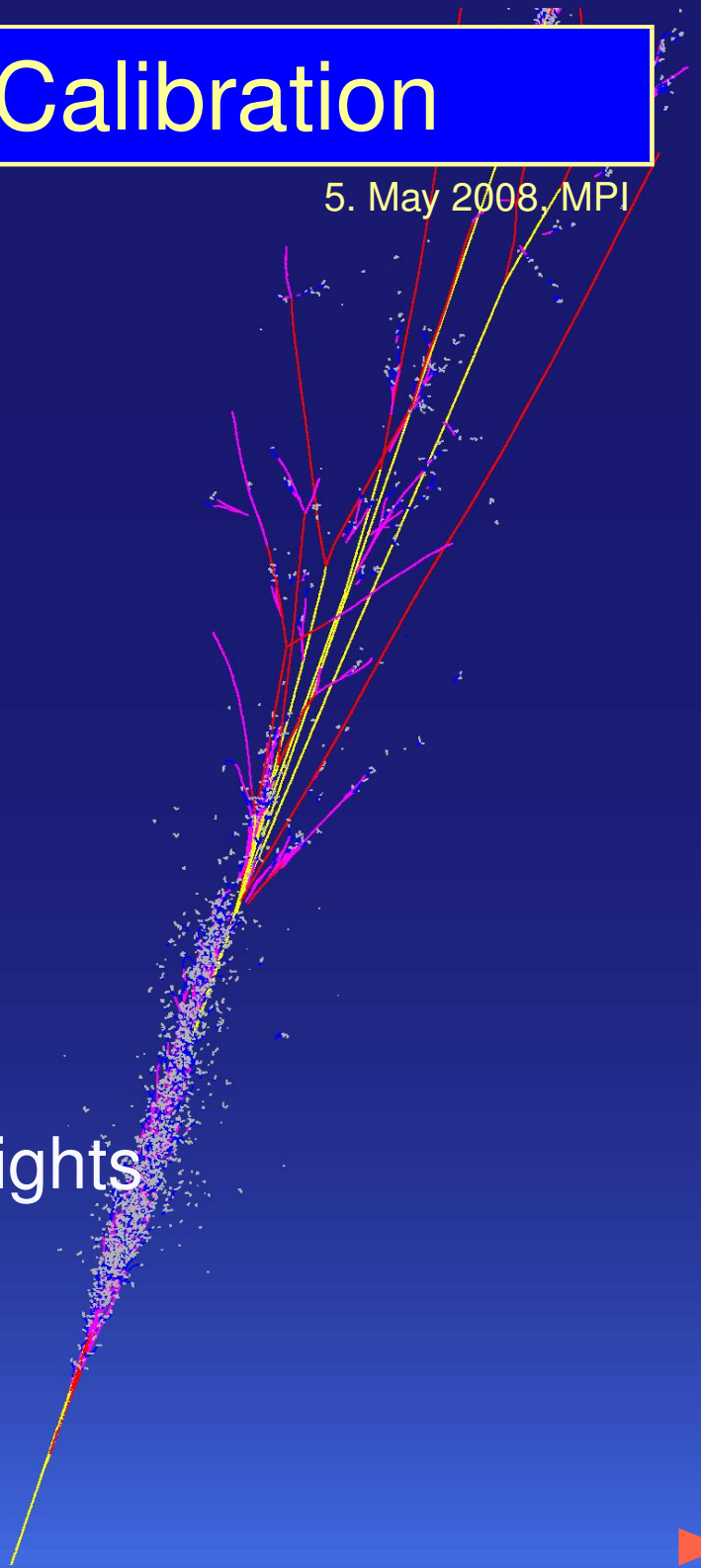
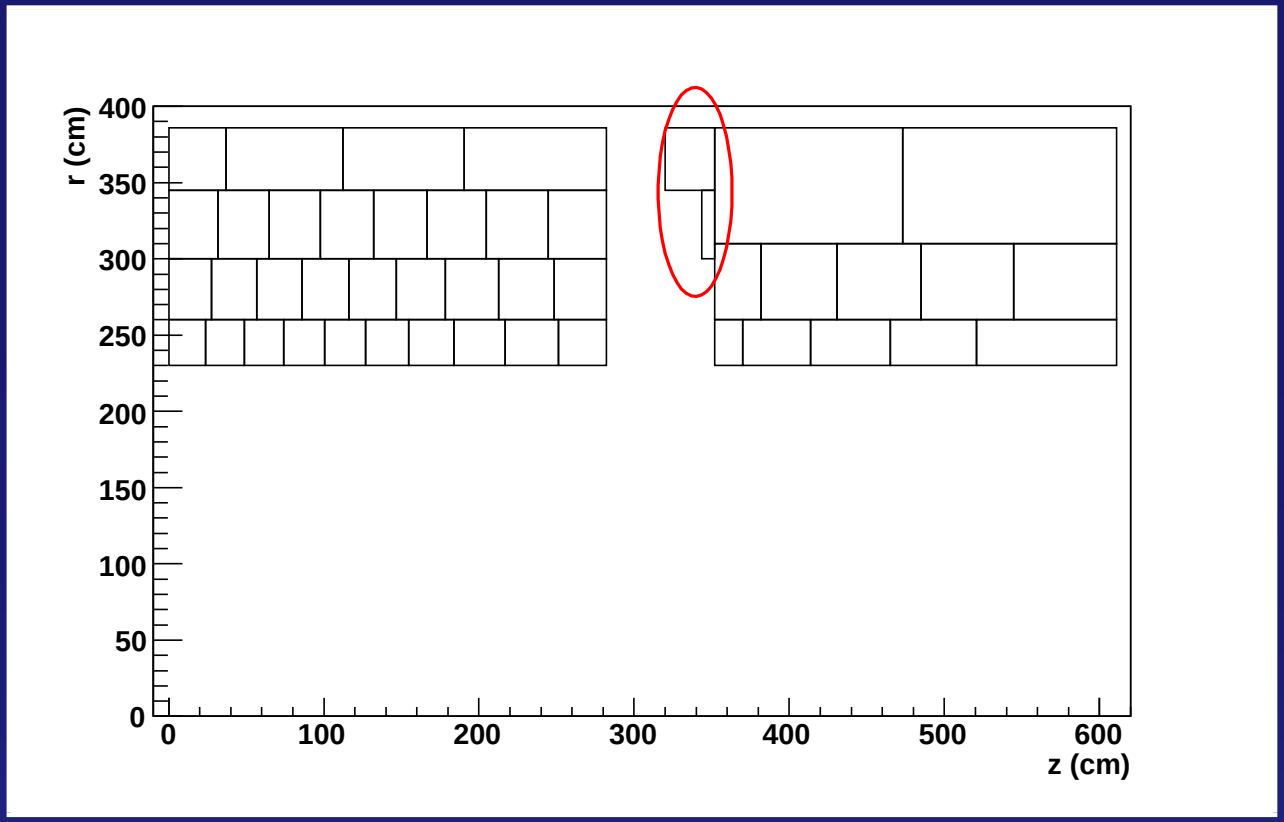
# Status of Local Hadron Calibration



- Current Work
  - refinement of hadronic weights
  - refinement of out-of-cluster corrections
  - current performance
- Plans for rel 14
  - prepare grid jobs to produce weights
  - refine classification



# Current Work



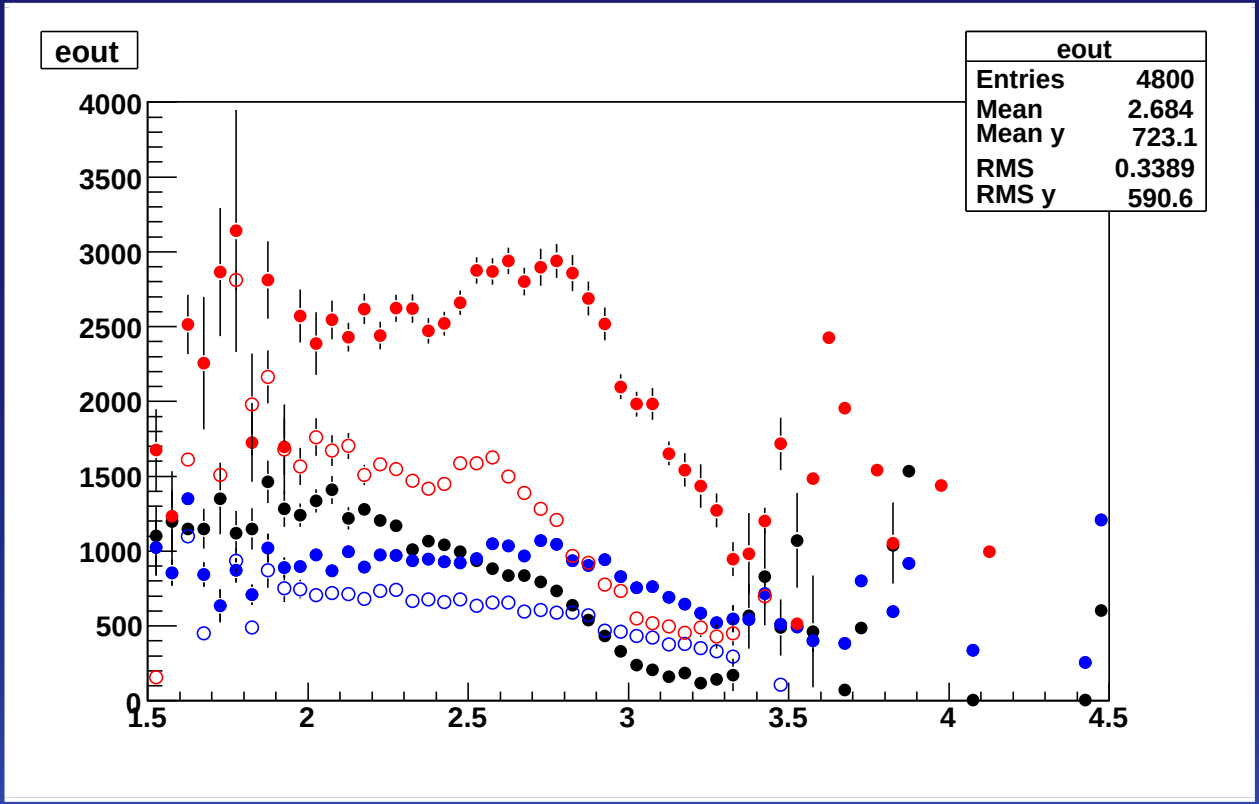

- Refinement of hadronic weights
  - start to include gap cells C and D (the large gap cells) in weights
  - currently by treating them like the cells in adjacent extended Tile
  - need still to check if this is sufficient or if smaller voume makes it necessary to use extra weights ...

# Current Work

- refinement of Out-of-Cluster weights
  - currently all clusters with positive energy are weigthed (also true for hadronic weights)
  - for OOC corrections no cut on significane of individual cells inside clusters
    - noise clusters receive large weights too
  - for hadronic weights currently $|E_{\text{cell}}| > 2\sigma_{\text{noise}}$ is required
    - symmetric treatment of noise inside positive clusters (o.k. for jets)
    - need to consider negative clusters as well to balance noise for MET too ...

# Out-Of-Cluster Energy

- Out-of-cluster energy for charged pions of 10 GeV at $0.2 < |\eta| < 0.4$ vs. $\log_{10}\langle\lambda_{\text{cluster}}\rangle$

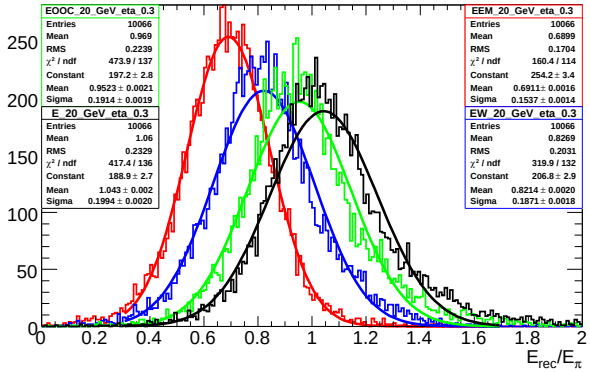


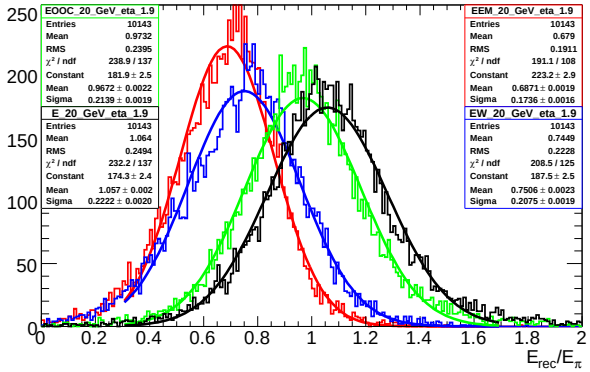

- black: Truth from calibration hits
- full red: current corrections for entire event (sum of all clusters) (weights from total out-of-cluster energy over expected pion energy vs. averaged depth and total expected energy)
- full blue: tested new normalization (weights from total out-of-cluster energy over expected pion energy times isolation vs. individual depth and individual cluster energy)
- empty red: current correction from cluster with true calibration hit contents
- empty blue: tested new correction from cluster with true calibration hit contents

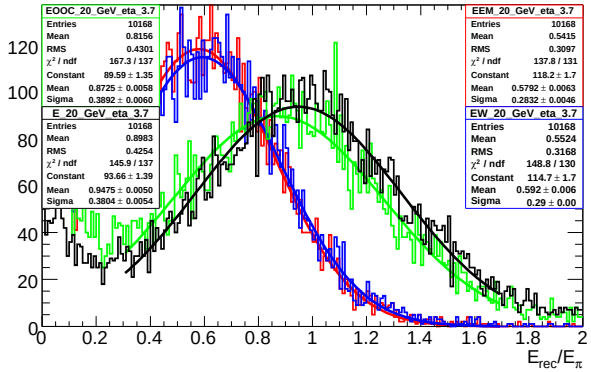
# Out-Of-Cluster Energy

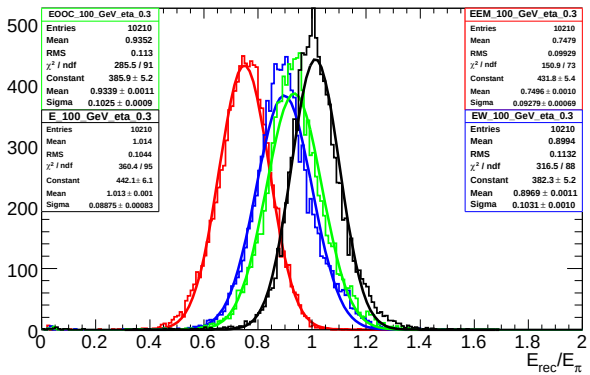
- Current correction overshoots due to weighting of positive noise clusters
- Tested new correction looks better if noise clusters are included but resolution of single pion energy worse
- If only clusters with calib hits are considered the reason becomes clear:
  - current scheme performes o.k. for signal
  - tested scheme underestimates OOC energy and shifts shape to larger $\lambda$
  - will refine current sheme to also consider negative clusters and discriminate noise cells within clusters

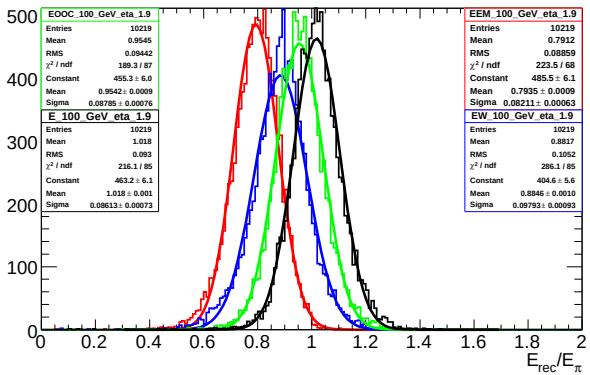
# Current Performance for single pions

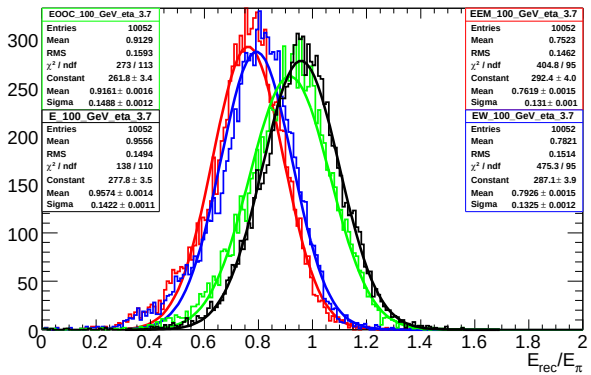


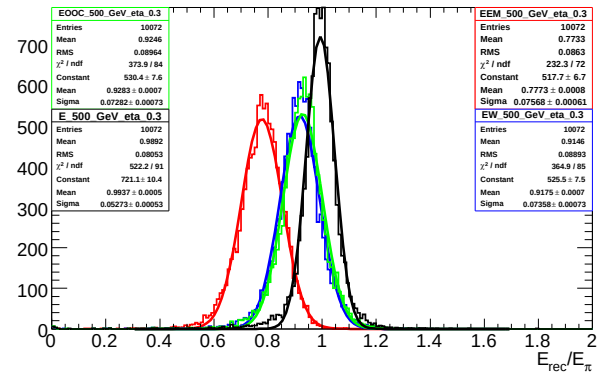



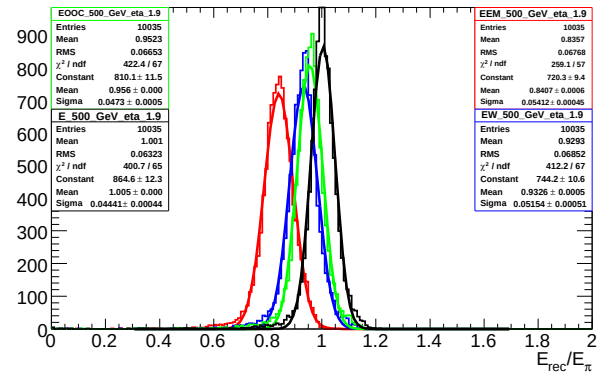



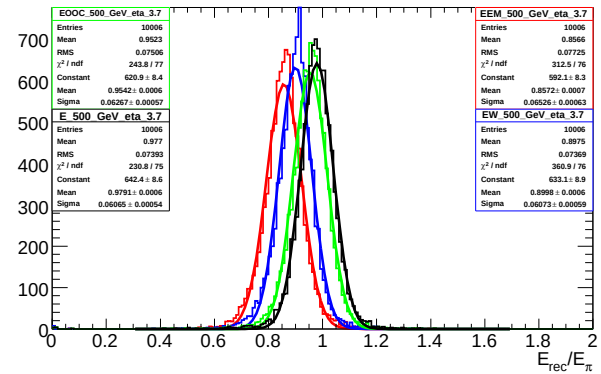



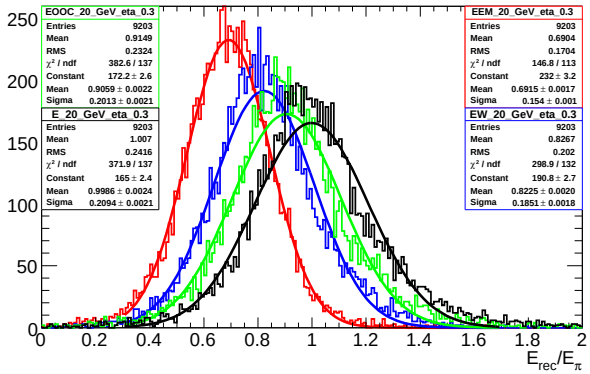



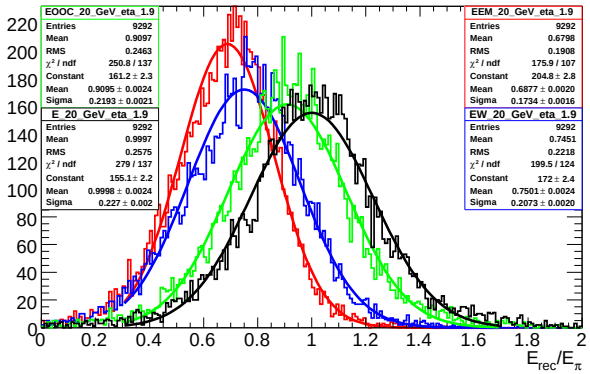



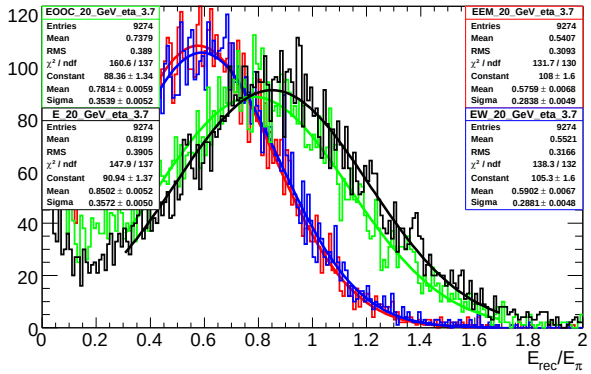



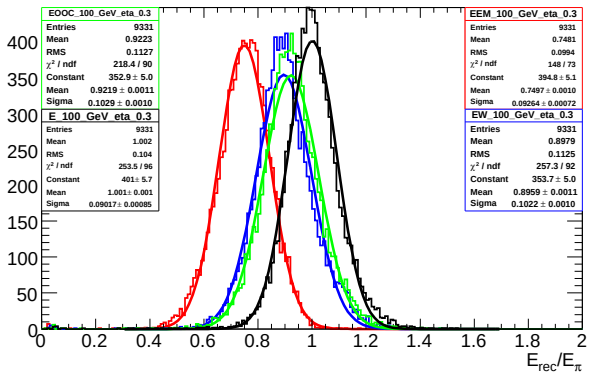



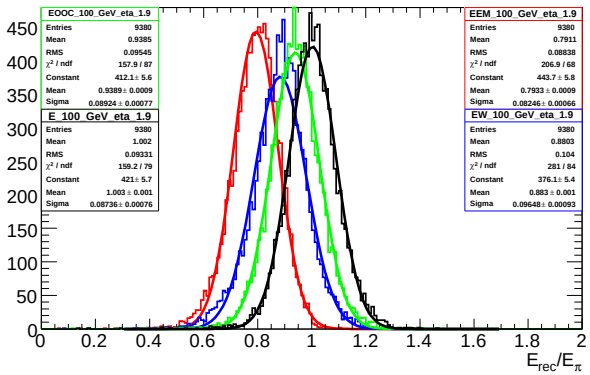
# Performance for single pions with negative clusters weighted

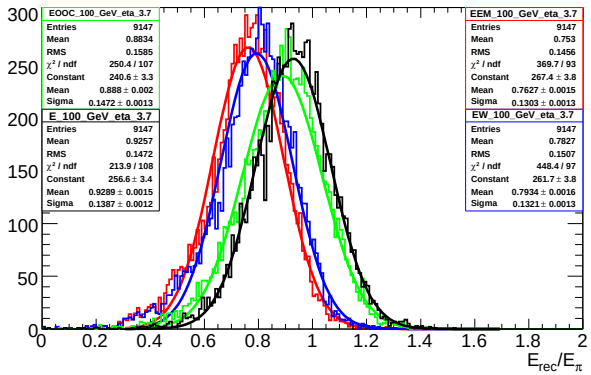


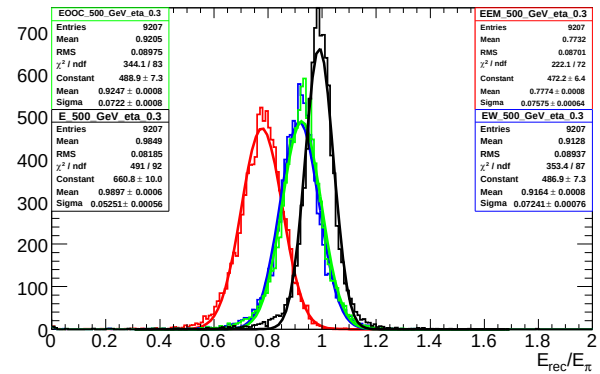



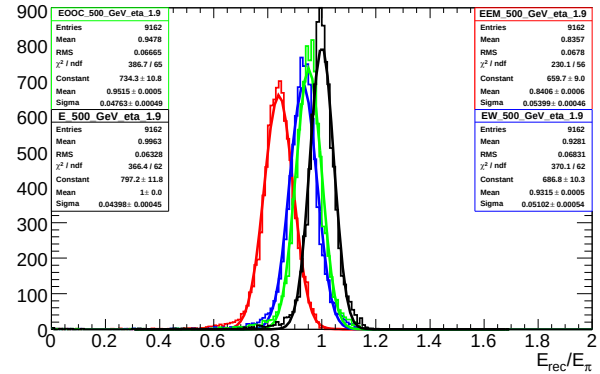



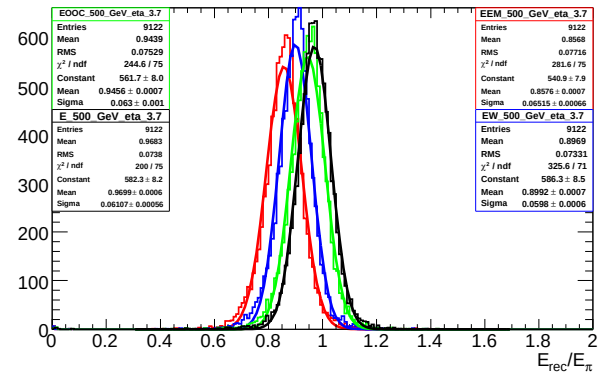



# Plans for release 14.1.0

- weight production on the grid
  - need the changes from Guillaum for `ParticleGenerator` to produce log spectrum in pion energy
  - simulation can be done on the grid for established releases and standard database (140 s/ev on average)
  - digitization and reconstruction much faster than simulation (3 s/ev and 1.5 s/ev, respectively)
  - digitization and reconstruction could thus be done locally
  - still a grid job to get initial set of constants should be prepared
- refine classificaton
  - still work needed to refine classification for low energies
  - no new ideas at this point ...
  - input very welcome!