

Forward Alignment Update

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Some additions and fixes to code

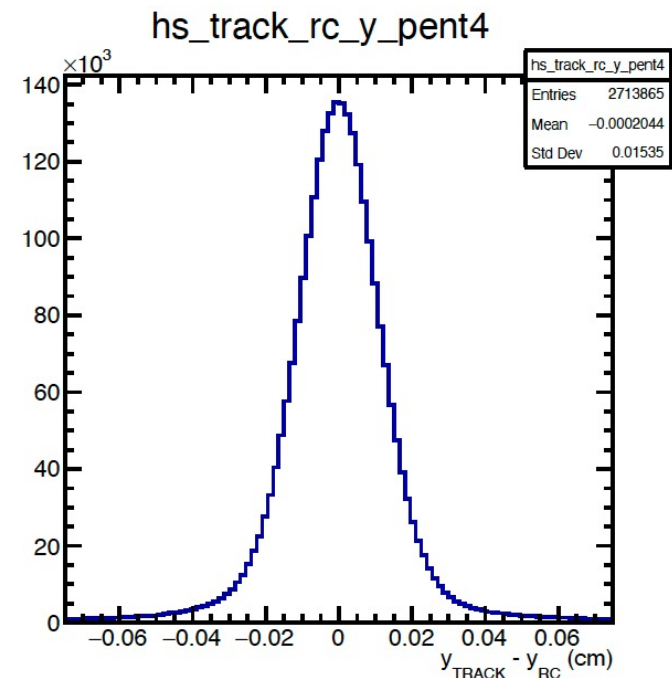
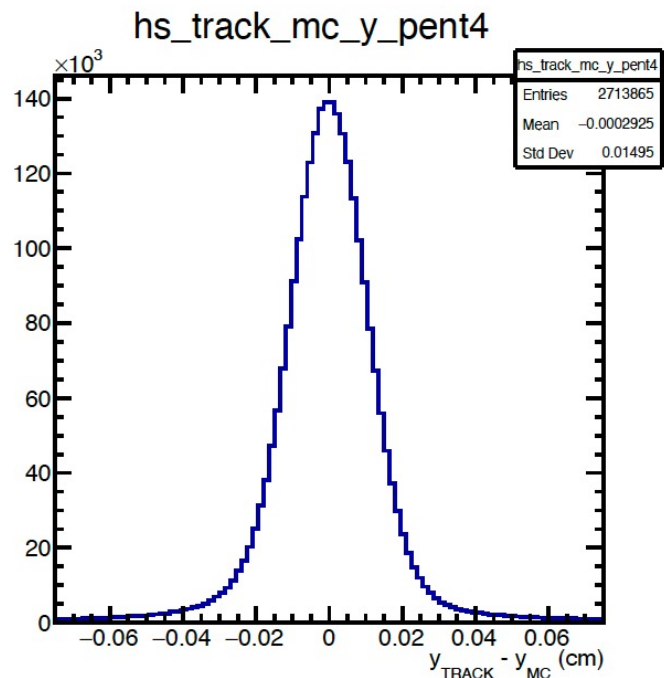
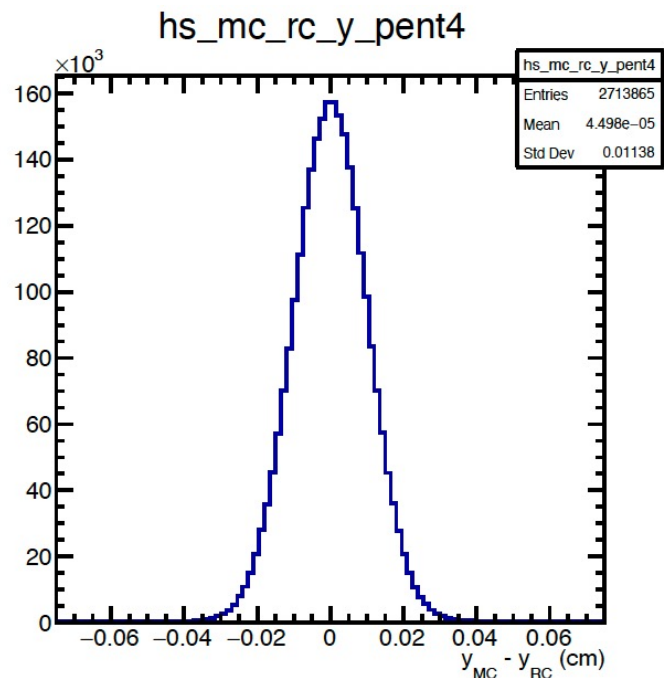
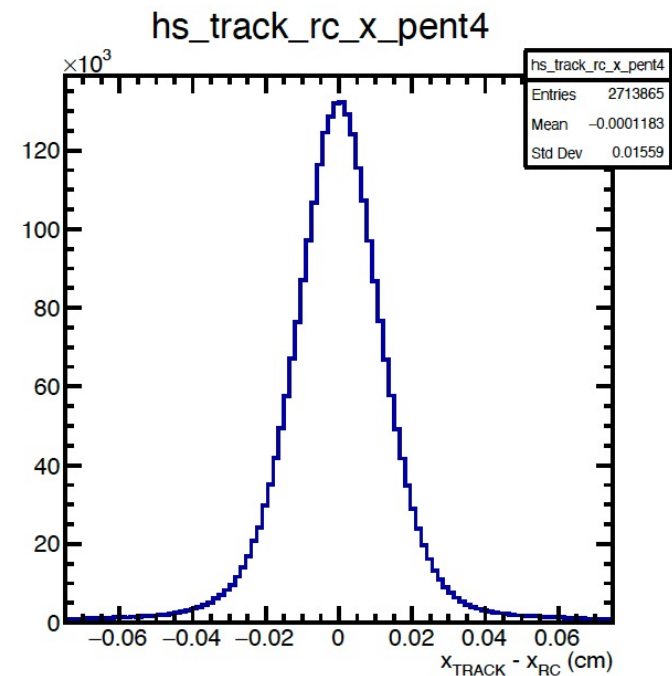
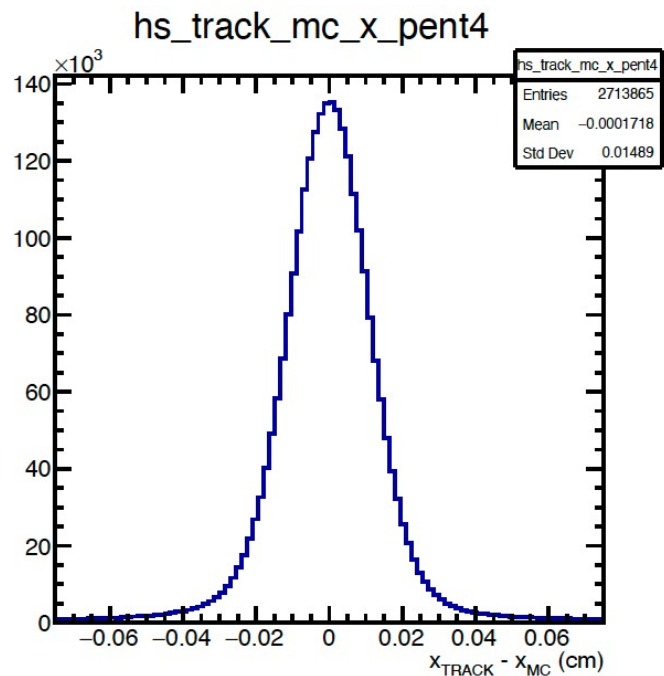
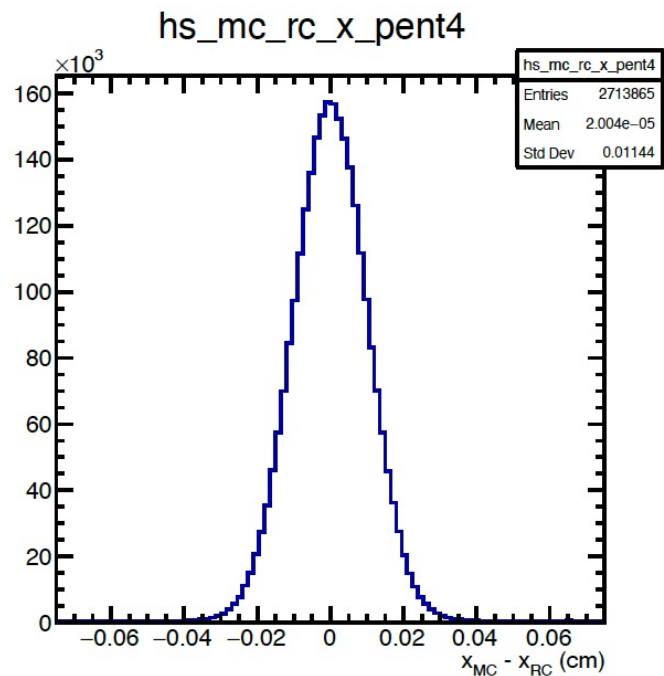
- Added an alignment Ttree, which contains the hit positions for each track which partakes in alignment.
 - volume id, MC, RC, Track positions.
 - Makes generating residual histograms easier and can be performed for every FST and sTGC module.
 - Also adds sTGC residuals which were not in place before.
- Found mistake in loading the sTGC hits, the covariance matrix was rewritten for the hits. Increased σ_x and σ_y by factor of 100.

Testing No Misalignment

- I did not require hits on all 3 FST planes for this test.

~2.7M tracks

Parameter	Input	Output	Error	Global Corr.
Δu (μm)	0.0	2.63	0.11	0.660
Δv (μm)	0.0	4.87	0.12	0.699
$\Delta\gamma$ (mrad)	0.0	-0.0030	0.0005	0.798

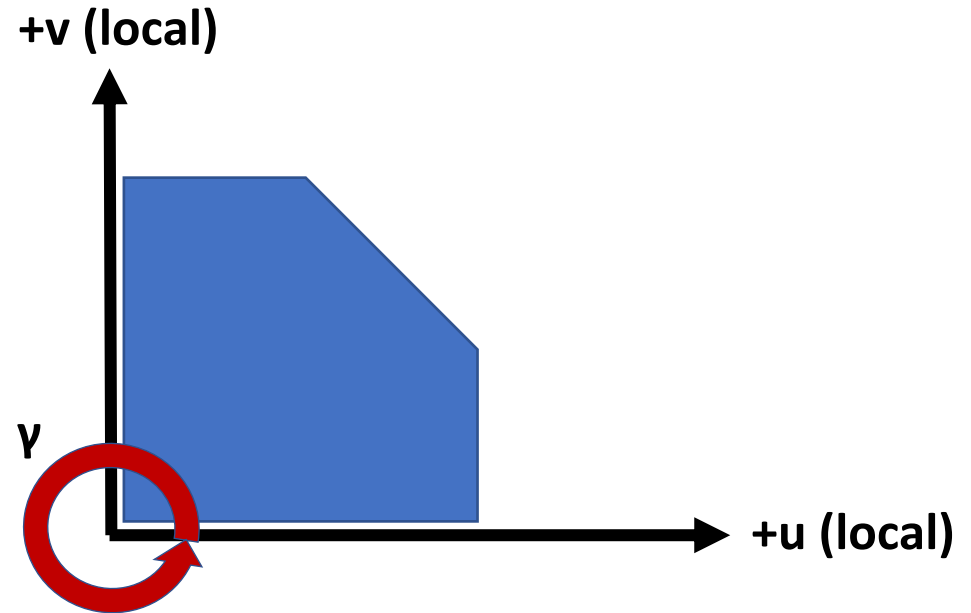


BACKUP

Alignment (global) Parameters

FTT (sTGC)

- 6 alignment parameters per pentagon (16 pentagons).
- 6 per plane (4 planes).
- 6 for sTGC.
- 126 alignment parameters.



Single Pentagon Alignment

- Misalign 1 Pentagon (4) in sTGC simulated geometry. Located in +x,+y quadrant on plane second closest to IP.
- Throw mu+ with particle gun with following settings:
 - $0.2 < p_T < 2.0$ GeV/c
 - $2.3 < \eta < 4.4$
 - $0.0 < \phi < 1.7$ rad
 - $B = 0$ T
- Require hits on all sTGC, at least 1 FST plane and pentagon module 4.
- Fit with GenFit Kalman filter and then refit with GenFit GBL.
- Output data to Mille.dat files. Mille.dat files are then fed to pede.
- Fix rotations about u-axis and v-axis, in addition to w translation all to 0.
- Matrix inversion used to solve for alignment parameters.

Testing No Misalignment

- Required on all 3 FST planes for this test.
- Before fix to covariance matrix.

~2.4M tracks

Parameter	Input	Output	Error	Global Corr.
Δu (μm)	0.0	-10.8	9.2	0.673
Δv (μm)	0.0	-34.9	9.9	0.714
$\Delta \gamma$ (mrad)	0.0	-0.063	0.047	0.816