Tracking Cheater Studies

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Outline

- TrackingCheater
- Jet finding
- W/Z separation
- Jet-parton correlations
- Cheater Studies
- W mass reconstruction

TrackingCheater

For each SimTrackerHit in charged tracking devices, the TC finds the MCParticle parent and creates a corresponding CheatTrack. It uses the MCParticle's momentum vector to provide the track momentum required to satisfy the FoundTrack interface.

The **TC** finds combined tracks in all tracking devices that have SimTrackerHit's from the same MCParticle. The CombinedTrack object is similar to the CheatTrack except that it has methods to add and get CheatTracks from its internal list.

Packages:	Classes:
org.lcsim.recon.ztracking	FoundTrack
org.lcsim.recon.ztracking.cheater	TrackingCheater
	CheatTrack
	CombinedTrack

To access tracks use event.get(CheatTrack.class) or simply event.get(Track.class).

TrackingCheater cont.

A TrackingCheater can be used to:

- Study detector acceptance since any MCParticle that leads to even only a few SimTrackerHit's will be found as a CheatTrack.

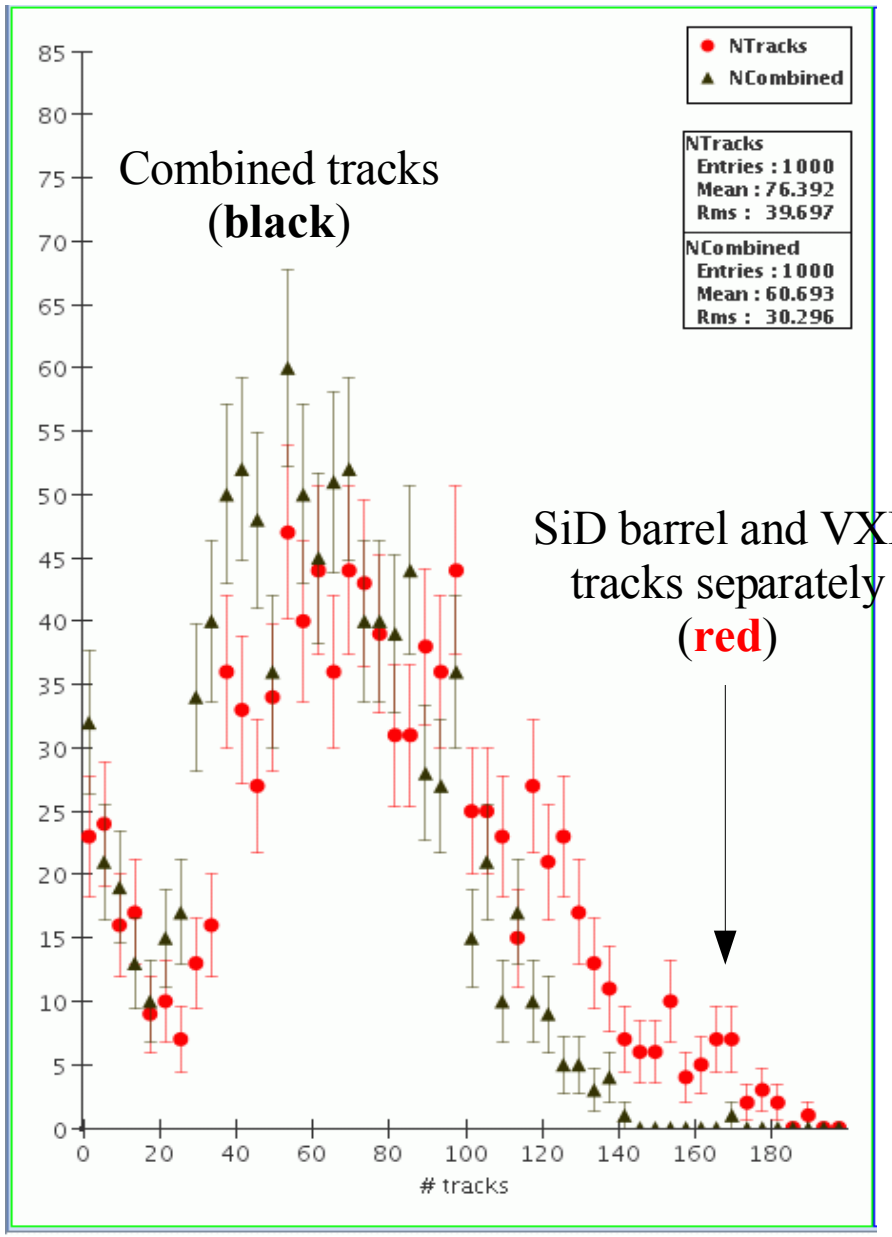
- Study **GEANT4** processes, such as photon conversion, nuclear interactions, pion and kaon decays in flight, ...

- Study track fitting software since each CheatTrack has all the hits that the MCParticle gave rise to.

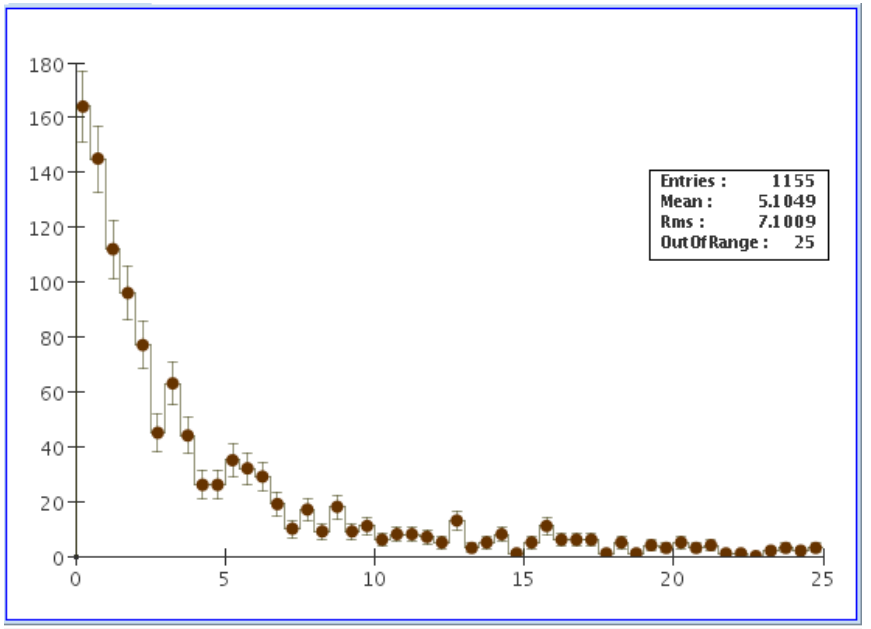
- Study pattern recognition software by merging nearby hits and determining if resulting track objects would have been found.

- Study calorimeter reconstruction software with perfect tracks and also with more realistic tracks.

TrackingCheater cont.



tracks



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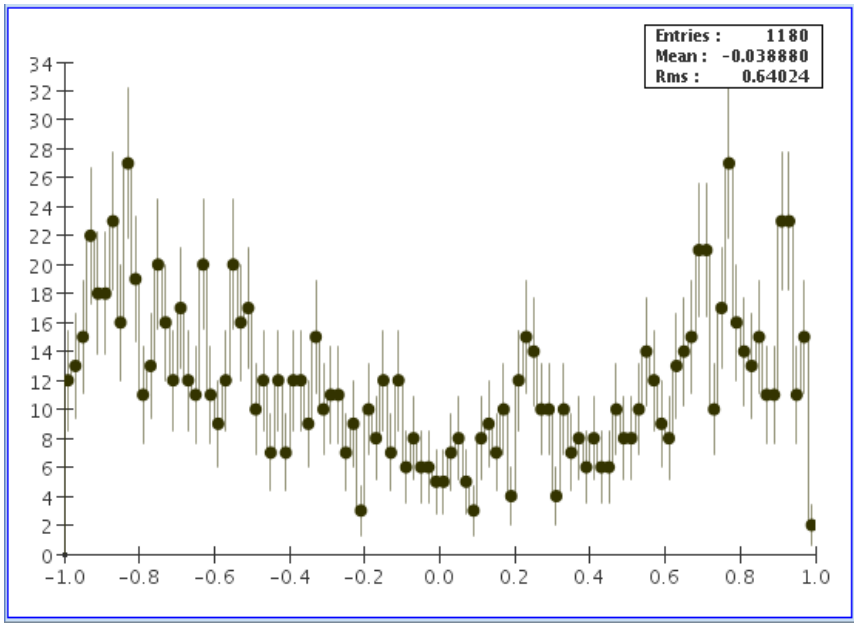

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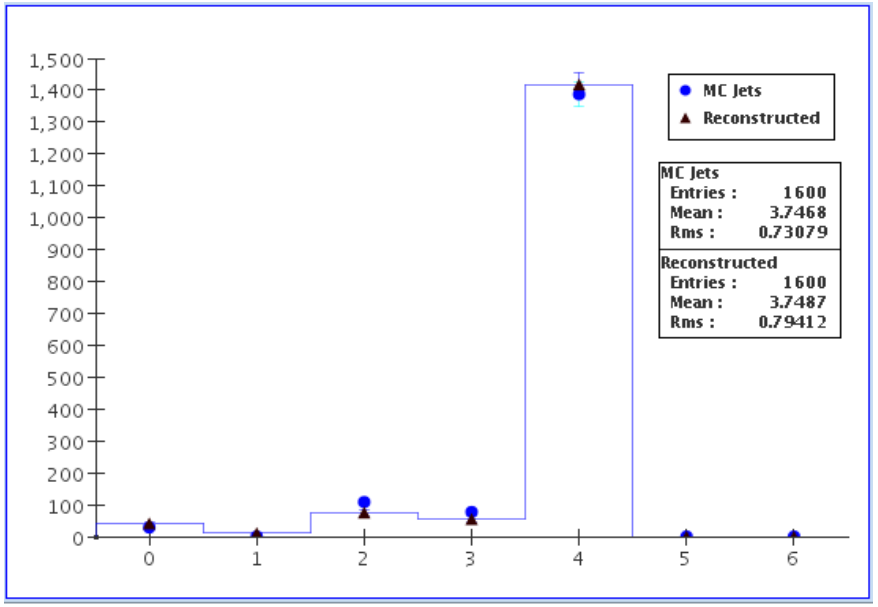
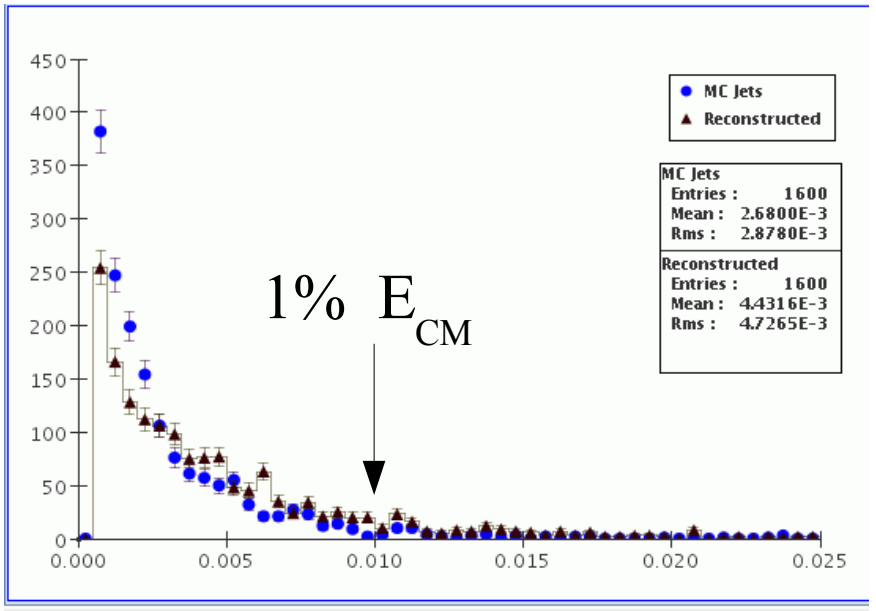
Jet finding

Require no more than 4 jets

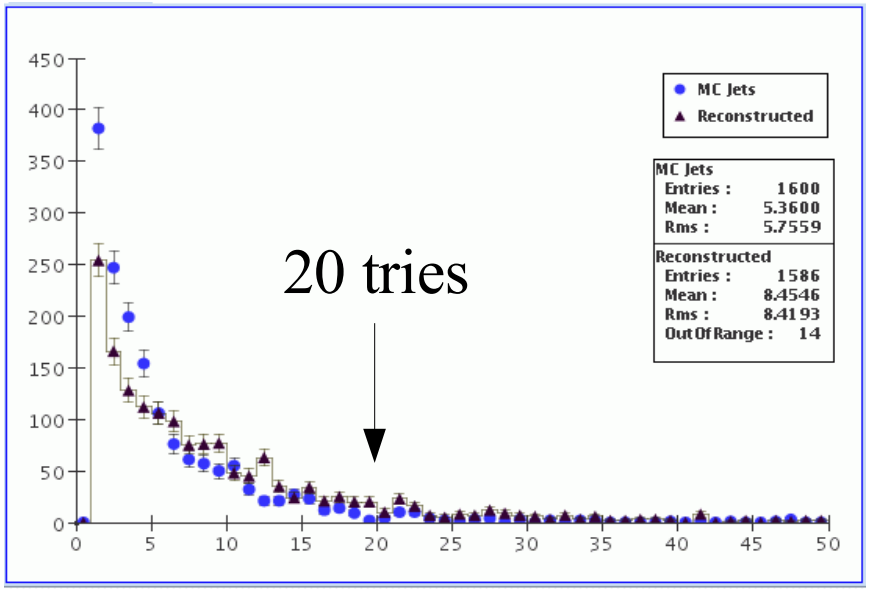
using JadeE jet finder



jets found

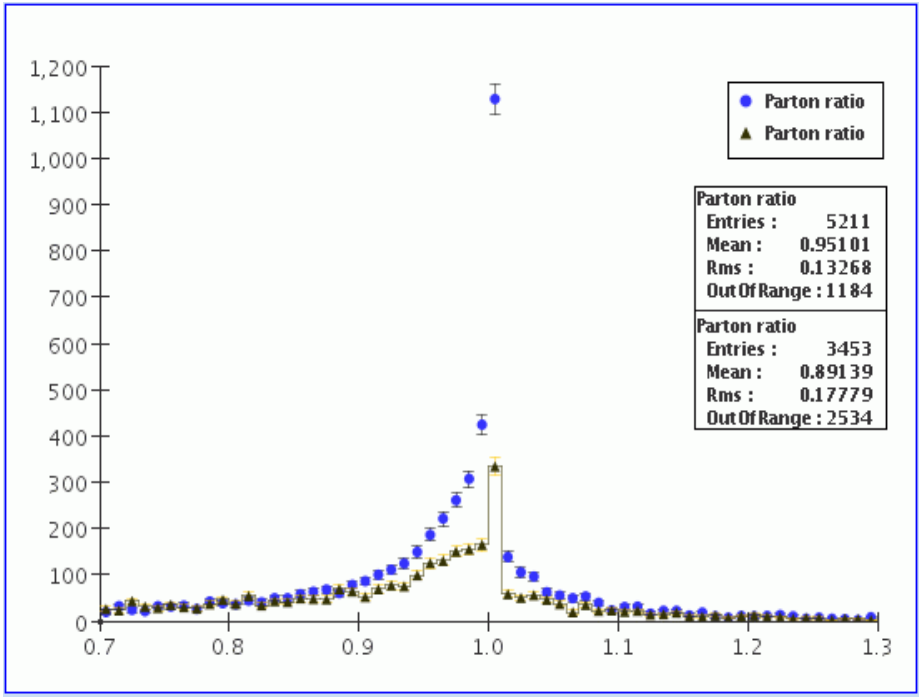


ycut

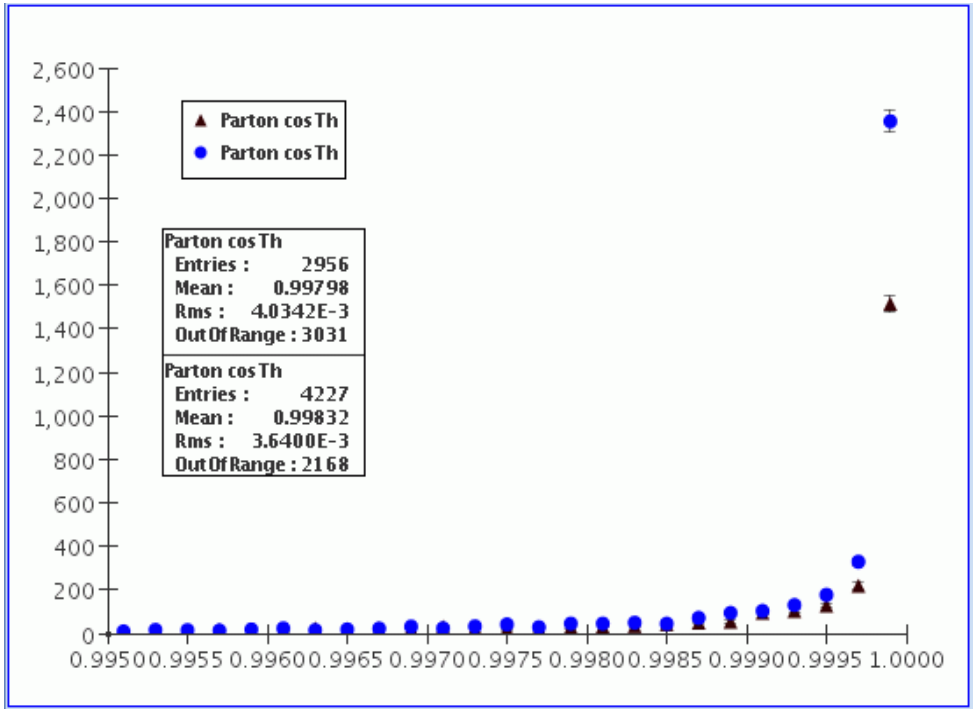


tries

Jet – parton correlations



Jet/parton energy ratio



Jet/parton angle

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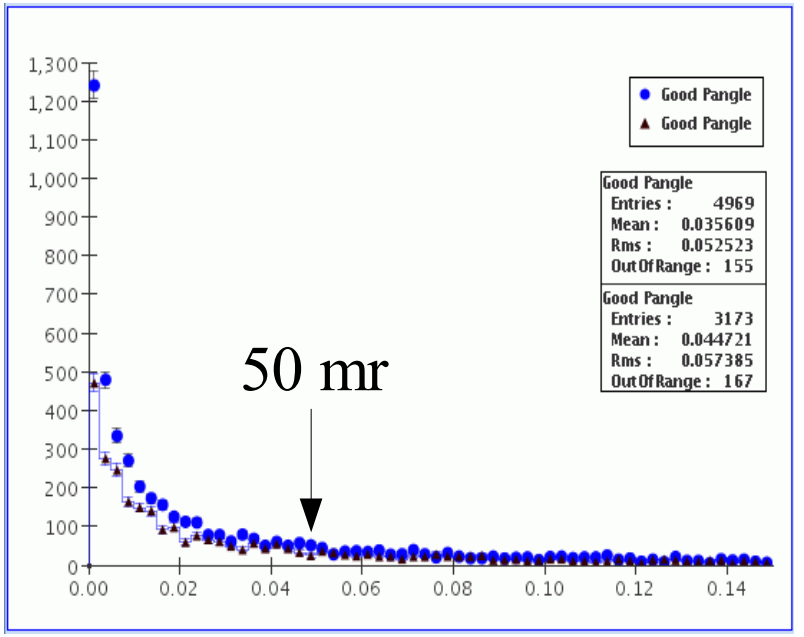
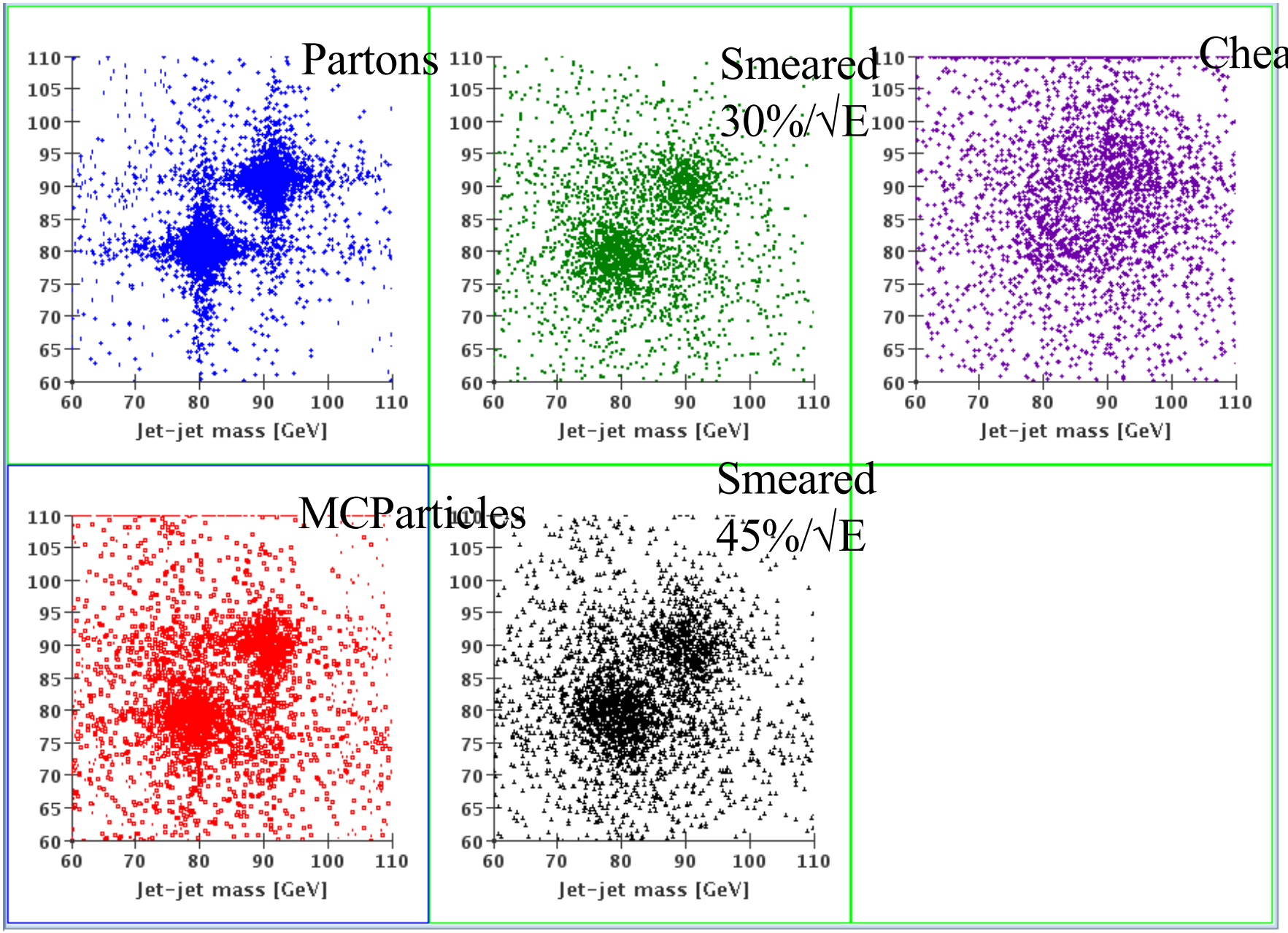


W/Z separation



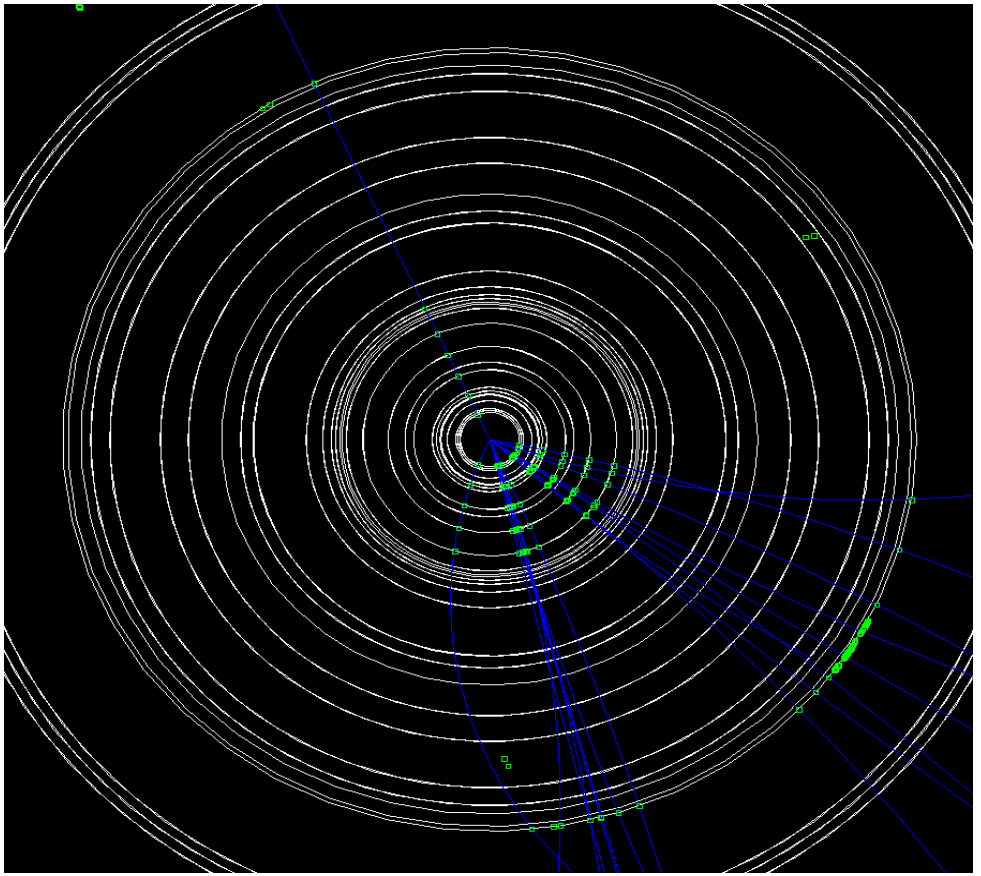
Cheater Studies

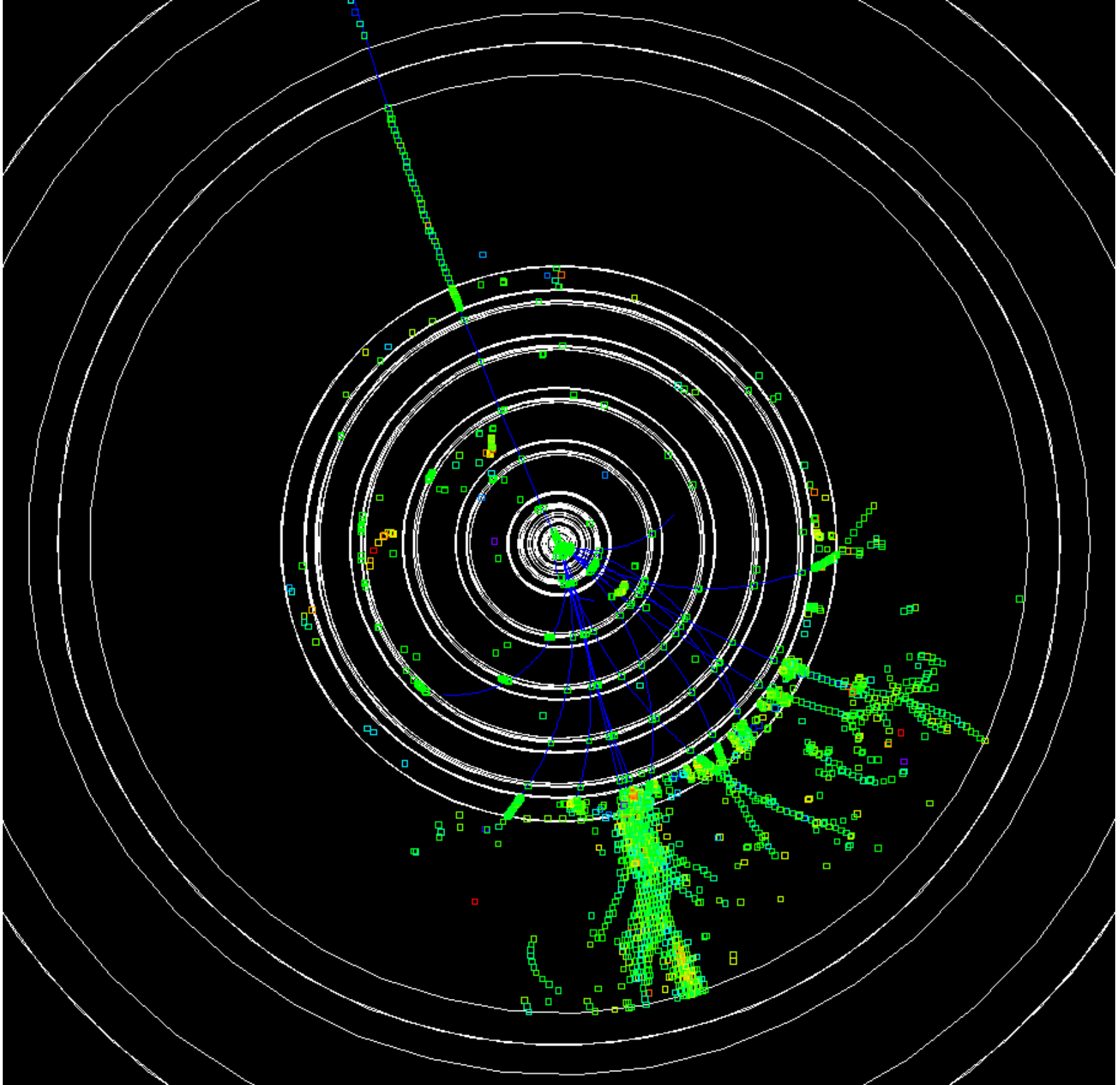
- Double cheater

Get MCParticle list with charged particles and neutrals listed separately. For each track and cluster check if it corresponds to a MCParticle. List extra and missing tracks and clusters separately. Add MCParticle and missing tracks and clusters only. No extras.

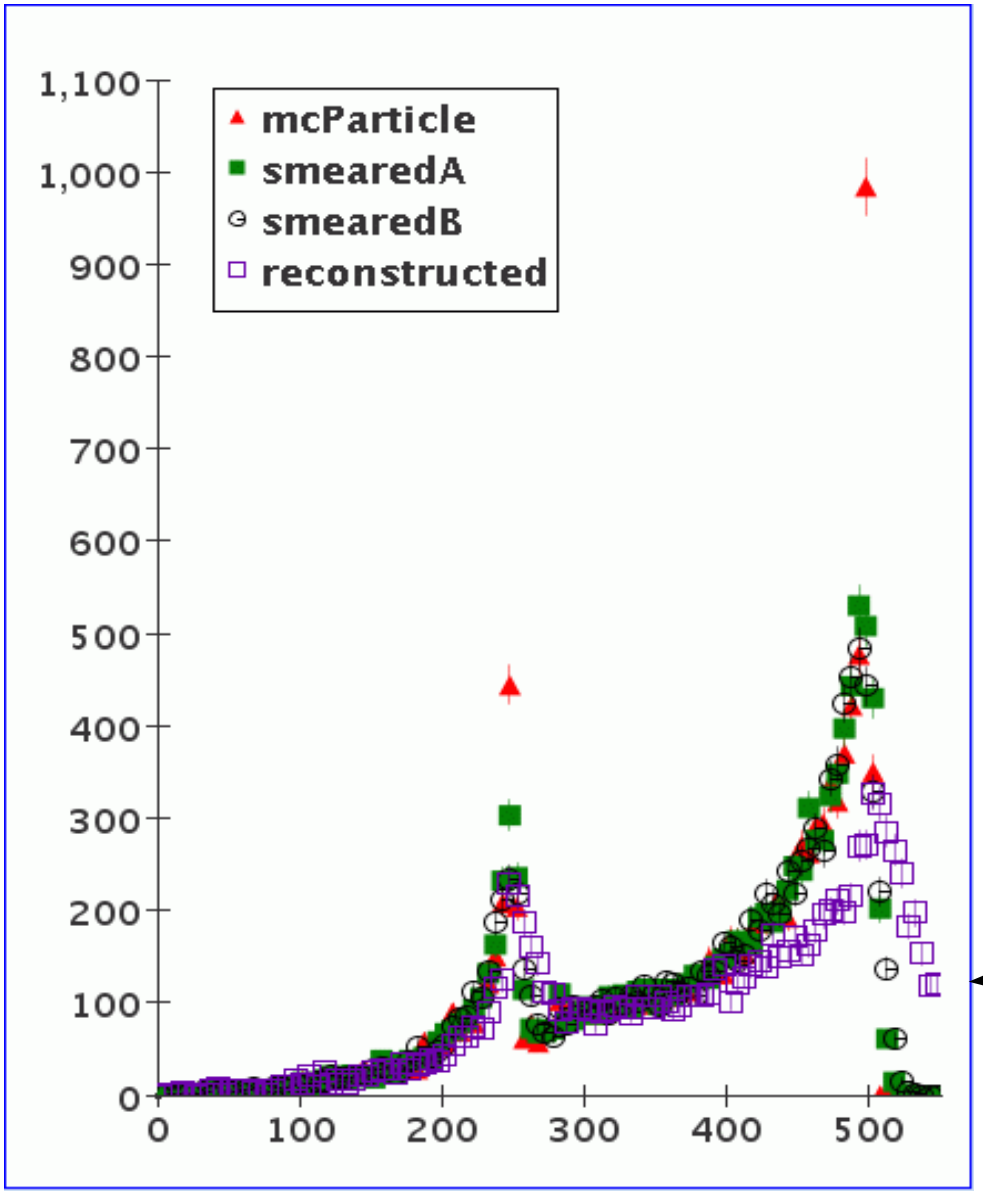
- Tracking matching efficiencies

The **TrackingCheater** can be used to study track matching from the Vertex Detector to the inner layers of the central tracking device.

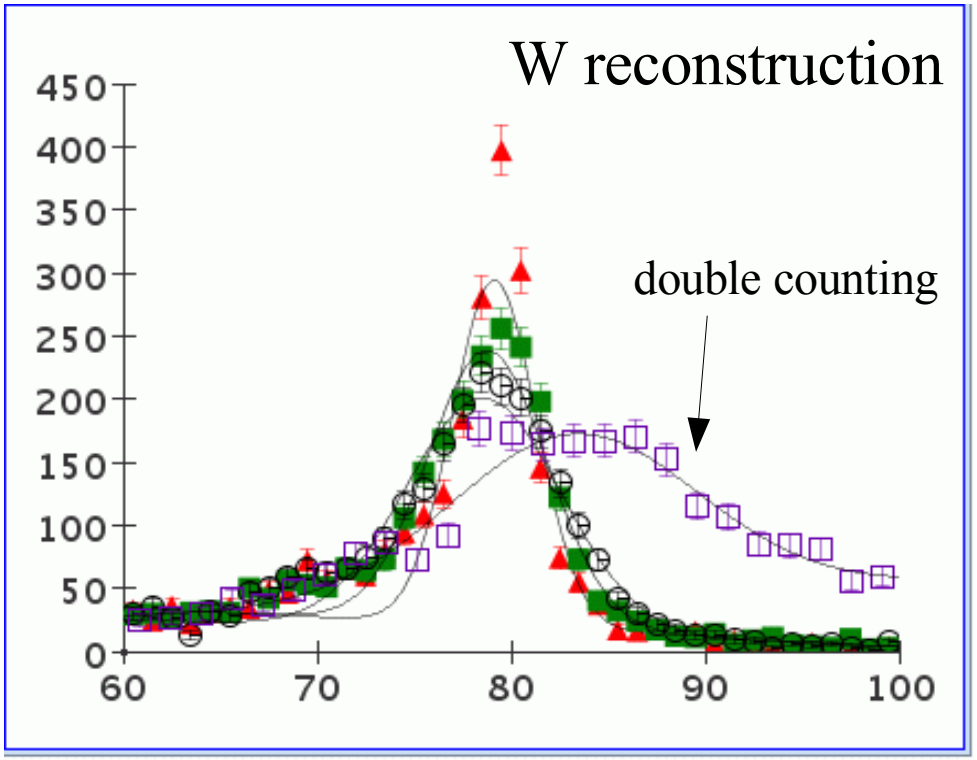




Jet energy resolution



Event energy (GeV)



Jet-jet mass (GeV)

double counting

Conclusion

- New Java framework, *org.lcsim*, is starting to work.

- The **TrackingCheater** will provide Tracks for anyone using the reconstruction tools, or developing new algorithms.

- Detector performance measures being developed.