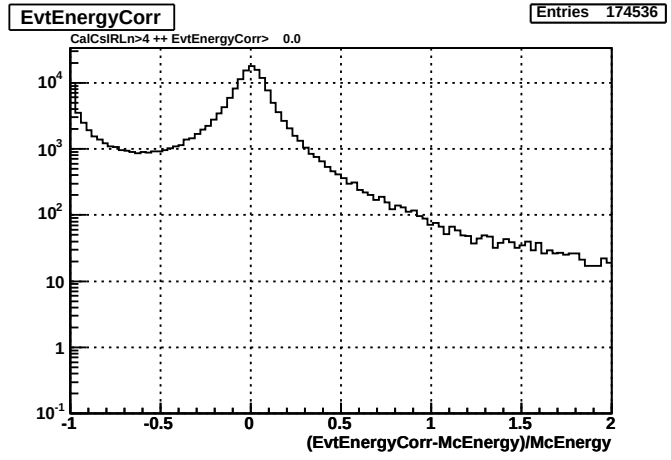
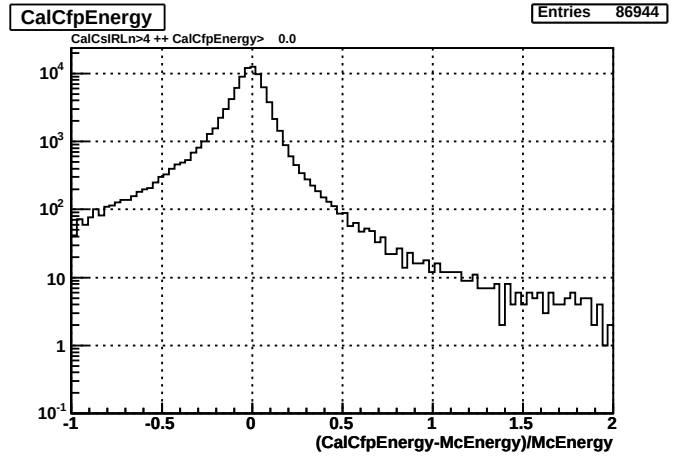
Discussion on energy tails

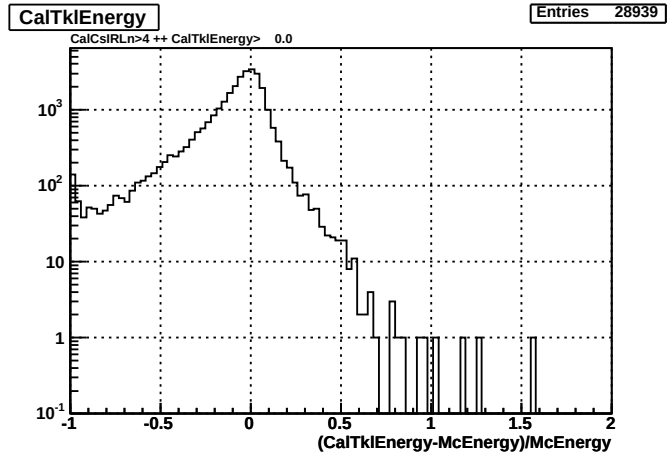
- allGamma-GR-HEAD1.594-merit-TKR-prune-1.root
  allGamma-GR-HEAD1.594-merit-TKR-prune-2.root
- four algorithms:
  - EvtEnergyCorr (parametric)
  - CalCfpProfile (profile)
  - CalTklEnergy (tracker + calo)
  - CalLlEnergy (last layer)
- Quick comparisons
- Discussion

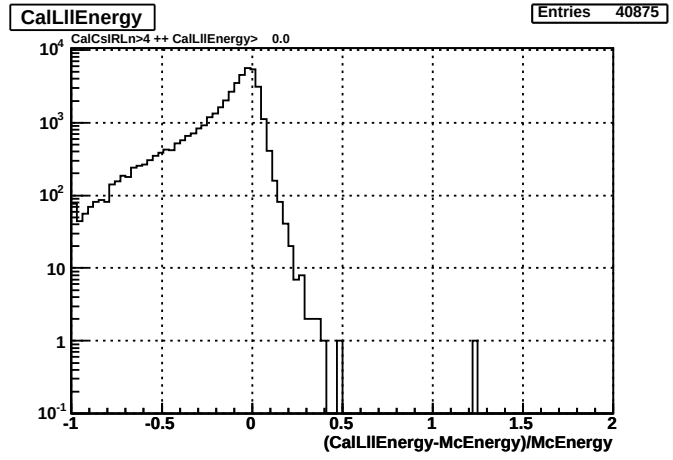
All algorithms

- CalCsIRLn>4 : no tail with Tracker and Last layer



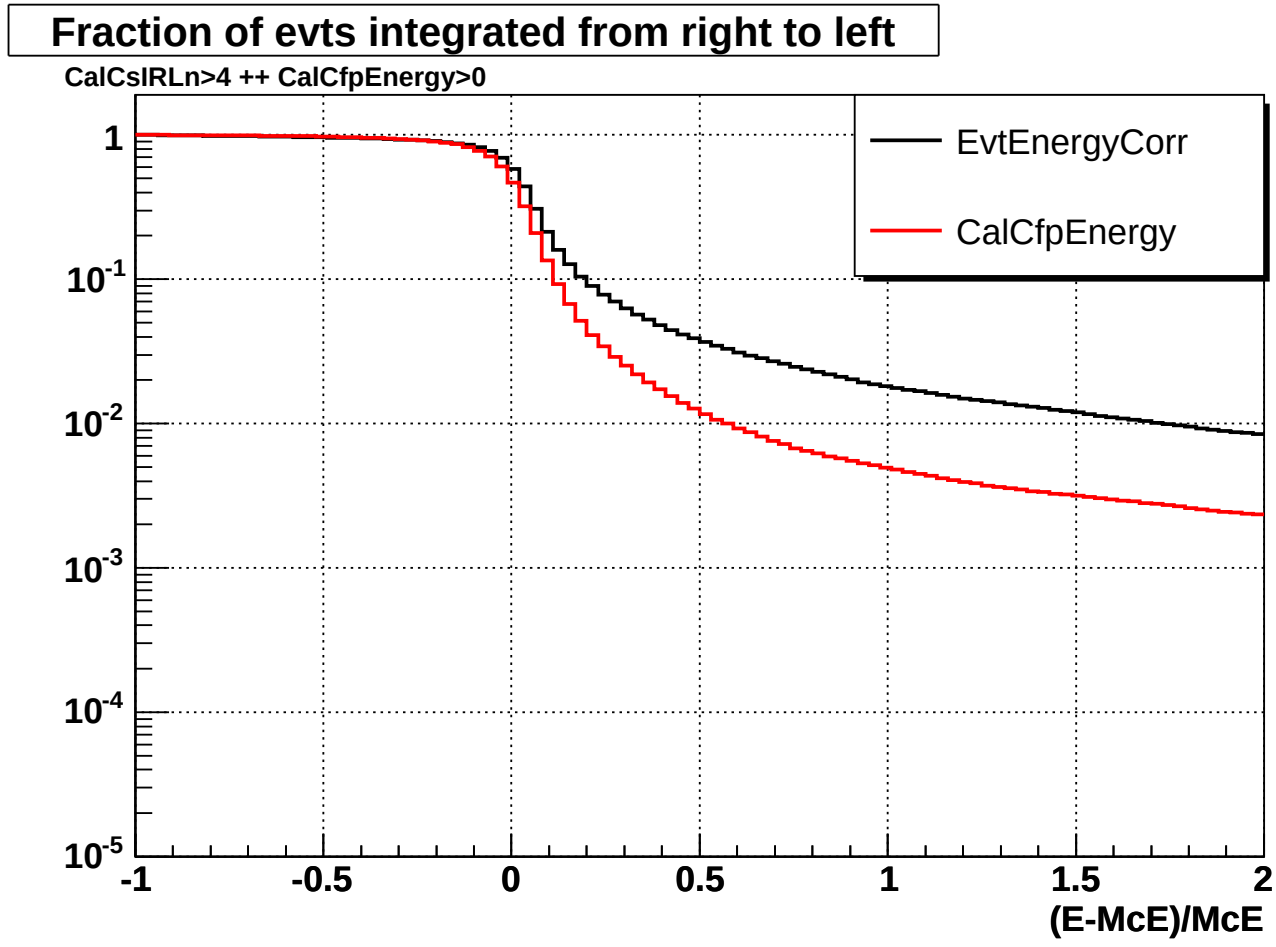






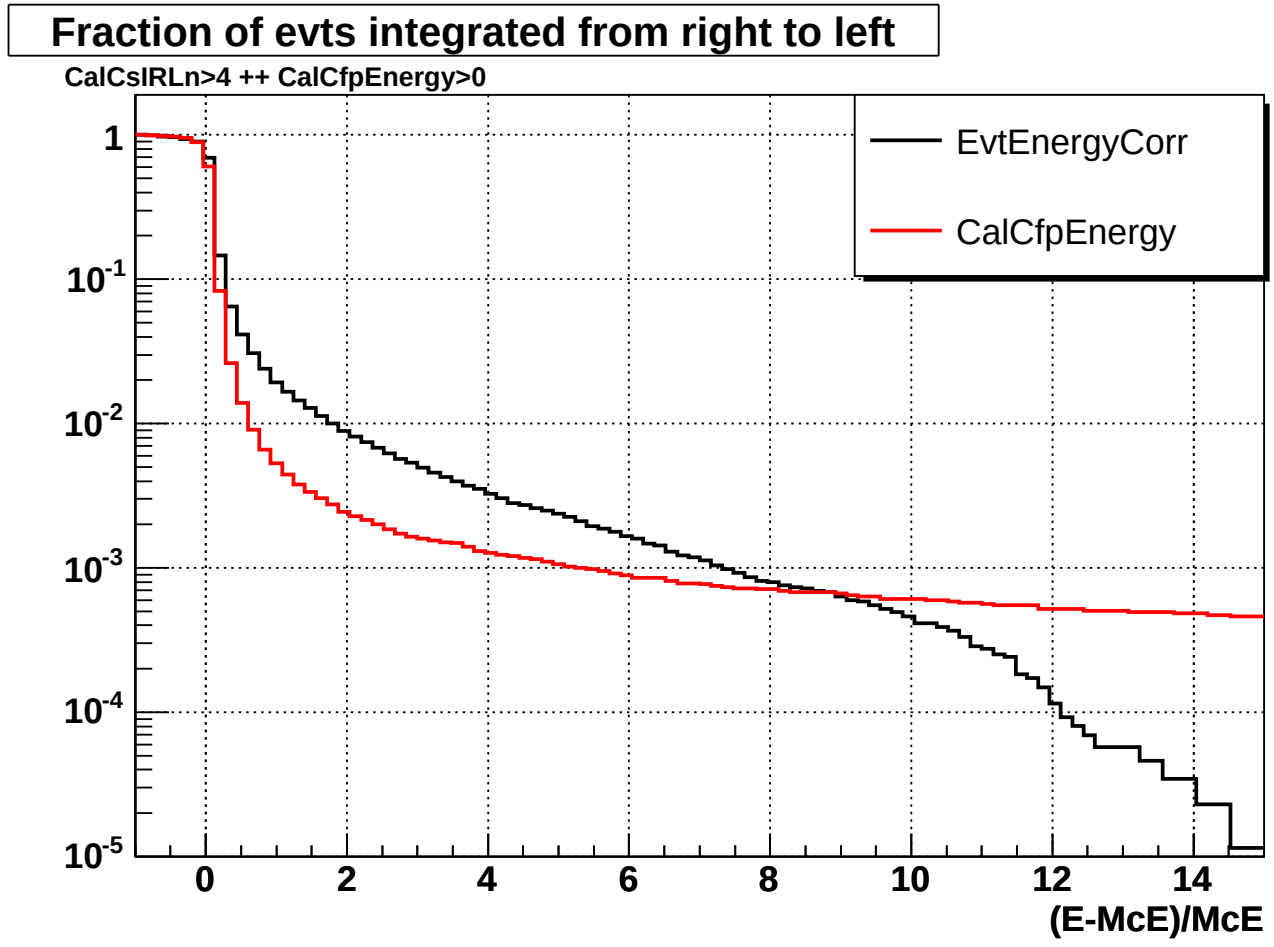
When Profile runs (>1 GeV)

- Parametric's tail is larger ...



When Profile runs (>1 GeV)

- but Profile's tail is flatter.

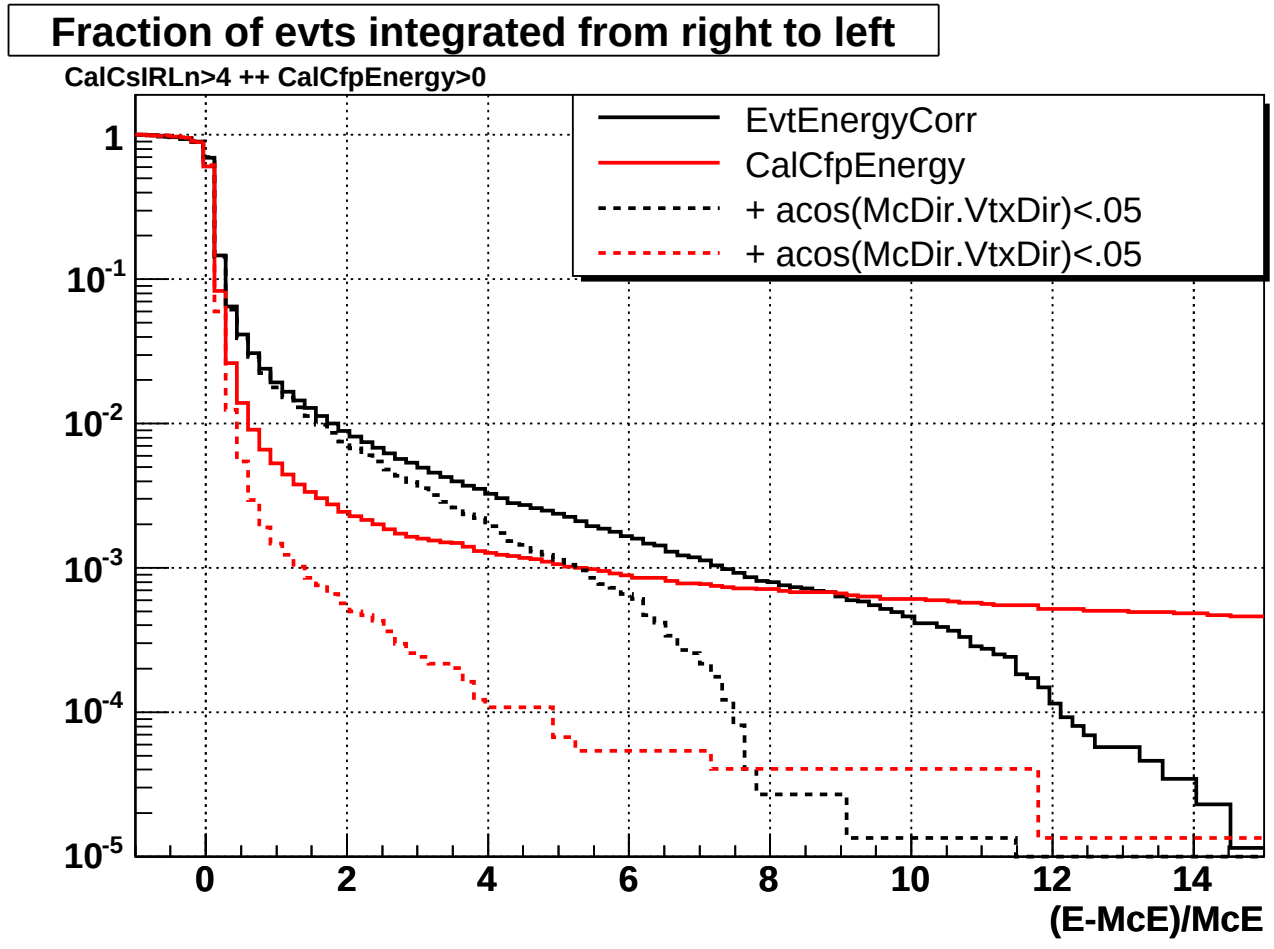


Profile's "'wild' tail

- The parametric algorithm doesn't use the vertex direction but the direction given by the vertex point and the cluster centroid;
- The profile algorithm uses the vertex direction;
- In my "private" analysis (before implementing it in GlastRelease) I uses vertex and calo information depending on the distance between the vertex direction and the cluster centroid;
- but not implemented yet

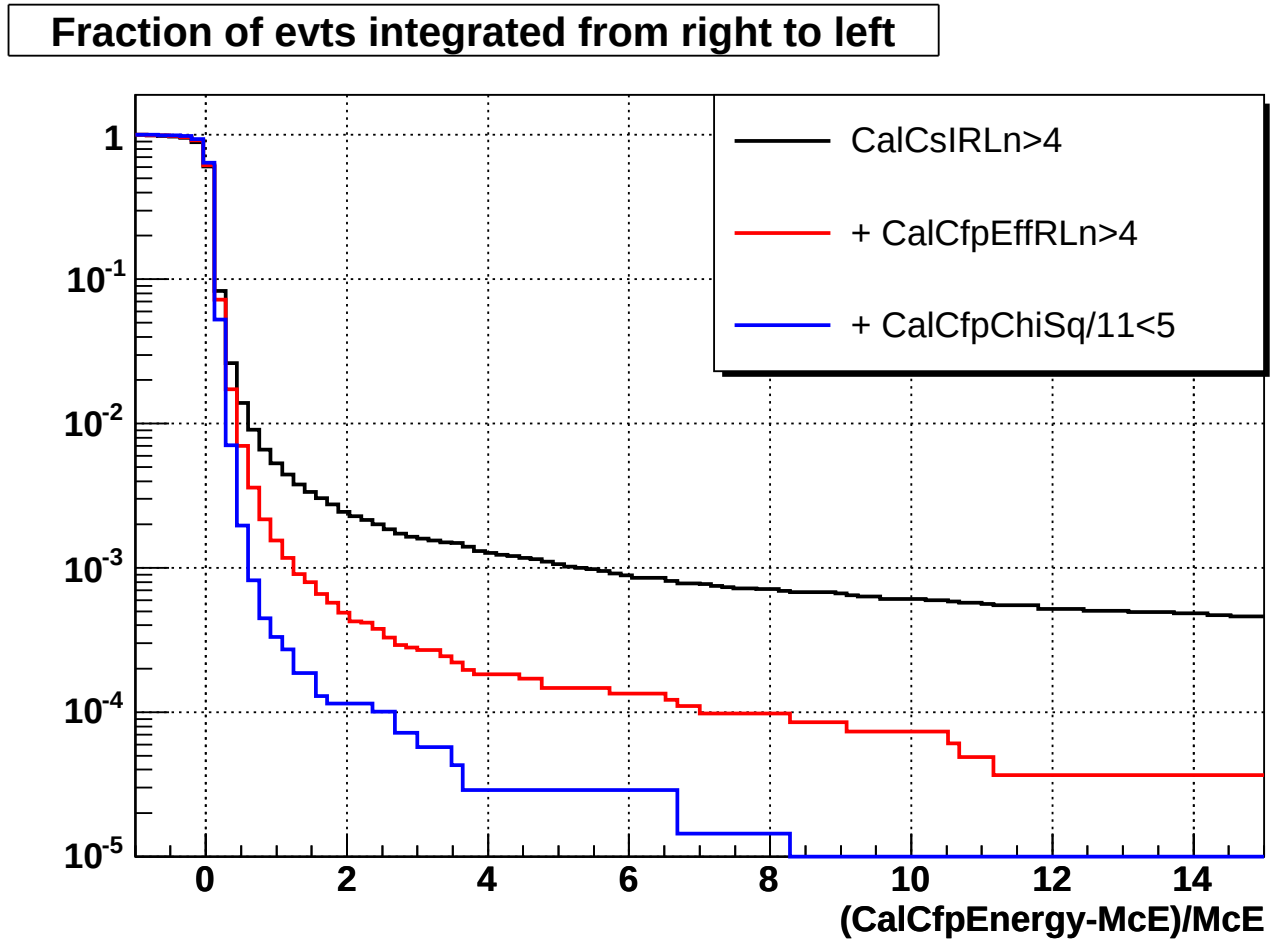
Requiring a good vertex direction

- the “wild” tail almost disappears



Profile variables cure the problem

- CalCfpEffRLn : effective radiation length in CsI
- CalCfpChiSq : the χ^2 of the profile fit



Digression about direction information

- Vertex direction : the most accurate but can be bad at high energy
- Cluster Point - Vertex point : more conservative but less accurate
- I think that in some cases (in particular at small theta and near cracks) the accuracy of the tracker reconstruction is very interesting for the energy reconstruction
- To be done : optimize the direction information for the energy reconstruction
  - Using the vertex quality
  - Using the distance of the cluster centroid to the vertex trajectory

High energy tail : discussion

- It’s not an obvious issue :
  - involves astrophysics $E^{\sim -2}$ spectra
  - involves IRF description accuracy
- Various situations : from best to worse :
  - No tail and IRF perfectly parameterized
  - High energy tail AND IRF perfectly parameterized
  - High energy tail BUT badly parameterized

Ideas, Suggestions, ...

- The classification tree could take into account a constraint on tails
  - presently : “best” means closest to McEnergy
  - suggestion : “best” means closest but -4σ should be favoured to $+4\sigma$
- Not choose which is best but what are the optimized weights assigned to the energies
  - Can reduce the tails...
  - and improve the resolution.