PFA and TB data analysis status and plans

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SiD - Calorimetry meeting

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PFA development status

- Implemented a PFA algorithm within org.lcsim + template, based on directed tree clustering algorithm (Vishnu)

  Tracks not used to guide clustering, but only to improve the energy resolution (PFA principle)

- Clusters saved to disk (reco files), and PFA algorithms are run as analysis job

- Preliminary results presented at Calor'06

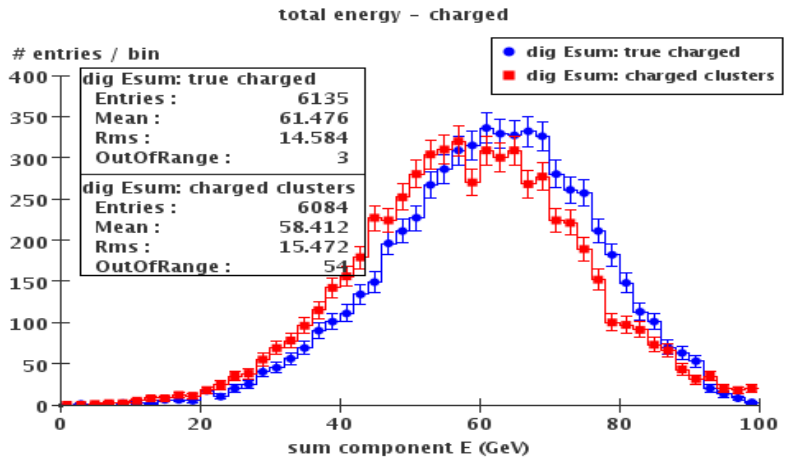
  $\sigma_E / E = 41\% / \mathrm{sqrt}(E)$ at the Z pole (57%/sqrt(E) with rms90)

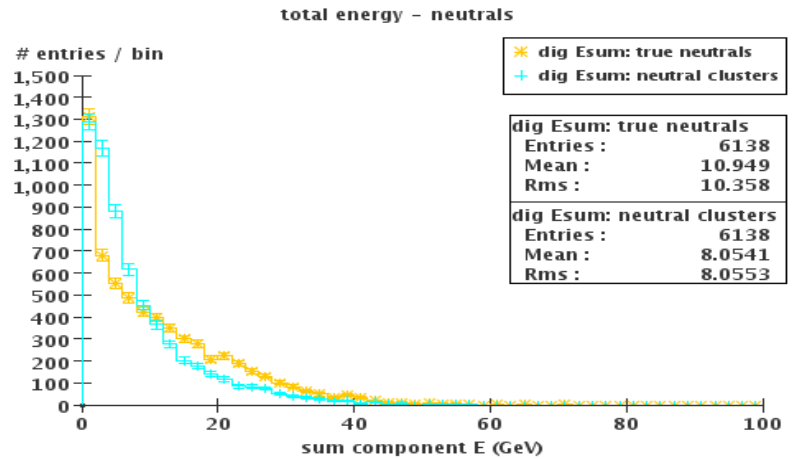
- All code released into org.lcsim CVS since June 2006

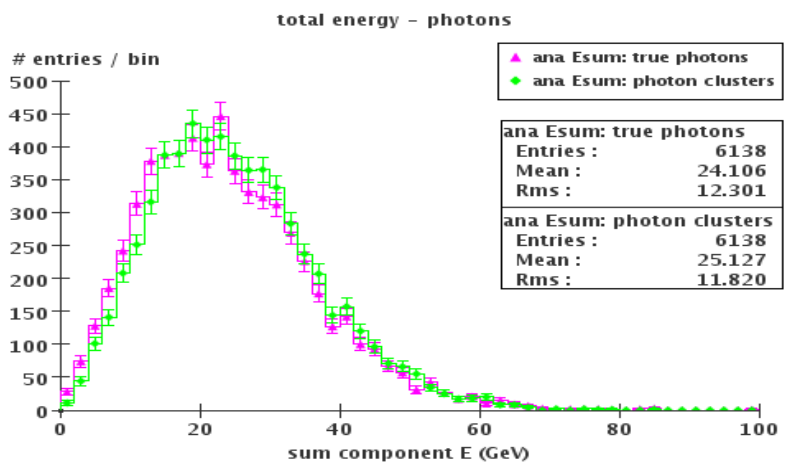
- Algorithm optimization suspended due to CALICE data analysis

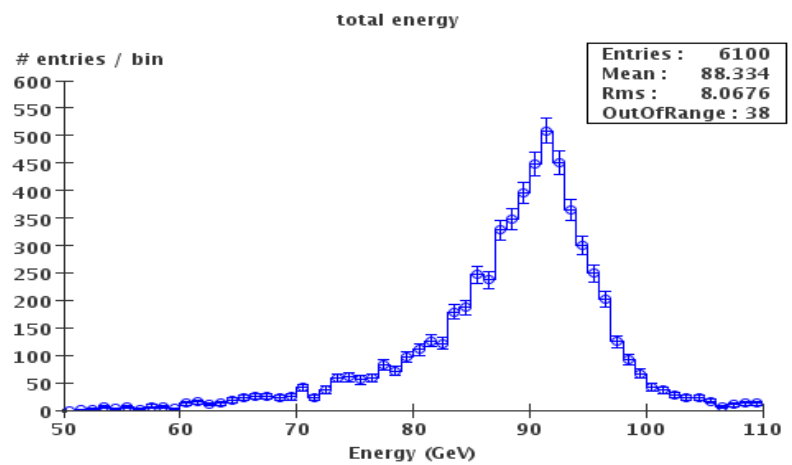
Current PFA results (preliminary)

Energy sums of each component in event

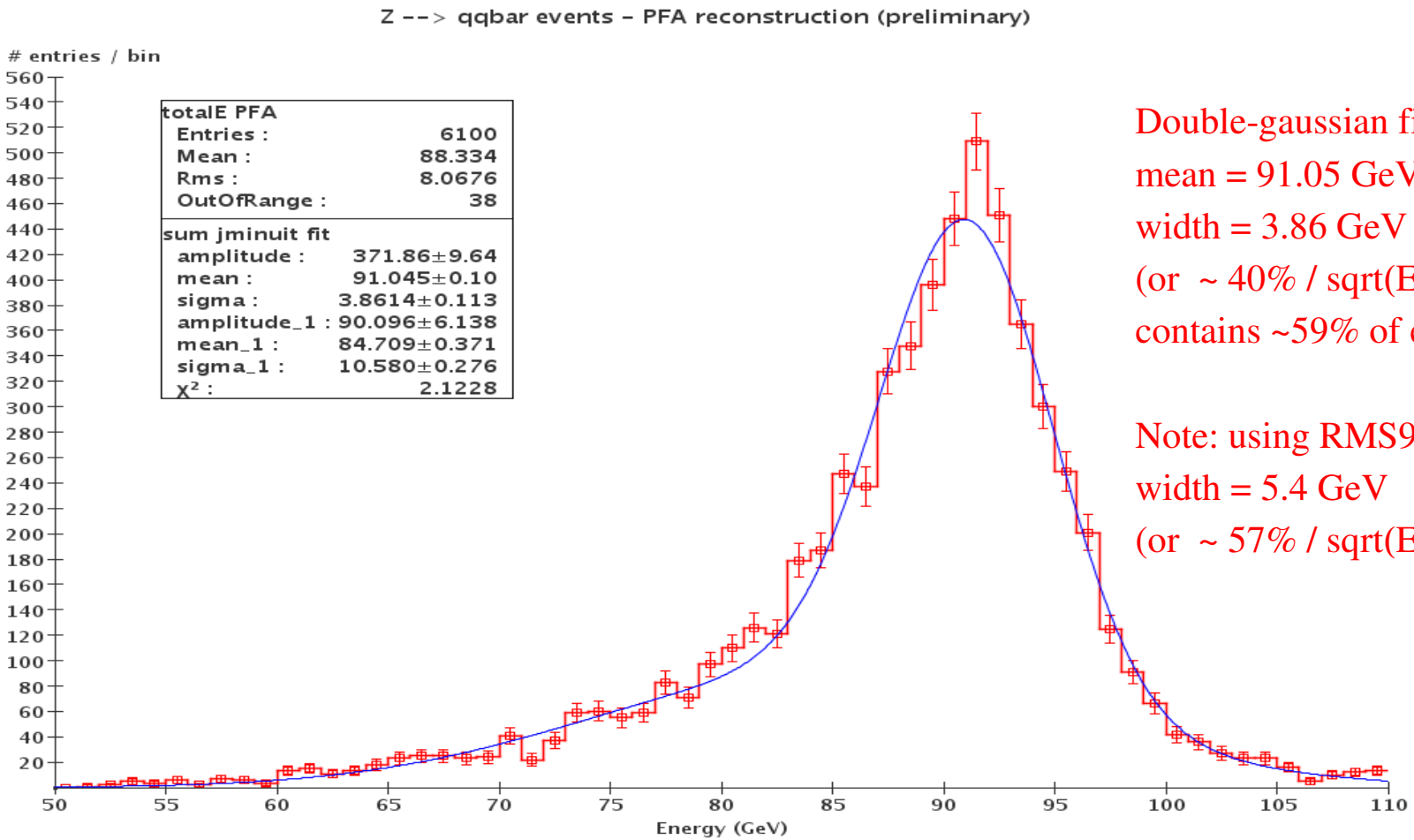








Current PFA result (preliminary)



Double-gaussian fit
mean = 91.05 GeV
width = 3.86 GeV
(or ~ 40% / sqrt(E))
contains ~59% of events

Note: using RMS90,
width = 5.4 GeV
(or ~ 57% / sqrt(E))

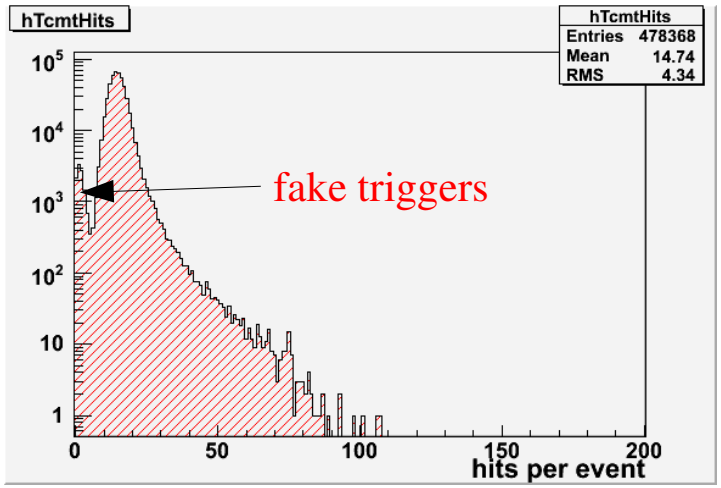
TCMT data analysis status

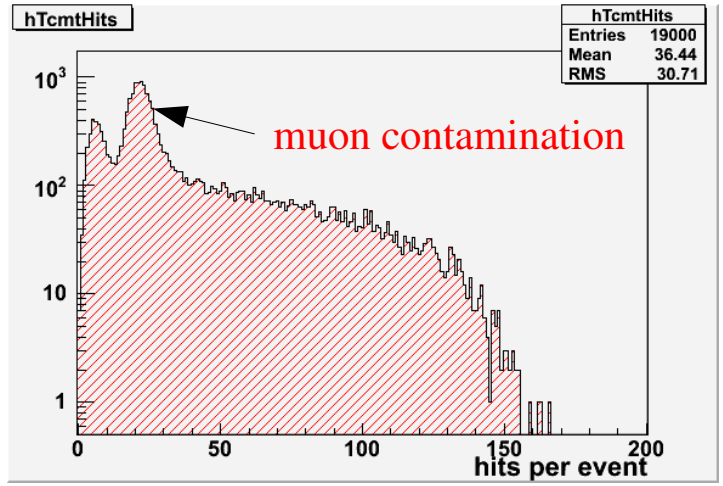
- Indirectly related to PFA, as it provides data vs. MC comparisons (critical to PFA credibility)
- Preliminary results presented to this group in December
- TCMT software development for Marlin (official framework) is under way

  current status: reproduce mip plots and calibrated hits

Comparing number of hits per event

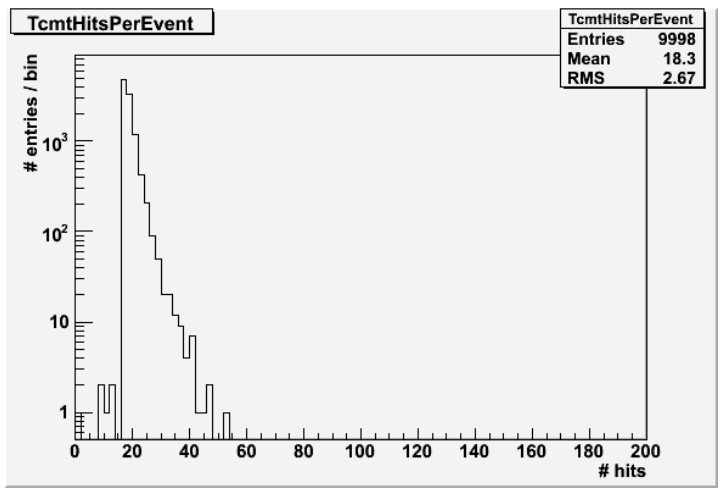
muons (data)

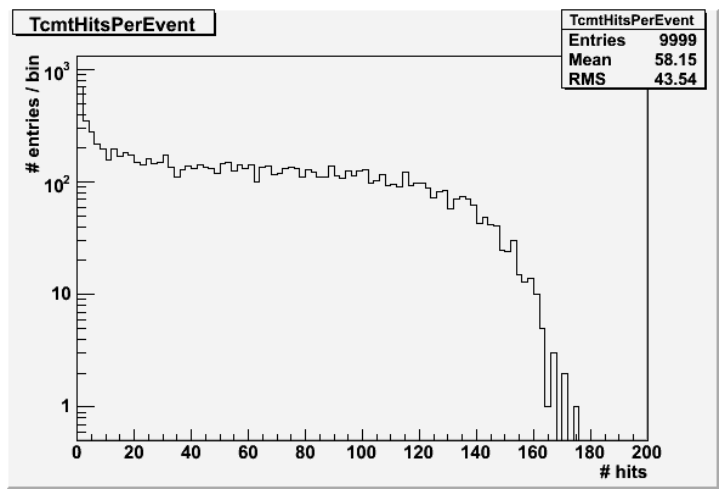




80GeV pions (data)

10GeV muons (MC)





80 GeV pions (MC)

Plans

- In the short term, priority to TB data analysis
  - Improved TCMT calibrations and corrections for SiPM saturation
  - For April: preliminary data vs. MC comparisons in Hcal and TCMT, taking into account different absorber thicknesses
- Exercising directed tree clustering to HCal/TCMT data (Marlin)
- PFA optimization studies
- Evaluate PFA performance at higher energies
- Contribute to SiD optimization