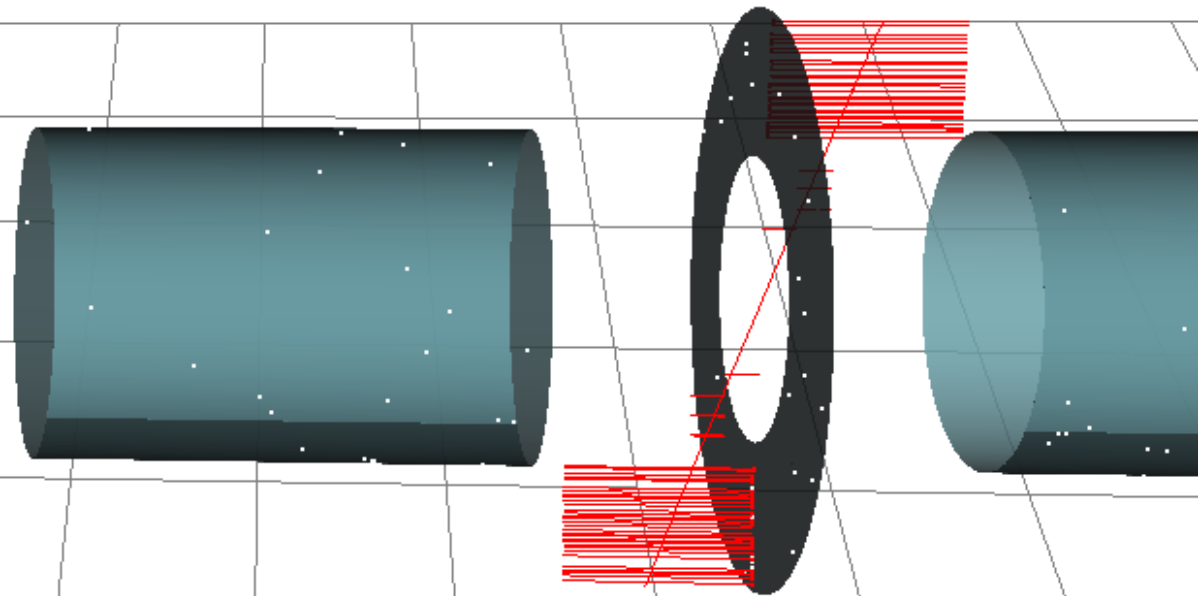


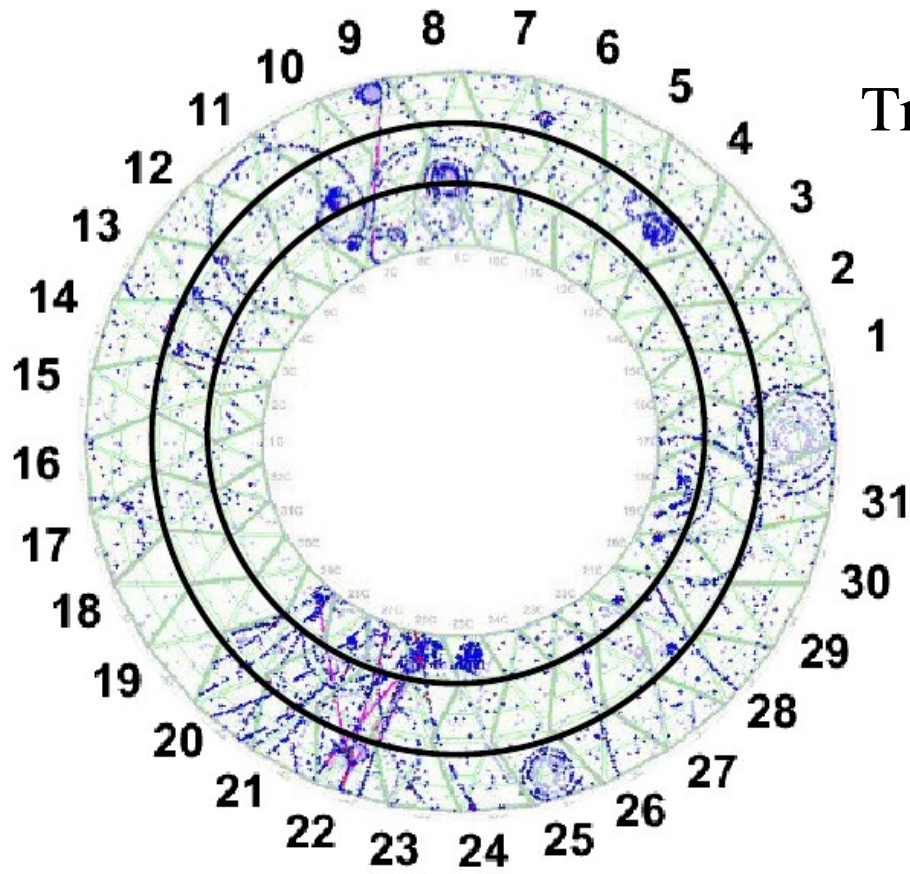
TRT L2 Alignment w/ TRT Only tracks

John Alison
Andrea Bocci



TRT L2 Alignment

Modules in the TRT Barrel (both A and C side together) are aligned in 3 DoF
2 translations + rotations around global- Z



Tracks Selection:

- > 45 TRT hits

- > 2 GeV

Reconstruction in rel 15 (tag=15.0.0)

Independent of Si alignment

Convergence after 5 iterations.

Number of hits and tracks increased
with alignment

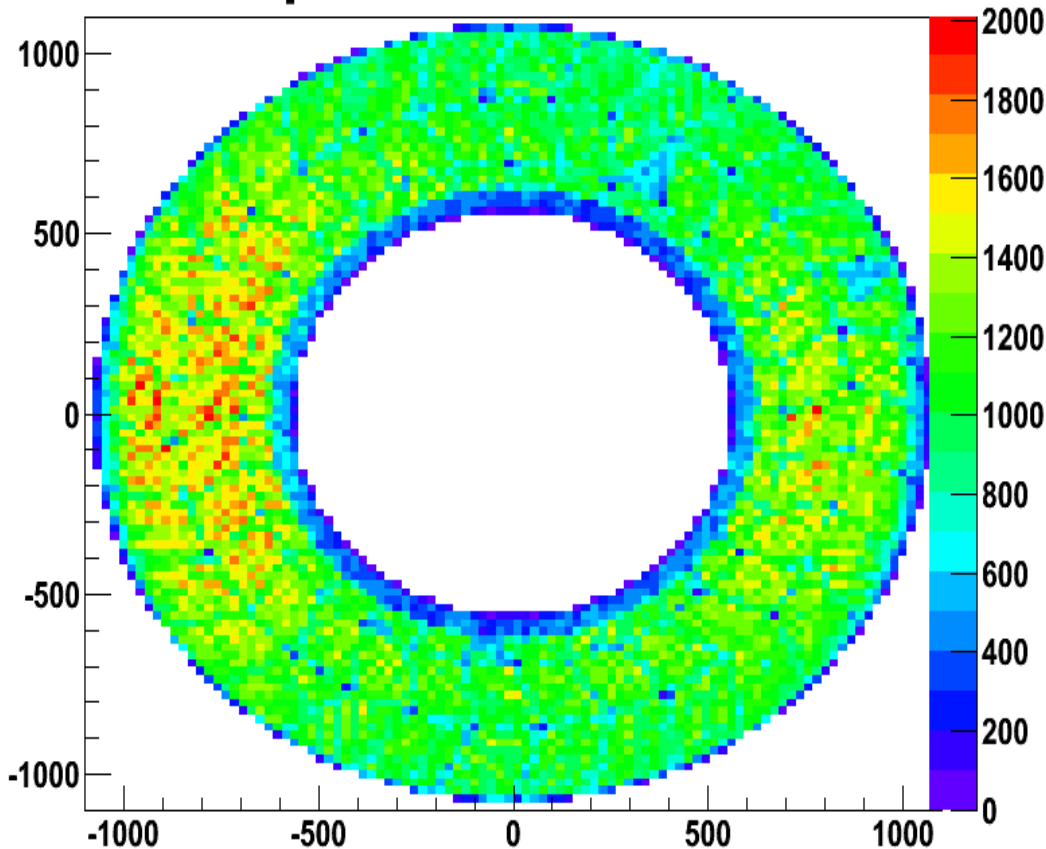


TRT Only L2 Alignment

- Convergence after 5 iterations.
- Number of hits/tracks increased with alignment

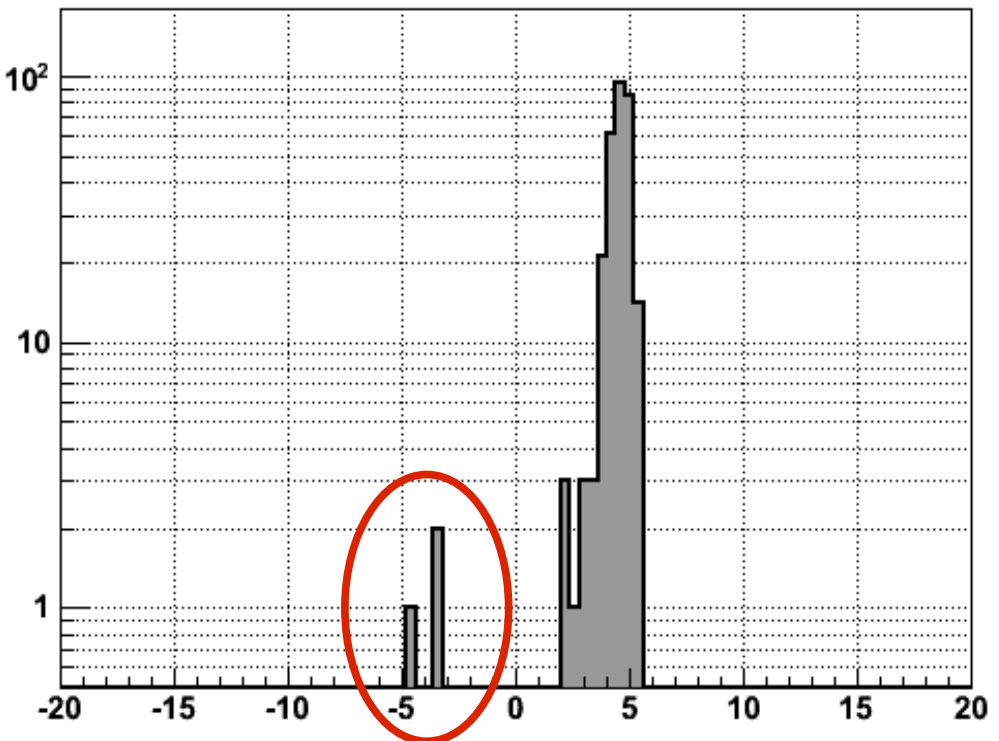
Hits used in the alignment

Hit Map for Barrel



Unconstrained global DoF
found and removed

Eigen value spectrum





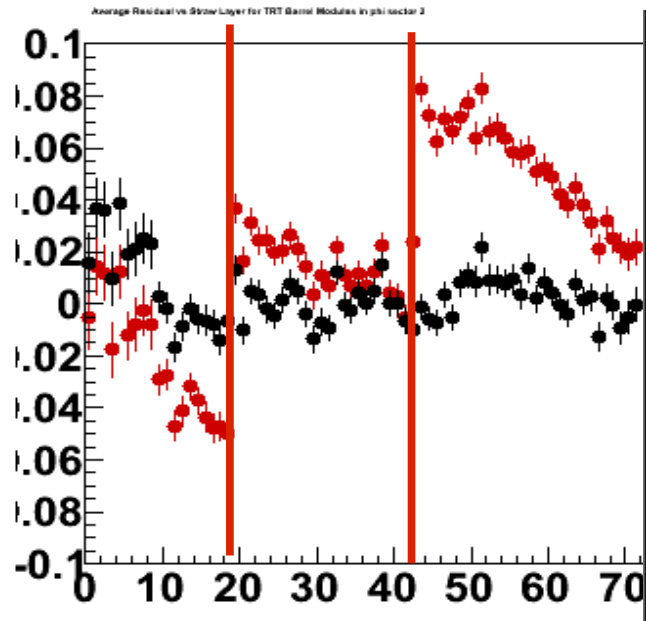
Track Selection for following plots
> 45 TRT hits
TRT-Only CTB Tracks

Before L2
After L2

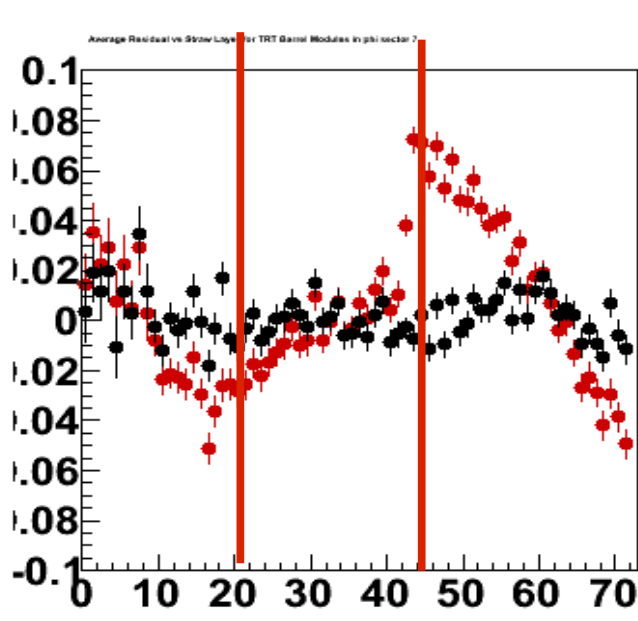


Average Residual Vs Straw Layer

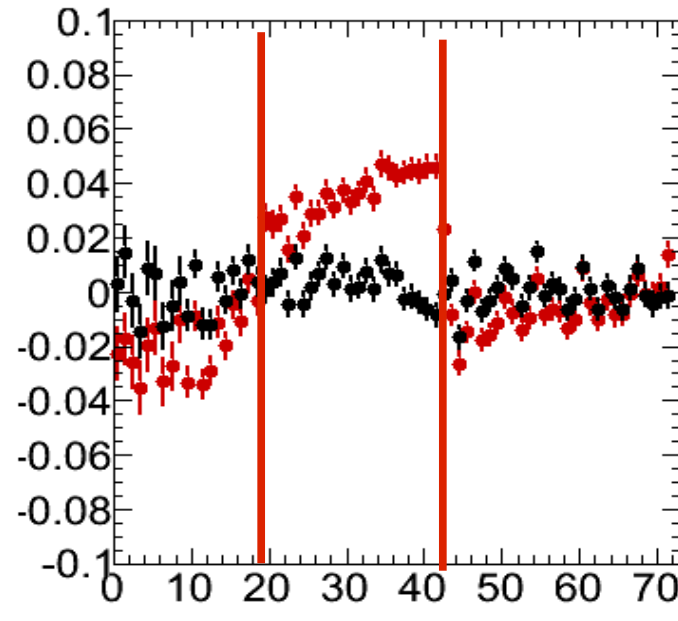
Phi Sector 2



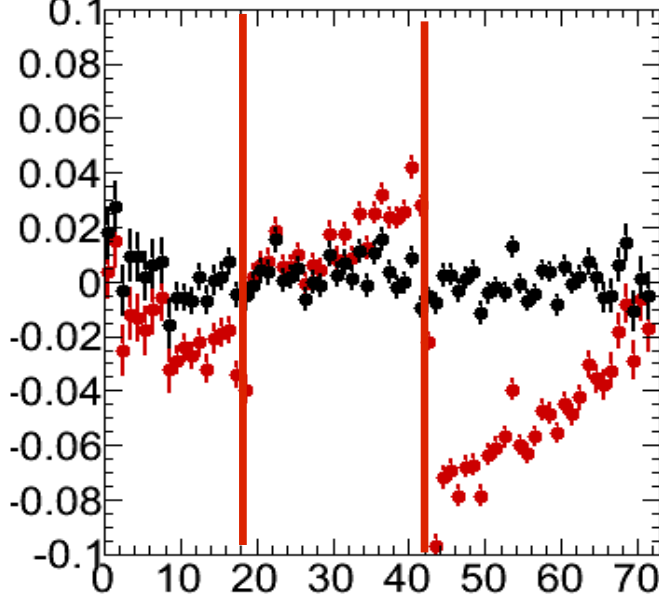
Phi Sector 7



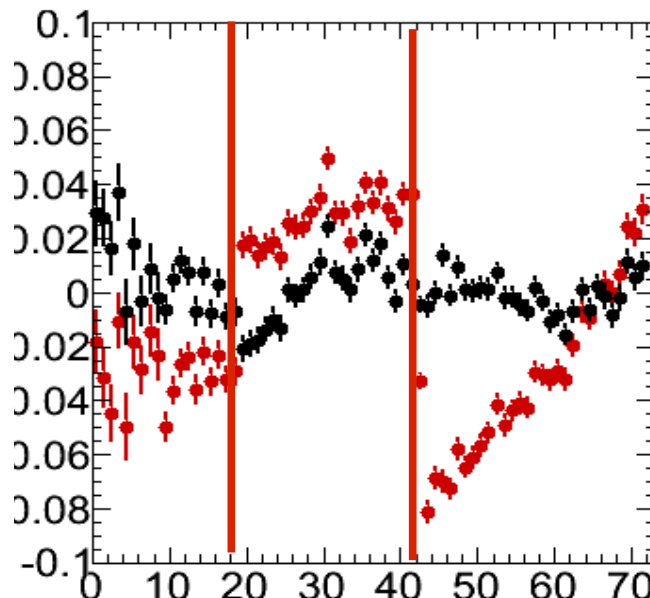
Phi Sector 12



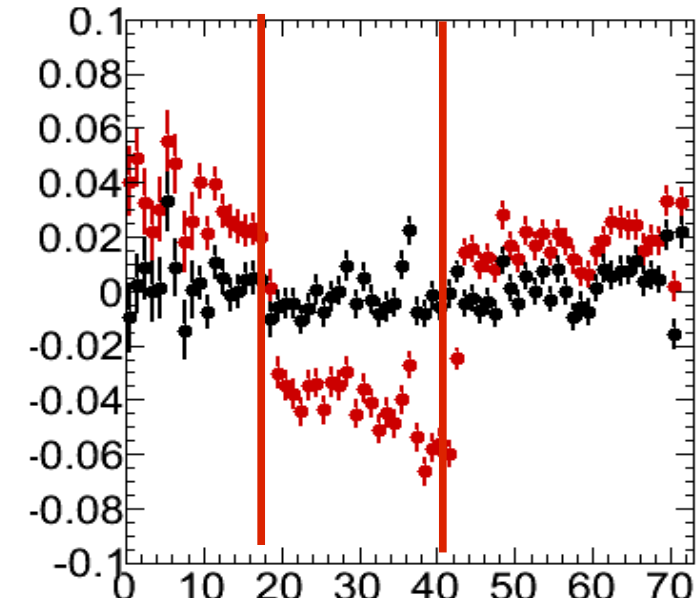
Phi Sector 17



Phi Sector 10

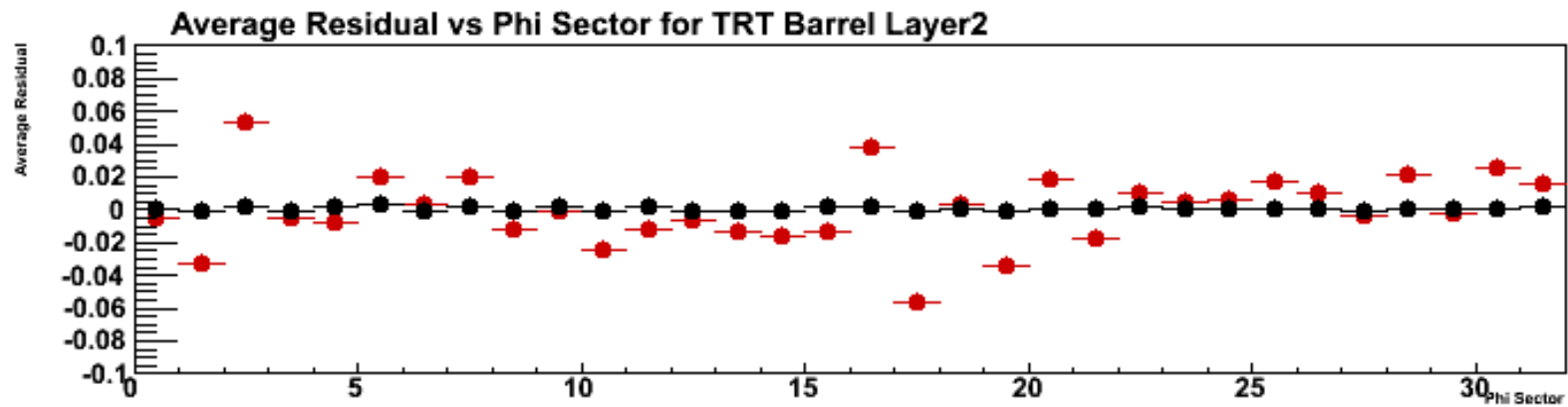
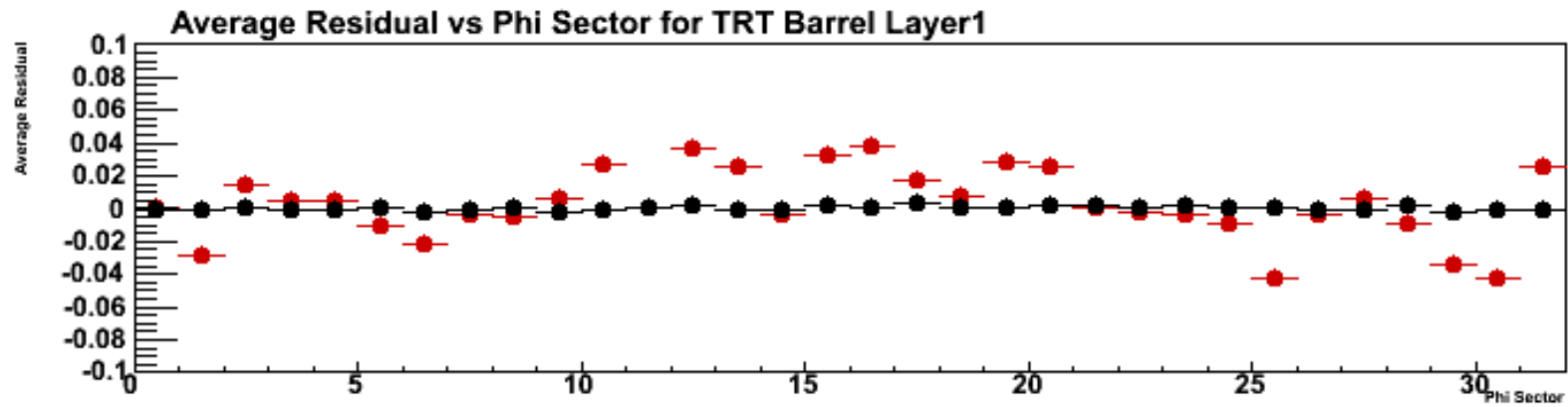
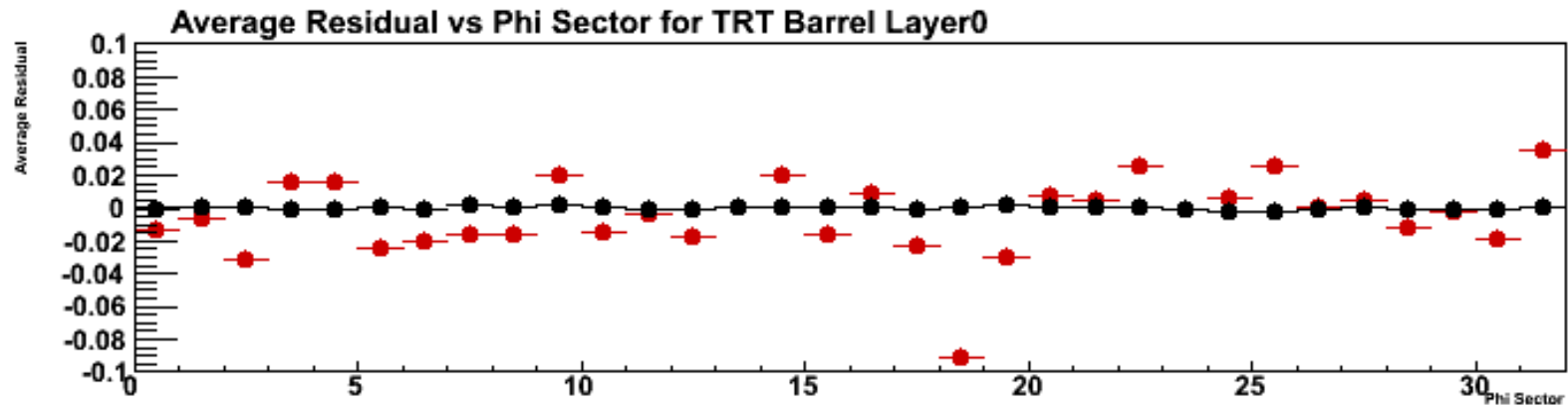


Phi Sector 25





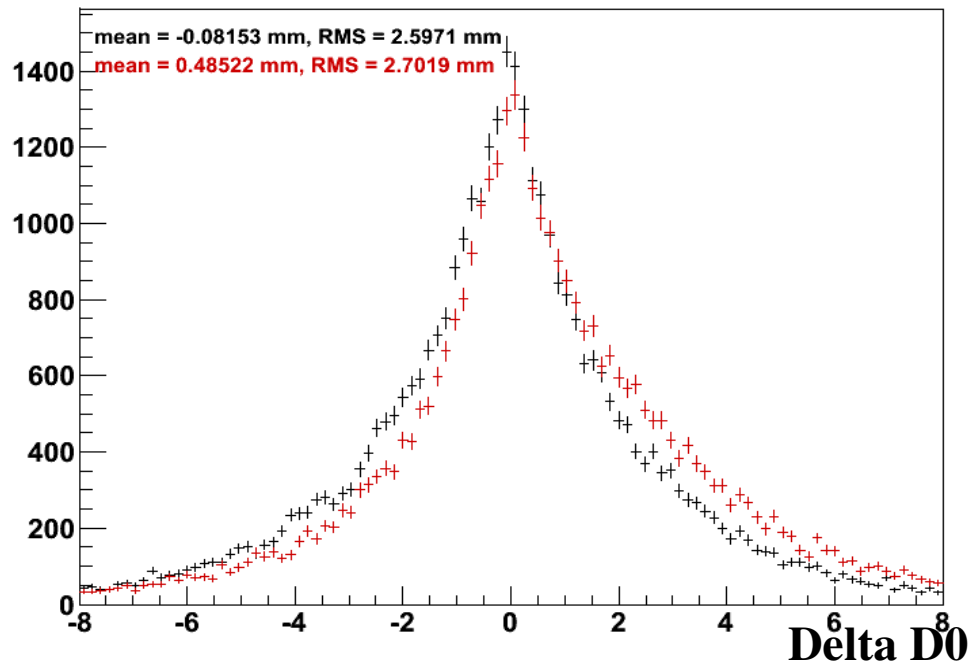
TRT Residuals



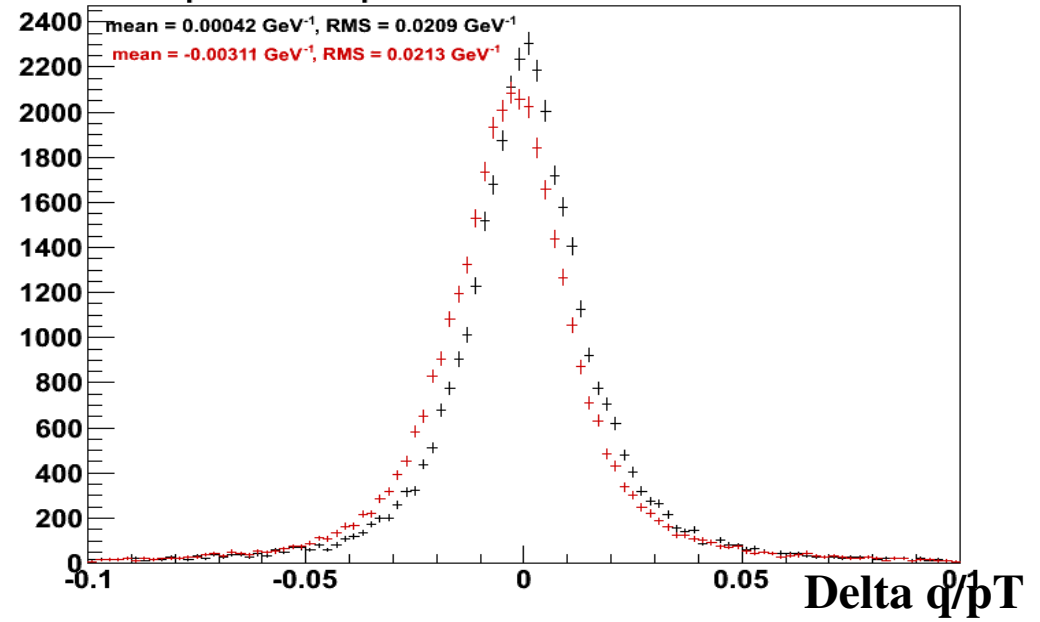


Track Segments

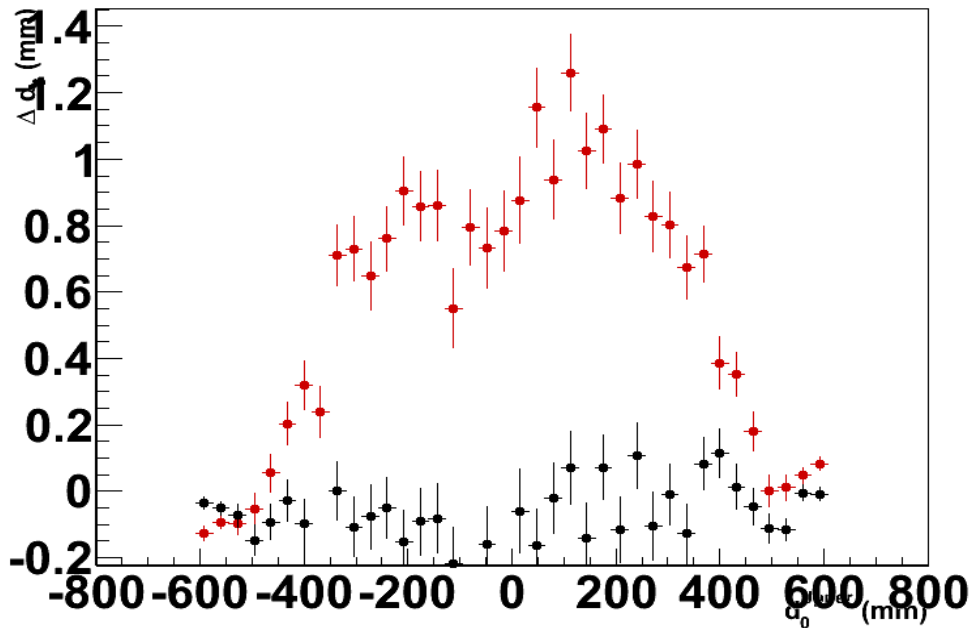
$$d_0^{\text{Low}} - d_0^{\text{Upper}}$$



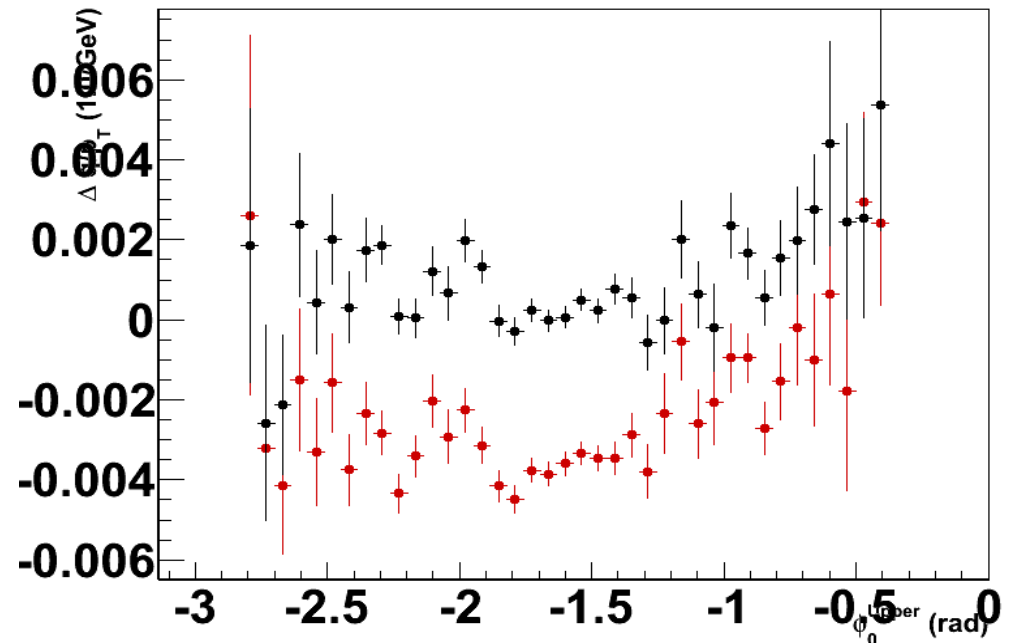
$$Q/p_T^{\text{Low}} - Q/p_T^{\text{Upper}} \text{ (1/GeV)}$$



average_delta_d0VsD0

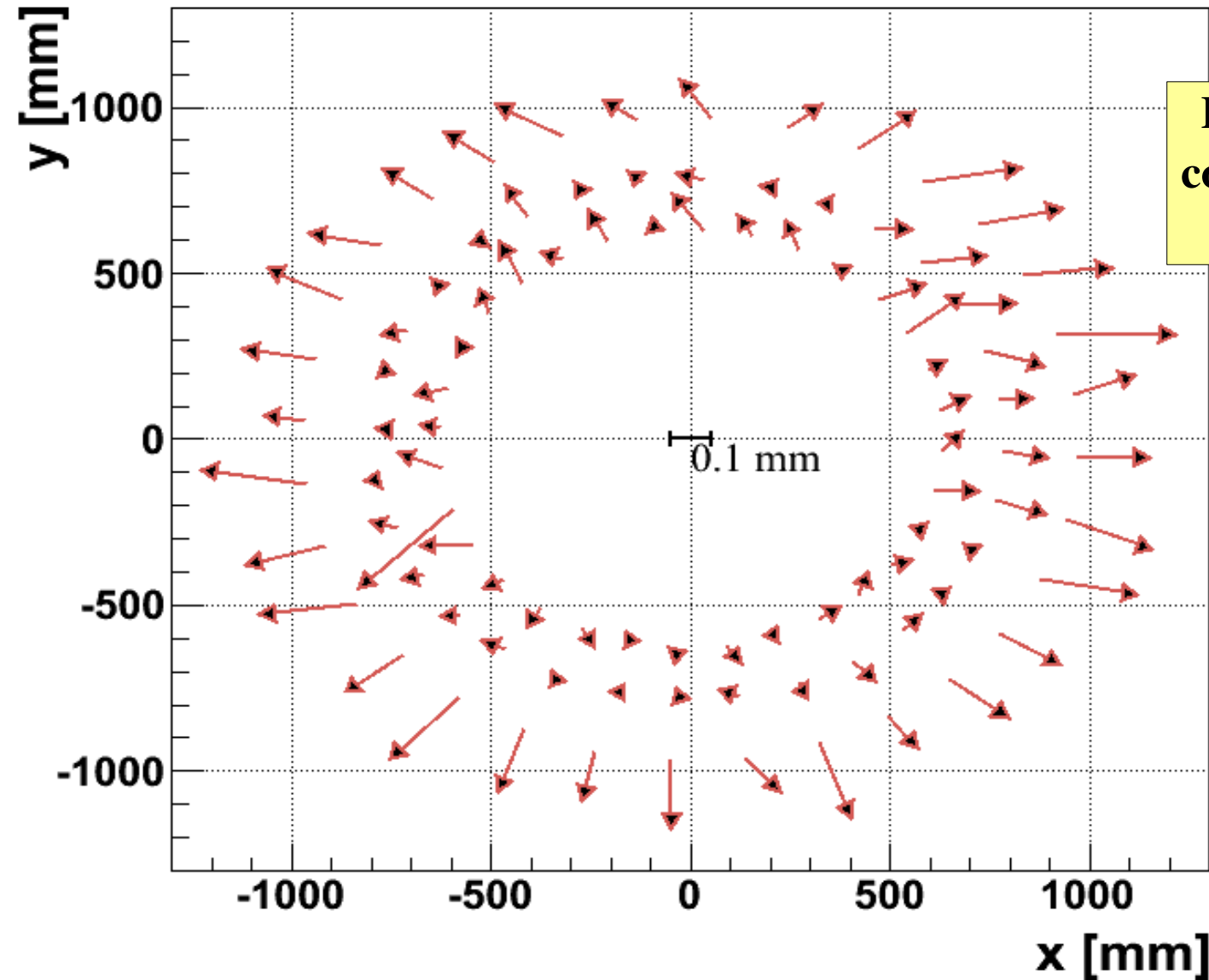


average_delta_qOverPtVsPhi0

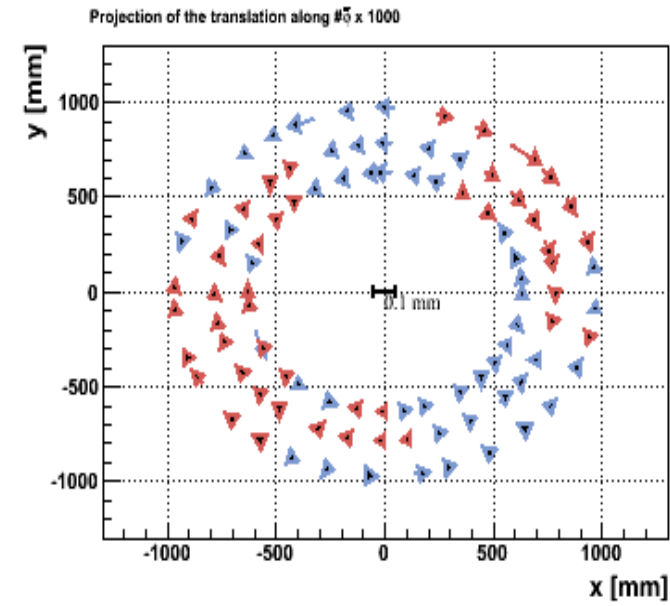


Measured Misalignment

translation x1000 - Layer _



Largely radial misalignment consistent with disappearance of phi structure with d0 cut





Track Selection for following plots

Combined tracks:

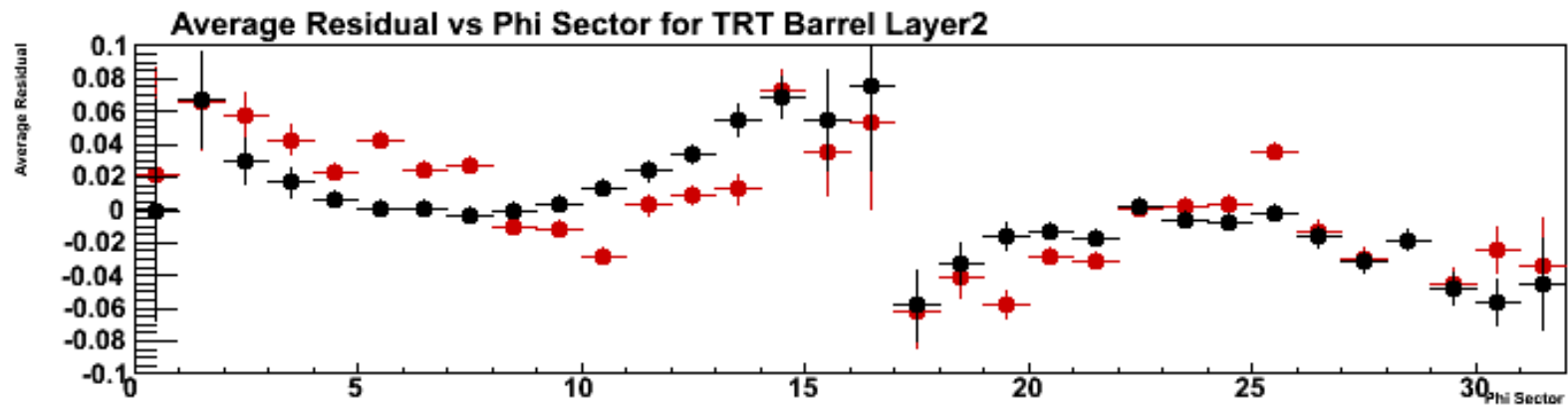
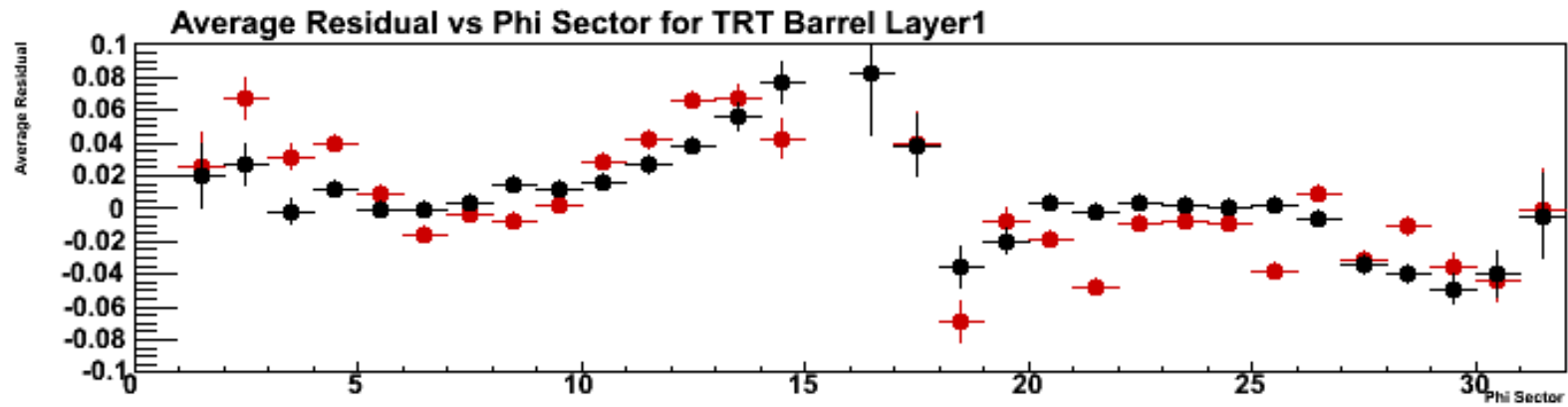
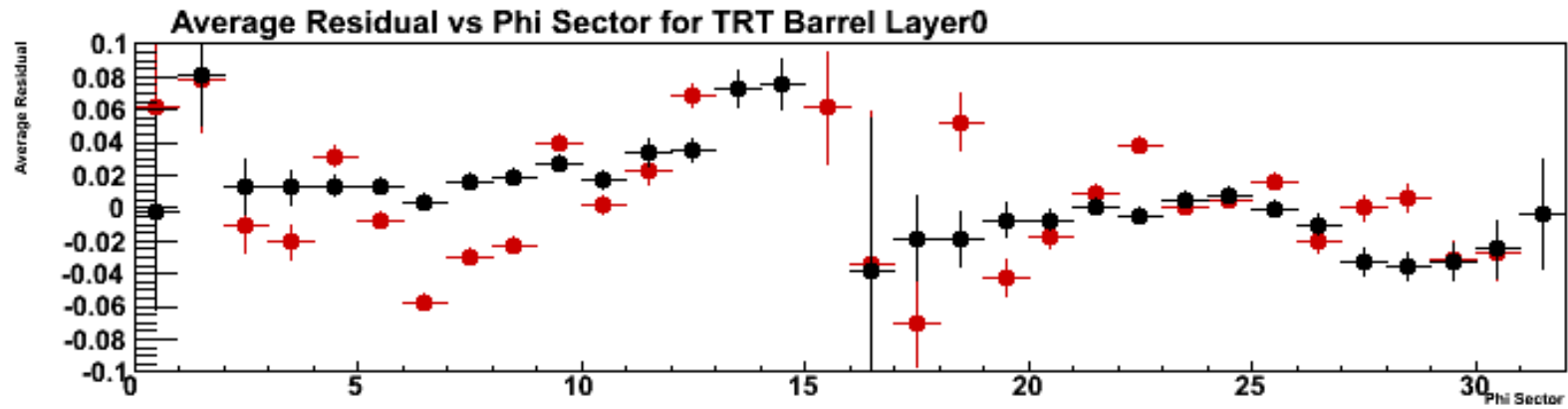
> 45 TRT hits, > 9 SCT hits, > 2 Pix hits
>2 GeV

Before L2

After L2



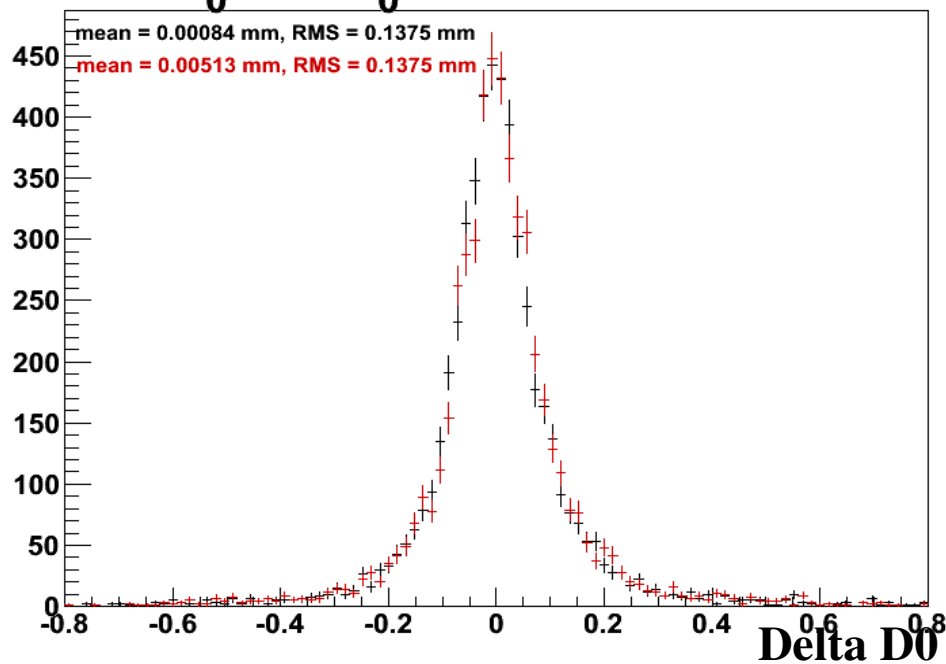
TRT Residuals



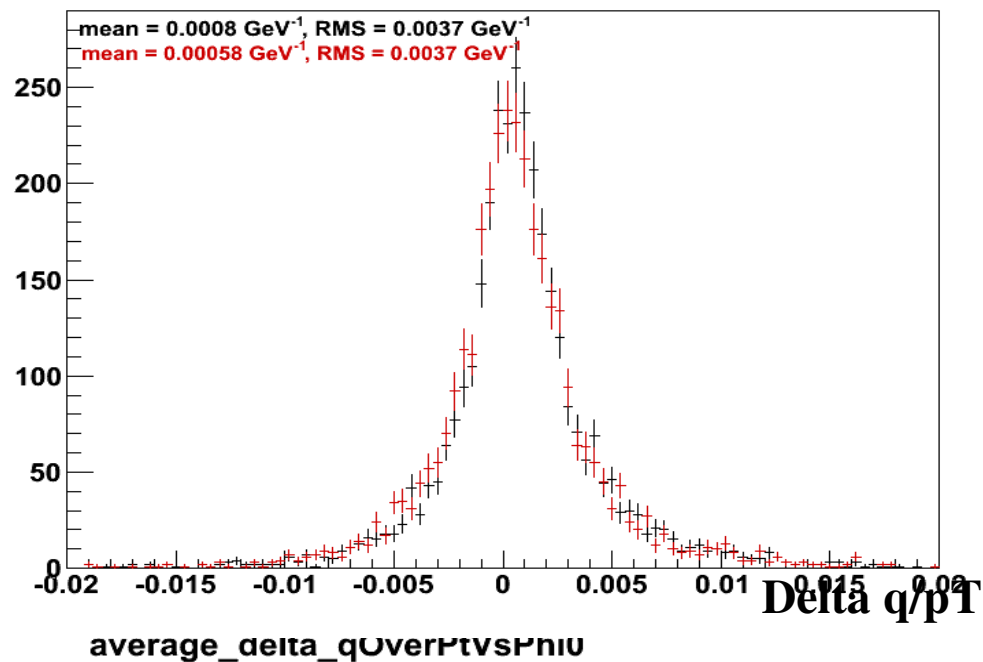


Track Segments

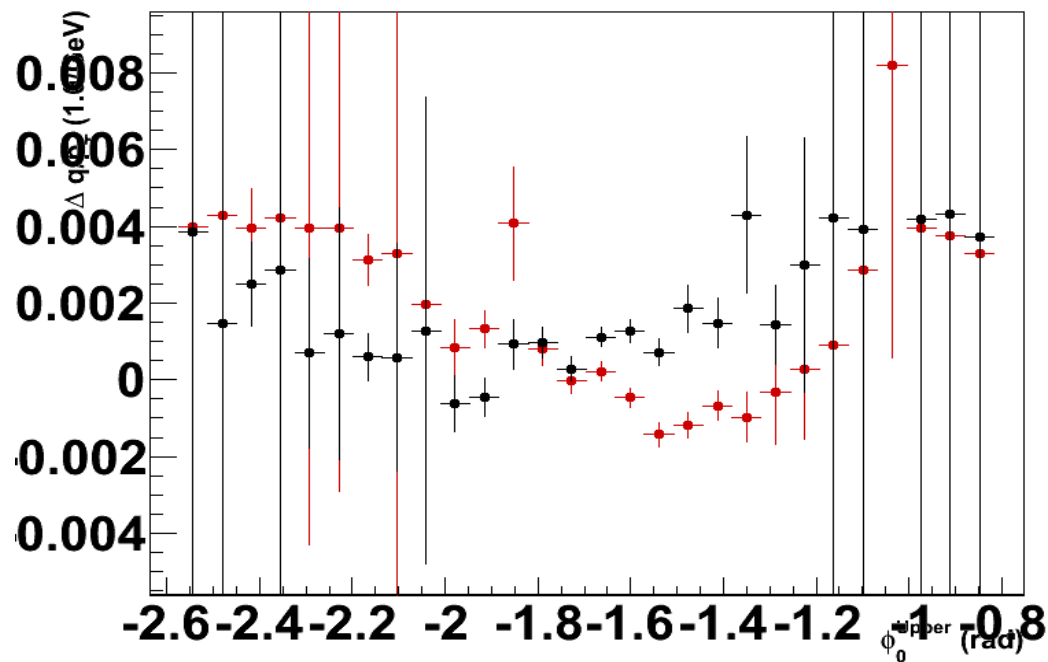
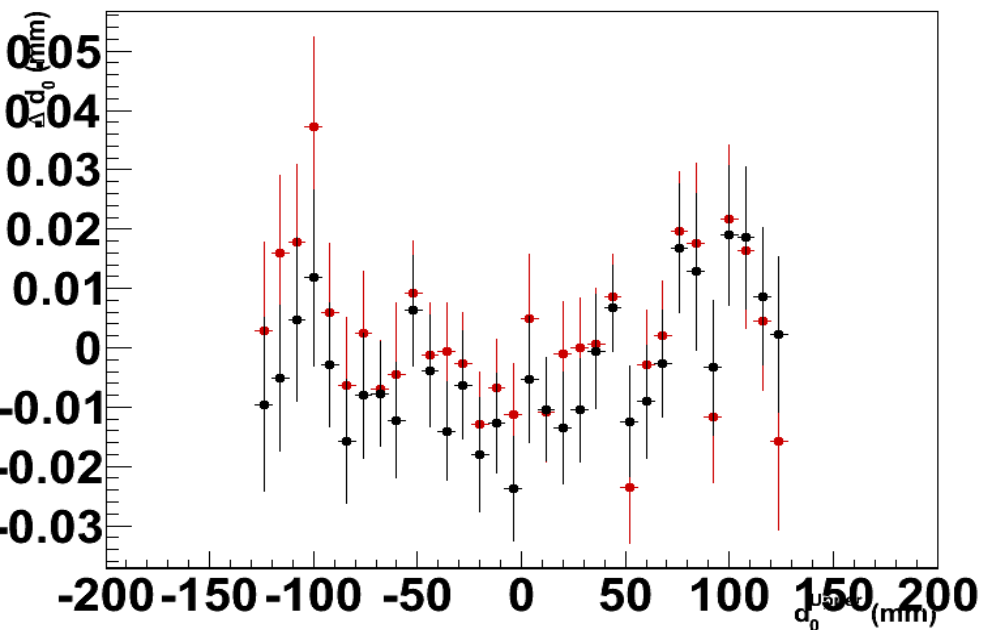
$$d_0^{\text{Low}} - d_0^{\text{Upper}}$$



$$Q/p_T^{\text{Low}} - Q/p_T^{\text{Upper}} \text{ (1/GeV) (Positive Tracks)}$$



average_delta_d0VsD0





Conclusions

- A lot more to do!
- A / C side differences seen, currently not handled in reconstruction
- TRT only alignment validated with TRT only tracks
- Remaining inconsistency for combined tracks?

L2 alignment presented here is not yet in db.



Bonus



Average Residual vs Phi Sector

A-Side

C-Side

