PES Simulation, Data/MC Comparison

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DataSets

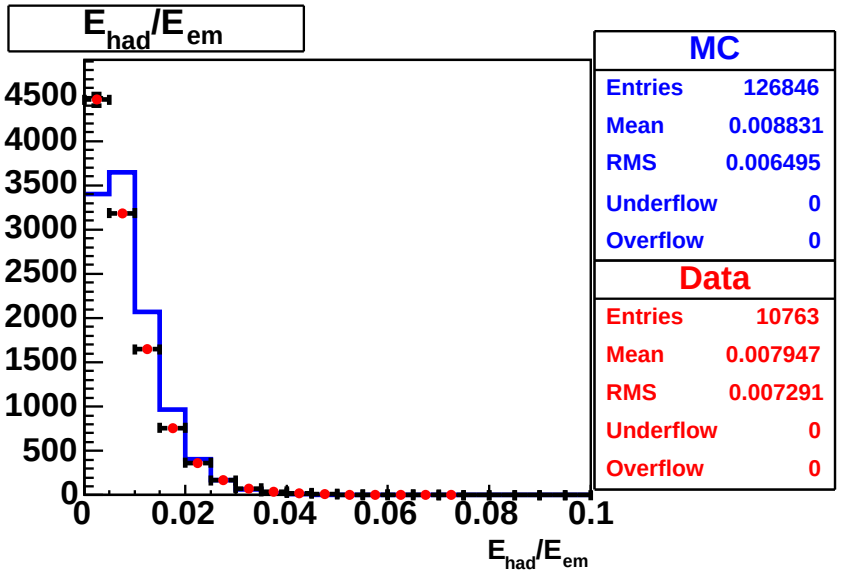
- Data:
  - Plug Electron dataset (bpel0d)
  - Run 176623 - 179055
  - $\mathcal{L} = 47.75\ pb^{-1}$ (offline)
  - Reconstructed with 5.3.1
- Monte Carlo:
  - Top group's $W \rightarrow e\nu$ MC (wtop1i)
  - Run 141544 - 179056
  - 1.3 M events
  - Version 5.3.2

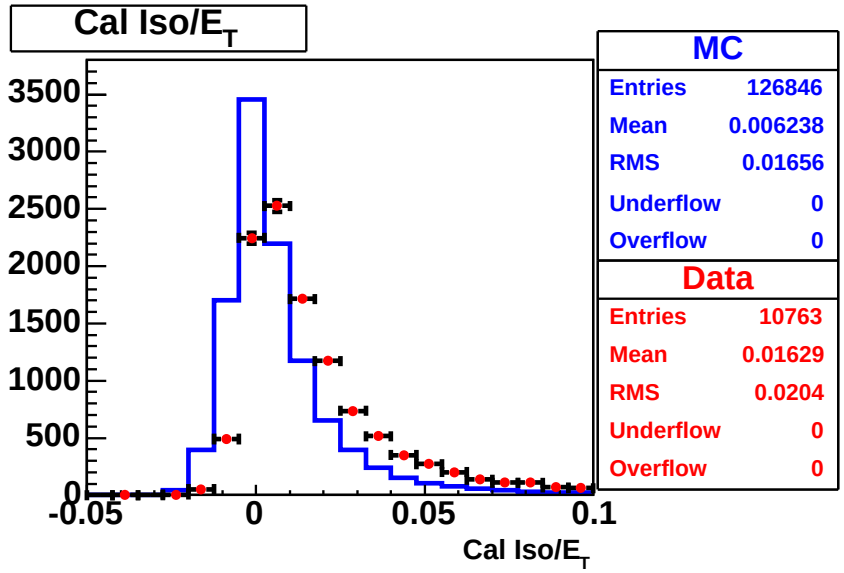
Table of Cuts

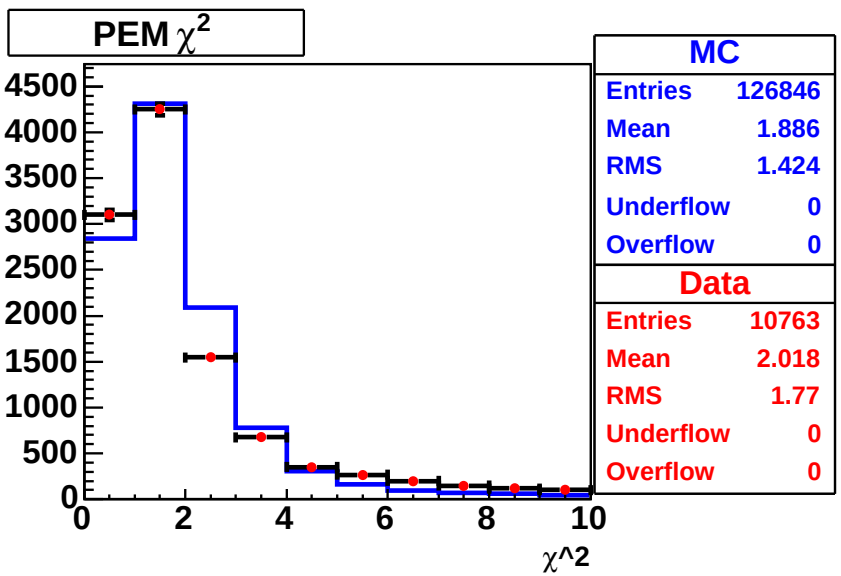
Cuts to select $W \rightarrow e\nu$

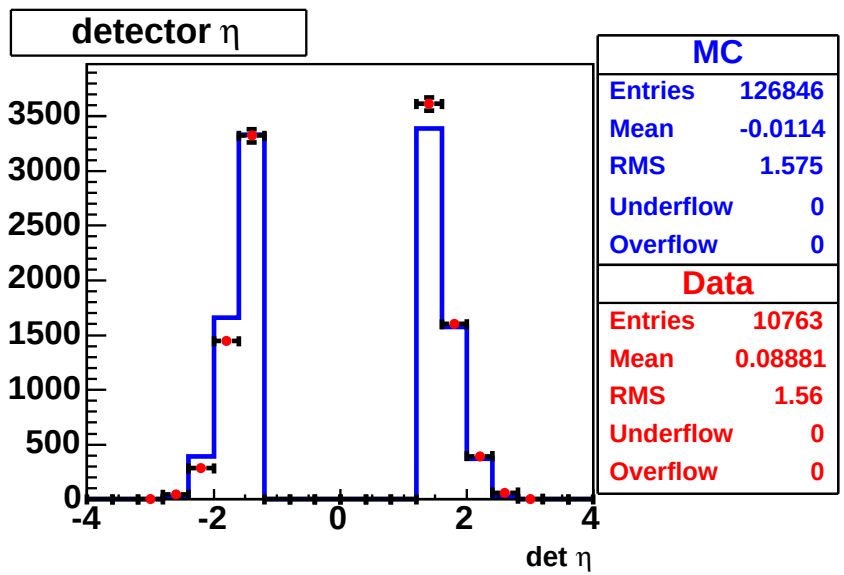
E_T	> 20 GeV
calIso	< 0.1
PEM 3x3 χ^2	< 10
E_{HAD}/E_{EM}	$>$ const eff
PES 5/9	> 0.65
$\|\eta\|$	> 1.2
p_T	> 10 GeV
ME_T	> 20 GeV
E/P	< 2

Electron ID Variables

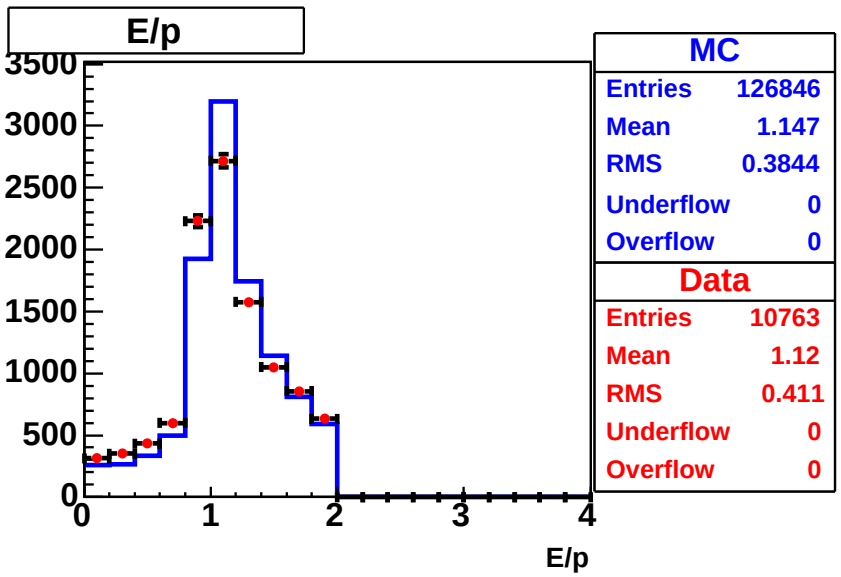


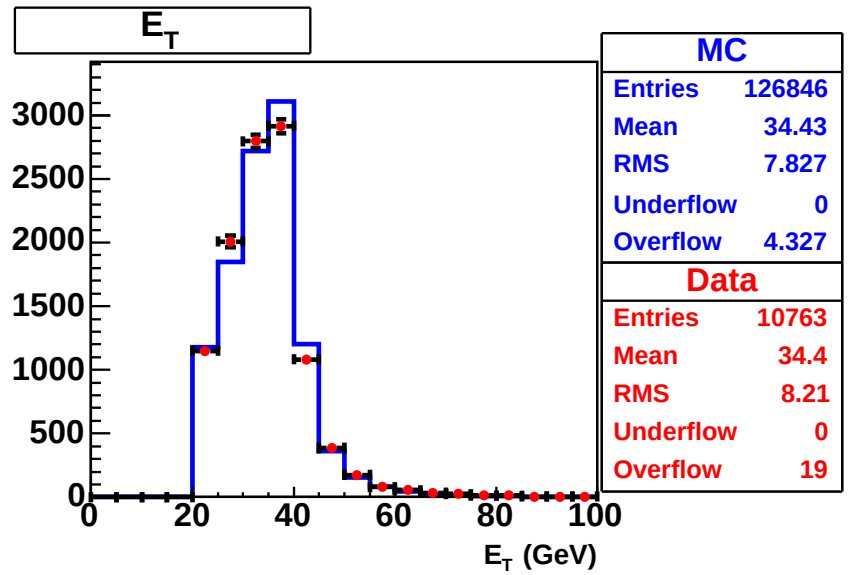


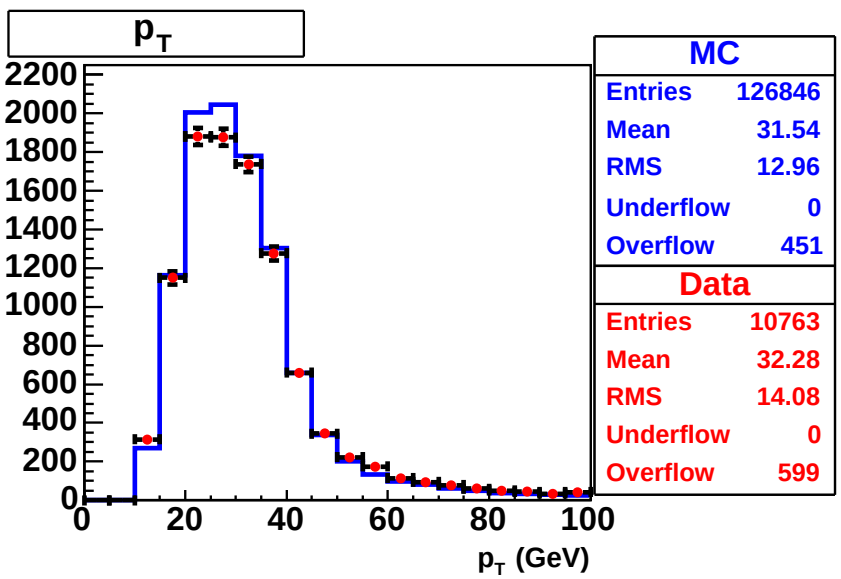


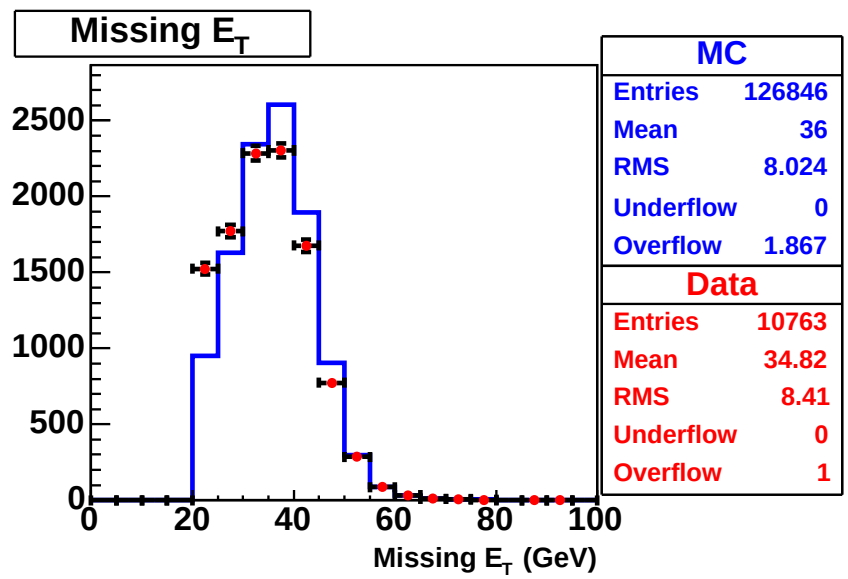


W Selection Variables





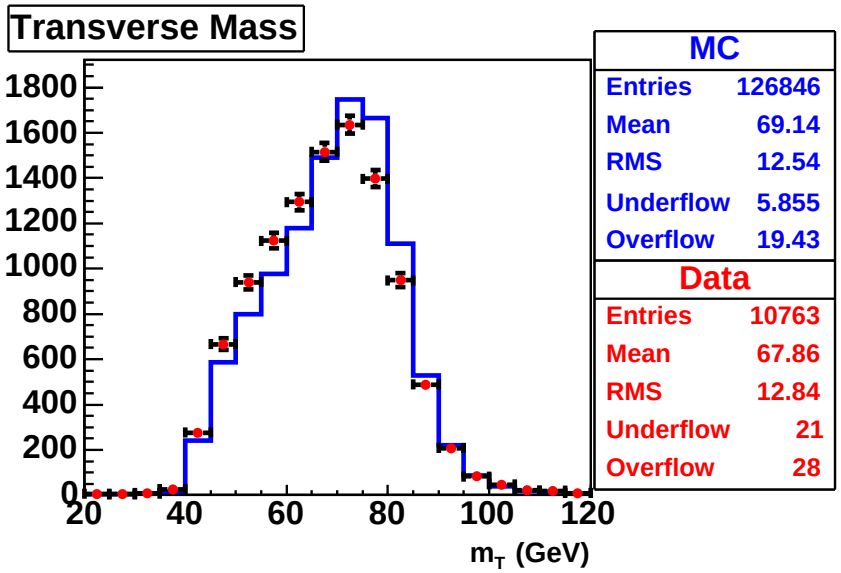


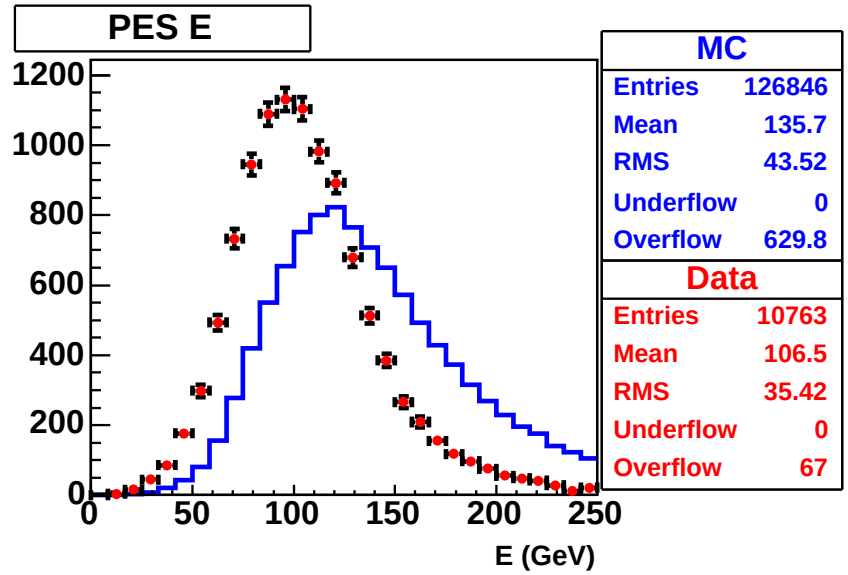


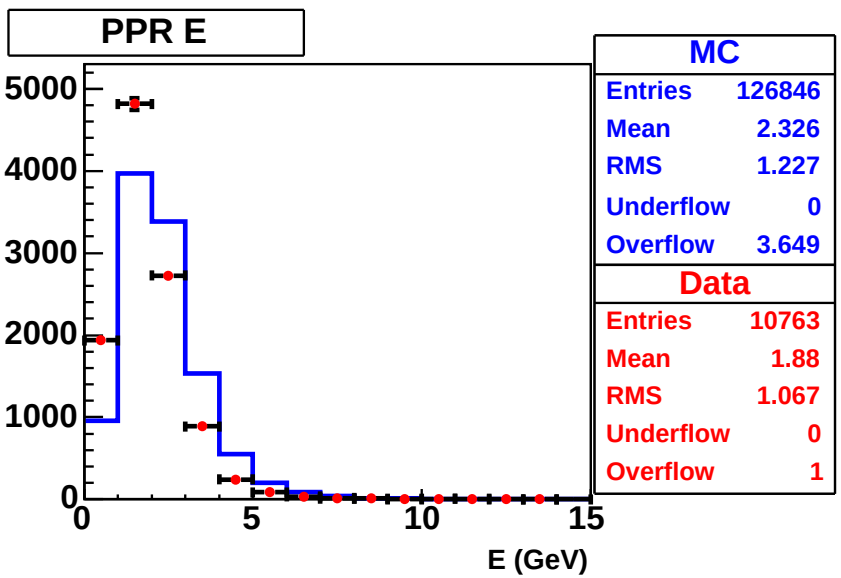
Notes on Energies

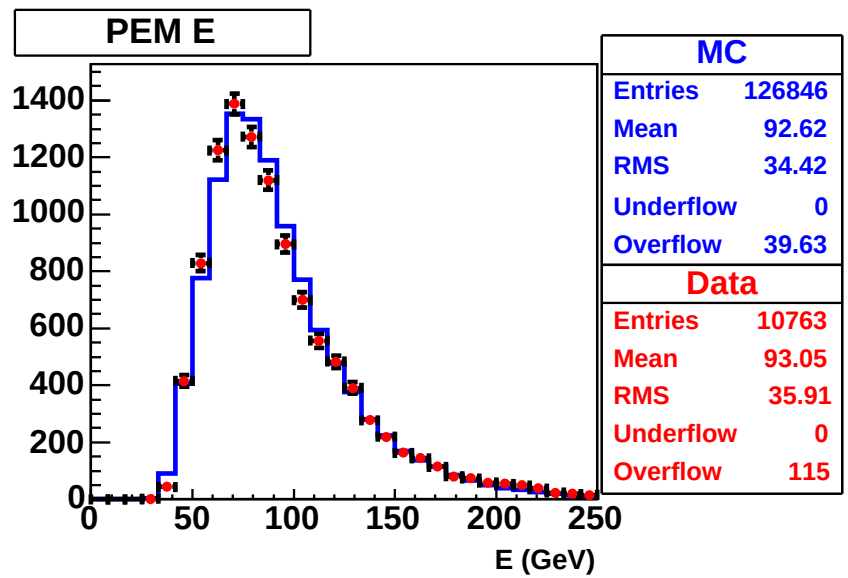
- PEM and PPR Energies are from StdPEMElectron
  - PEM E: pem3x3Energy()
  - PPR E: pprEnergy()
- PES energy is from Pes2dCluster
  - plug2dAverageEnergy()
  - the average energy is $\bar{E} = (U + 1.2V)/2.2$
- In this talk:
  - PES E $\equiv \bar{E}$
  - PES U $\equiv$ sum of 9 strips, U layer
  - PES V $\equiv$ sum of 9 strips, V layer

Plug Detector Energies

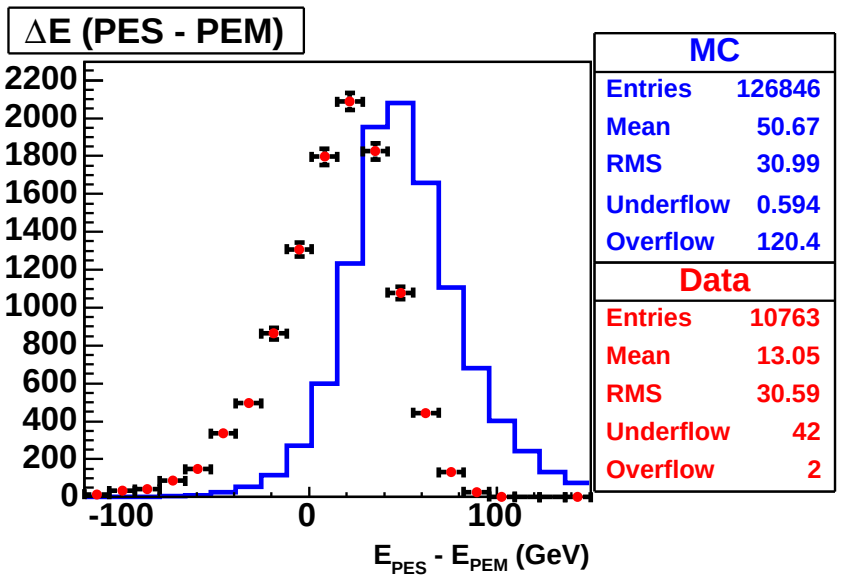


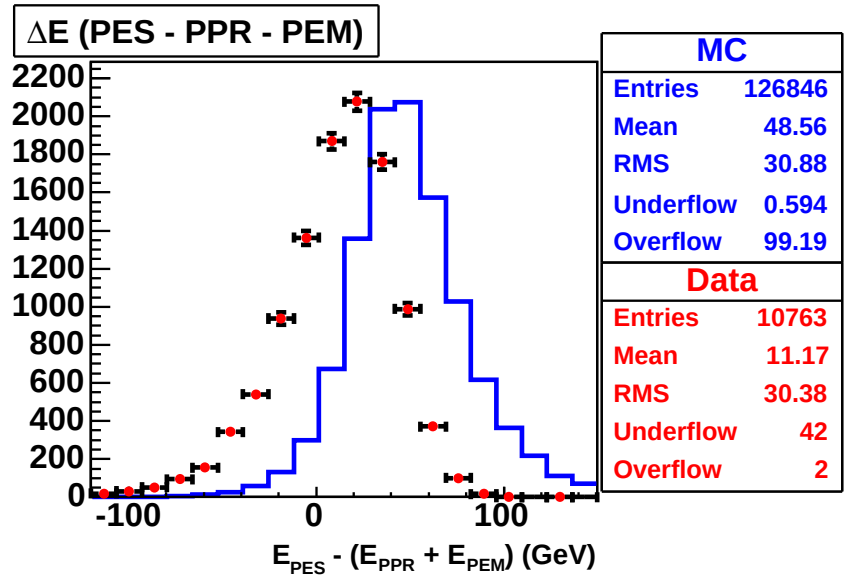


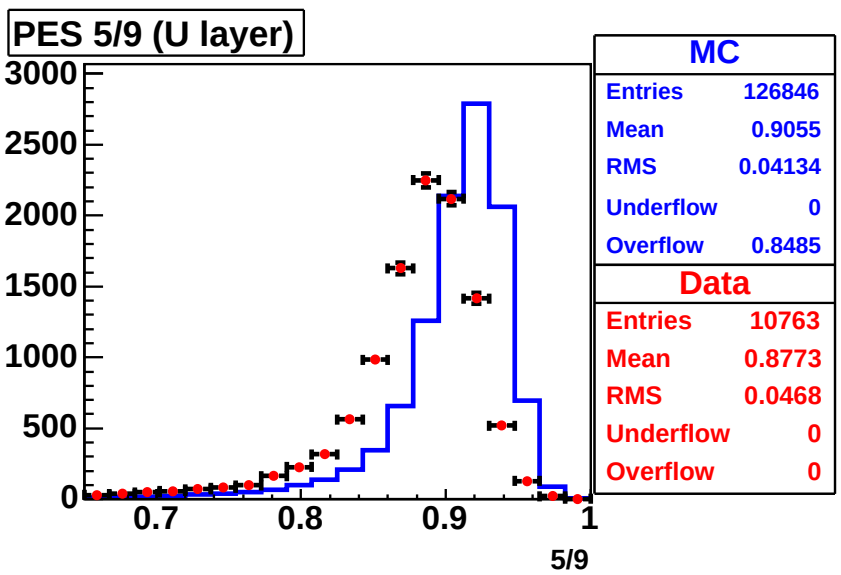


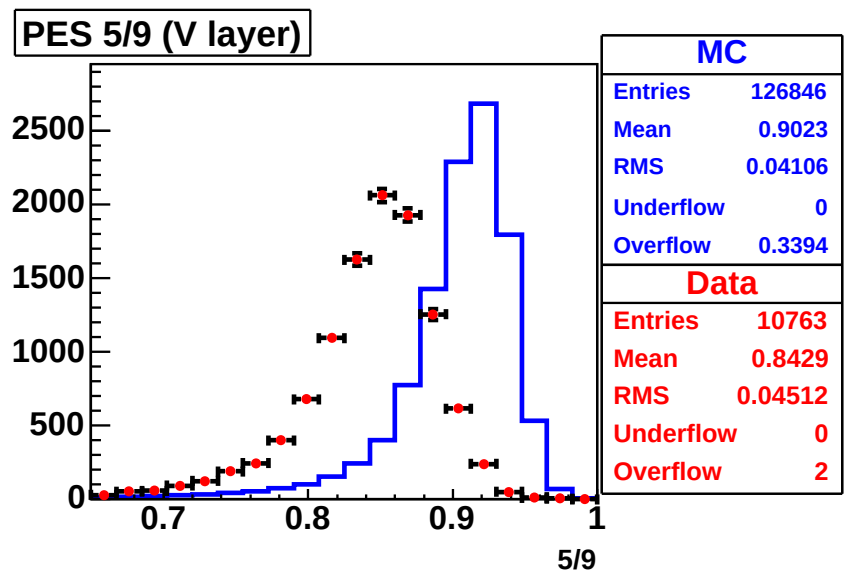


Energy Comparisons

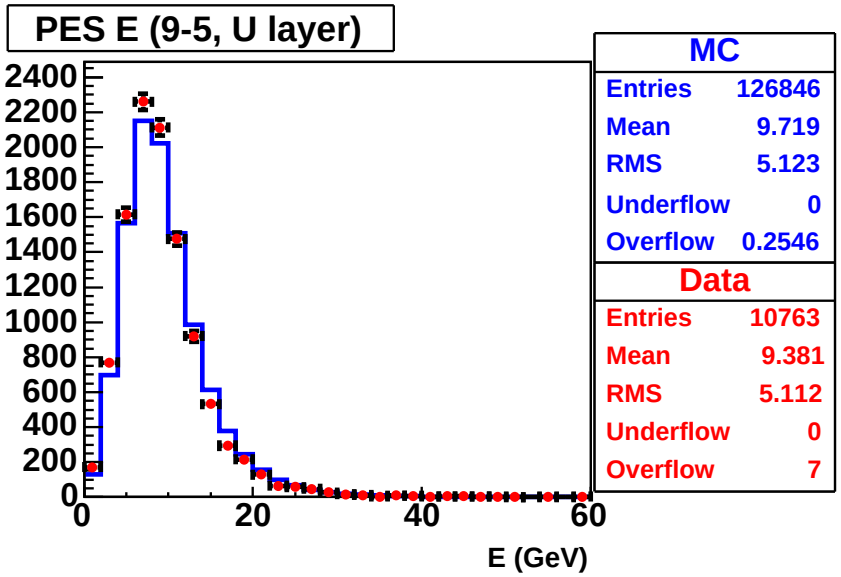


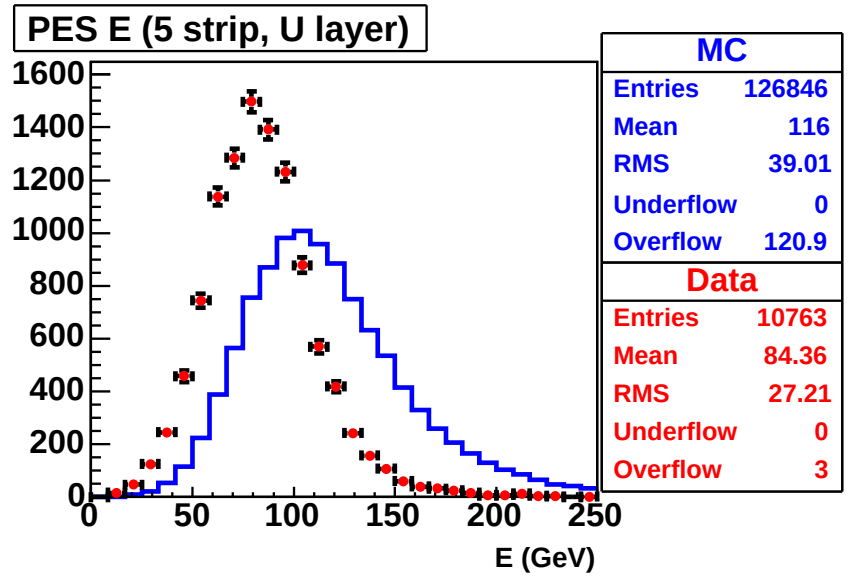


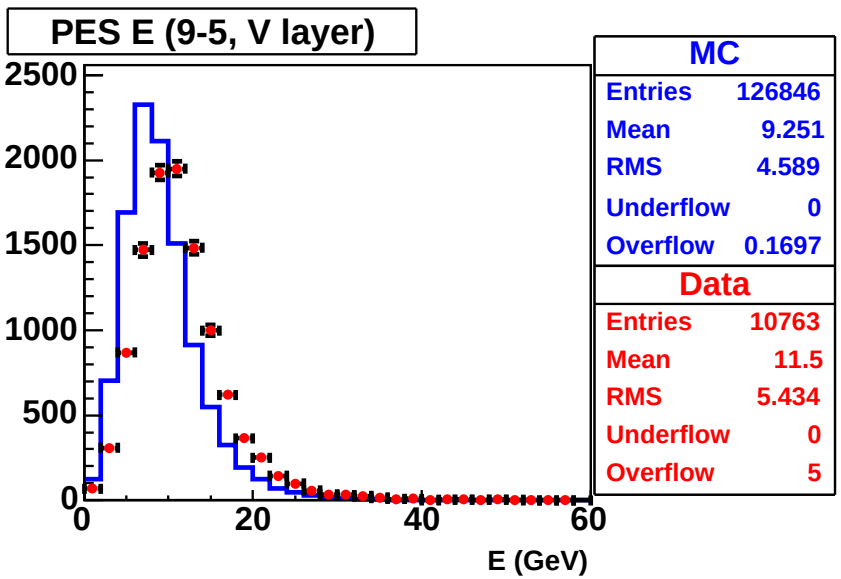


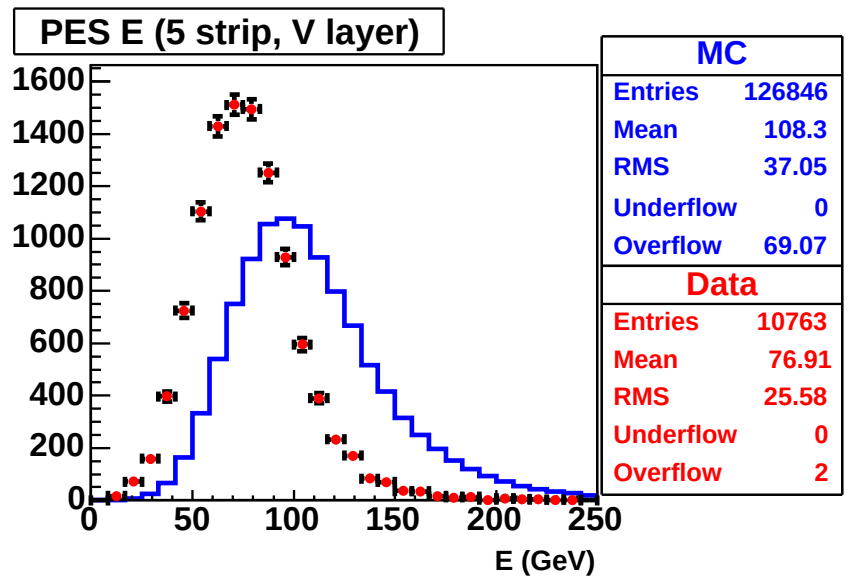


Cluster Energy

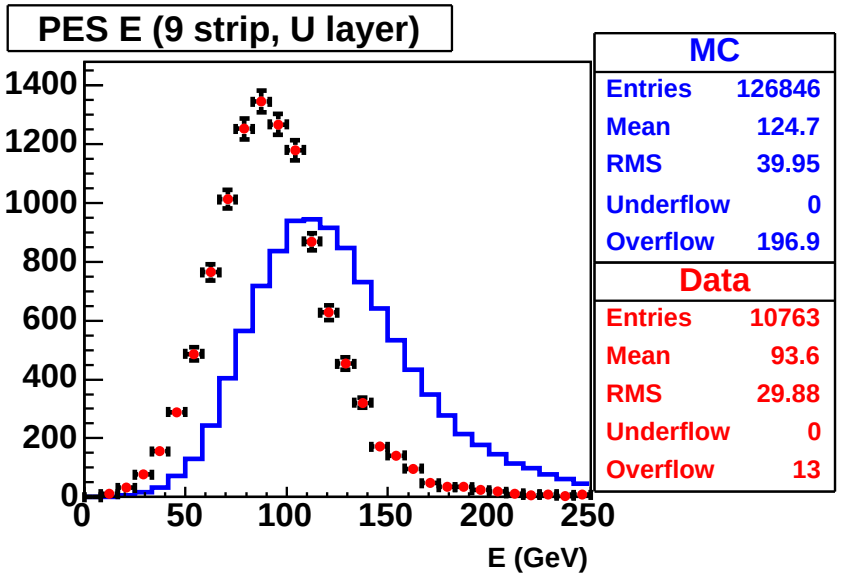


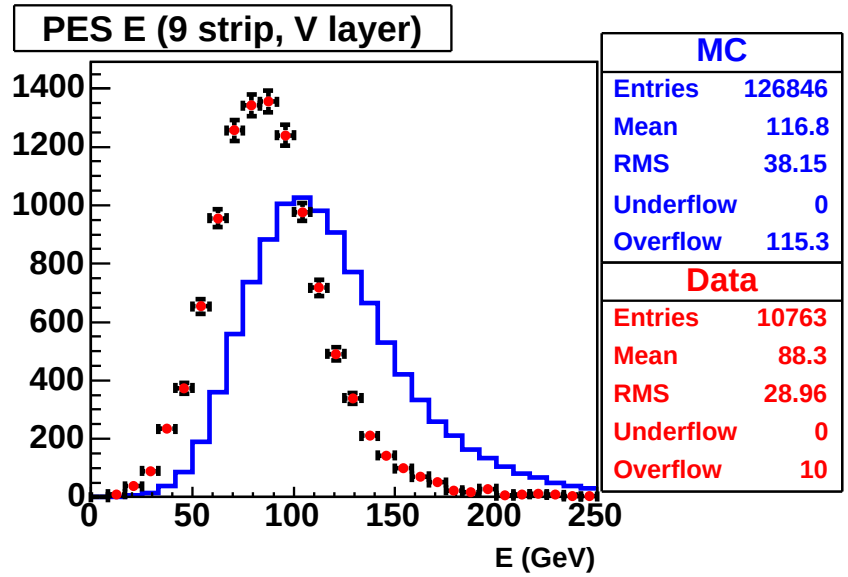


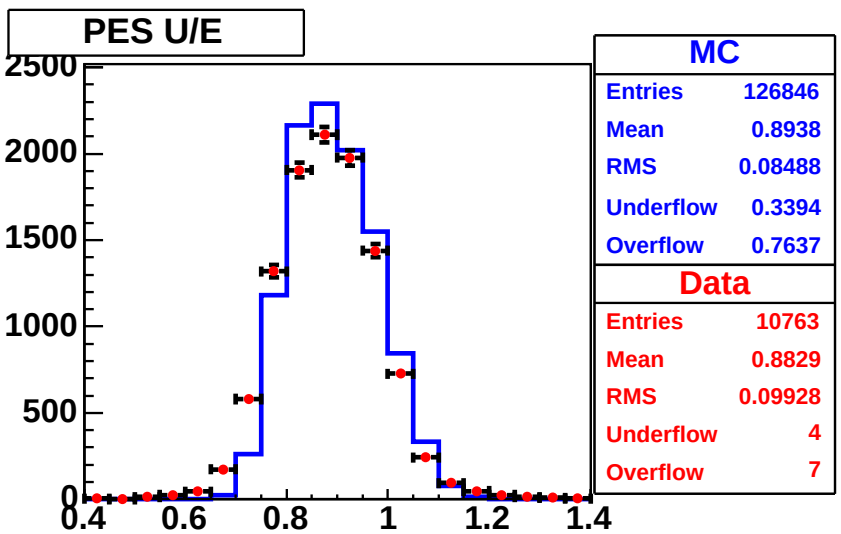


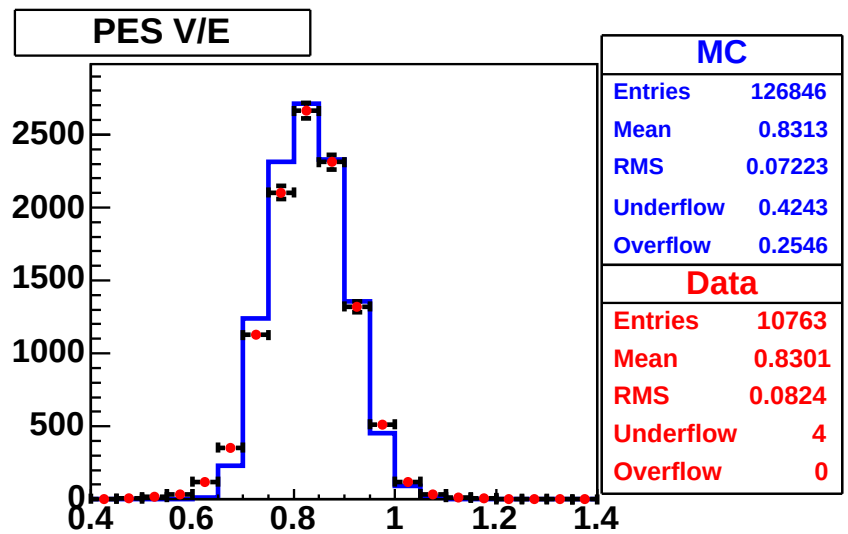


Cluster Energy







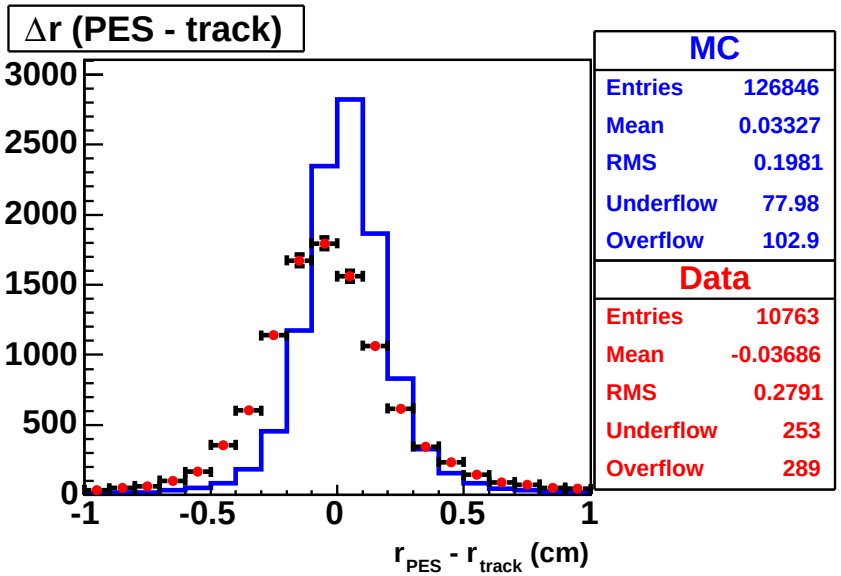


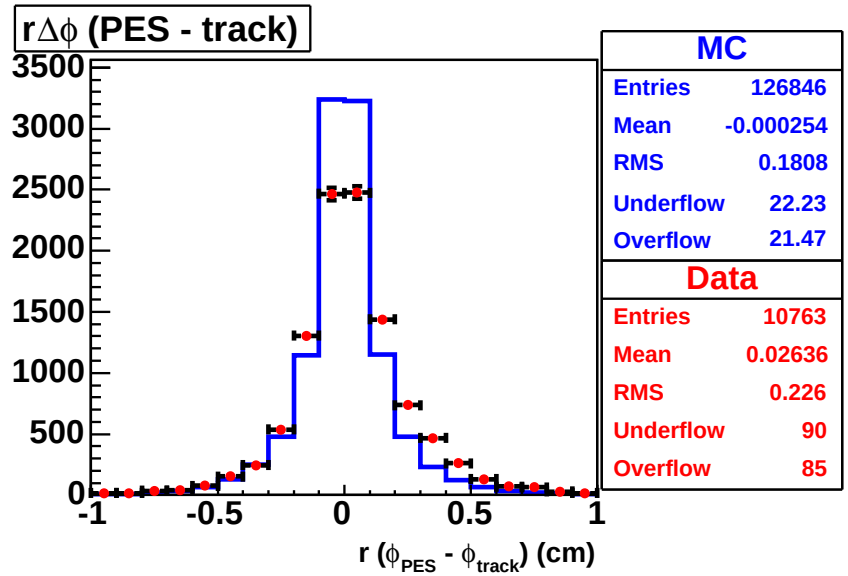
Notes on Position Residuals

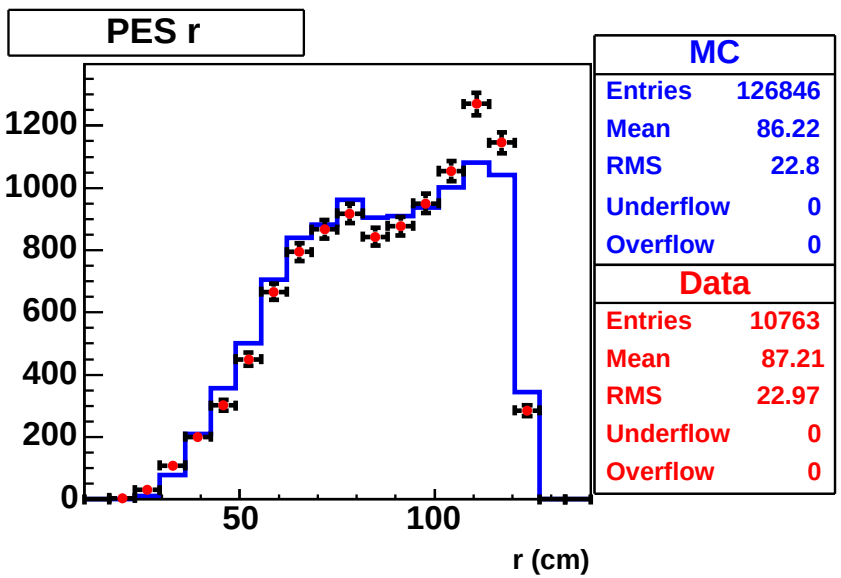
- PES data from after Nov '03 shutdown
  - reduced cross-talk in PES MAPMTs
  - data should be more comparable with MC
- Using improved PES alignment from UCSB
  - no mis-alignment in MC
  - data should be more comparable with MC
- Cluster/track residual variables (Δr and $r\Delta\phi$) taken from new accessors in StdPEMElectron
  - pesDeltaR()
  - pesRdeltaPhi()

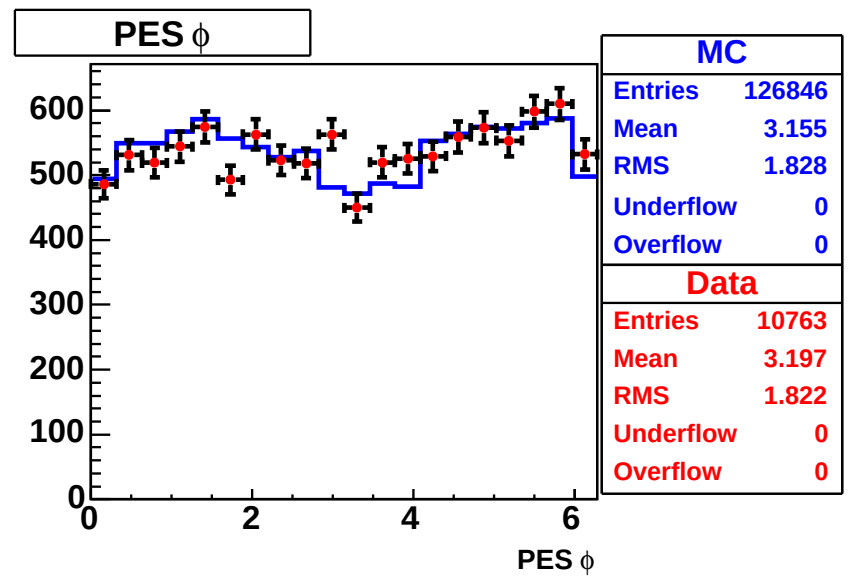
see http://www-cdf.fnal.gov/internal/upgrades/endplug/smd_files/remake_cluster.html for details concerning remaking PES clusters with newest alignment and the required versions of StdPEMElectron etc.

PES Position









Summary

- PES energy is 10 - 15 GeV higher than PEM in data
  - no attempts have been made to calibrate PES to PEM
- PES - PEM energy offset is 35 - 40 GeV higher in MC
- PES 5/9 variable has a mean of 3-6% higher in MC than data.
  - could be a real effect (some remaining cross-talk in MAPMTs)
  - simulation effects (too much energy in cluster centroid)
- In data, PES 5/9 has a 3% difference in mean between U and V layers.
  - theoretically there should be no difference (as in MC)
  - we do not fully understand why this effect is present
- Work is still in progress on PES alignment
  - improved version coming soon.