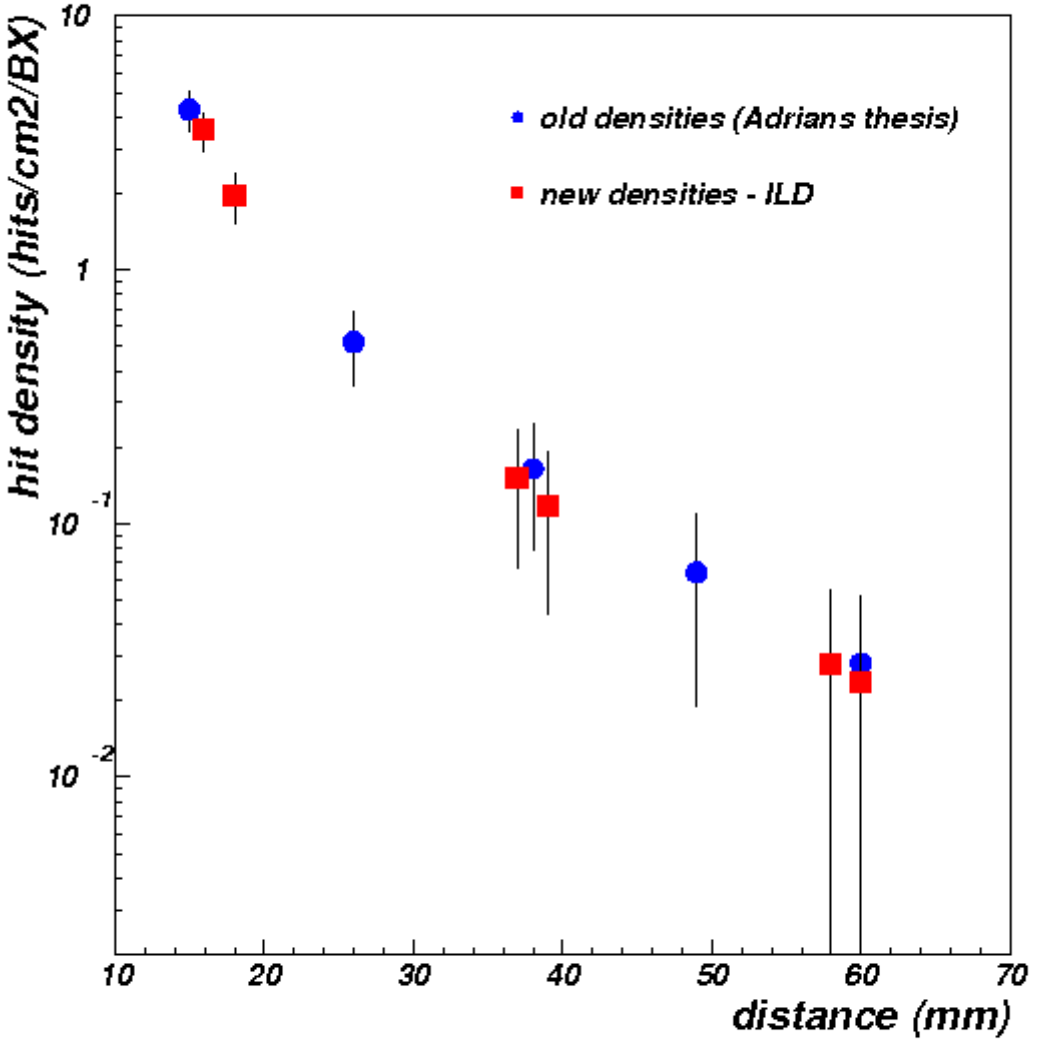
Beam Background with ILD

- Hit densities for VTX detector with ILD
- Hits, tracks, PFOs
- Applying old cuts to ILD samples

Hit Densities

1) calculate average number of VTX hits from Guinea Pig files simulated with Mokka with ILD detector (SimTrackerHit), for each layer, per bunch crossing (BX)
   - ~100 BX used
2) calculate densities/layer: number of hits/area/BX
3) procedure same as applied for Adrian's studies (previous results)
4) compare with Adrian's results
   - good agreement despite different detector & magnetic field

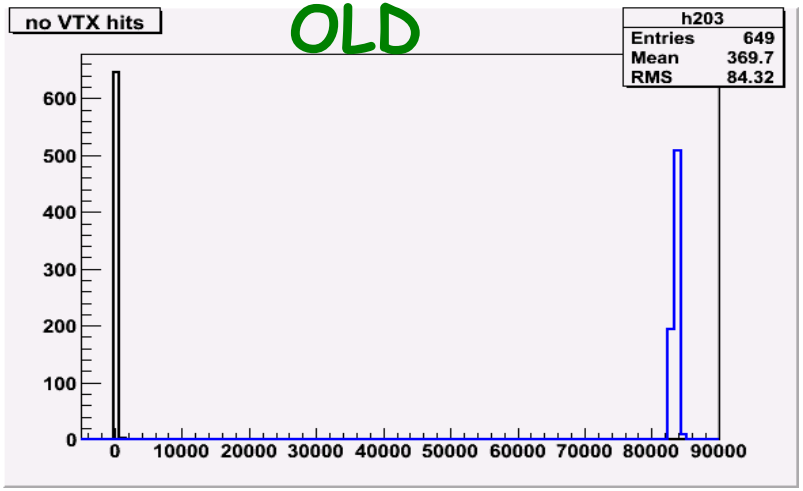


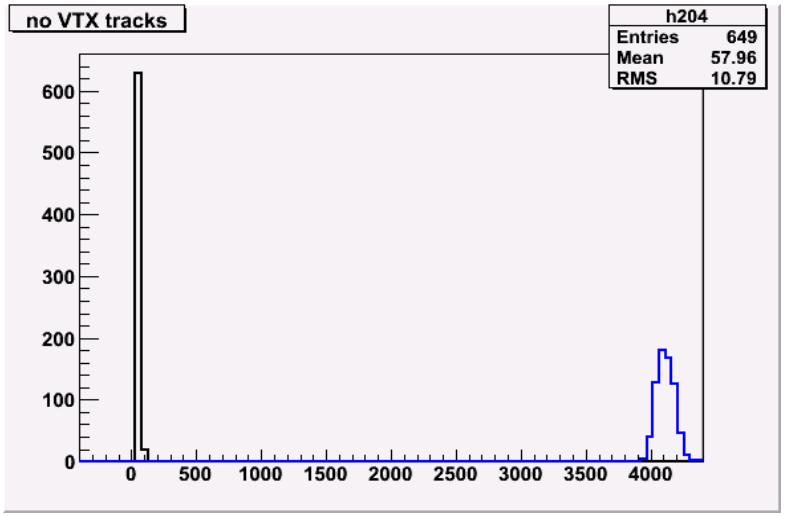
- densities the same, total number of hits in VTX quite bigger – more layers & more close layers (higher hit occupancy)

Hits & Tracks @ VTX

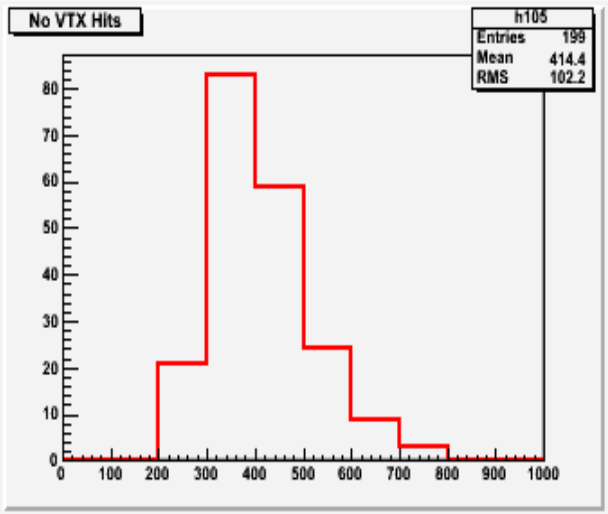
- background: salt&pepper hits added to VTX detector, according to NEW densities, for 100 BX (VTXNoiseHits Marlin Processor)
- process: ttbar -> jets, as before

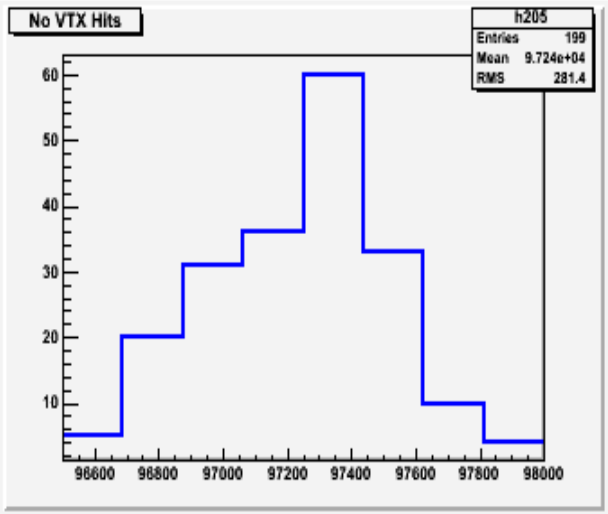
OLD

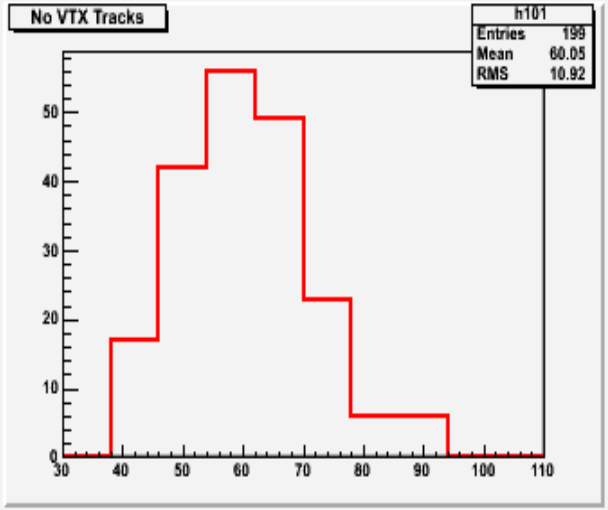


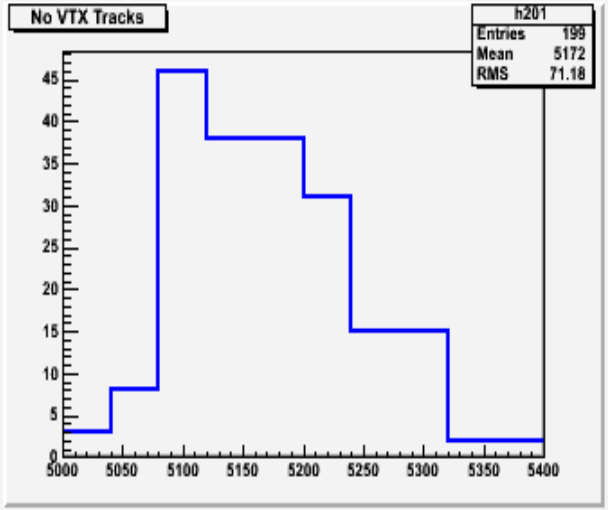


NEW: NoBG BG



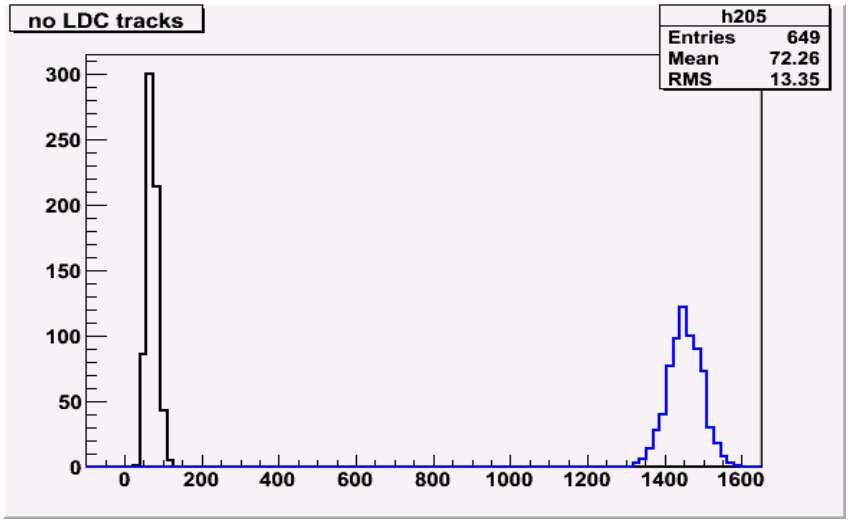


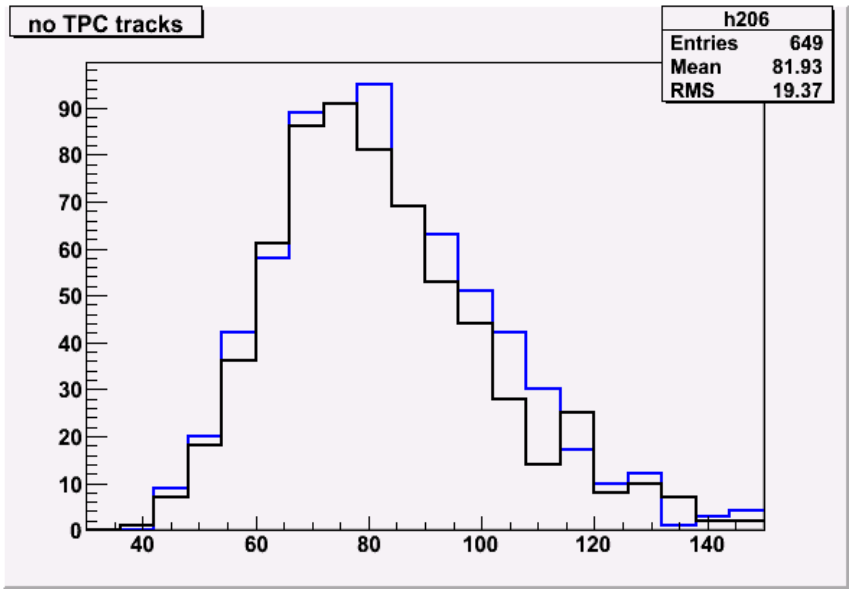




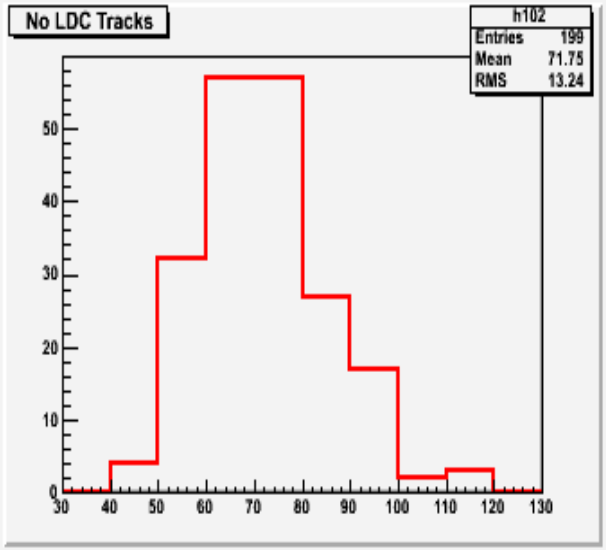
LDC & TPC Tracks

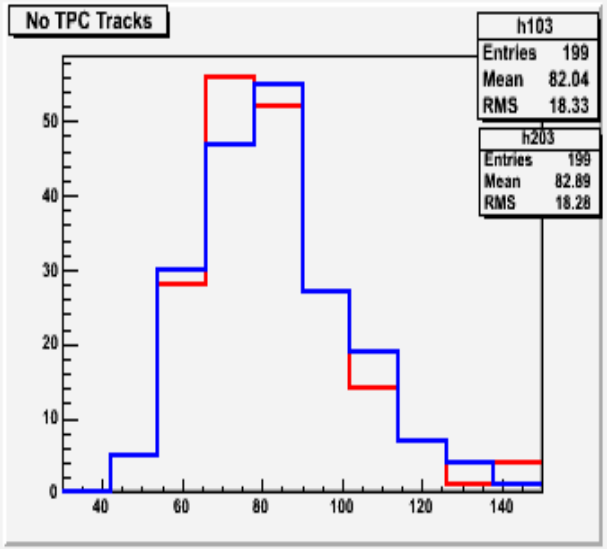
OLD



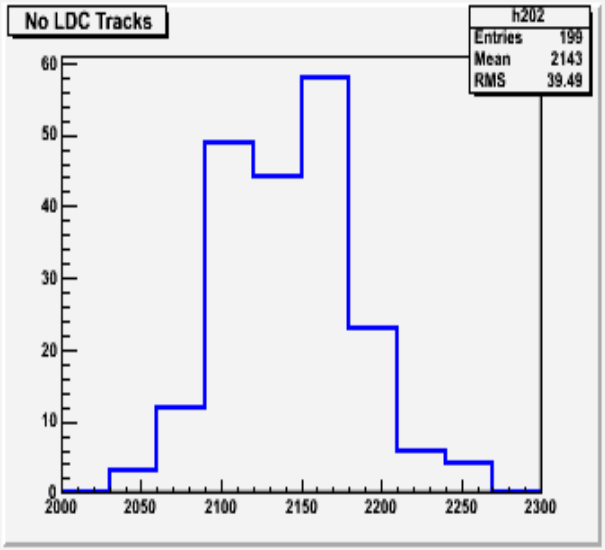


NEW: NoBG



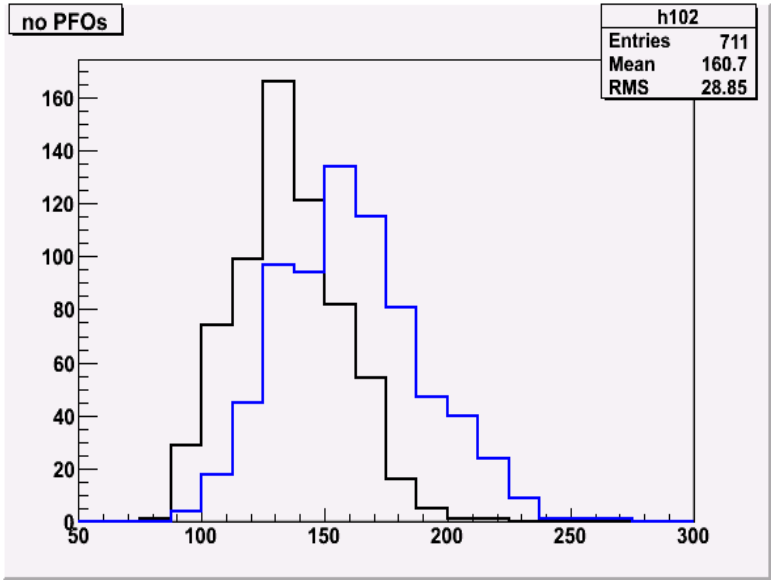


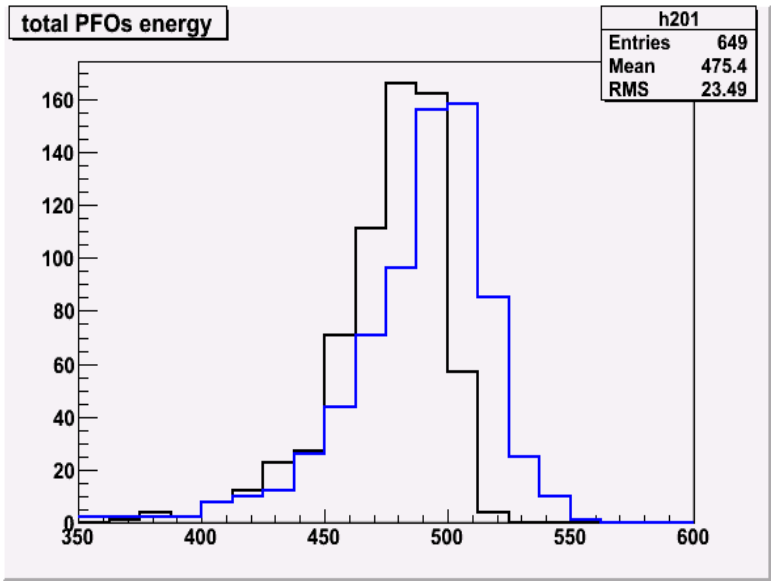
BG



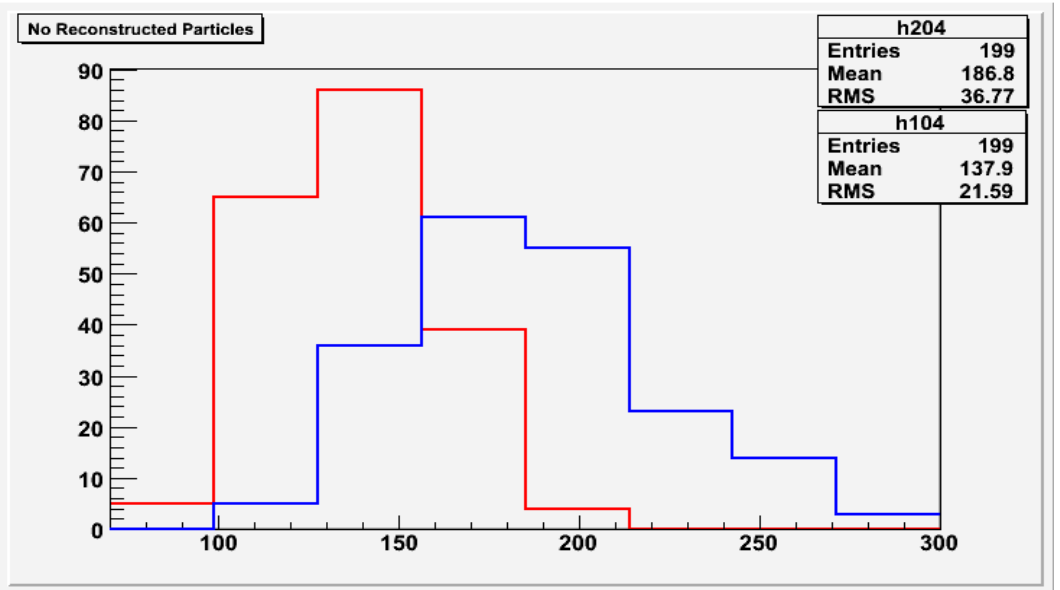
PFOs

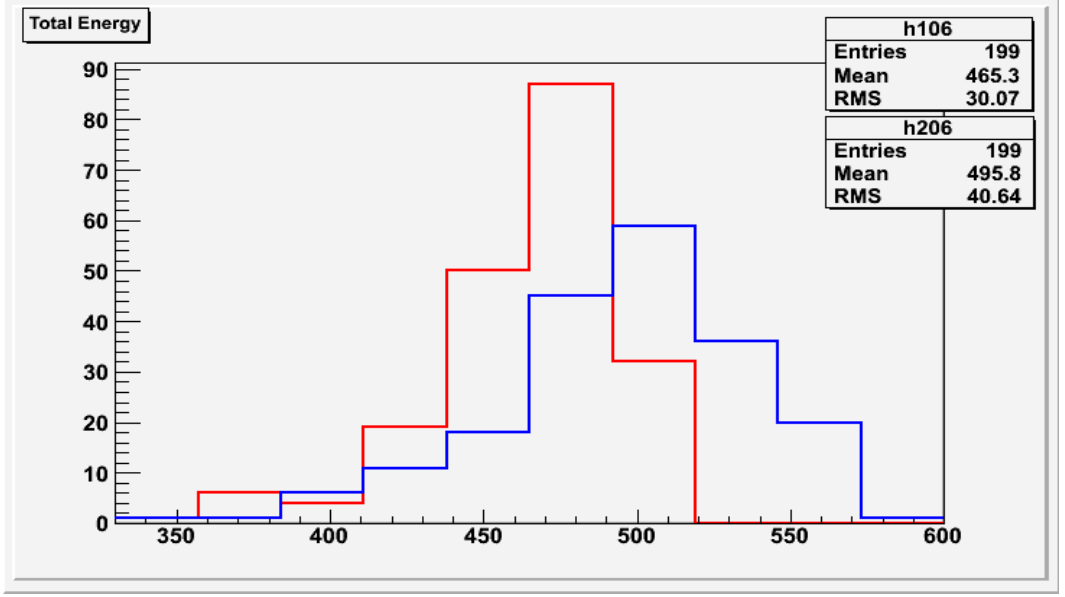
OLD



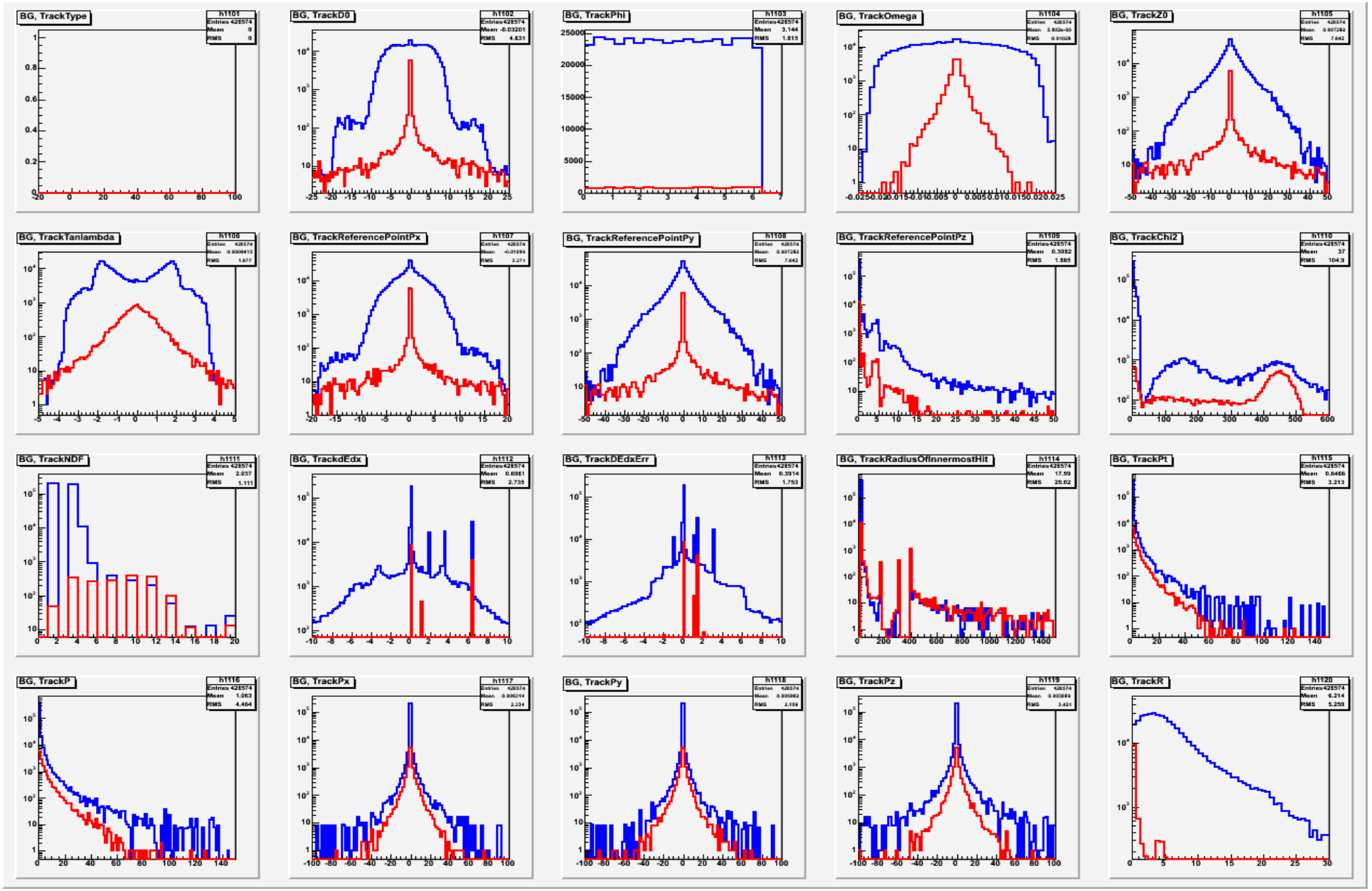


NEW: NoBG BG





LDC Tracks Distributions



Old Cuts & New ILD Samples

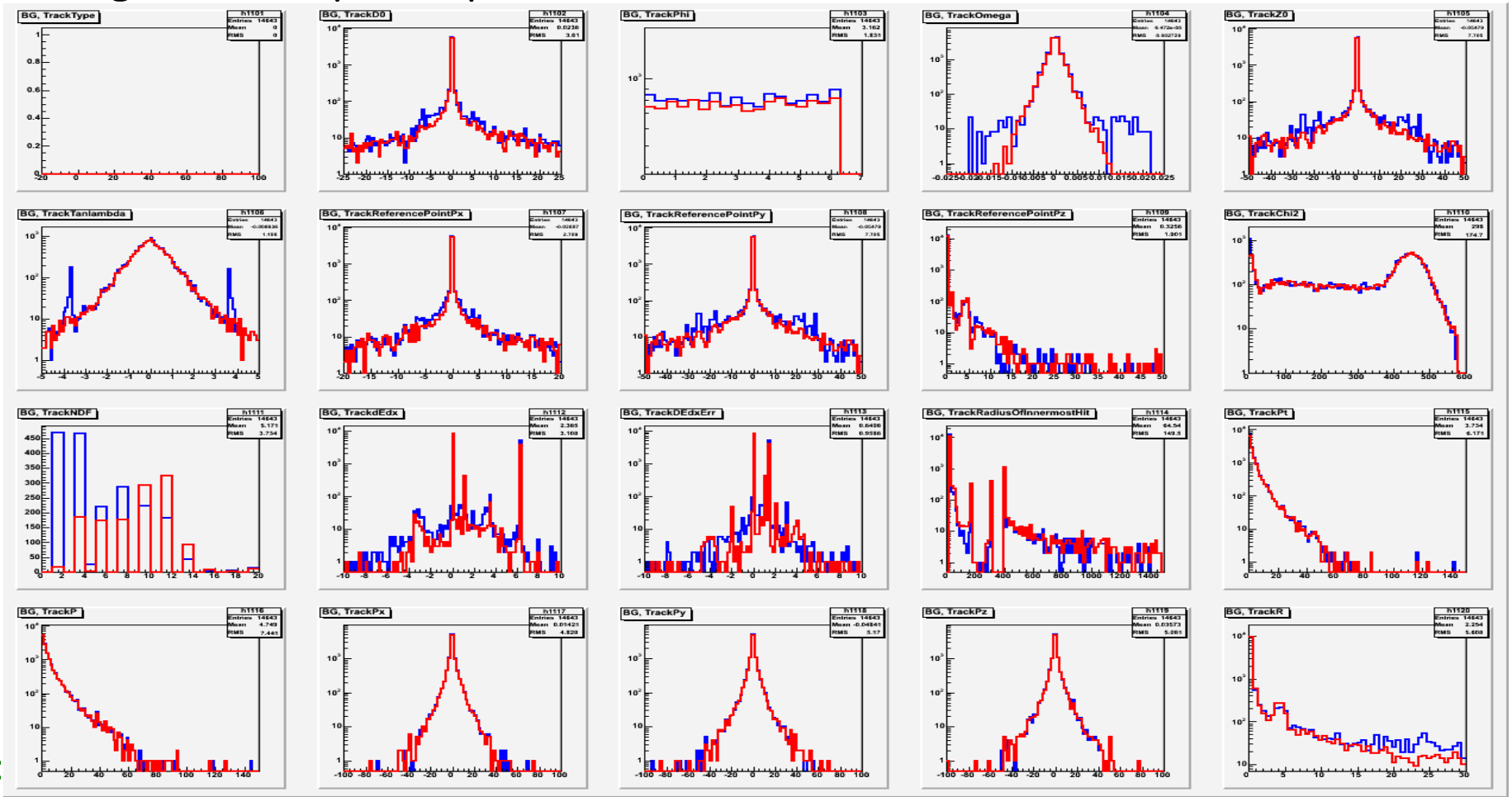
|Track D0| < 0.1 || TPCHitsTotal > 25 || |Track η| > 2.

&&

|Track Y| < 0.25 || TPCHitsTotal > 25 || |Track η| > 2.

} accepted tracks

- tracking efficiency (no p cut): 4%, background rejection: 97%
- tracking efficiency with p>0.5 GeV cut: 1.4%



Old Cuts & New ILD Samples

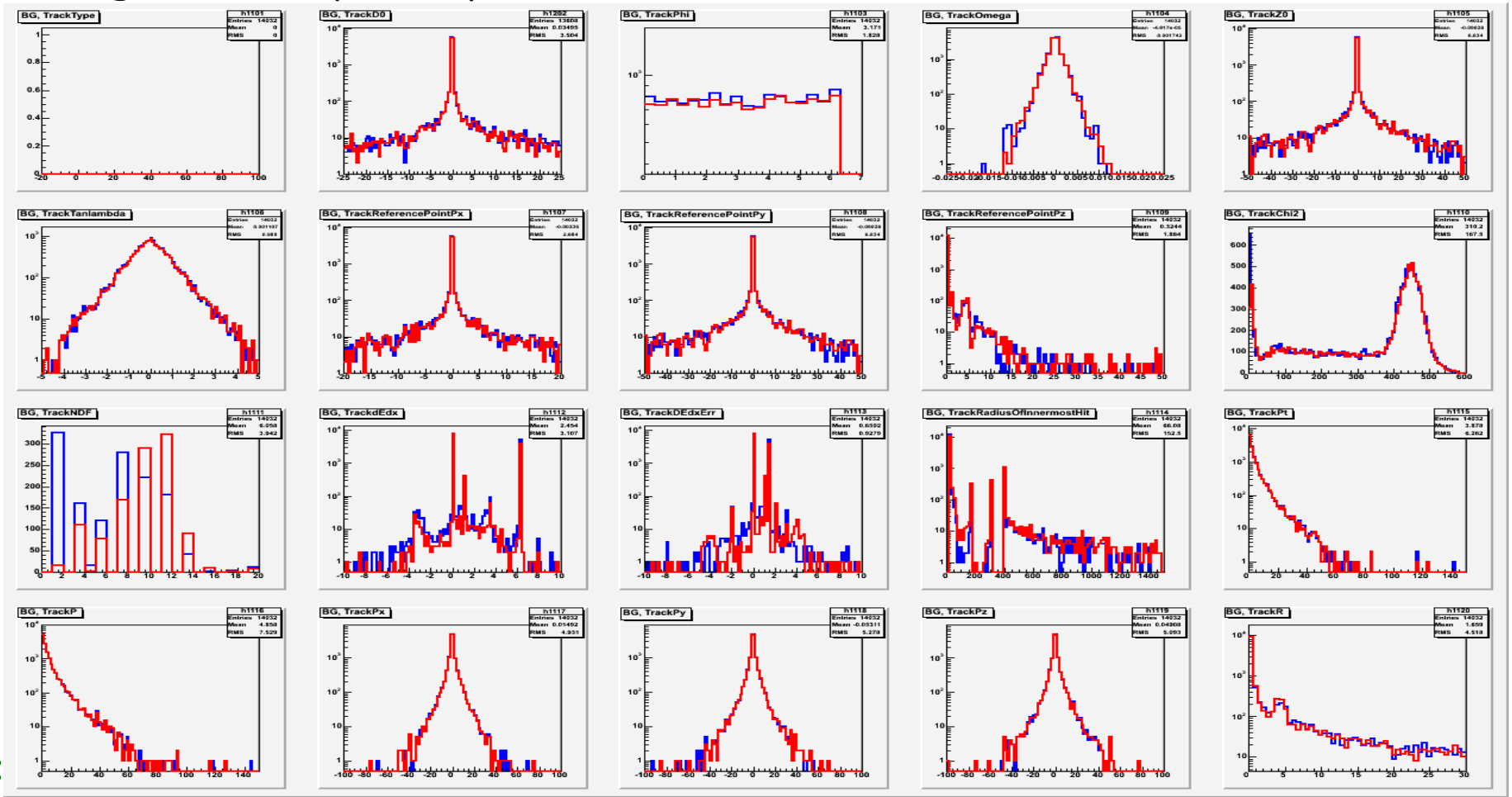
|Track D0| < 0.1 || TPCHitsTotal > 25

&

|Track Y| < 0.25 || TPCHitsTotal > 25

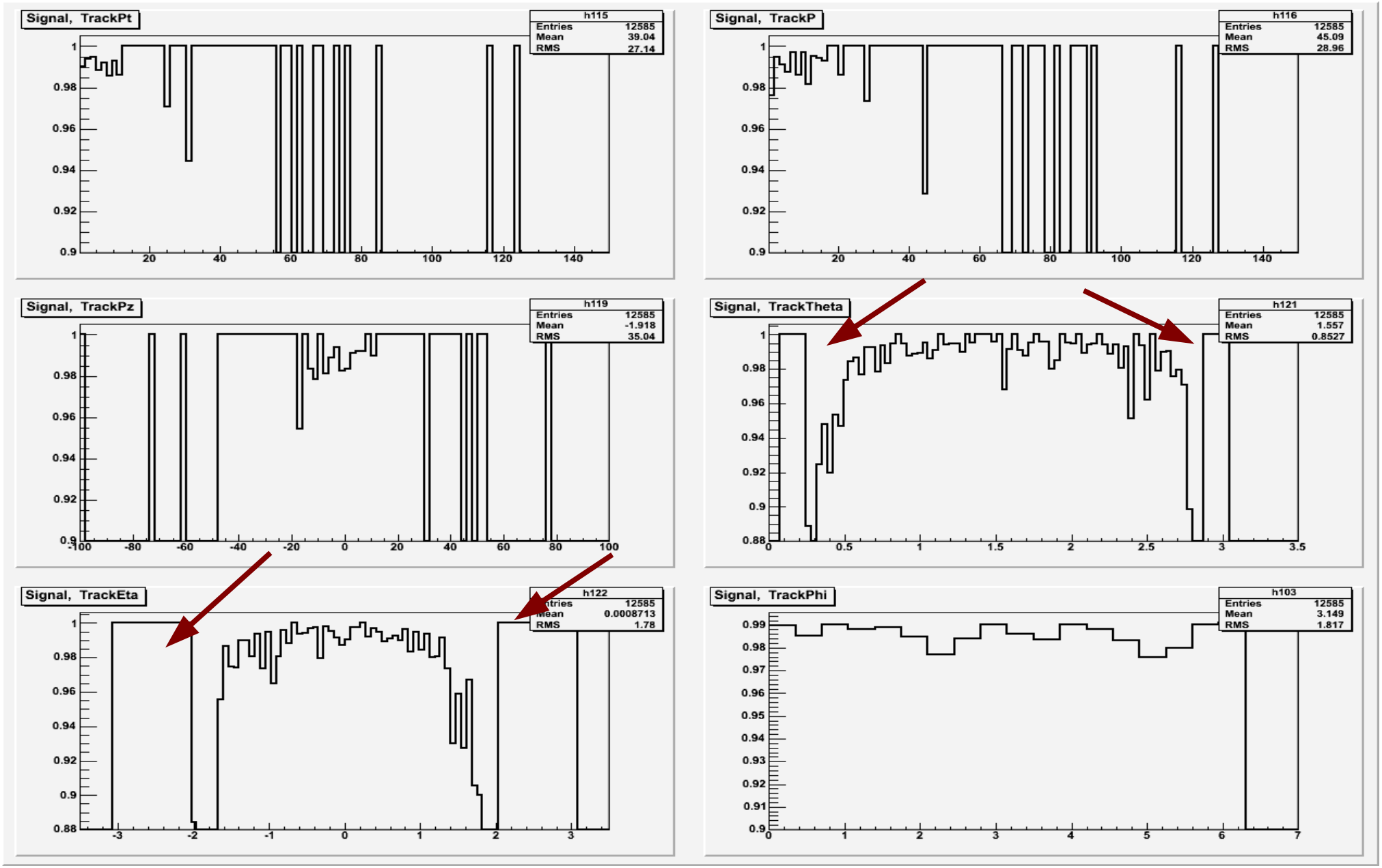
} accepted tracks

- tracking efficiency (no p cut): 5%, background rejection: 97%
- tracking efficiency with p>0.5 GeV cut: 3%



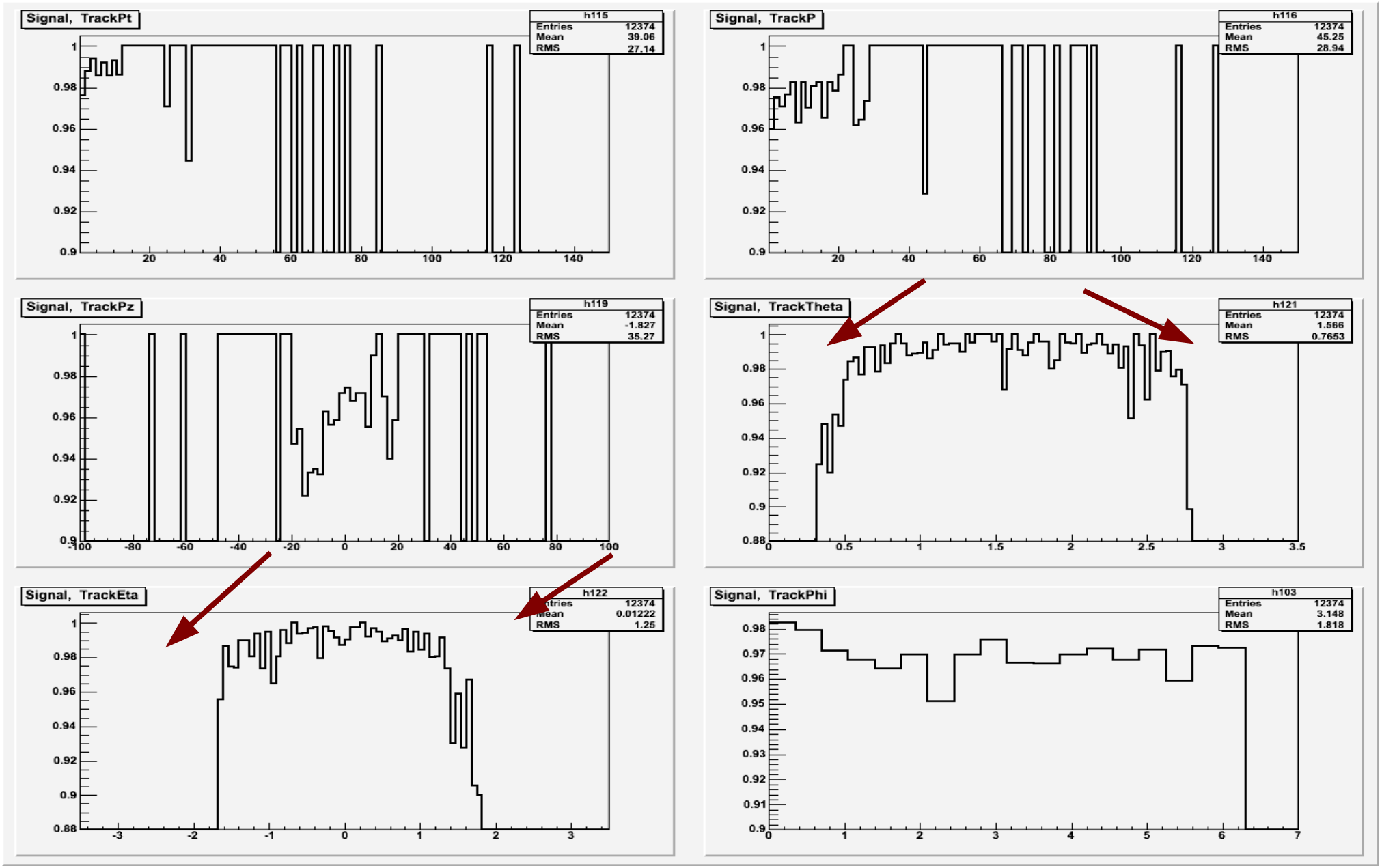
Accepted Tracks: old cuts

ee -> ttbar -> jets Accepted Tracks/All Tracks



Accepted Tracks: modified cuts

ee -> ttbar -> jets Accepted Tracks/All Tracks



Summary & Plans

- GP beam background samples simulated & ready to use
- VTX hit densities evaluated for ILD, in agreement with previous values
  - work ongoing on hit densities for other detectors (forward & TPC!)
- for ILD more VTX layers -> more VTX hits -> more VTX tracks -> more LDC tracks
- Pandora ~ copes – like before
- cuts from old studies used -> more-or-less ok, without any tuning
- need more studies!
  - need to explore 2-close-layers feature!
- Overlay Processor ready, need to be tested & used
- flavor tagging studies still pending