Converter position and upstream background

Pelle

work in progress

Test Run Converter position

SLAC

Is the converter where we think it is?

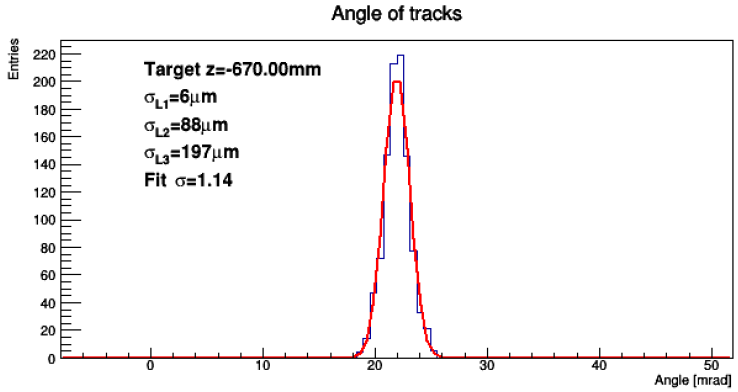
- Look at the y-position at our assumed converter position vs track angle
- Parallax effect will create a slope in the y-position

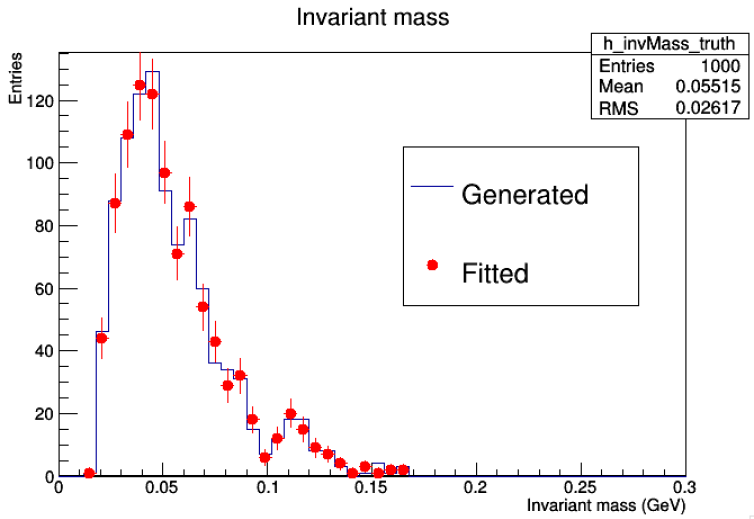
Where is “no target” background coming from?

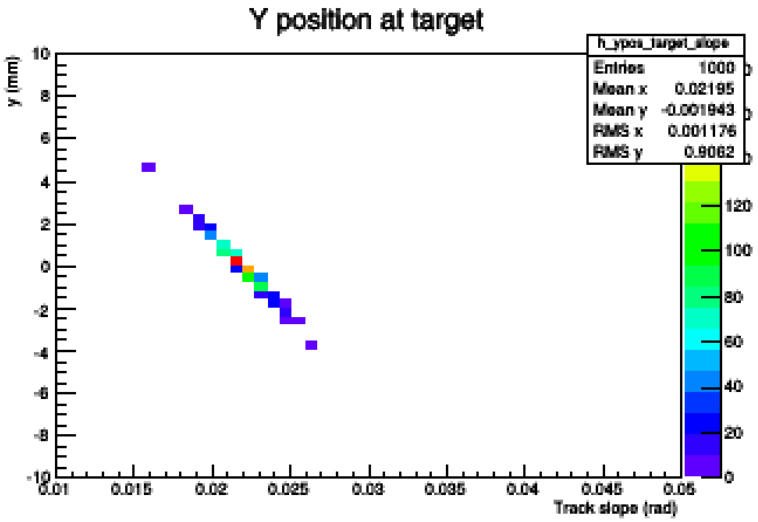
- Conversion in 14mm collimator ~8” upstream of converter?
- Can be used as extra target to remove global alignment problem? Single point?
- Ties in with discussions for global alignment ambiguity
- Note: Test run had all planes on a hinge; new SVT has only 3 of 6 planes on the hinge => residuals will inform about pointing direction of upstream layers without target position!

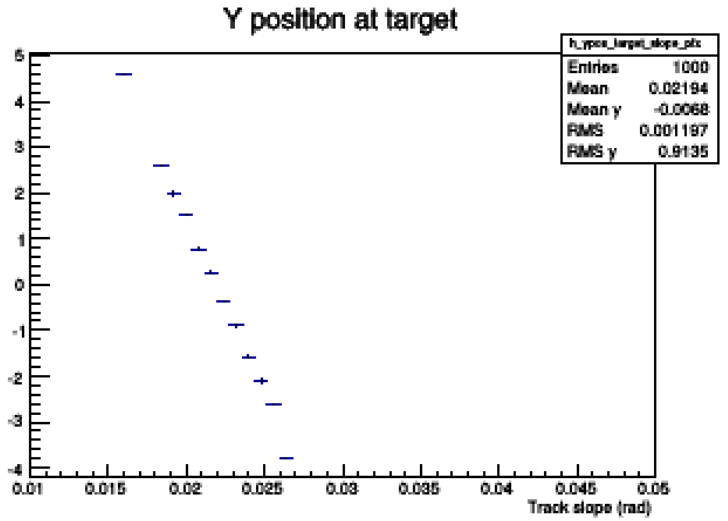
Y converter position vs slope in Toy Simulation

Particles generated at single angle



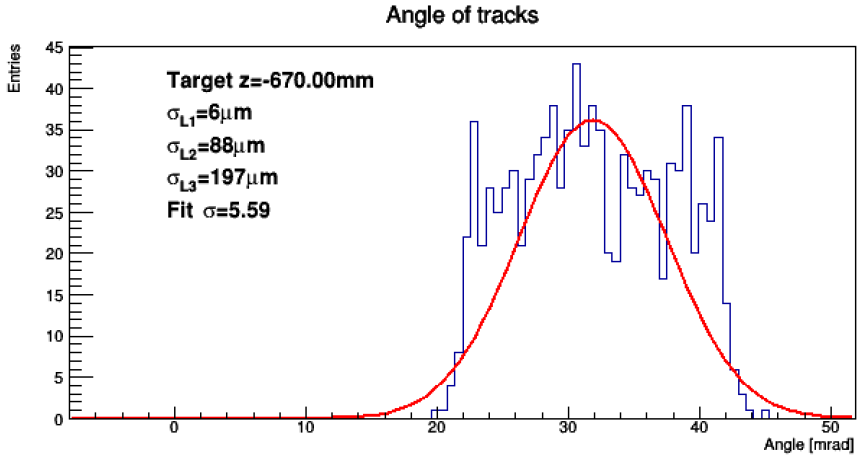


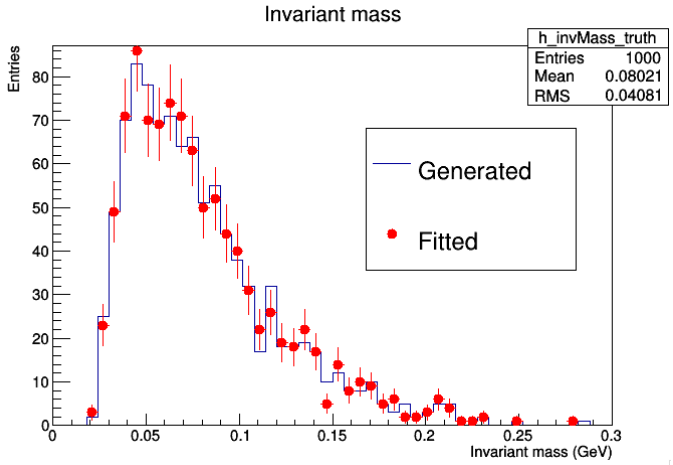


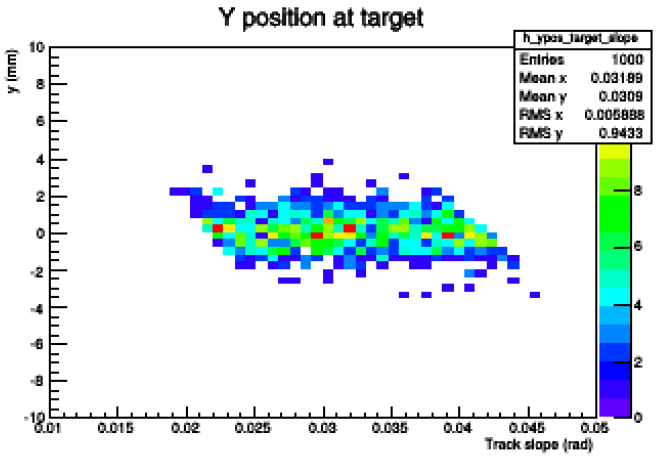


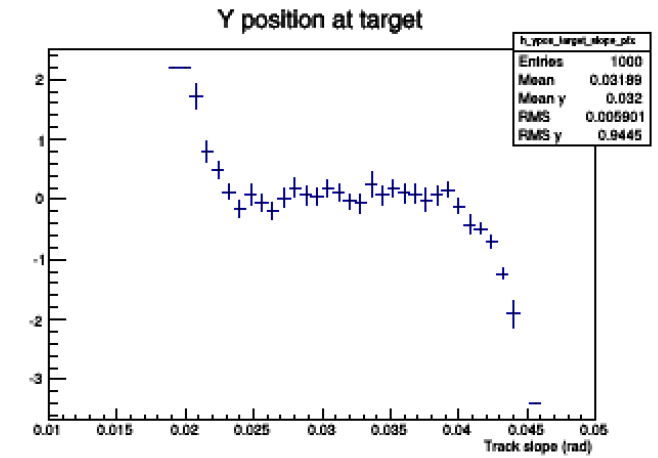
Y converter position vs slope in Toy Simulation

Particles generated with different angles



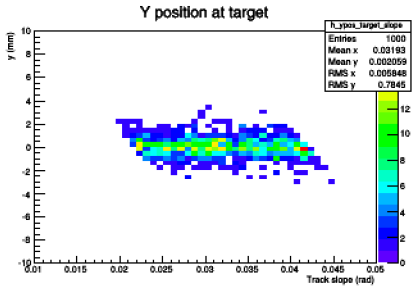


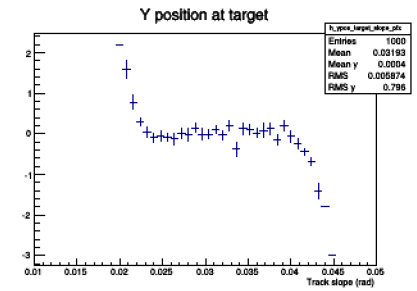


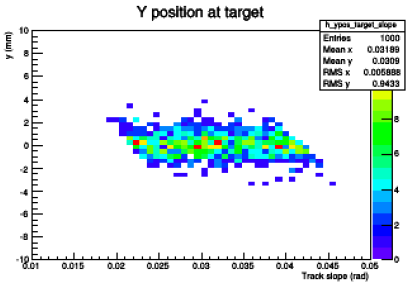


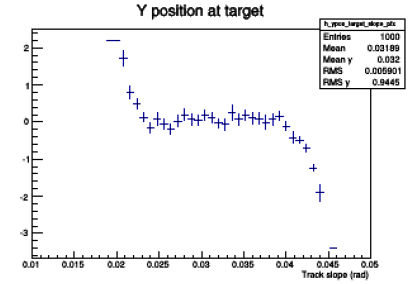
Y converter position vs slope in Toy Simulation

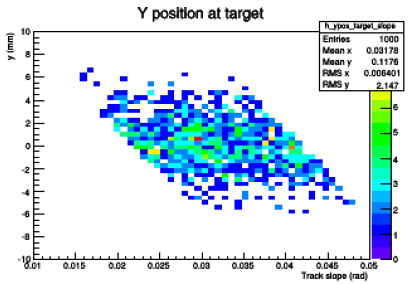
Beam spot effect

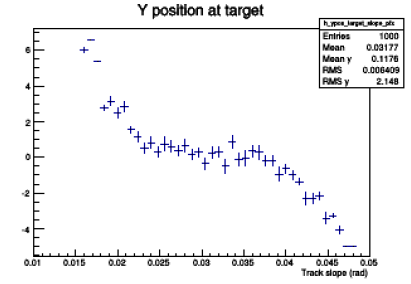


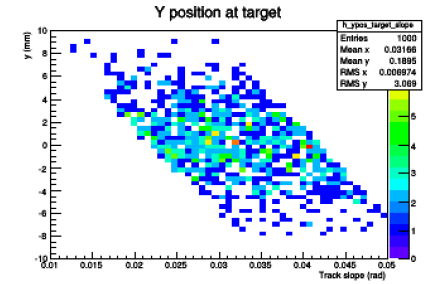


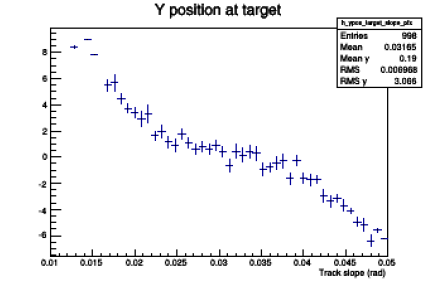








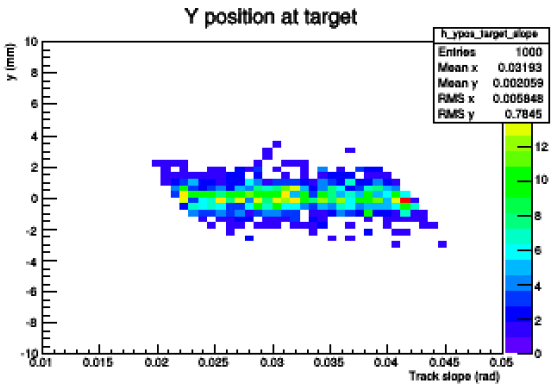


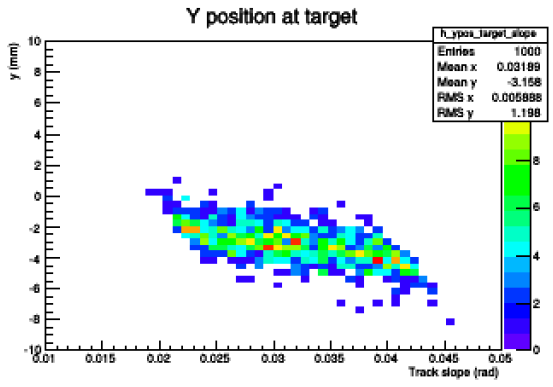


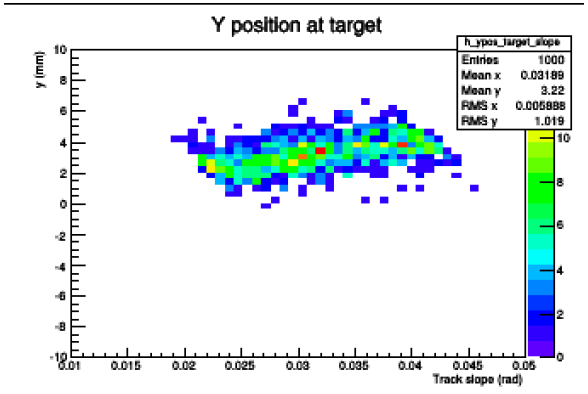
0.001mm 0.5mm 2mm 3mm

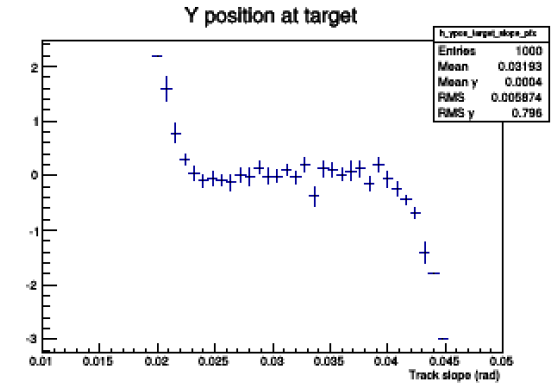
Y converter position vs slope in Toy Simulation

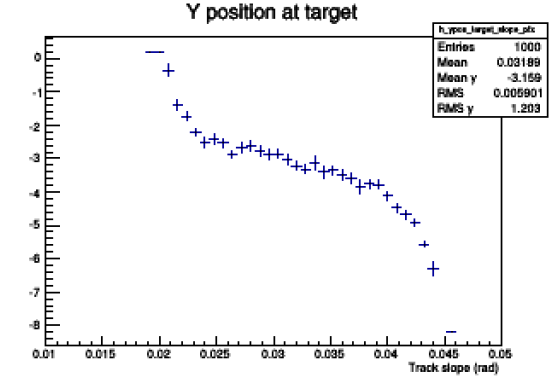
Converter position

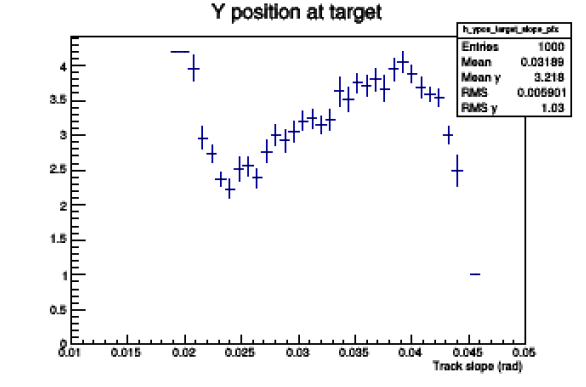








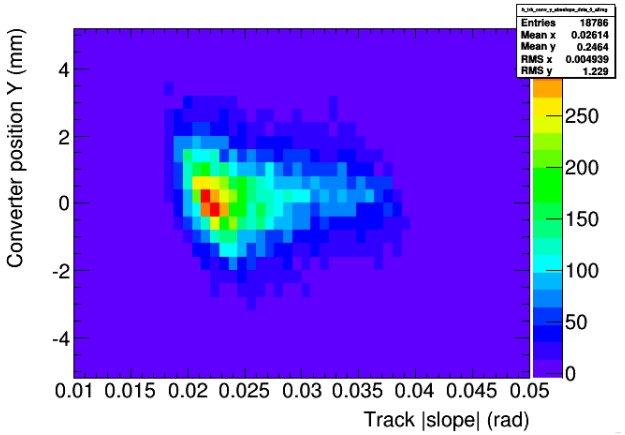


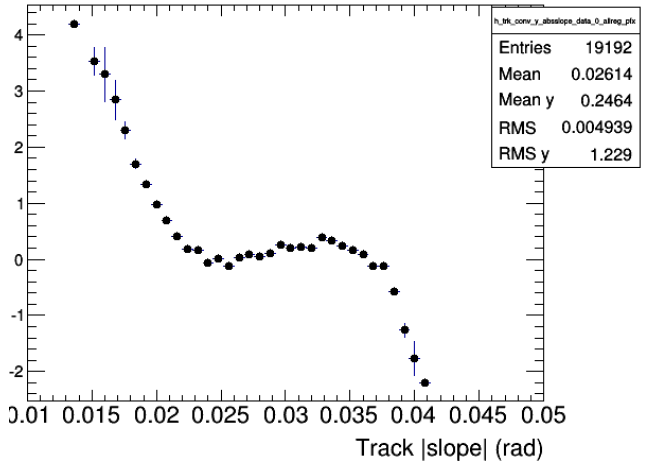


Ideal -100mm +100mm

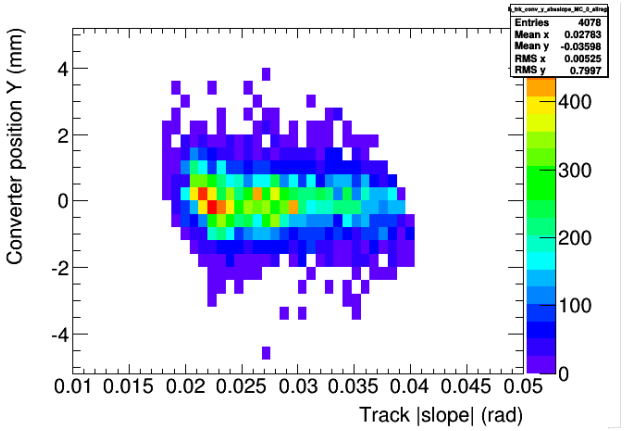
Slope in central region tells you about converter position and beam spot
Parallax effect precision given by accurate distance between layers in the SVT

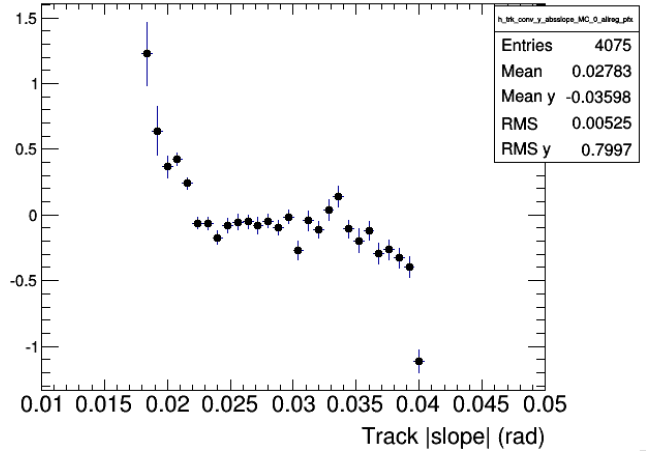
Y converter position vs slope (top+bottom)





Data
1.6% RL

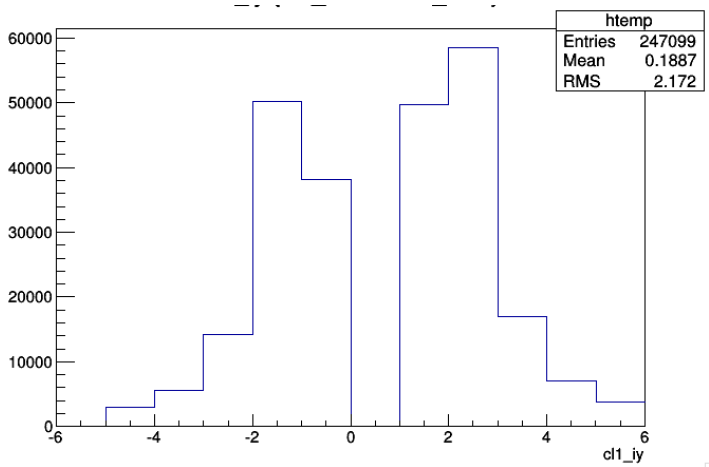




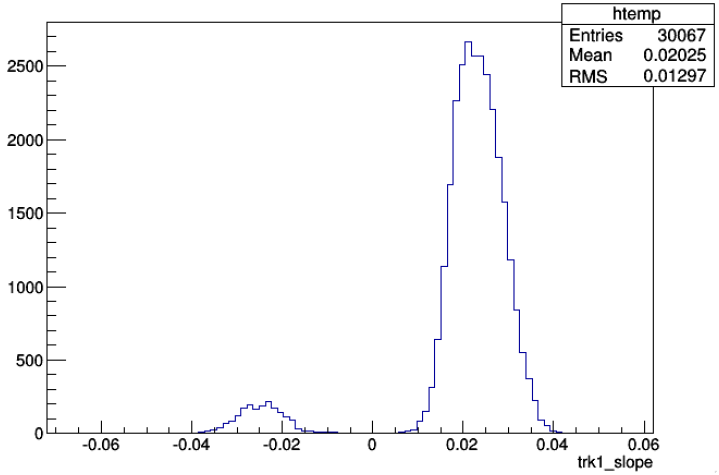
MC

Track p>1GeV, Chi2<5

Where do tracks in no target run come from?



Cluster vertical position



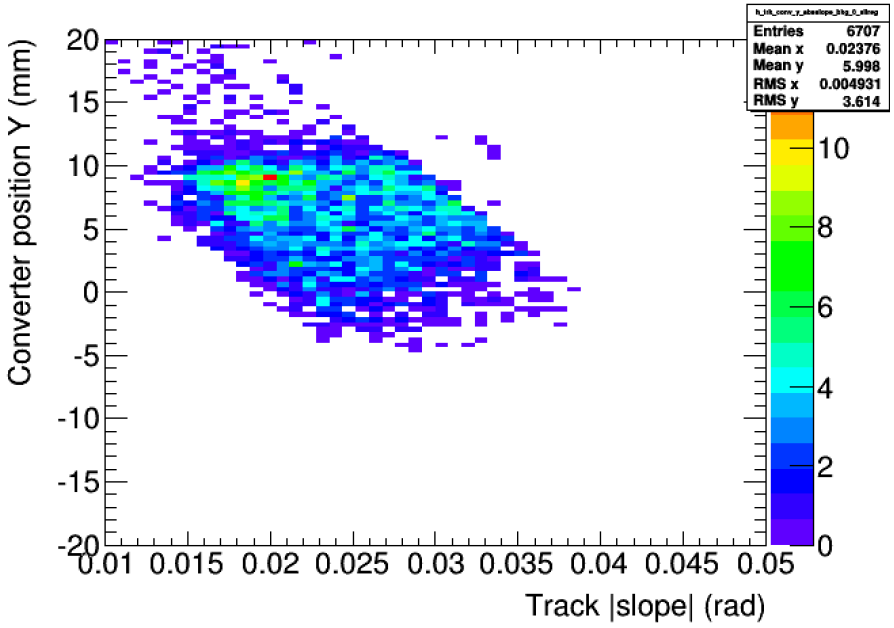
Track slope

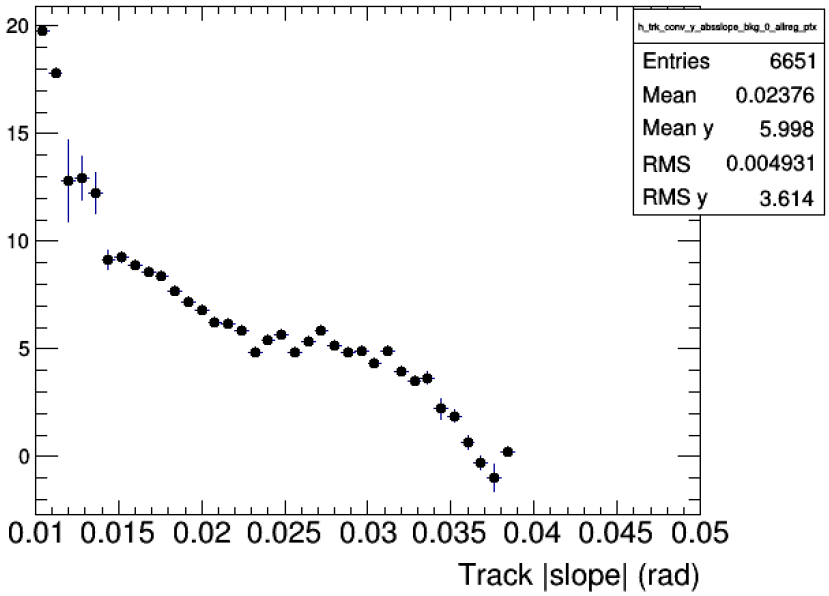
Lots more tracks in the top half of the tracker

- Even taking into account more dead channels in SVT
- 20% clusters have a track in the top
- 2% clusters have a track in the bottom

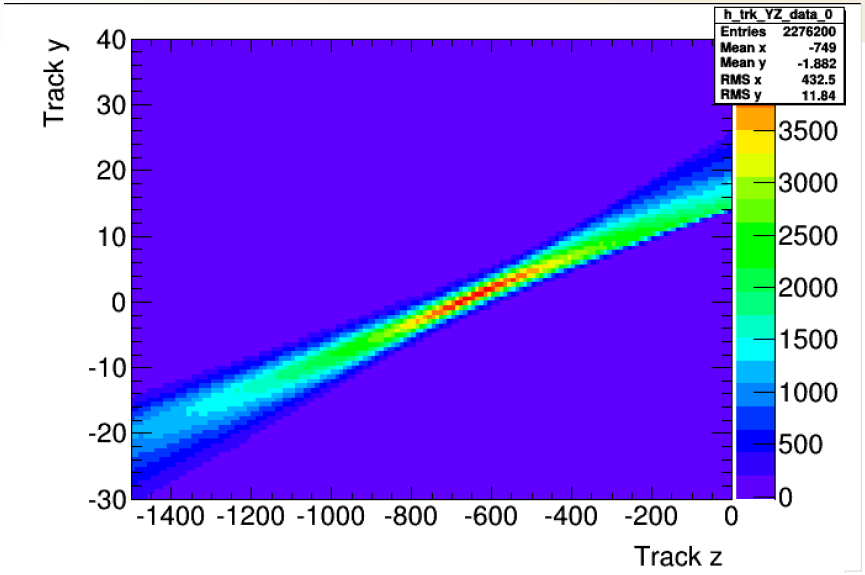
Where do tracks in no target run come from?

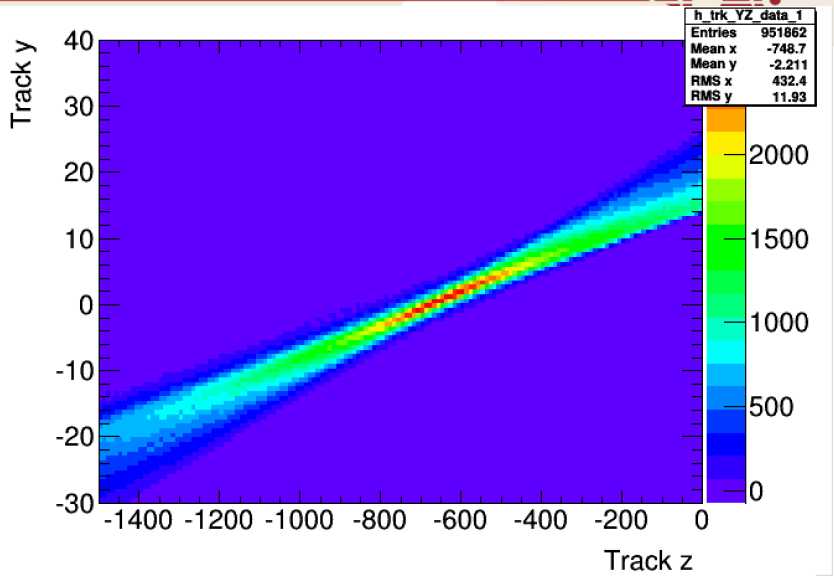
Has slope at converter position (no surprise)

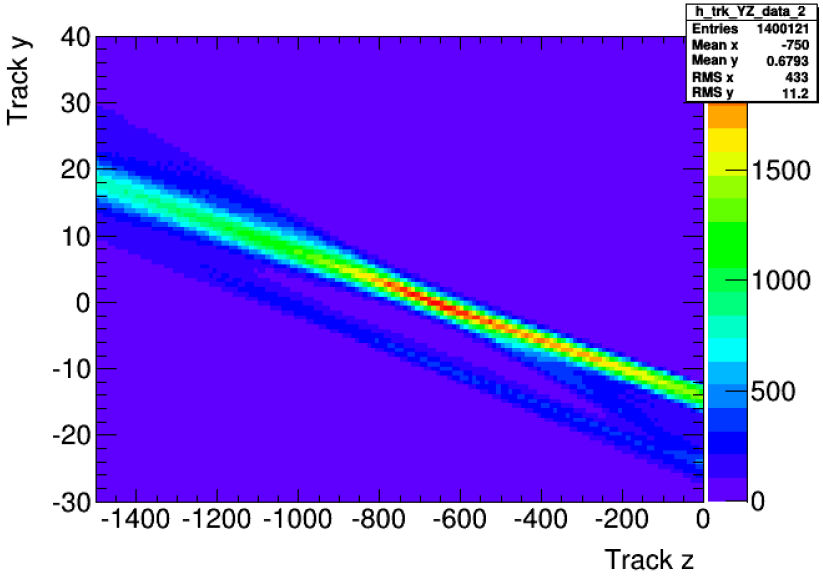


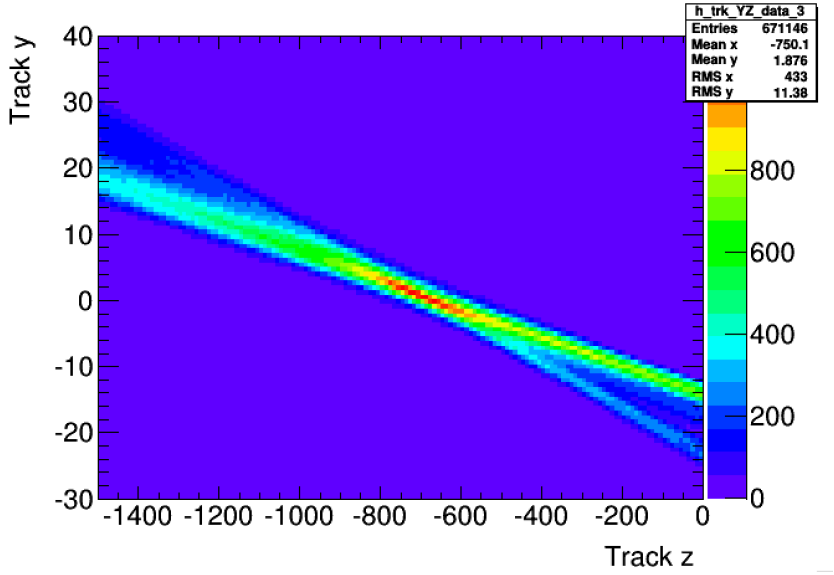


Track YZ scatter plot for data (bkg subtracted)

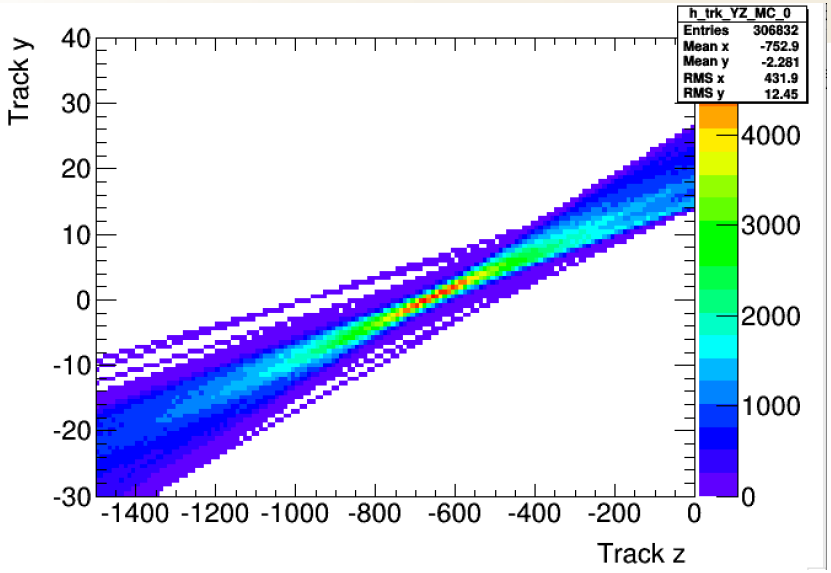


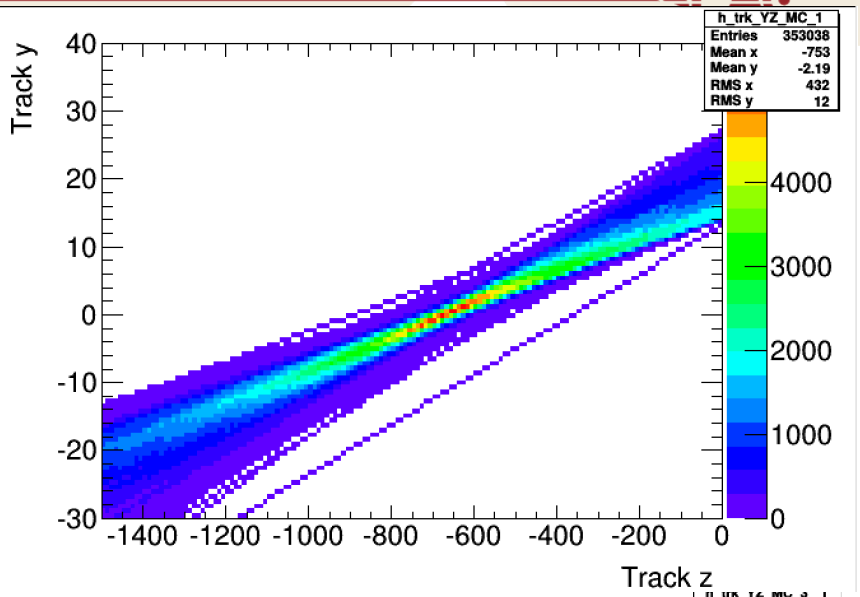


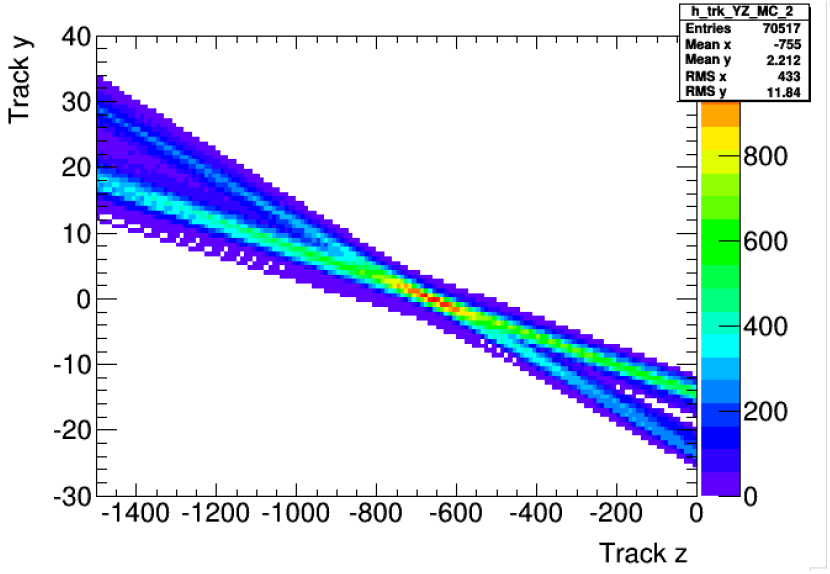


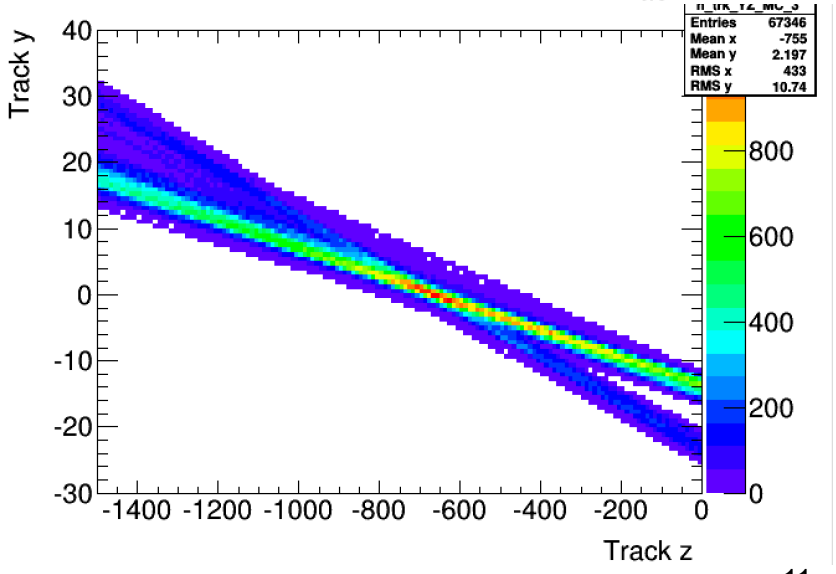


MC

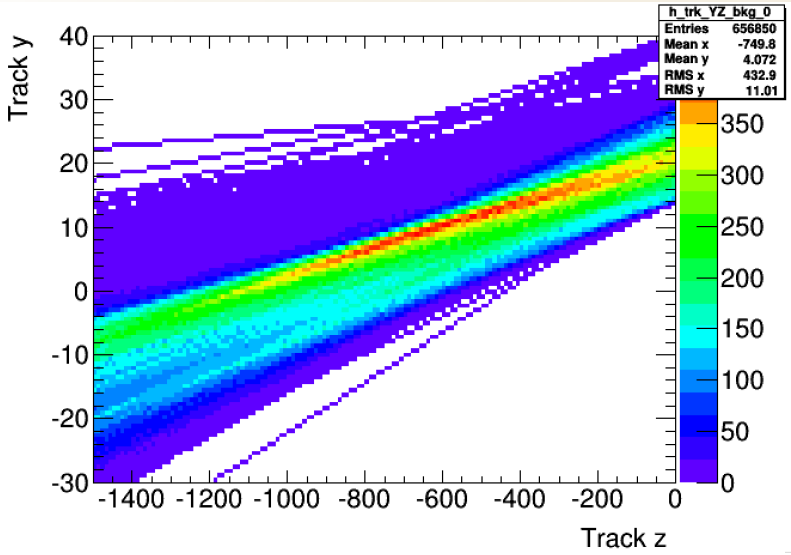

h_trk_YZ_MC_0
Entries 306832
Mean x -752.9
Mean y -2.281
RMS x 431.9
RMS y 12.45
Track y
Track z


h_trk_YZ_MC_1
Entries 353038
Mean x -753
Mean y -2.19
RMS x 432
RMS y 12
Track y
Track z


h_trk_YZ_MC_2
Entries 70517
Mean x -755
Mean y 2.212
RMS x 433
RMS y 11.84
Track y
Track z

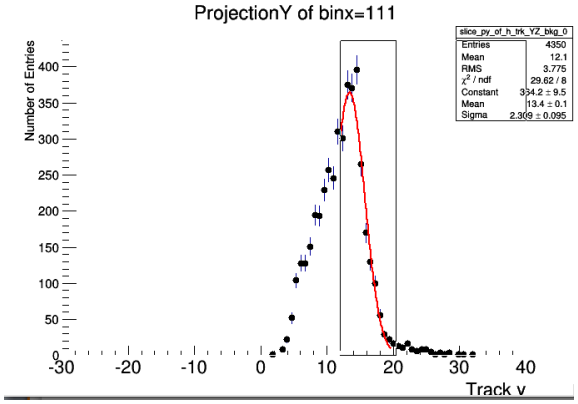

Entries 67346
Mean x -755
Mean y 2.197
RMS x 433
RMS y 10.74
Track y
Track z

Where do tracks in no target run come from?

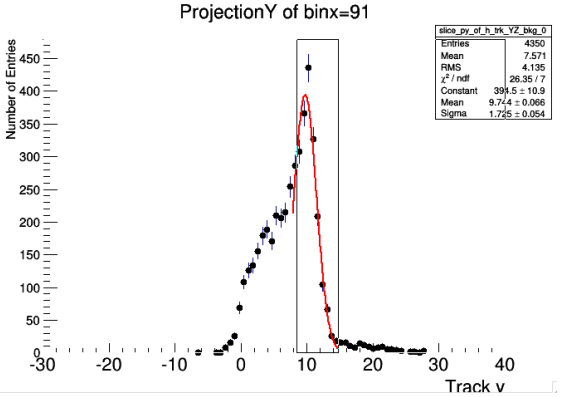


- Top tracks in this plot
- Focus pretty spread out
- No charge separation in top vs bottom (charged particles from sweeping magnet ruled out)

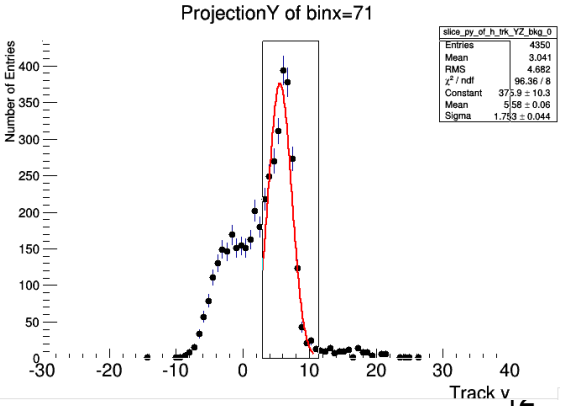
Z=-400mm
Mean 1.34012e+01
Sigma 2.30930e+00



Z=-600mm
Mean 9.74383e+00
Sigma 1.72501e+00

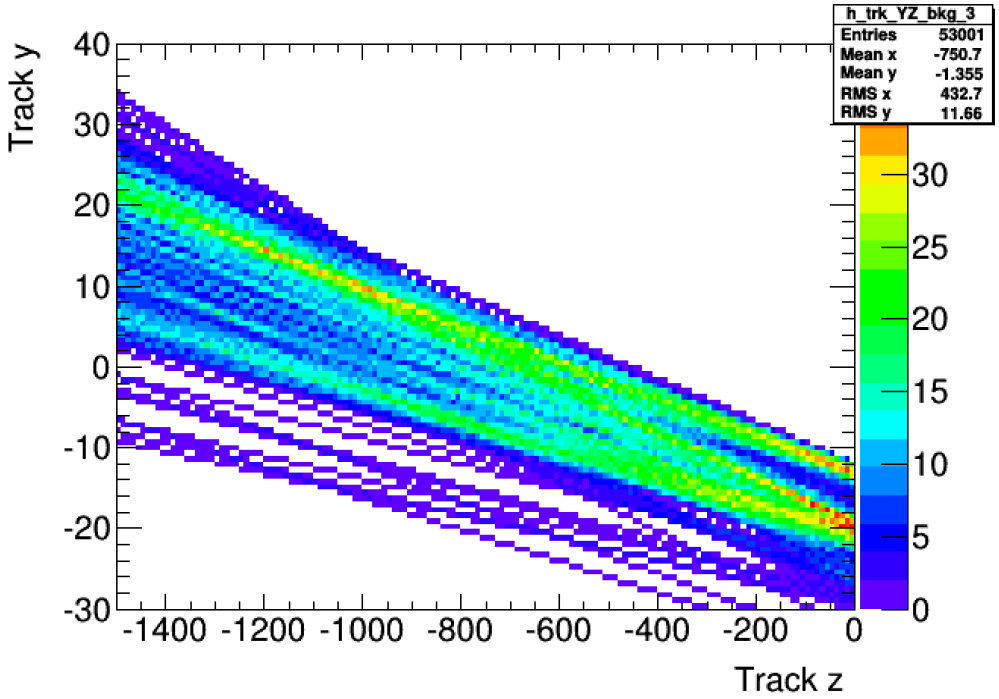


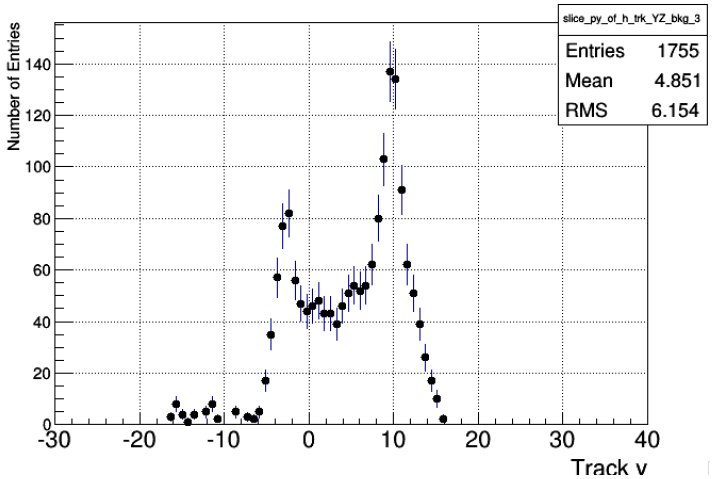
Z=-800mm
Mean 5.57987e+00
Sigma 1.75267e+00

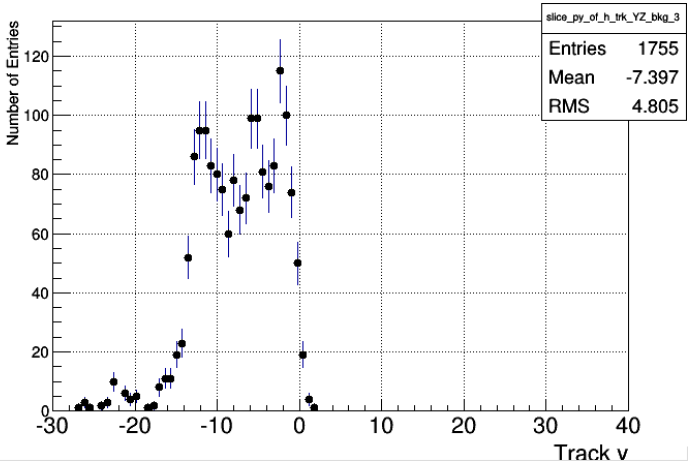


Where do tracks in no target run come from?

Bottom tracks harder to figure out







Comments

Data/signal (bkg subtracted)

- Look good coming from the assumed converter position
- Show no obvious sign of slope in y-slope
- Indicates we have the position of the converter at the right place
- Doesn't tell us that we have global rotation around the converter position of SVT (need 2nd target)

Upstream background has interesting features

- About equal number of Ecal clusters, but many more top tracks than bottom tracks?!
- Top tracks seem to originate in z from between -800mm to -600mm i.e. around the converter region but less focused (?)
- Bottom tracks hard to say anything about

What is at those z's?

- -1524mm: clean up magnet with horizontal B-field (swipes beam up/down)
- -859mm: 14mm diameter collimator
- -674mm: converter target