Rotation misalignment tests

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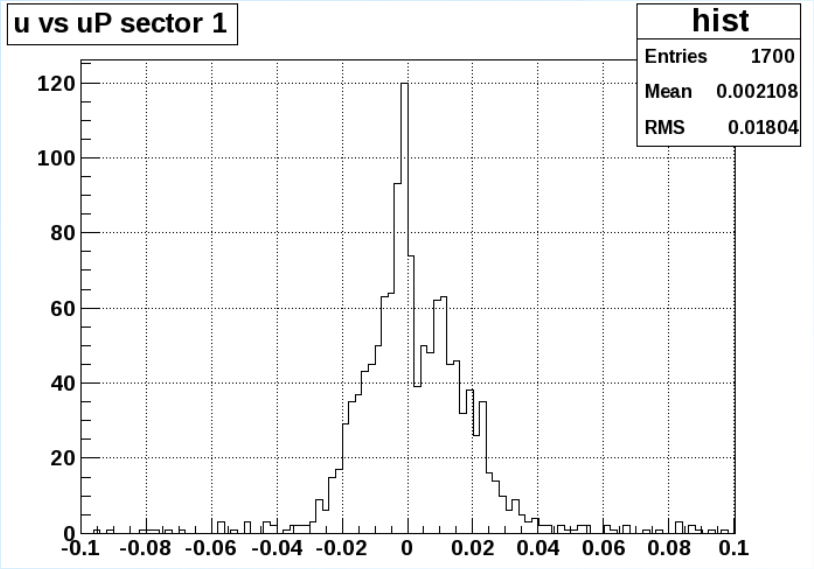
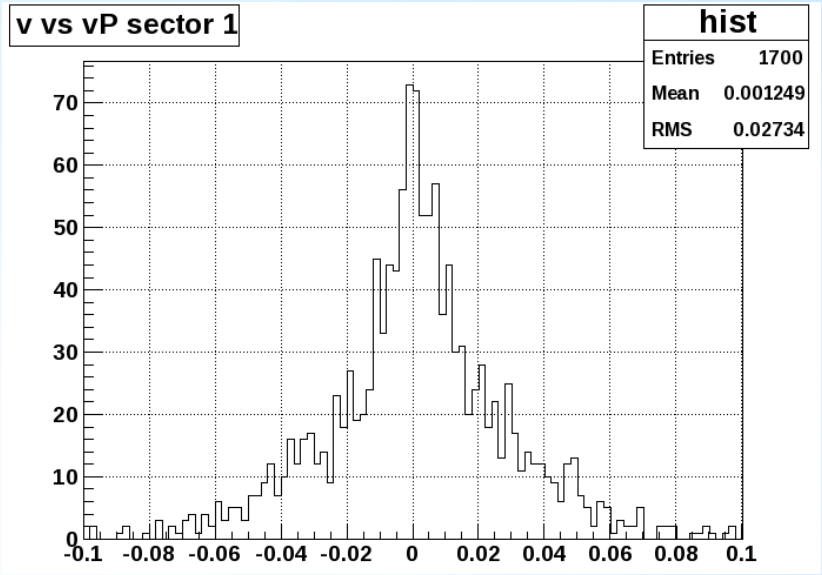
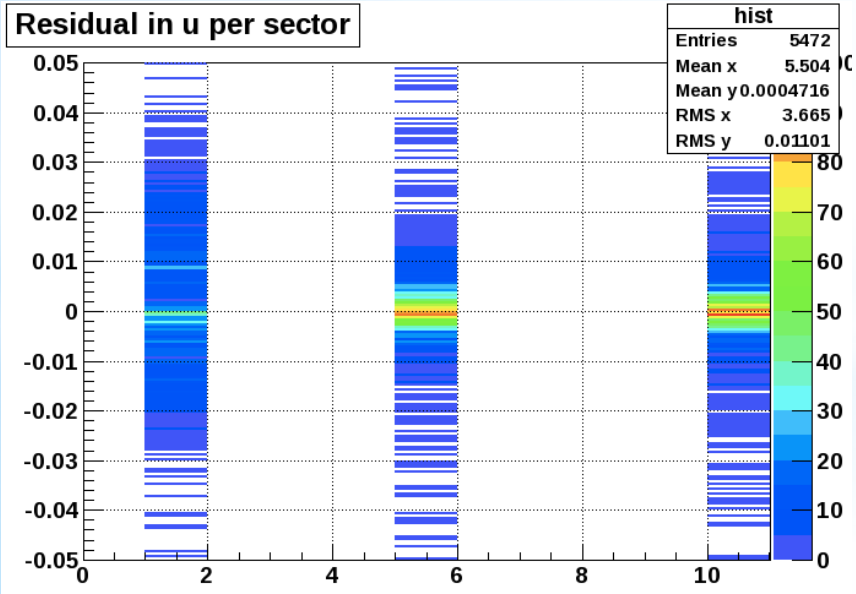
For STAR collaboration

- To test misalignment Jonathan rotated sector 1 by 1^{o}(~0.017 rad) clockwise along the z axis in GEANT to produce simulation with 400 events with 20 tracks per event. Then the hit reconstruction was done using the ideal (un-shifted) geometry (/star/institutions/ksu/bouchet/MISALIGNMENT/reco/with_tracking/test.event.root).
- The rest of the alignment code was run to see if the misalignment could be accurately diagnosed.

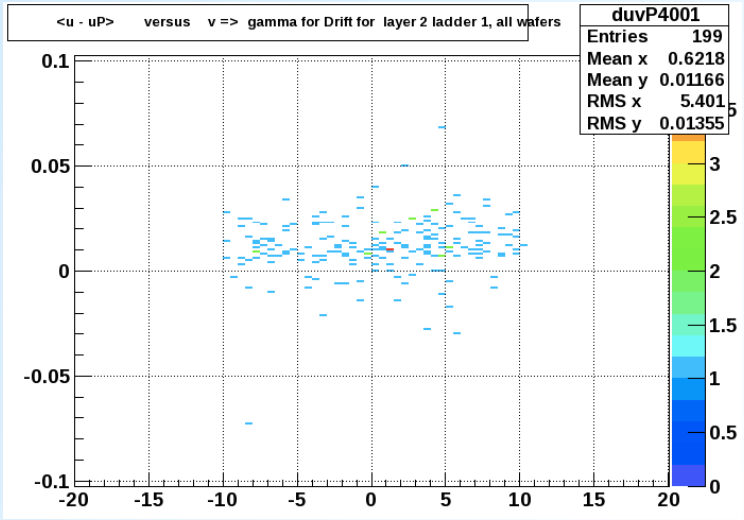


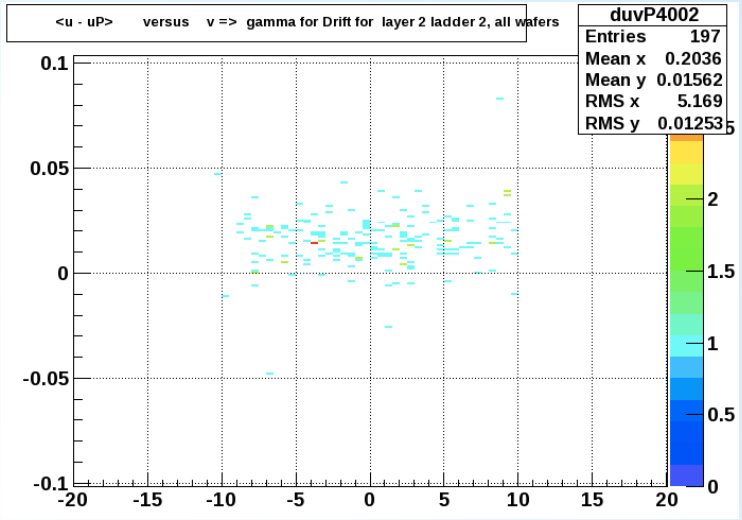


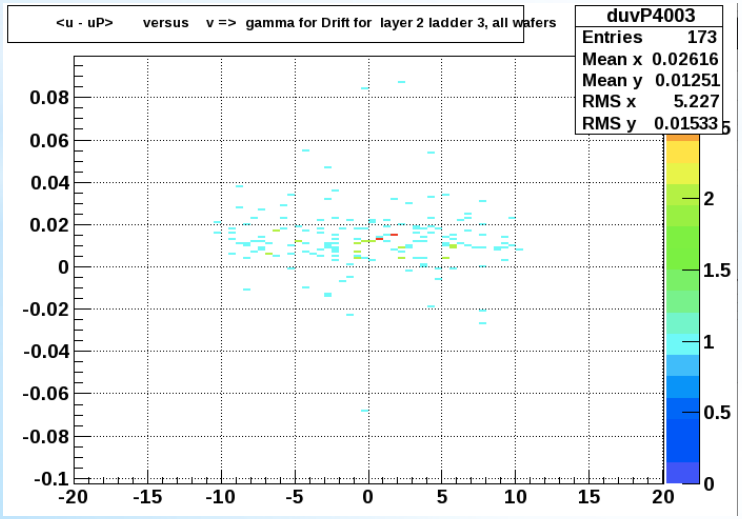


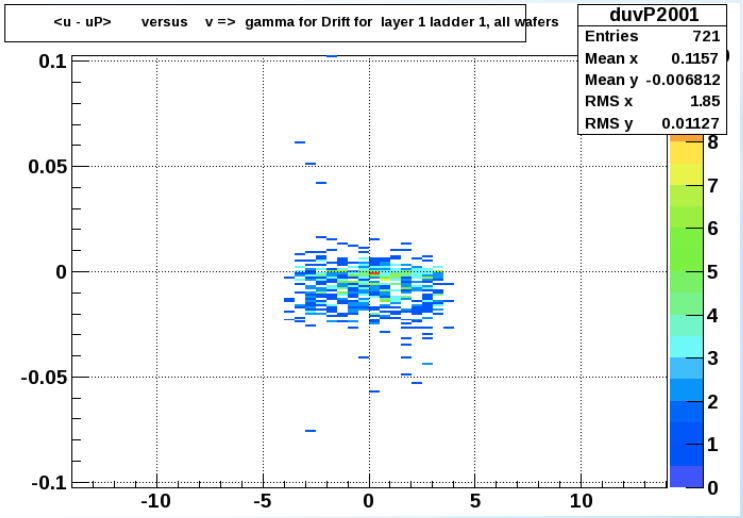
After filling the tree (HFTTree.C) we see that there are two clear peaks for the residuals u-uP in sector 1.

Closer inspection of the histograms produced using Spyros's code show that the obtained rotation angle γ in the ladders on outer layer are all POSITIVE, where as the rotation calculated in the inner is NEGATIVE!

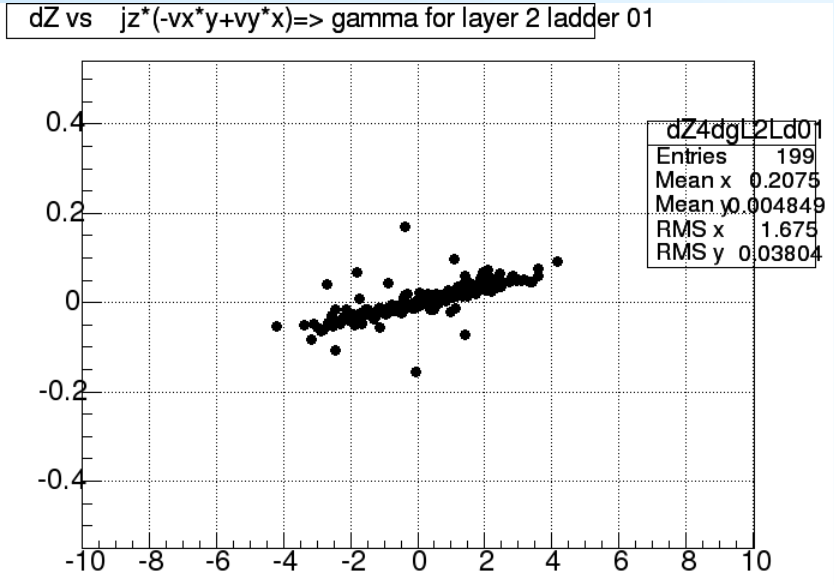


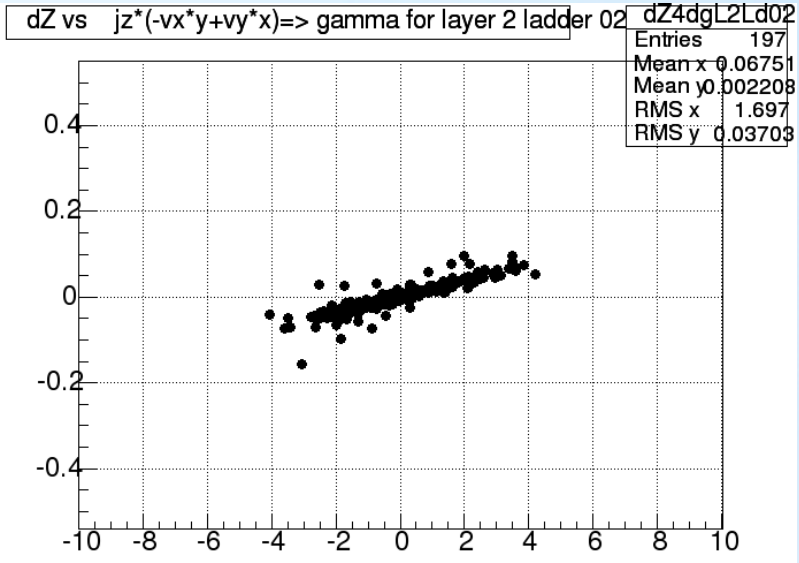


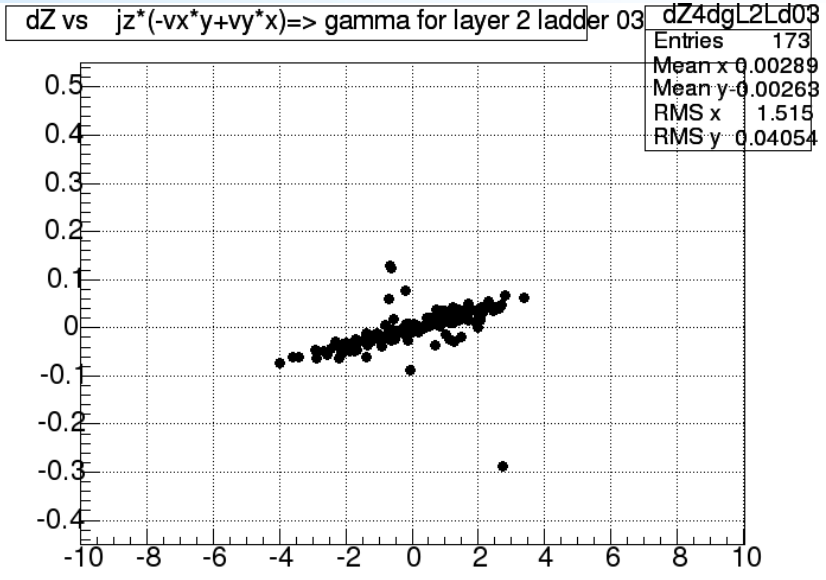


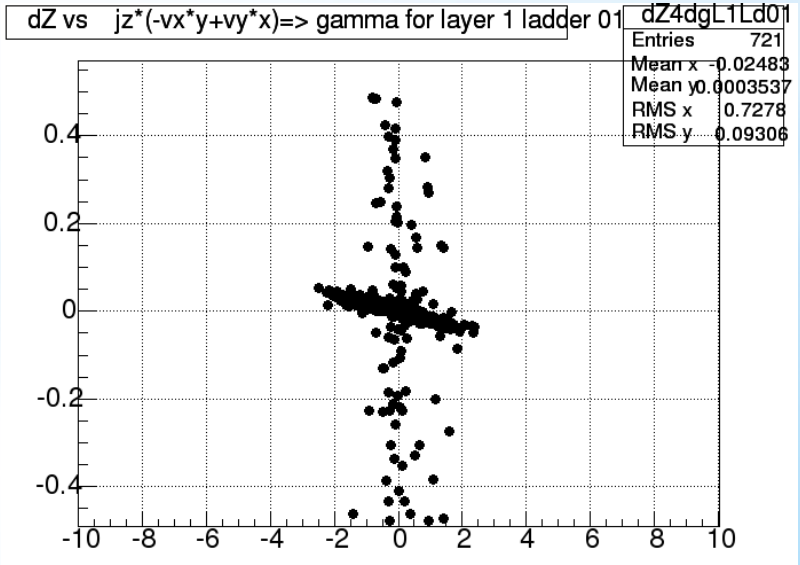


Fitting the slope of the following graphs should give us the misalignment angle for each ladder. Again the same inconsistency appears between the inner and outer layer. Furthermore there is a lot of noise in the inner layer. We will investigate this issue further.









Conclusions

- Misalignment test showed inconsistent results between the inner and outer layer, differing by a “-” sign both in local and global coordinate system.
- Most likely this is due to the fact that the “v” axis in local coordinates is flipped for the inner layer, and the calculations while filling the HFT tree in “runHftTree.C” do not take this into account.
- We are investigating these issues.