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)
  - CalTkIEnergy (tracker + calo)
  - CalLlIEnergy (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 ...

Fraction of evts integrated from right to left

CalCsIRLn>4 ++ CalCfpEnergy>0

EvtEnergyCorr
CalCfpEnergy

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When Profile runs (>1 GeV) but Profile’s tail is flatter.

![Graph showing fraction of events integrated from right to left]
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 $\chi^2$ of the profile fit

Fraction of evts integrated from right to left
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 $E^{-2}$ 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
The classification tree could take into account a constraint on tails
- presently: “best” means closest to McEnergy
- suggestion: “best” means closest but $-4\sigma$ 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.