WEIRD TRACKS IN TILTED-BEAM MC

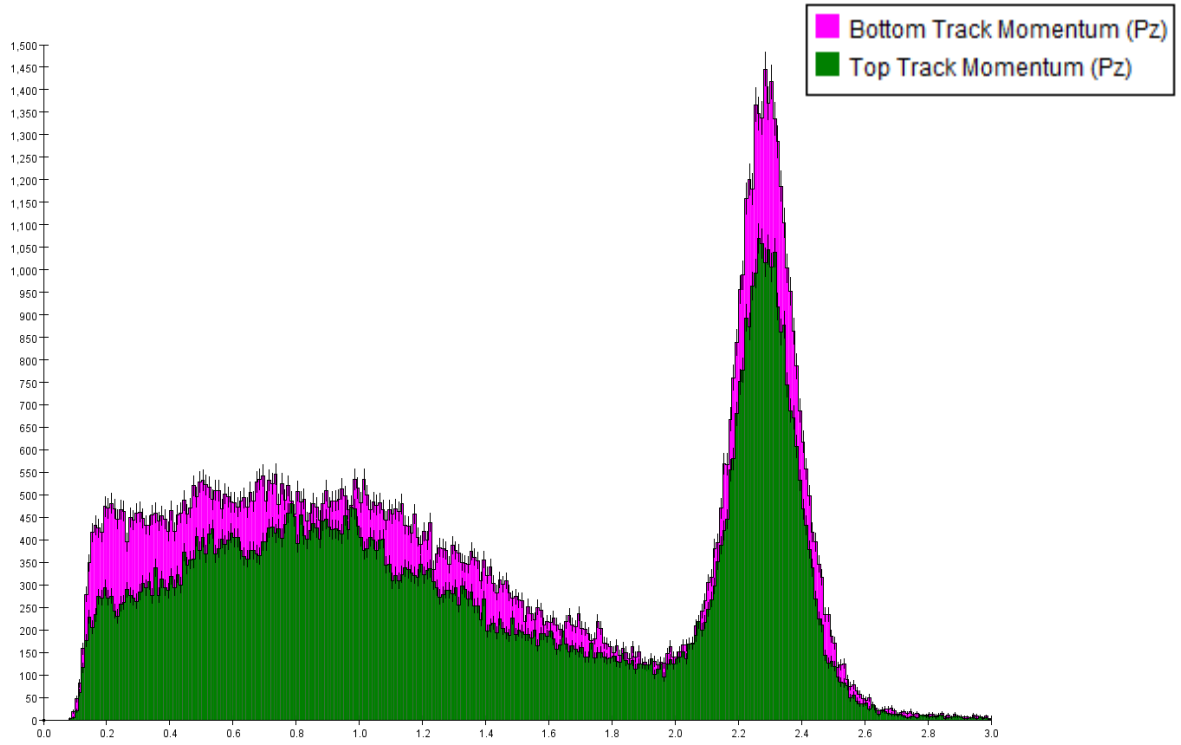
MIRIAM DIAMOND

JULY 9 2018

Follow-up to June 18 DAWG Meeting

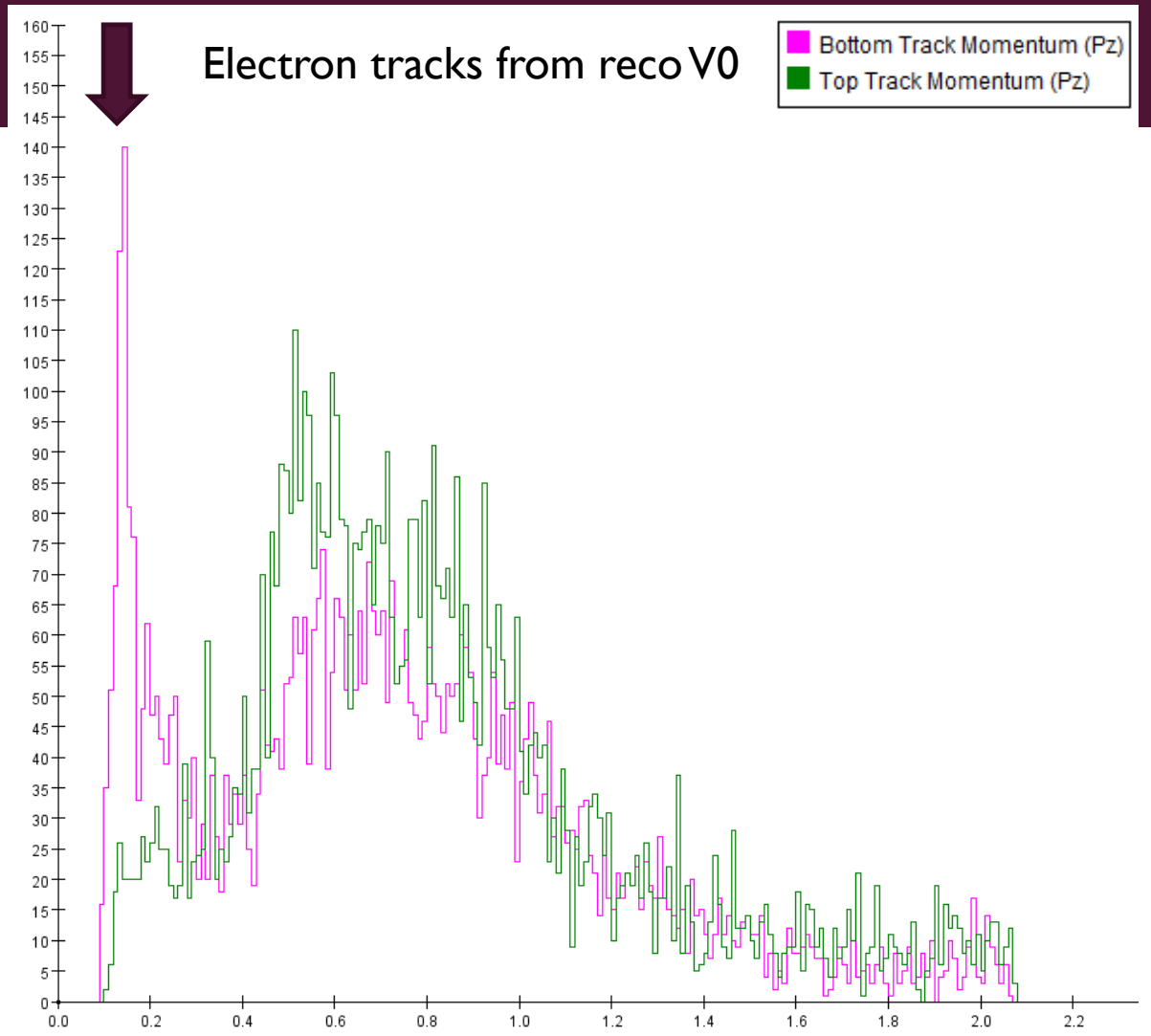
TRACKS IN WAB-BEAM-TRI MC

- New wab-beam-tri MC with tilted beam: /mss/hallb/hps/production/BeamTilt/physrun2016/x31_yneg0pt5_withCorrectedZTilt/recon/WBT/
- Momentum distributions of tracks in reco particles show top/bottom asymmetry ☺



WITH TRIDENT CUTS...

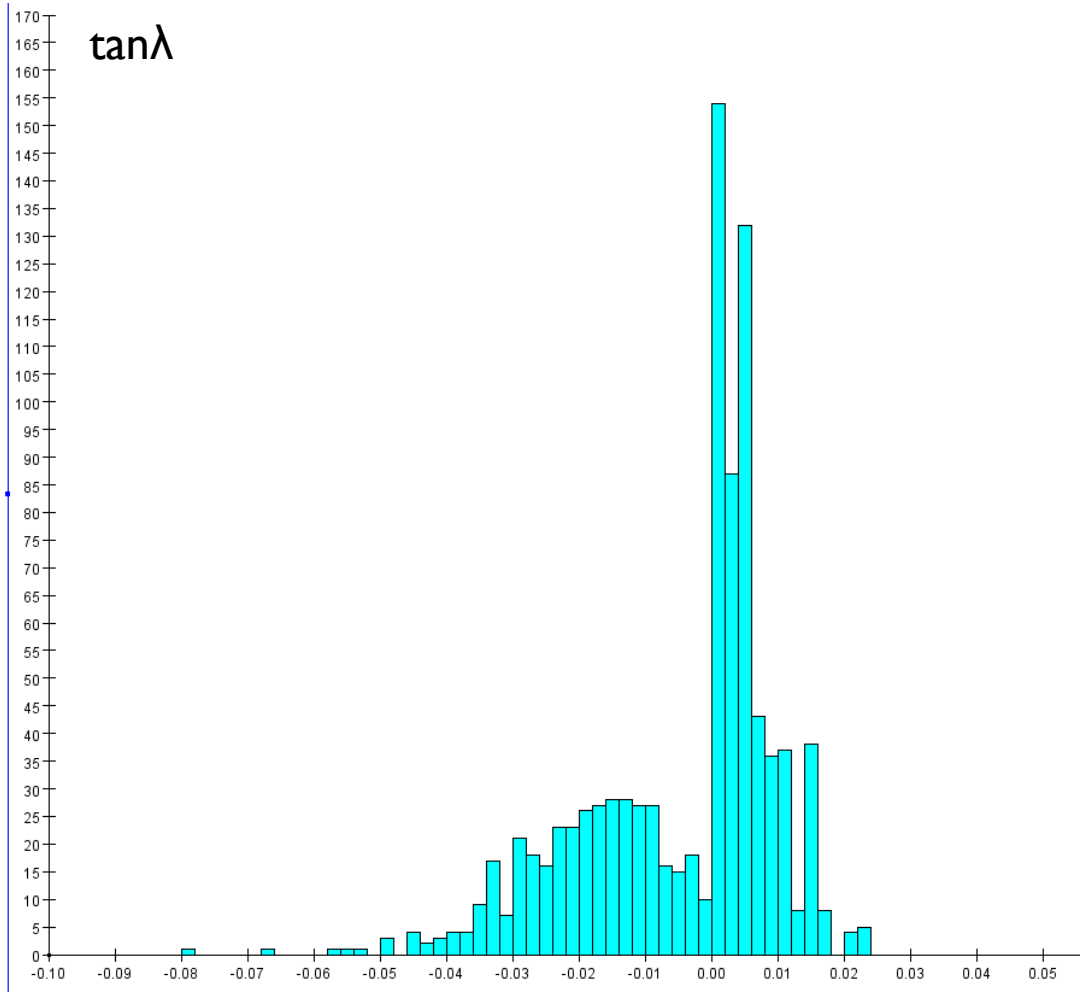
- Bradley's plots from trident tuples showed anomalous population of low-momentum electron tracks
- Only shows up when cuts are applied (especially the final one):
  - Reconstructed V0
  - electron p < 0.9 Ebeam
  - positron p < 0.9 Ebeam
  - electron p + positron p < 0.9 Ebeam
  - electron and positron have opposite tanλ
- It's a small number of tracks compared to the total uncut number, but did not appear in data or previous (nominal) WBT MC



WEIRD TRACK POPULATION

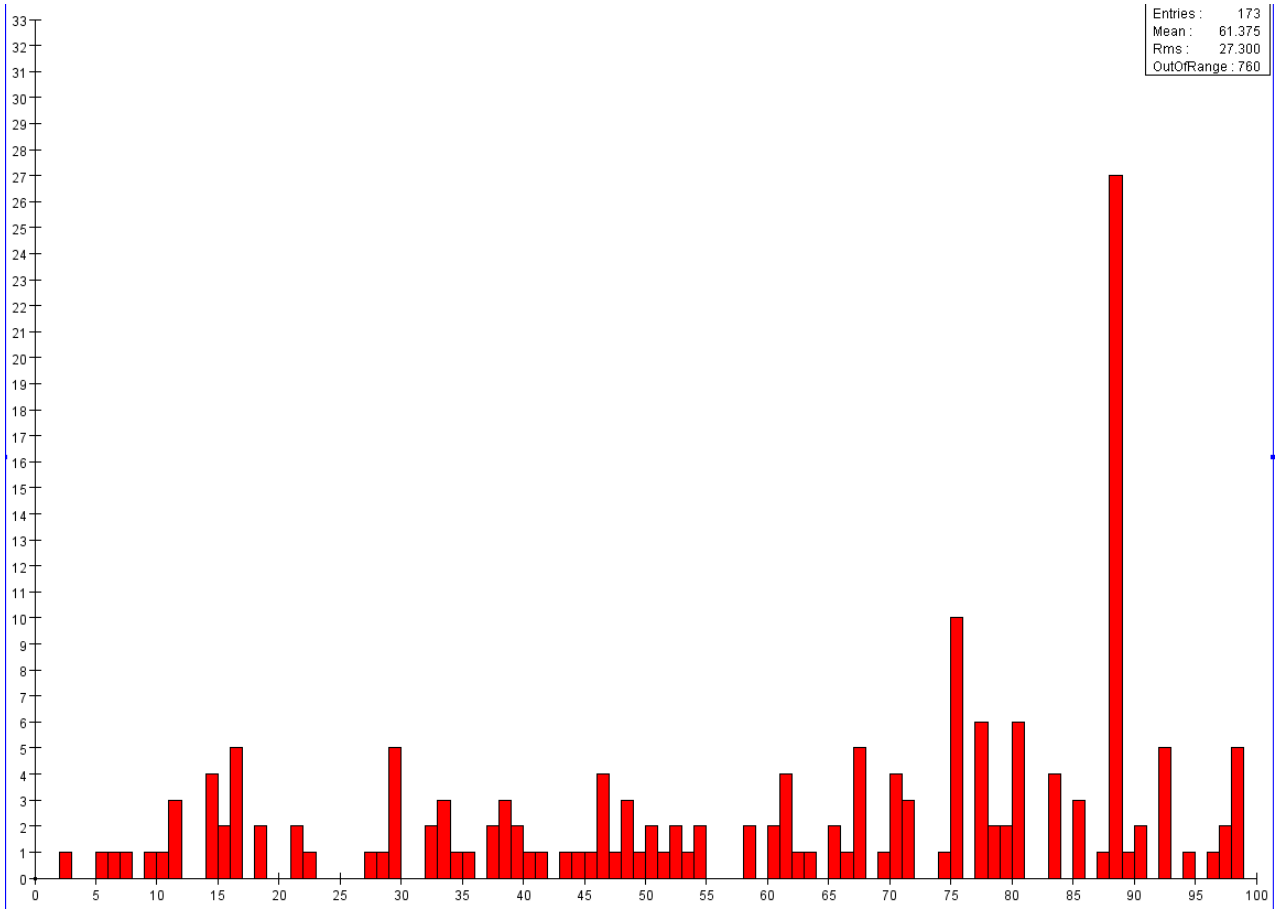
- Focus on population with
  - E < 250 MeV
  - Hits in bottom

- Many of these bottom tracks have weird tanλ
  - Too small (not within acceptance)
  - Positive (wrong sign!)



WEIRD TRACK POPULATION

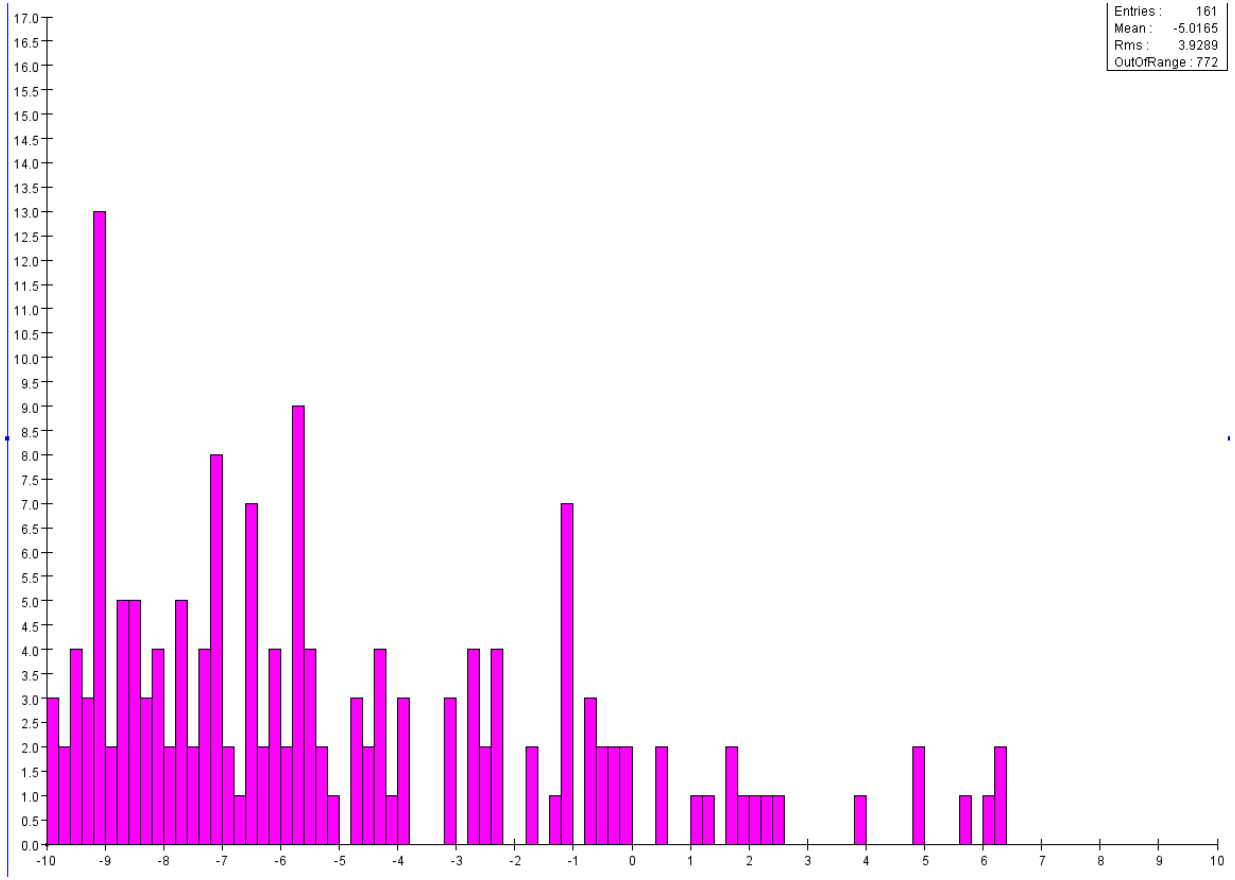
Lousy χ^2



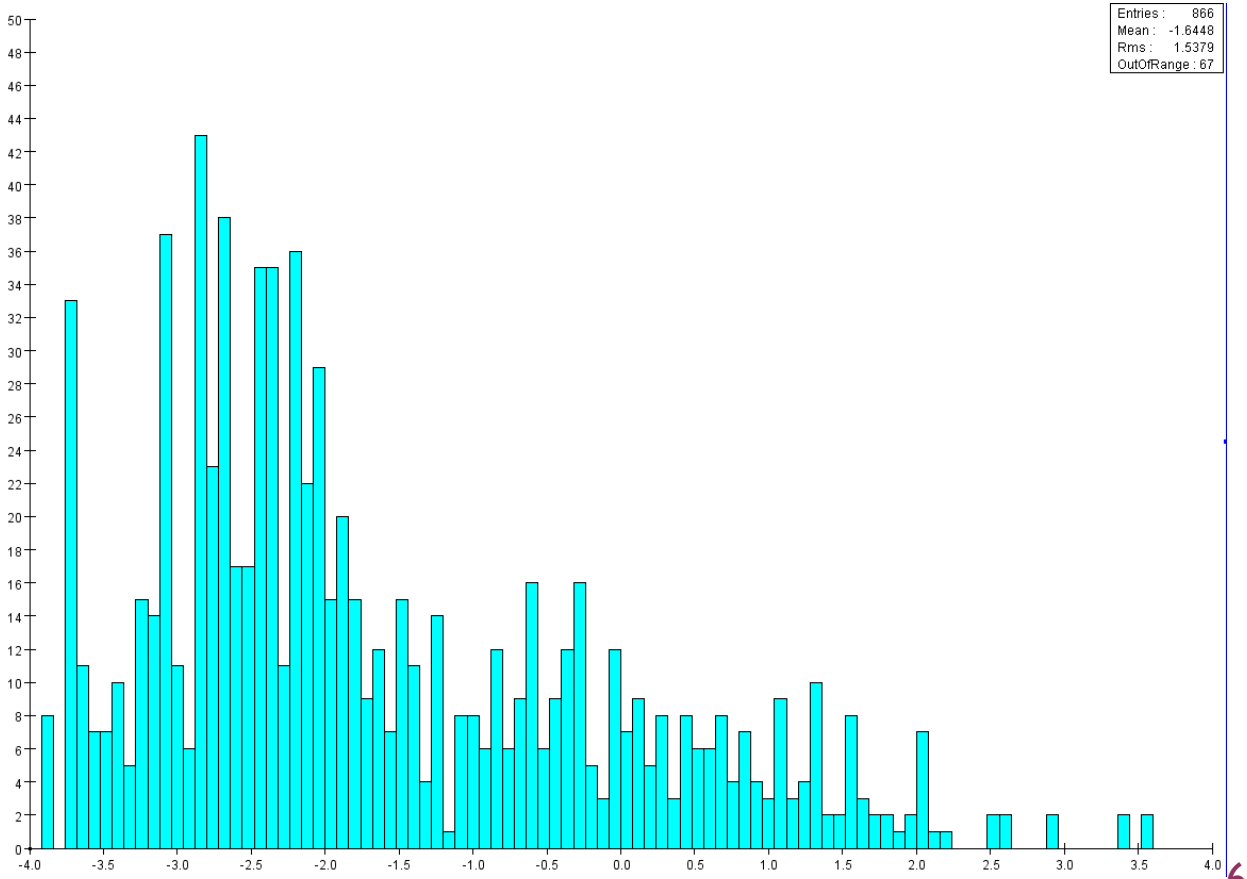
Mostly 5-hit tracks

WEIRD TRACK POPULATION

Lousy d0

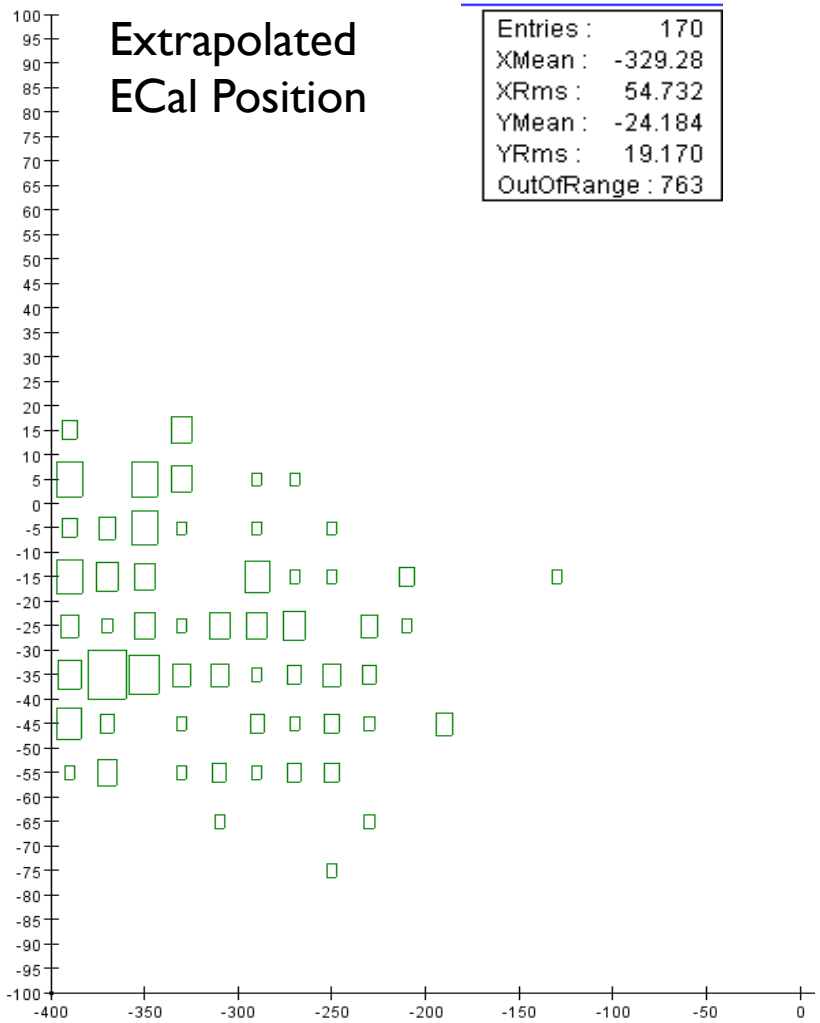


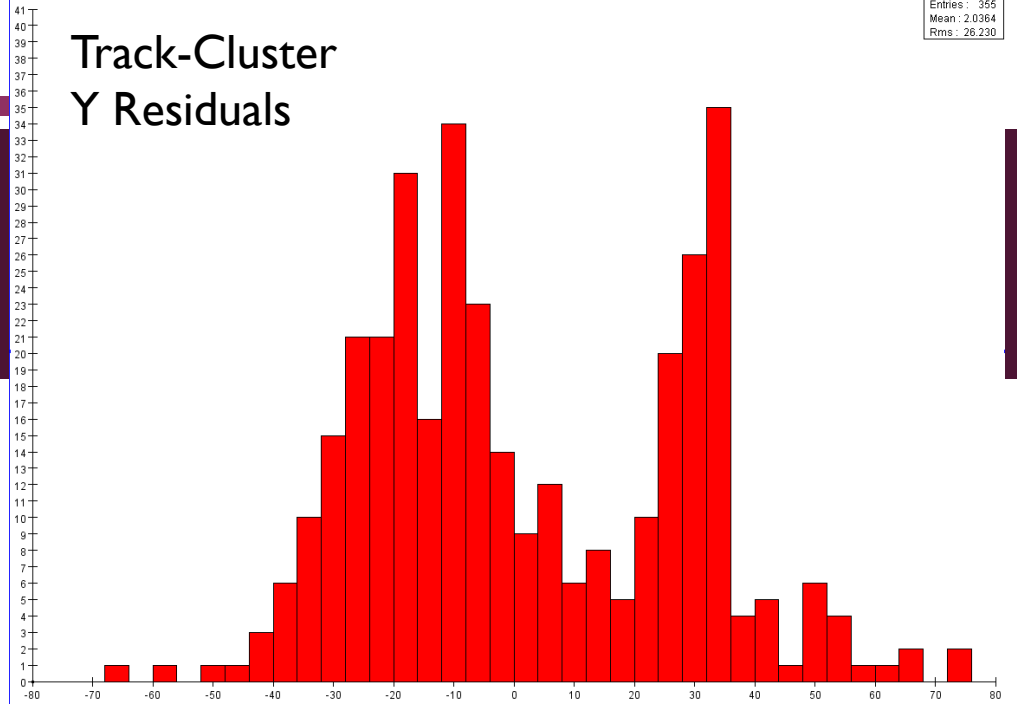
Lousy z0

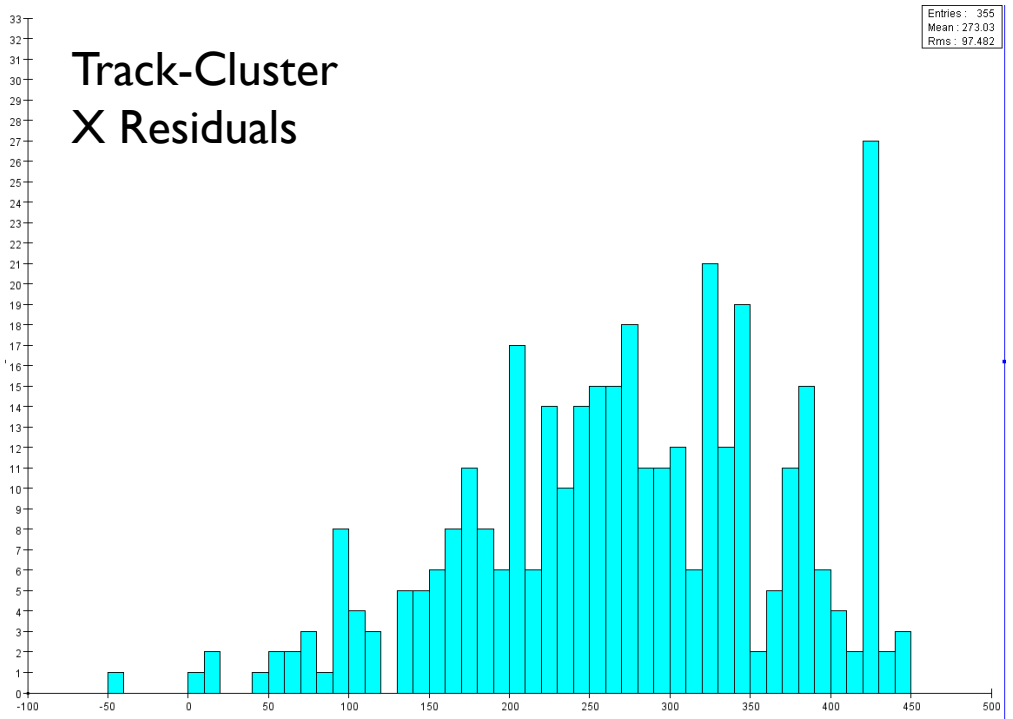


WEIRD TRACK POPULATION

- Most extrapolate to an ECal position outside acceptance
- About a third match to an ECal cluster, but residuals are lousy







WEIRD TRACK POPULATION

What are these tracks?

- What MCParticles / noise hits contributed to them?
  - SimTrackerHits mostly missing from the lcio's ☹
- Verify they only show up with tilted beam
  - Need equivalent WAB MC with nominal beam
- Why is SeedTracker forming them?
  - Rabbit-hole…

Probably not a big concern, since χ^2 cut easily eliminates them

- But … possibly symptomatic of something wrong in the MC?