Effect of hit merging on tracking

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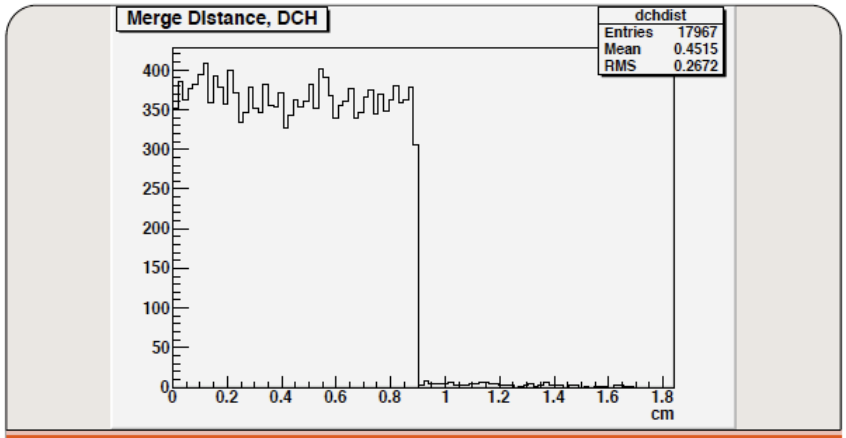
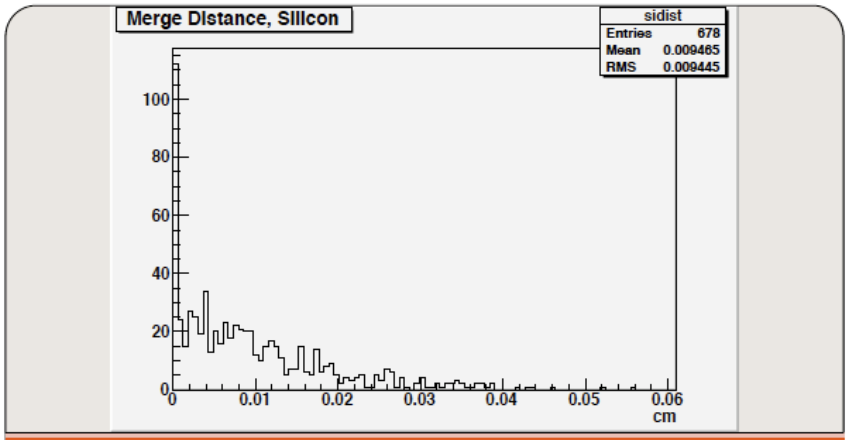
Hit Merging (D. Roberts)

- PacMergeHits module
  - on by default in V0.0.3
  - Impact on FastSim speed is small (<5%)
- Merged Dch and Svt hits are merged
  - 100% of the time
  - dch merge size is twice cell width
  - svt merge size is twice readout strip pitch
  - merged hits are forced onto higher-P track
  - resolution is hugely affected!



Distance moved by hit in merging, DCH

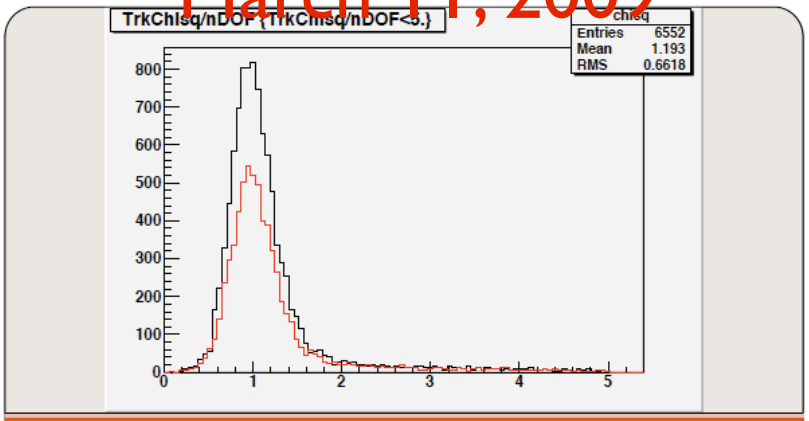
Single merge distance limited by DCH cell size. Small tail above 0.9 cm comes from hits that were merged more than once.



Distance moved by hit in merging, Silicon

Peak at zero from two sources: pixels and interactions.

From D. Roberts presentation March 11, 2009

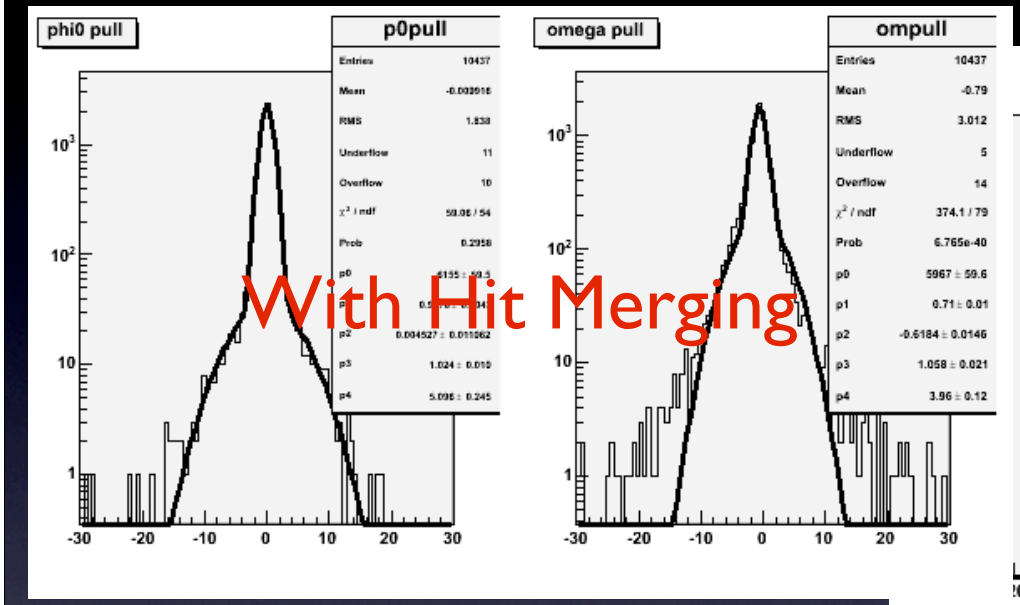


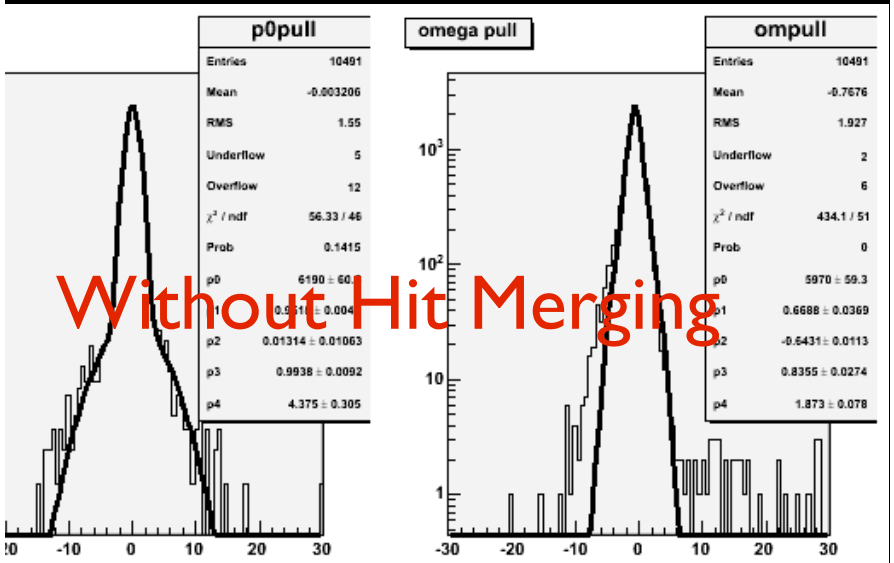
Track fit χ^2 /dof

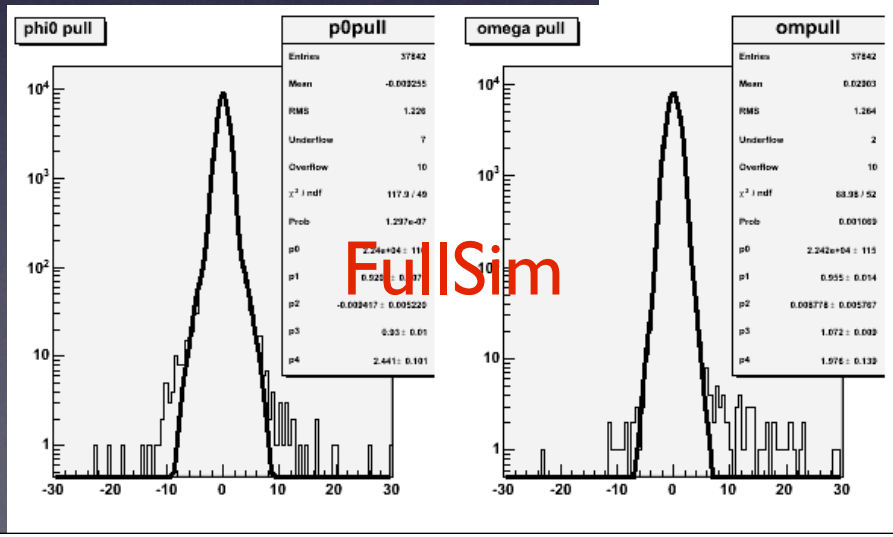
Black: No hit merging Red: With hit merging

Note: This loss of tracks in the central peak is disturbing!

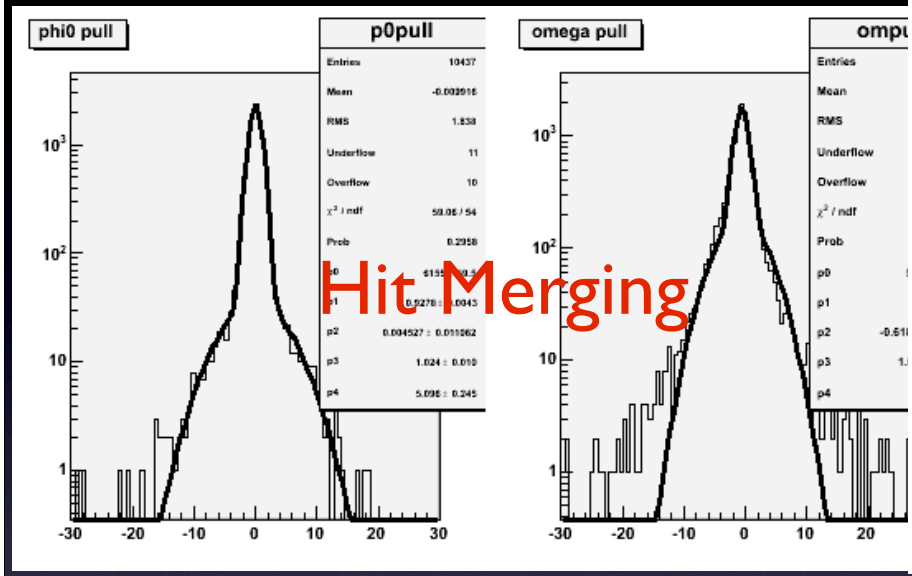
μ-pair Track Fit Pulls



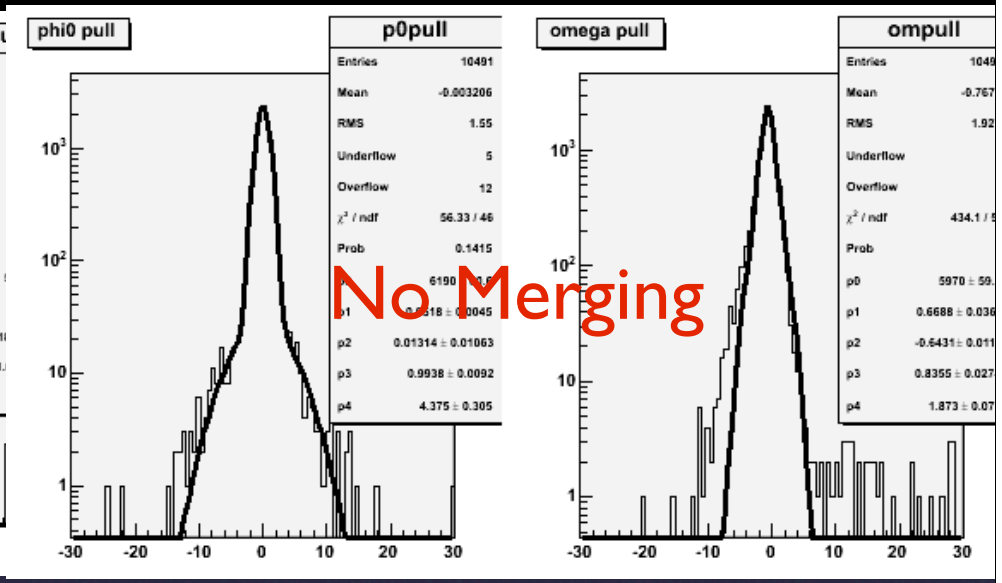




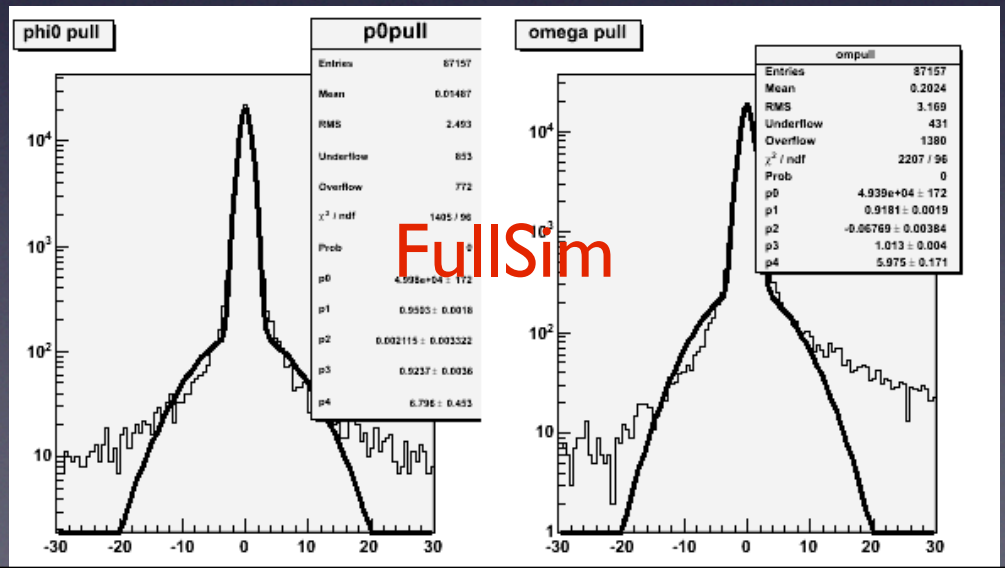
B0 Track Fit Pulls



Hit Merging



No Merging



FullSim

Conclusions

- Hit merging may be overly aggressive
  - some tuning is in progress
- Retuning of intrinsic non-Gaussian errors is needed
  - After hit merging and confusion?
- V0.0.3 Job hang seen
  - under investigation