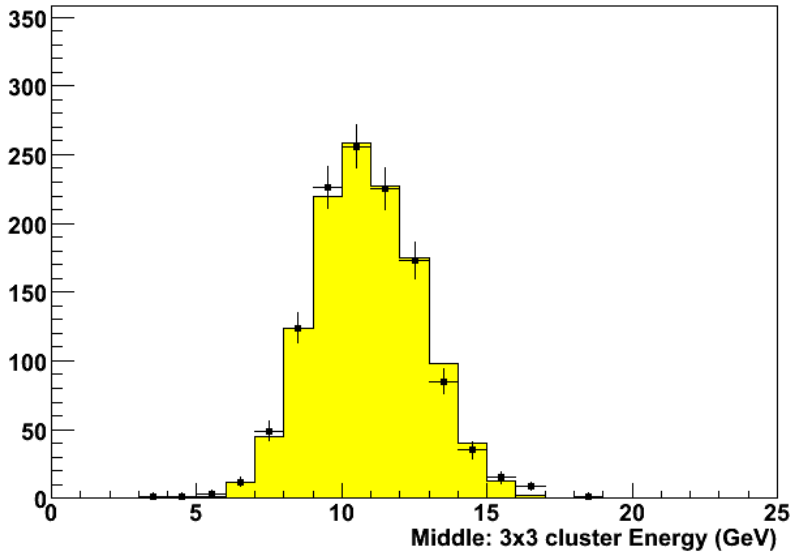
- Data vs MC description in agreement to better than 0.5% for 20-250GeV electron energy range
  - Caution1: CTB has tails produced ustream our area which make comparisons challenging
  - Caution2: When raw energies are compared the beam profiles in data vs MC must match because we have out-of-cluster losses that are different (in %) for strips,middle and PS.
  - Caution3: Our MC upstream material X0 assumption may be too high by 0.02X0 or so (fine tuning).
- We have different material configurations so we can put the Data vs MC comparison to the test (see Walter's talk)
- Why we do this? We want to calibrate the MC first and apply the constants to the data. This should work if Data vs MC comparison is good.
  - Cell to cell (region to region) final calibration must still be done in-situ with data (Z->ee, MIPs, etc) but this is just an overall scale factor.
  - All we need in 2007 is a good MC description of the ATLAS material (for example ID services, SCT LMTs, ...)

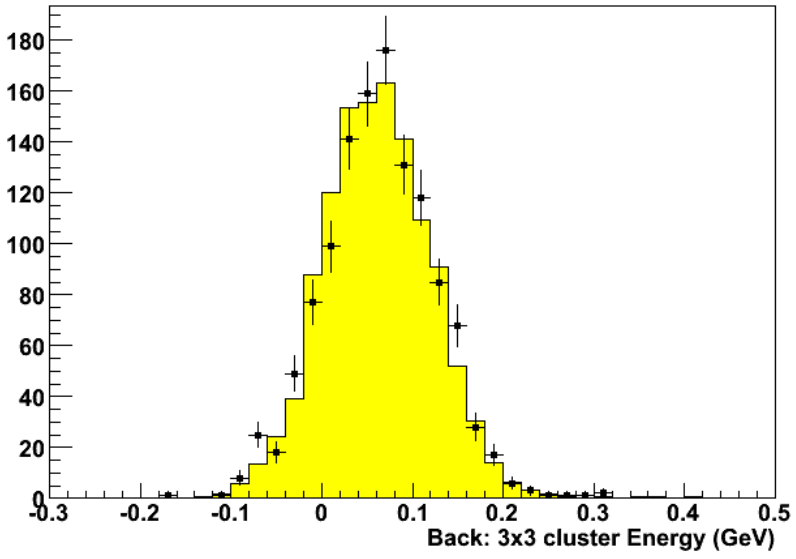
Appendix

Sampling Layers: 20GeV









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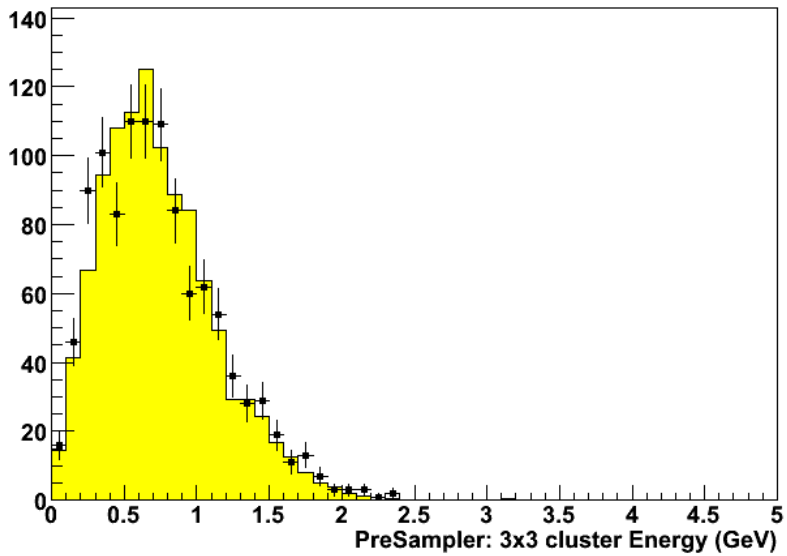
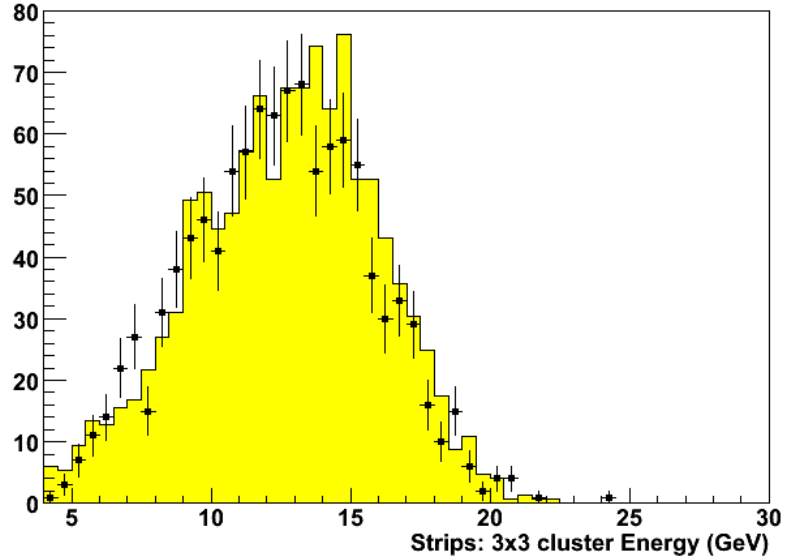
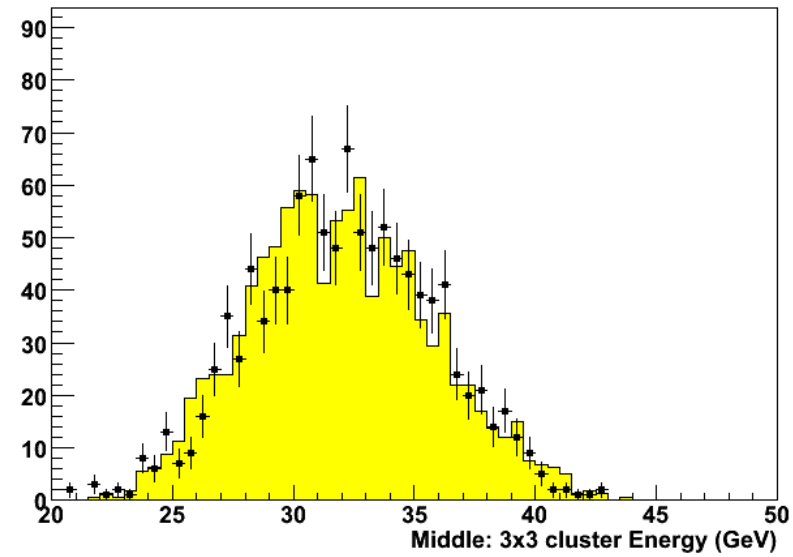
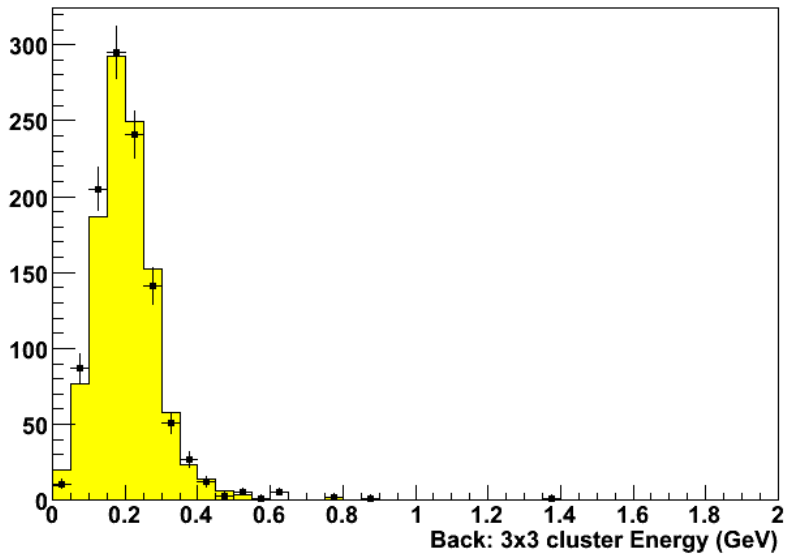
Sampling Layers: 50GeV









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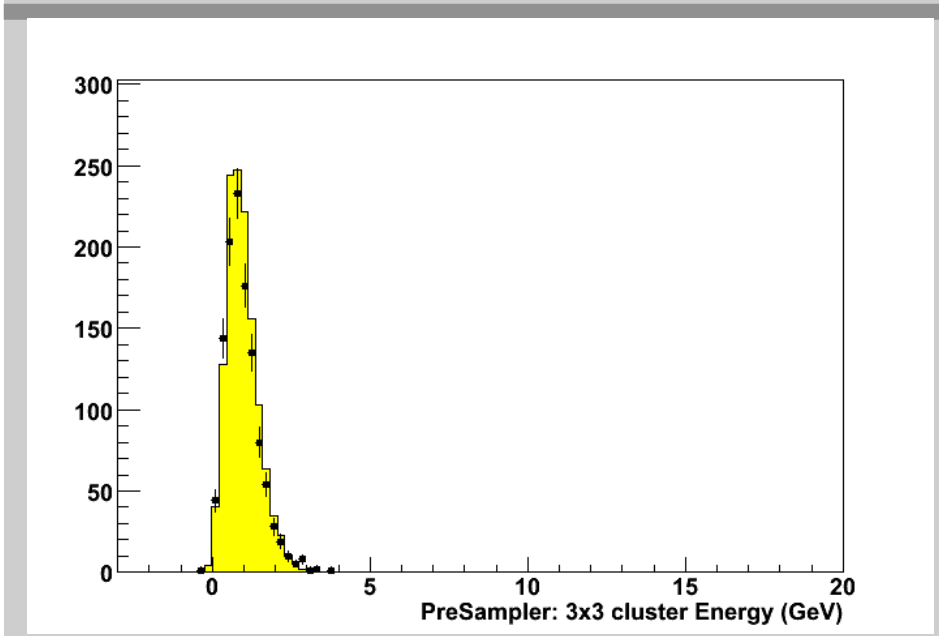
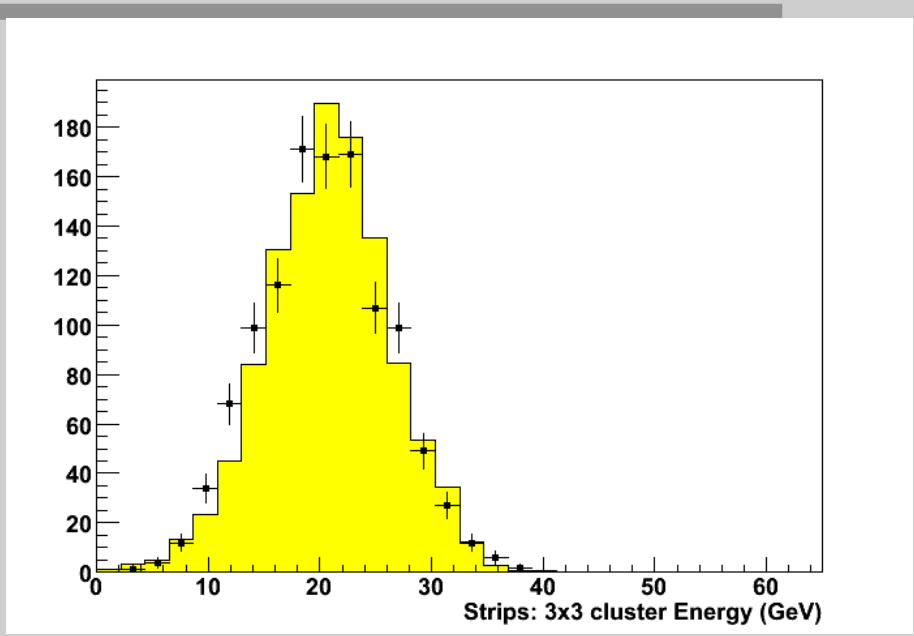
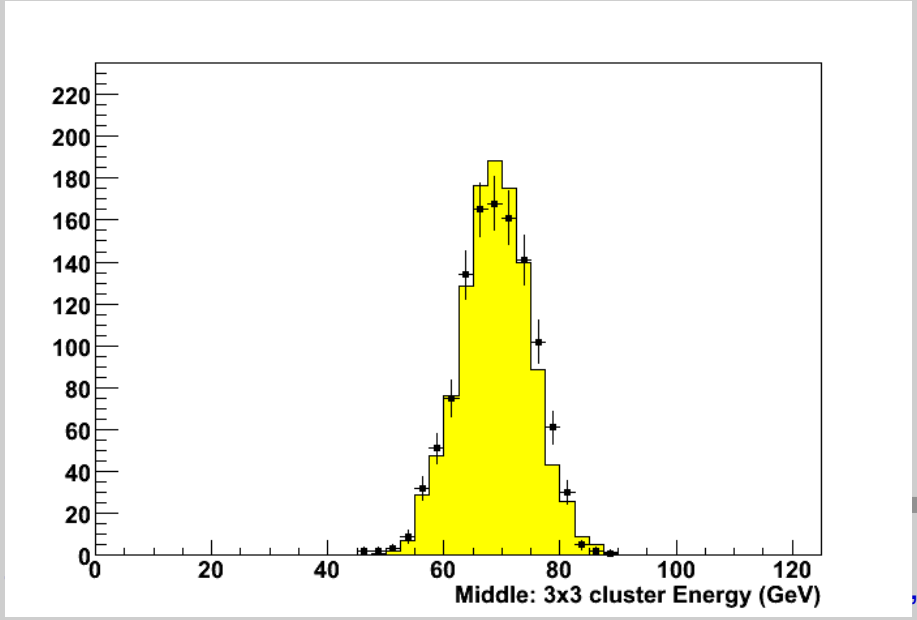
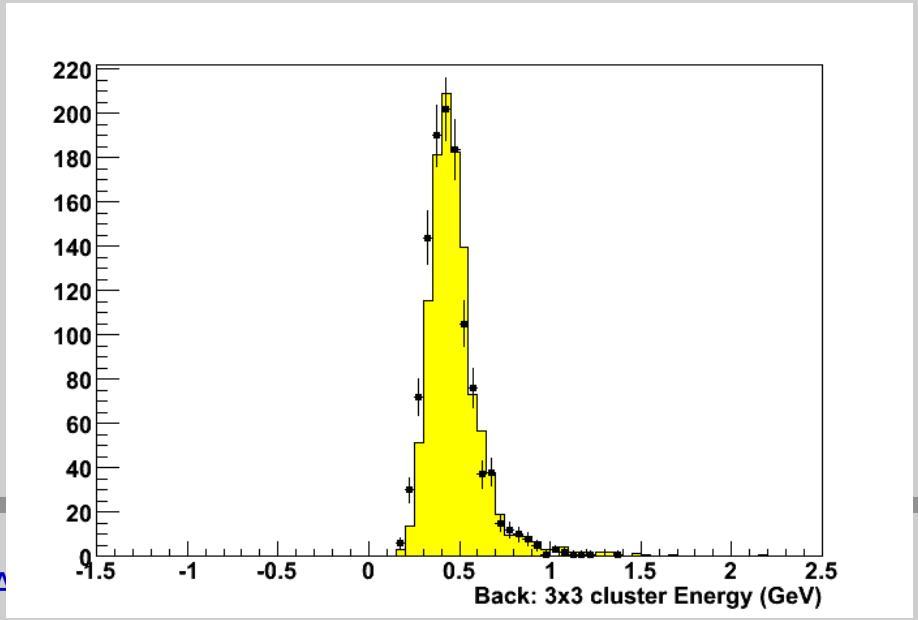
Sampling Layers: 100GeV

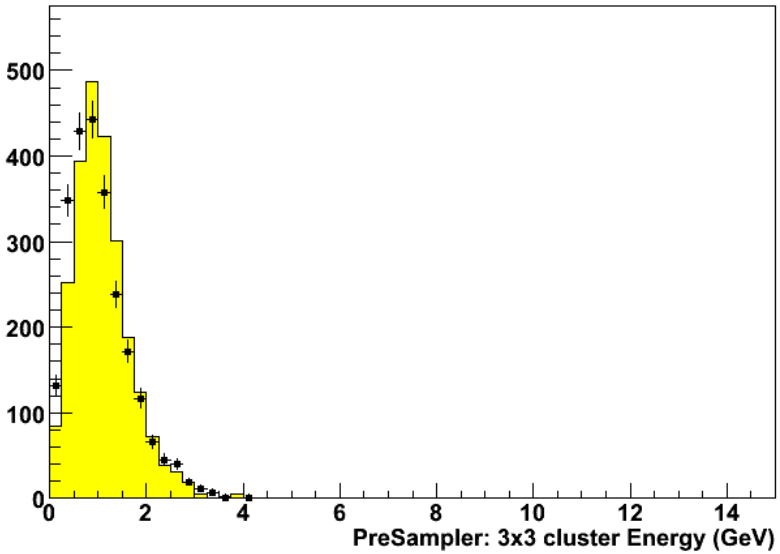


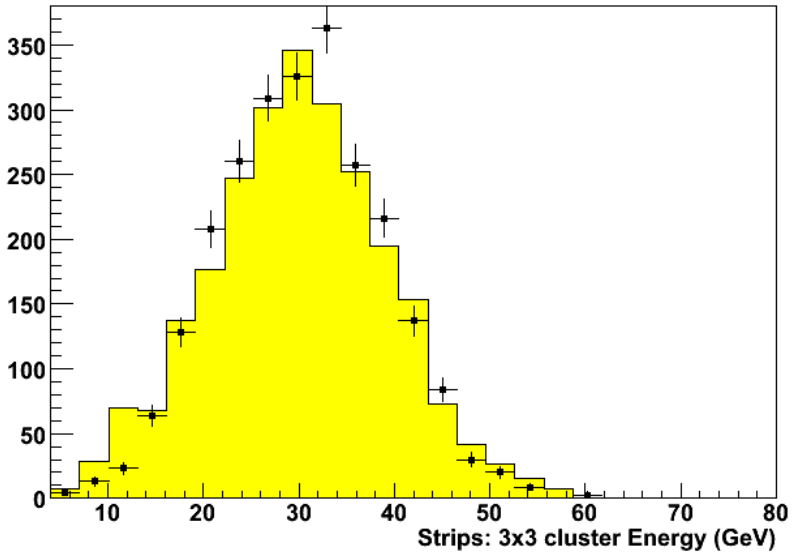


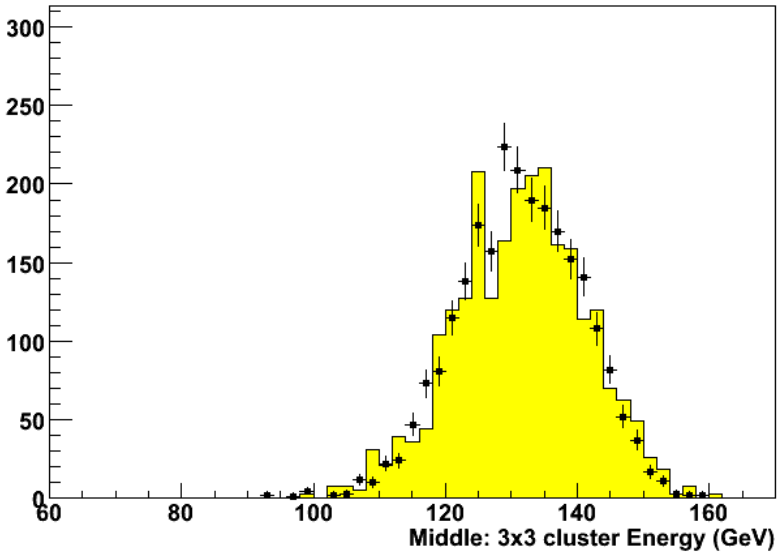


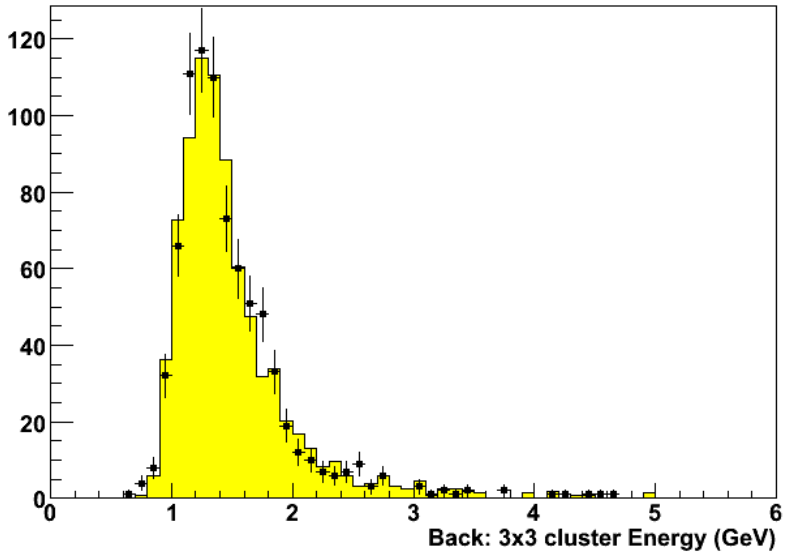


Sampling Layers: 180GeV









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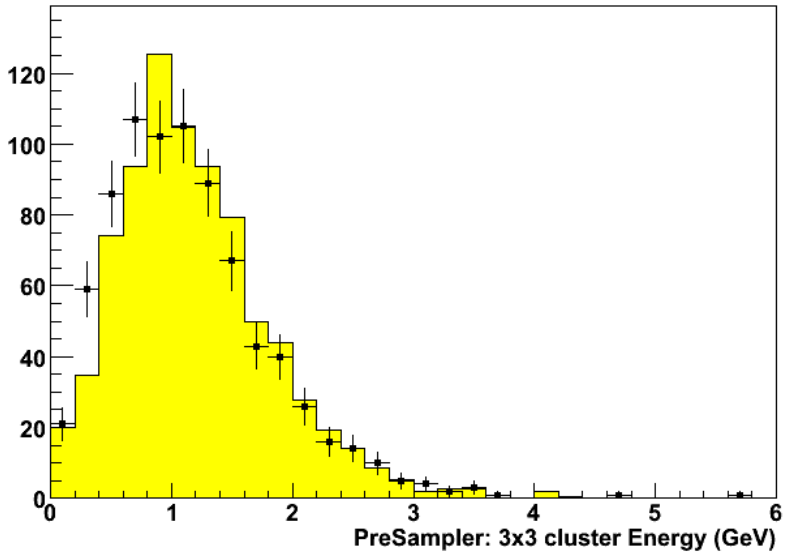
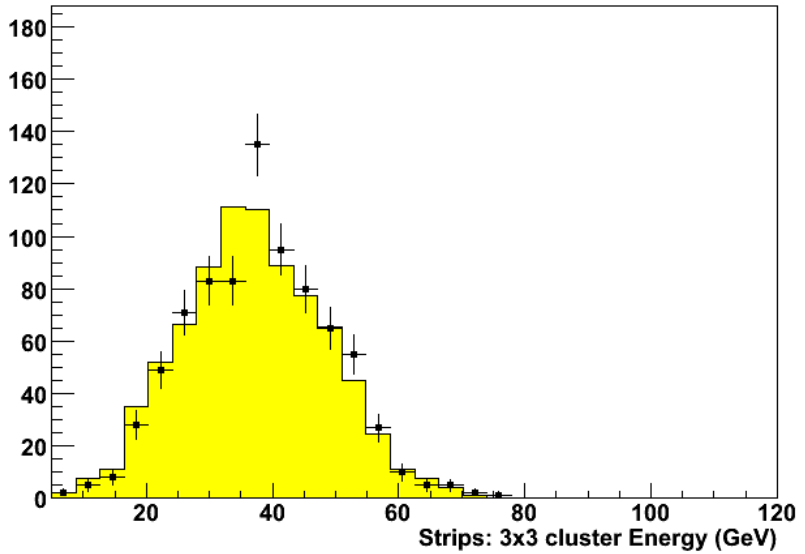
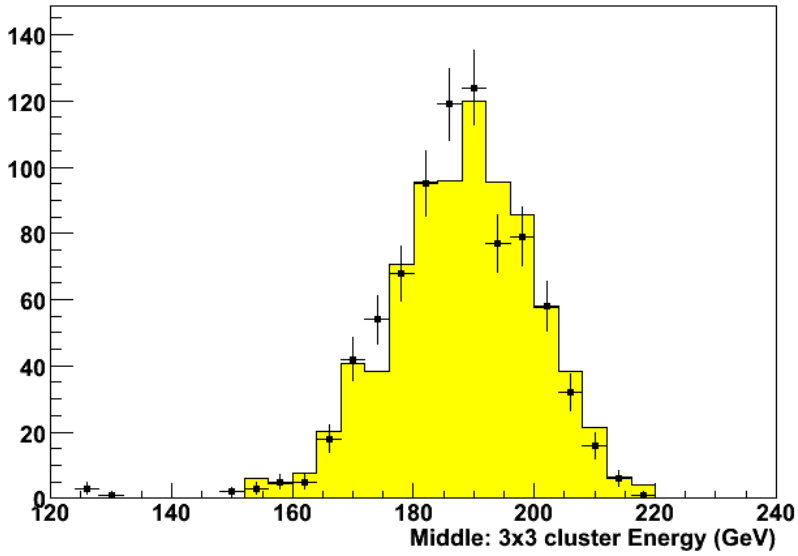
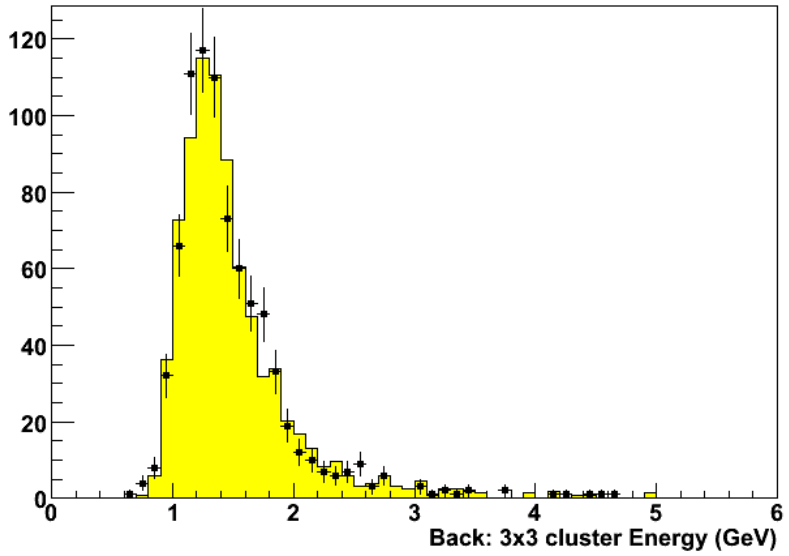
Sampling Layers: 250GeV









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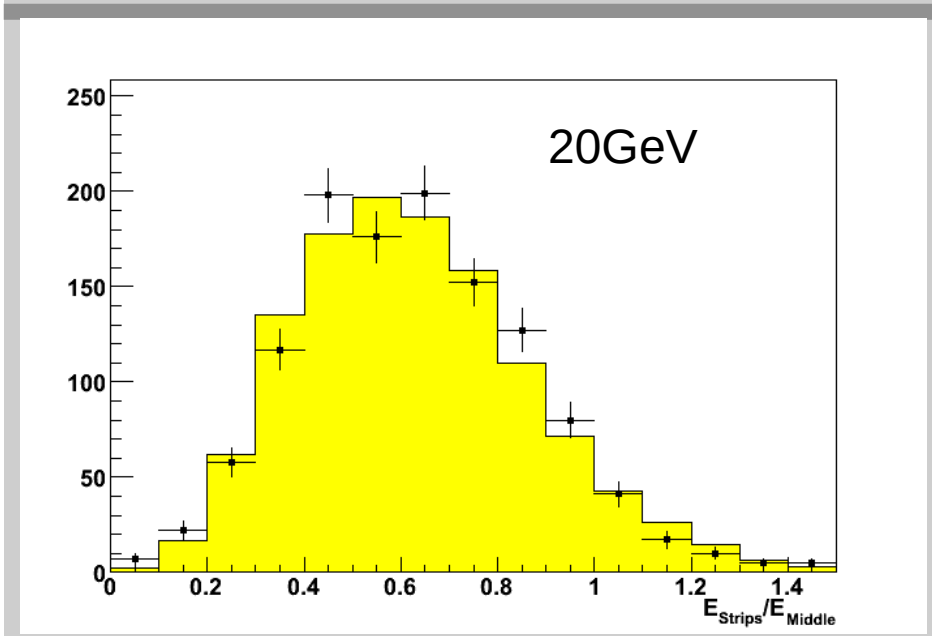
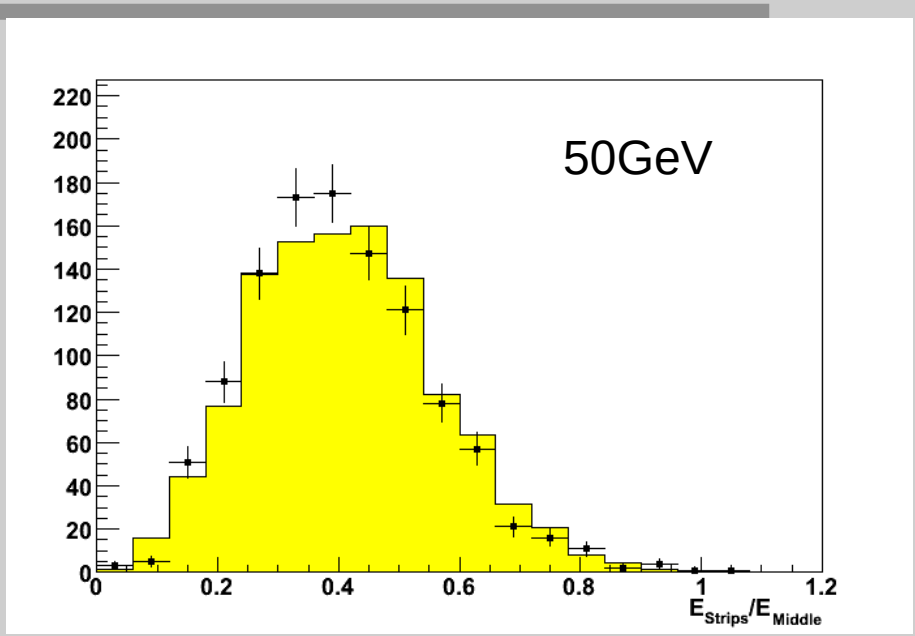
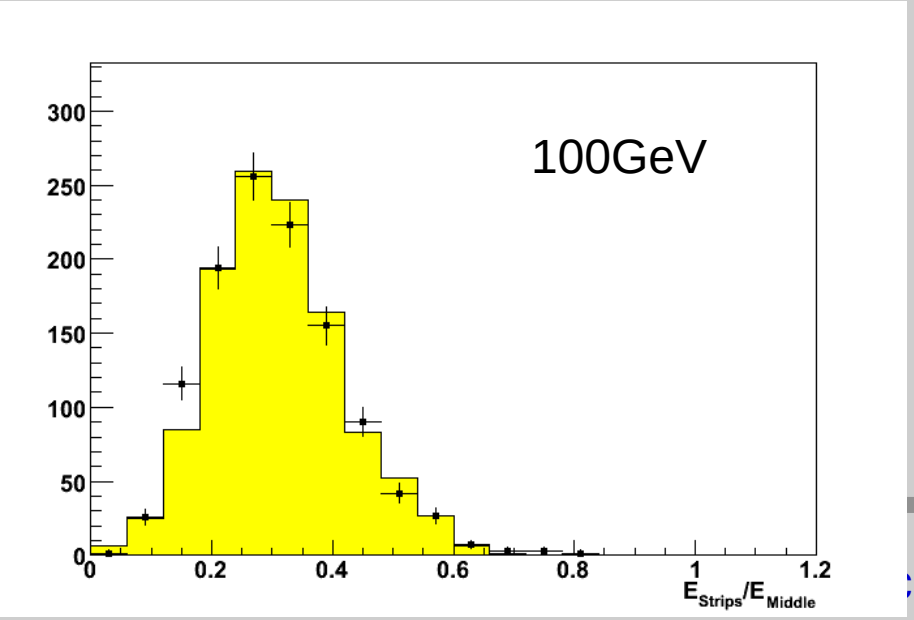
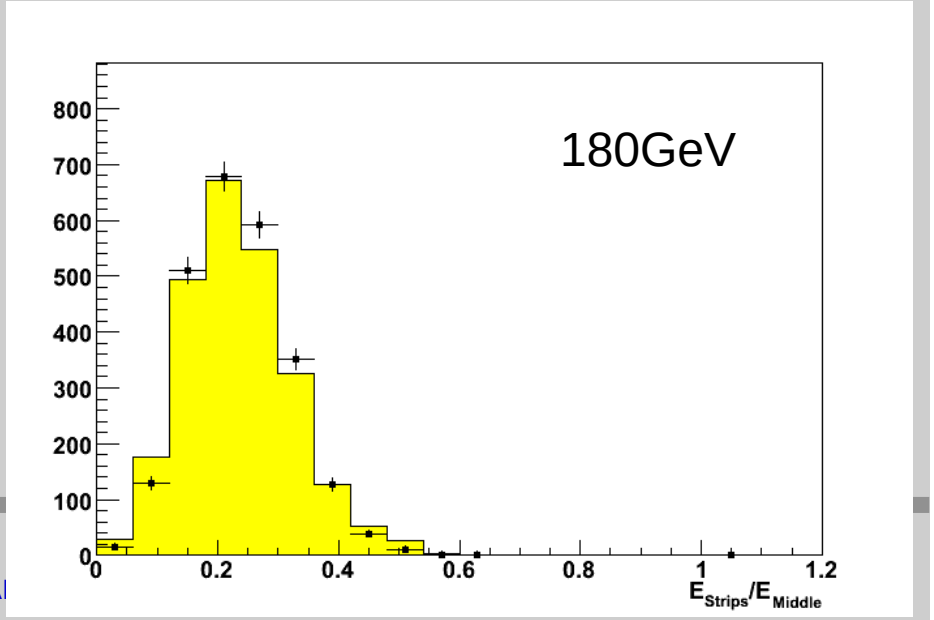
Estrips/Emiddle all energies (period 5)

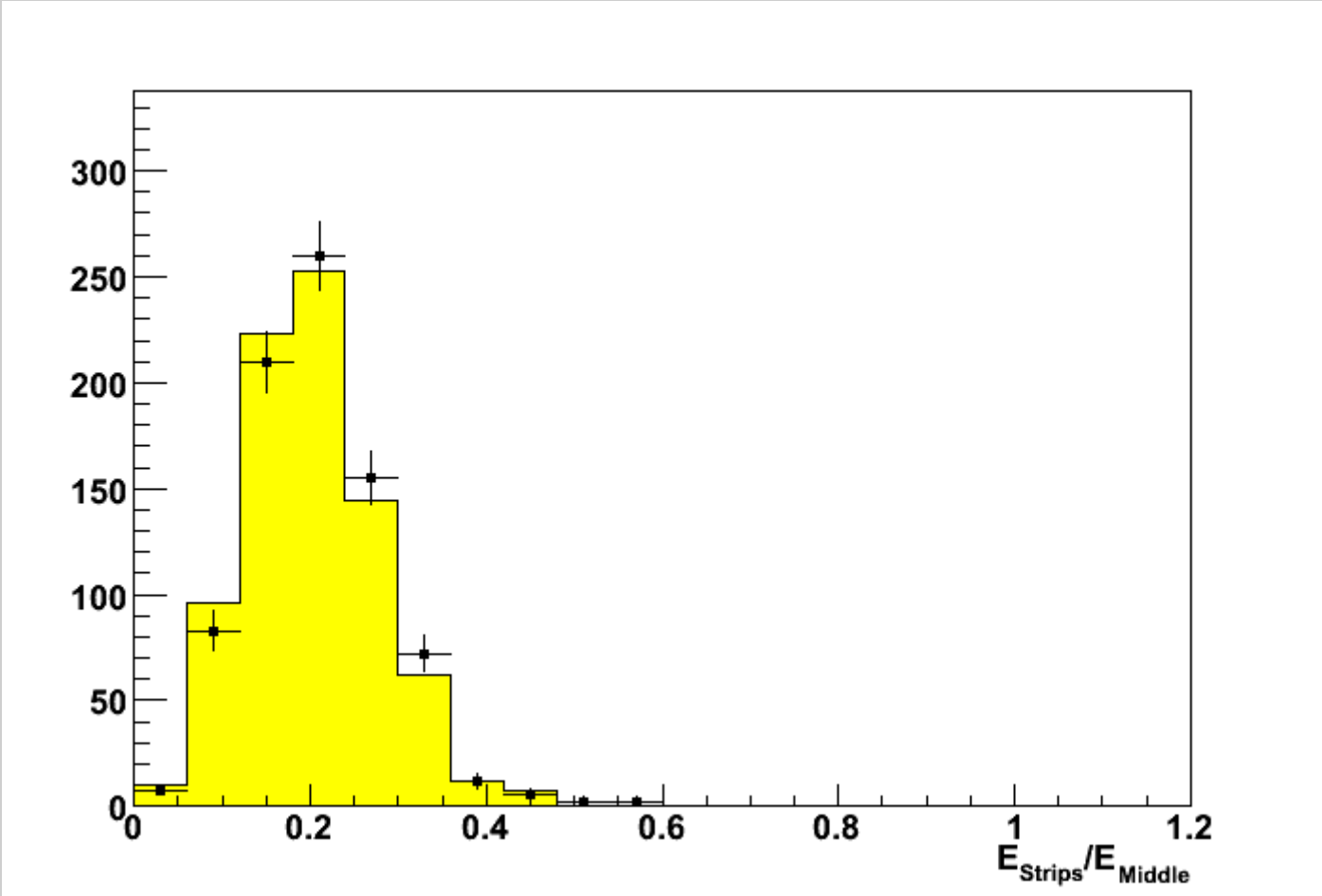




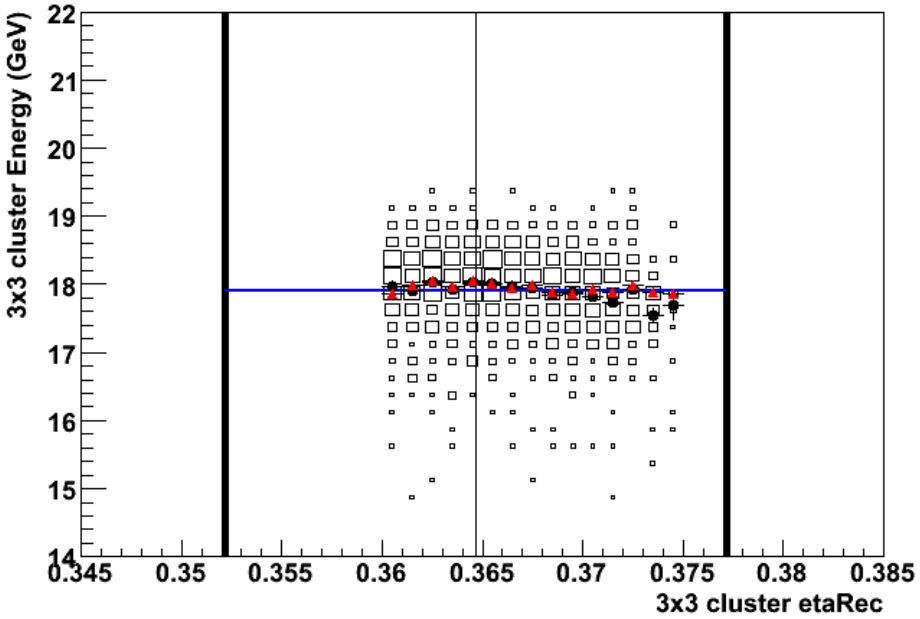


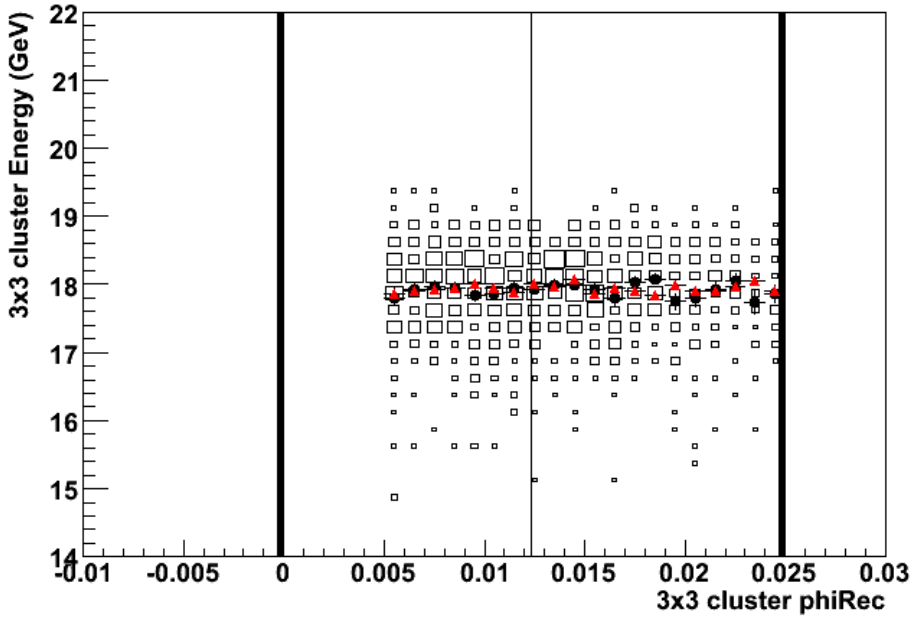


Estrips/Emiddle (250GeV period 6)

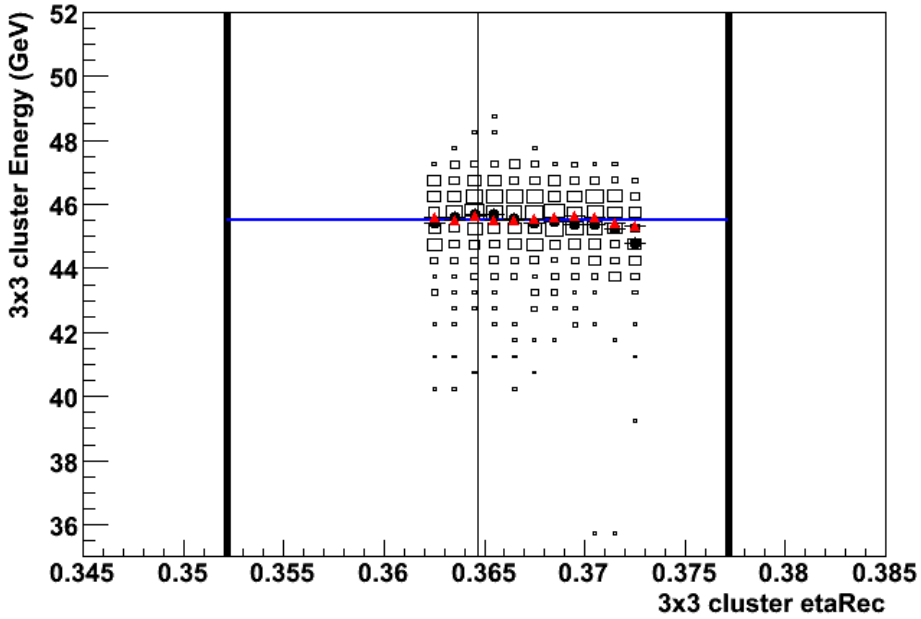


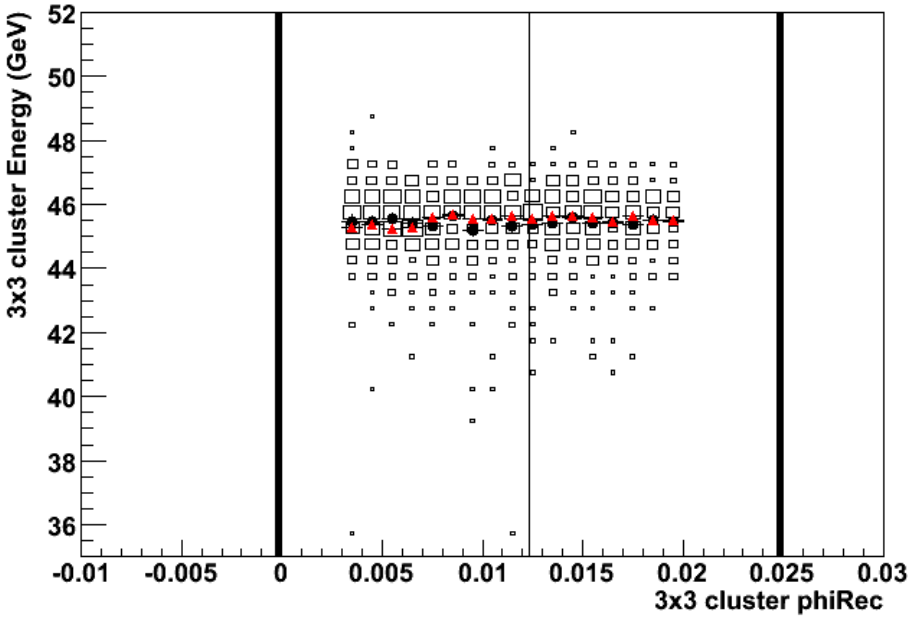
Eta/phi comparison (20GeV)



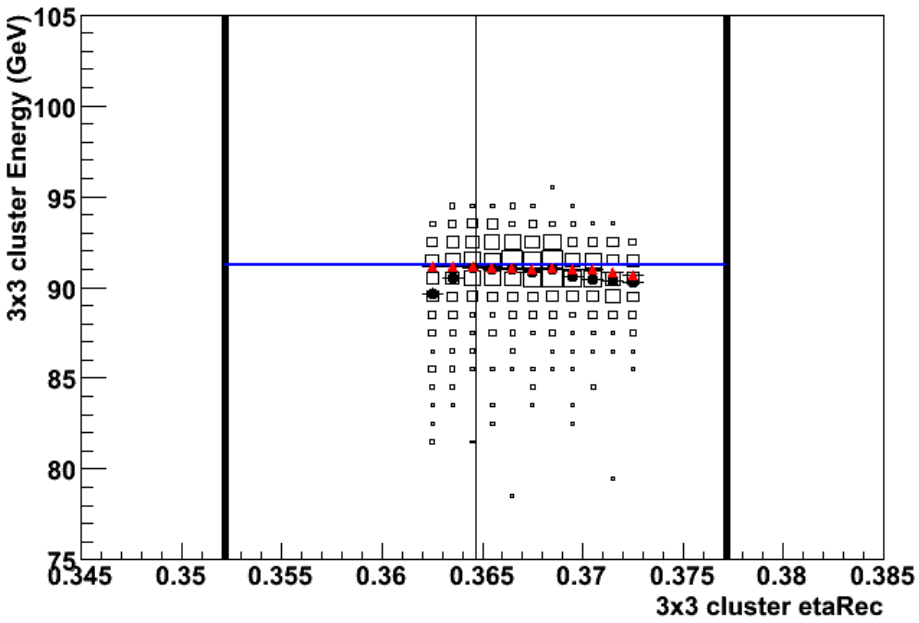


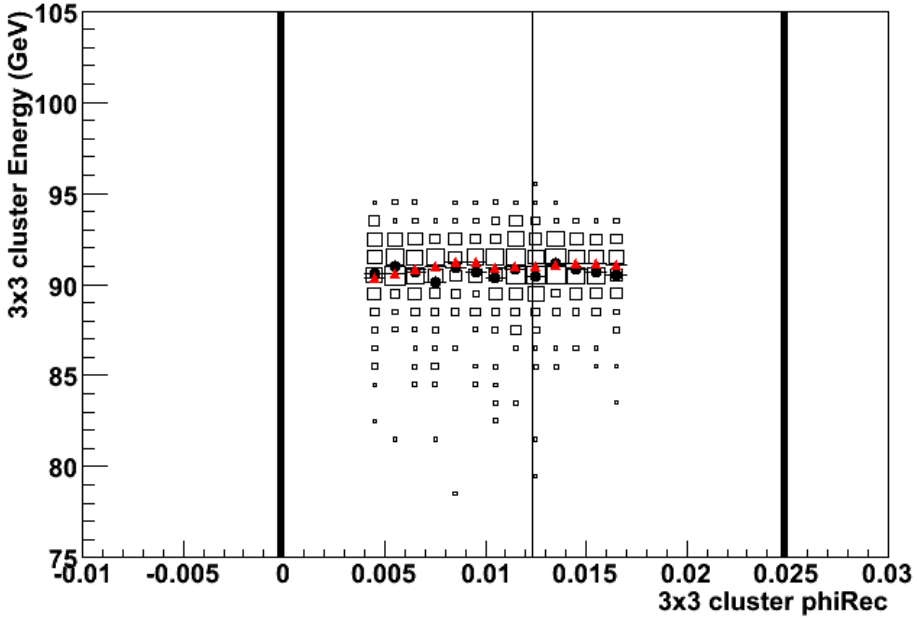
Eta/phi comparison (50GeV)



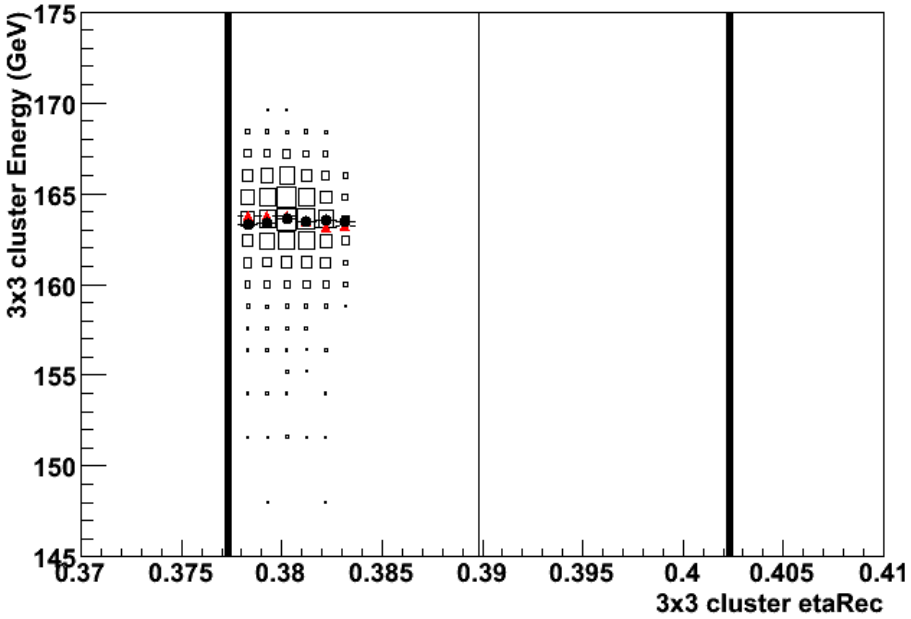


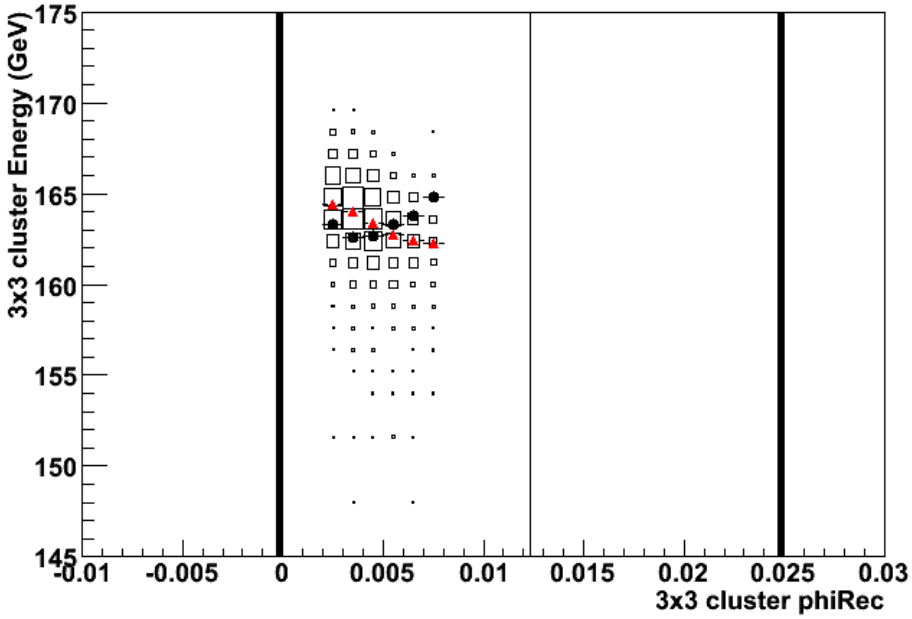
Eta/phi comparison (100GeV)



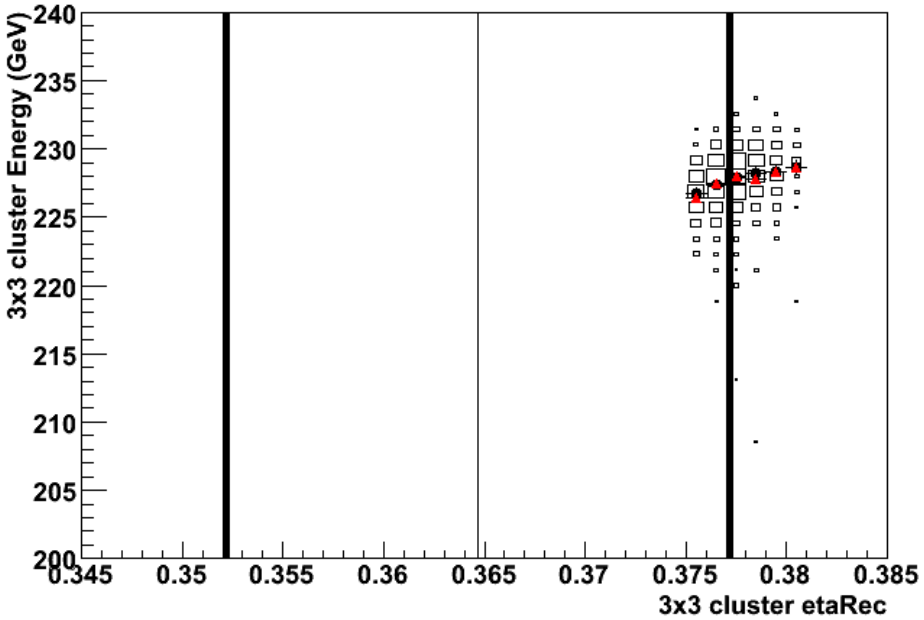


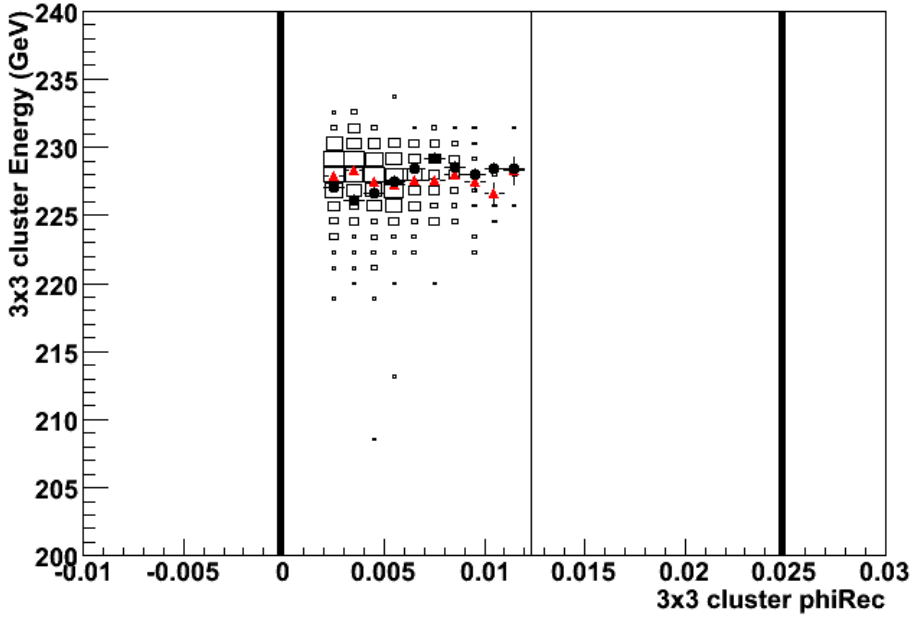
Eta/phi comparison (180GeV)



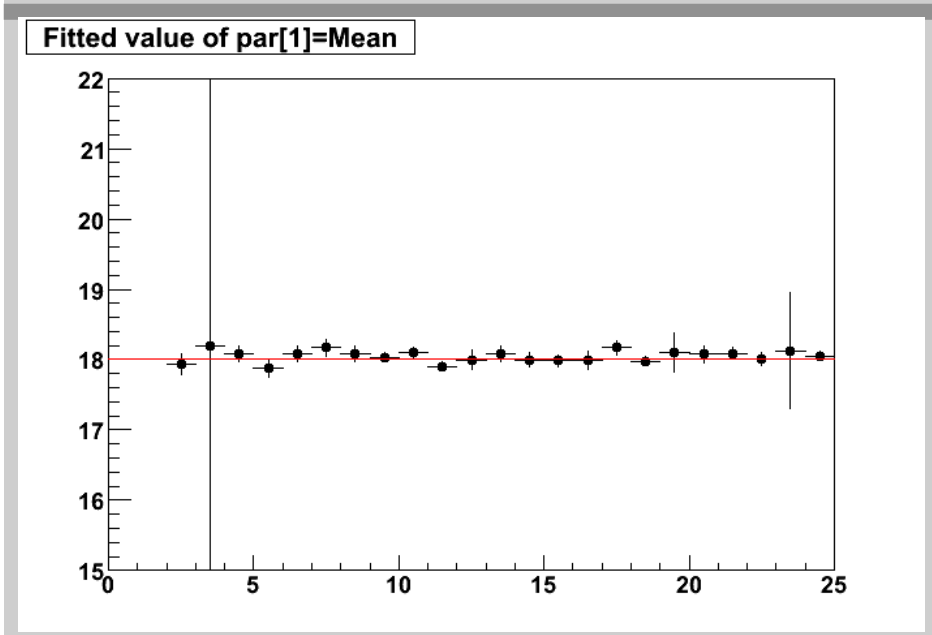


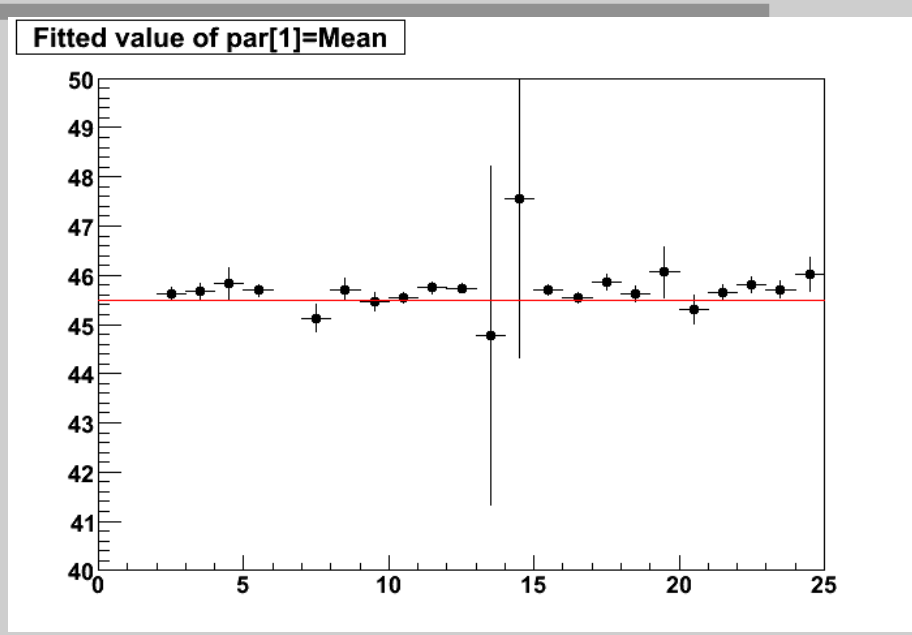
Eta/phi comparison (250GeV)

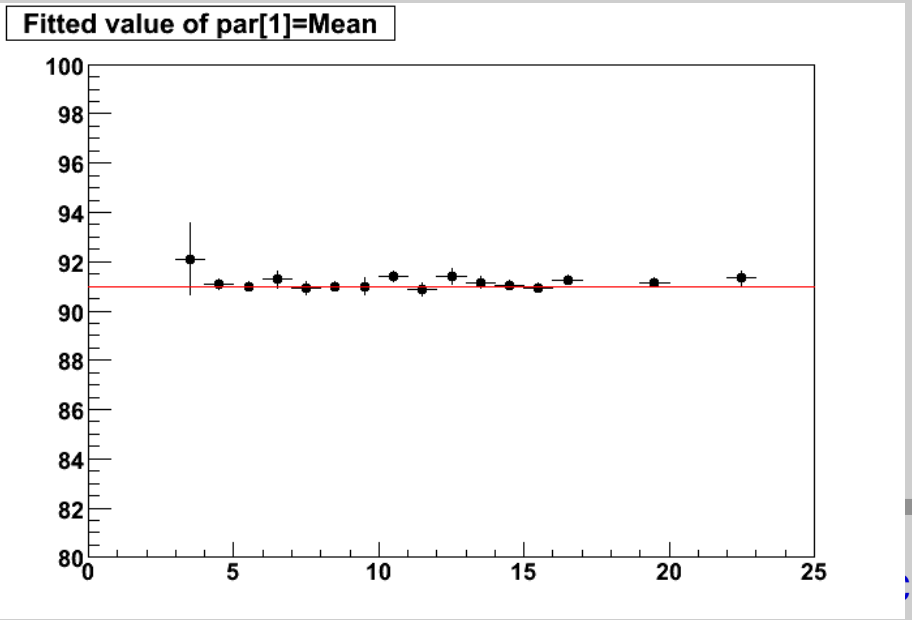


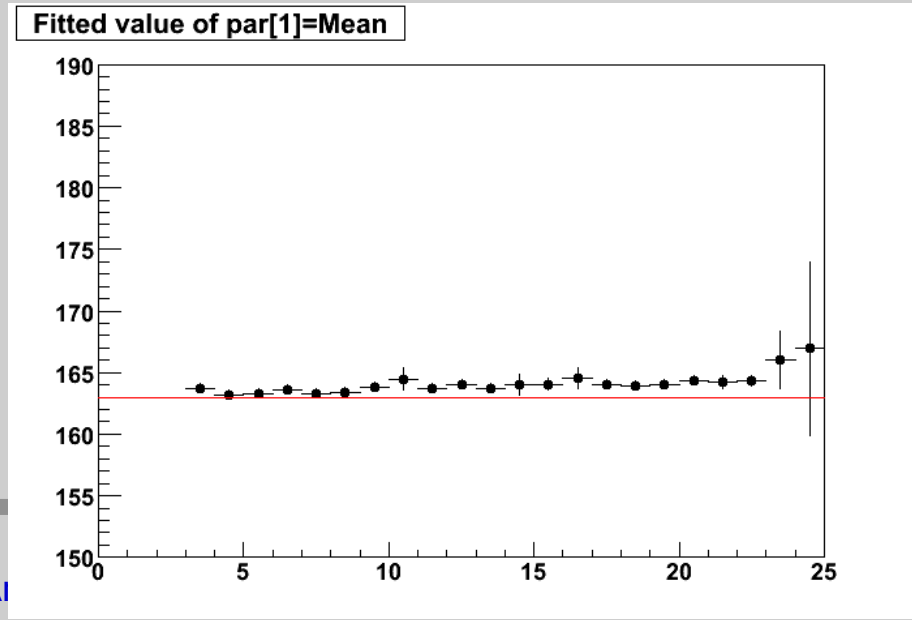


Energy vs Clock

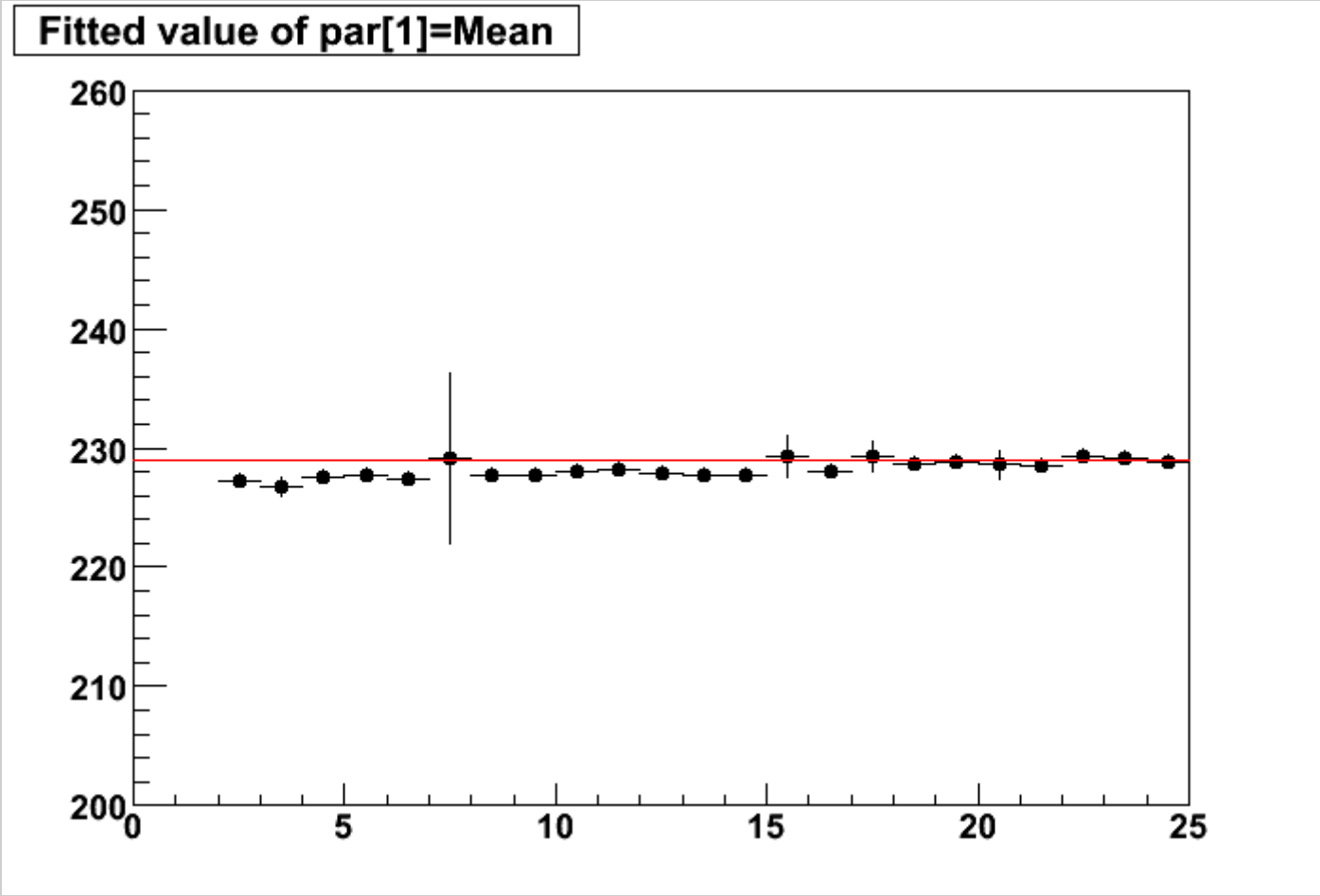




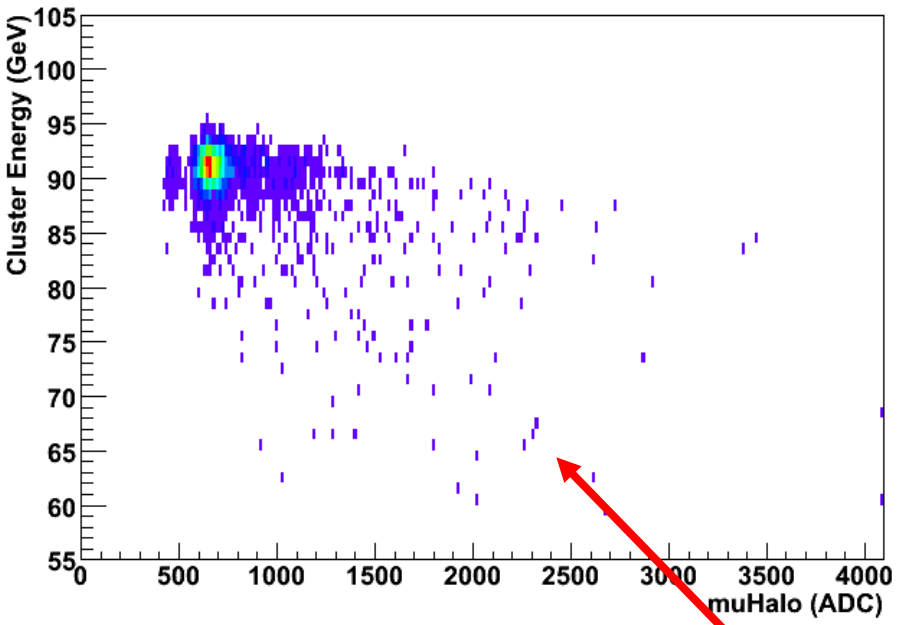


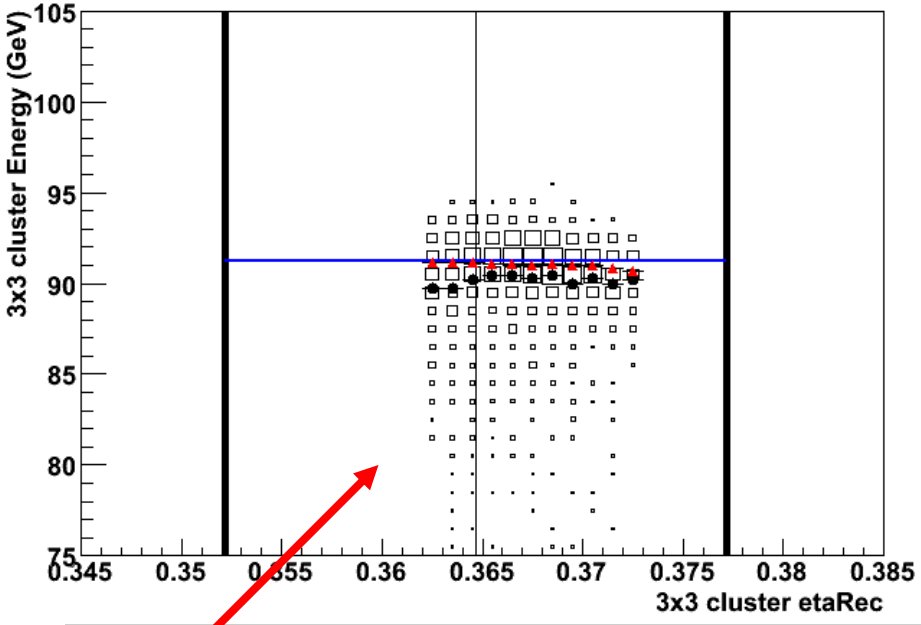


Erec vs Clock: 250 GeV



Remove MuHalo cut for 100GeV





Tails in Erec increase and we loose in resolution