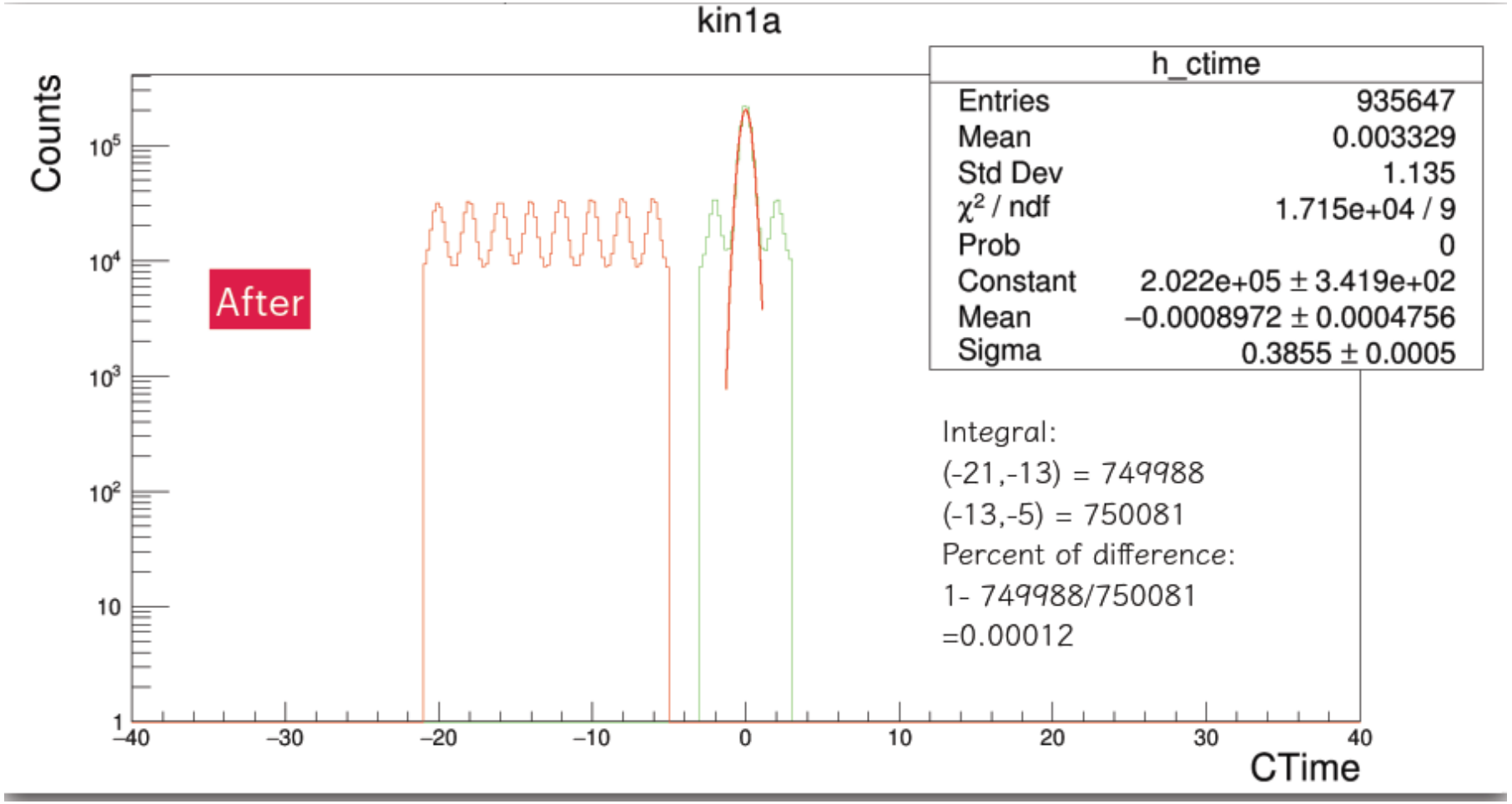
Update to HCANA THcDC to fix problem in THcHodoscope focal plane time

- For VCS pulse structure is every 2ns
- The coincidence time peak has sigma of 0.4ns



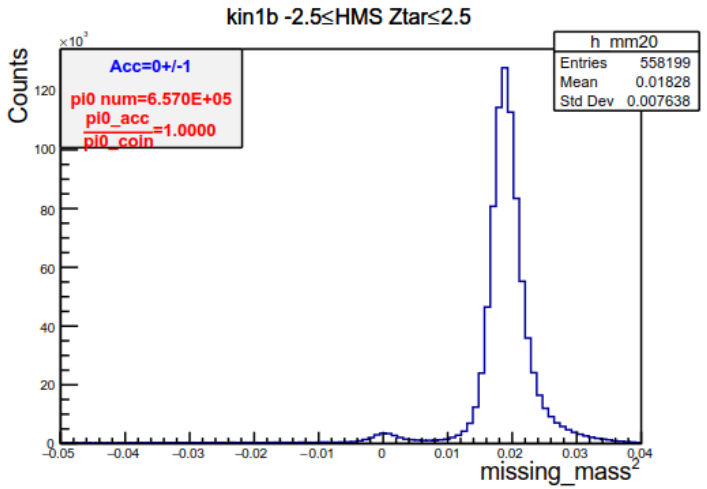
Update to HCANA THcDC to fix problem in THcHodoscope focal plane time

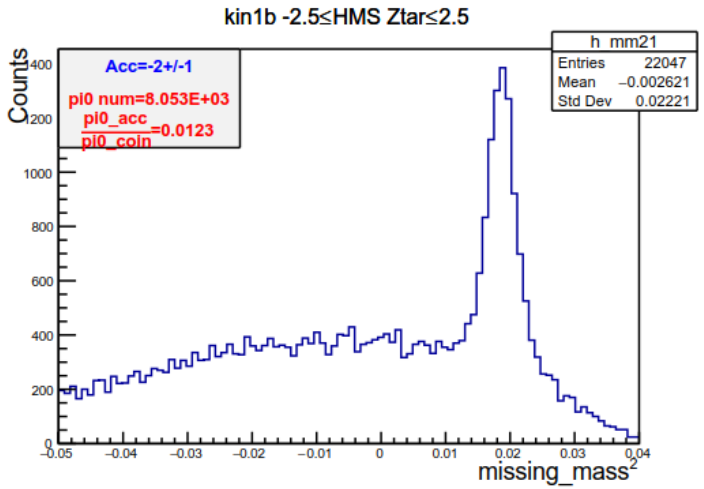
- In VCS analysis, Ruonan found a problem that good π^0 MM events were up to 4ns away from coincidence peak

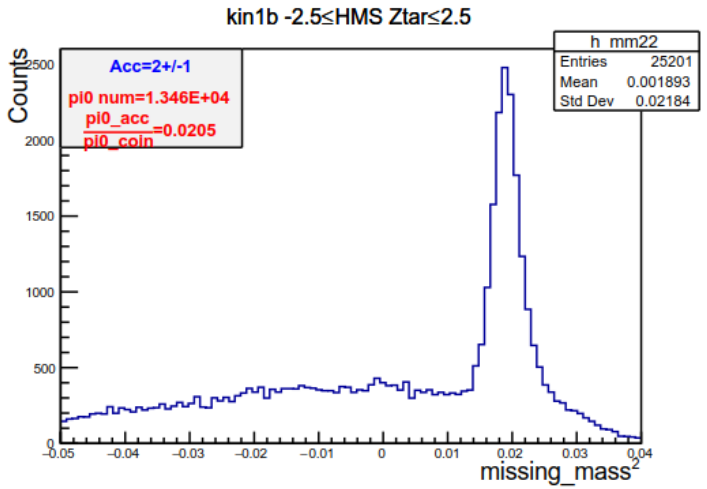
- Fraction of events is small, but larger than expected by statistics and asymmetric around peak.

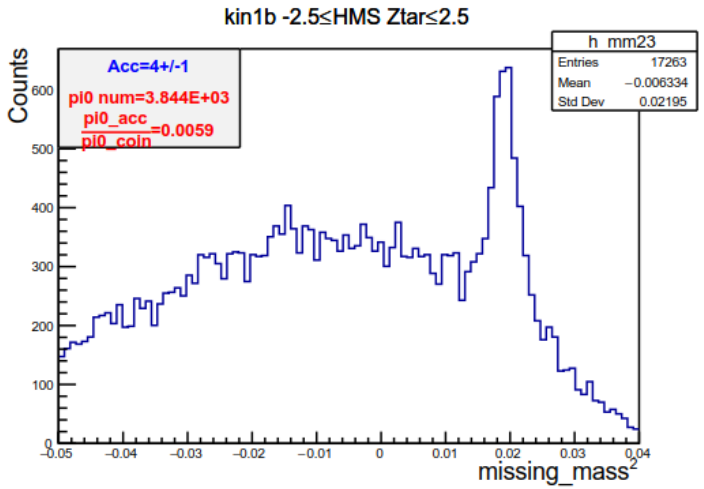
Bin	Frac
-2 +/- 1ns	1.2%
+2 +/- 1ns	2.0%
+4 +/- 1ns	0.6%

- Saw similar ratios for elastic data.



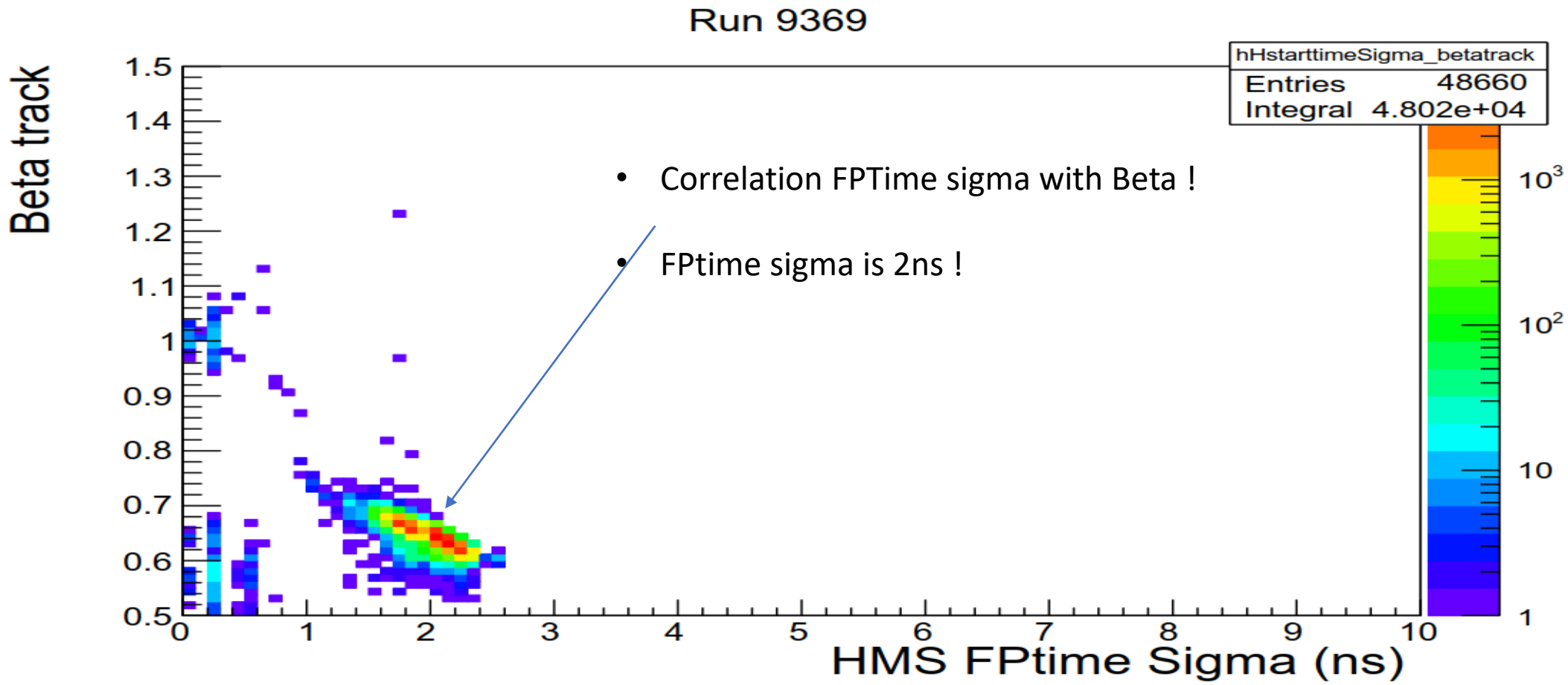






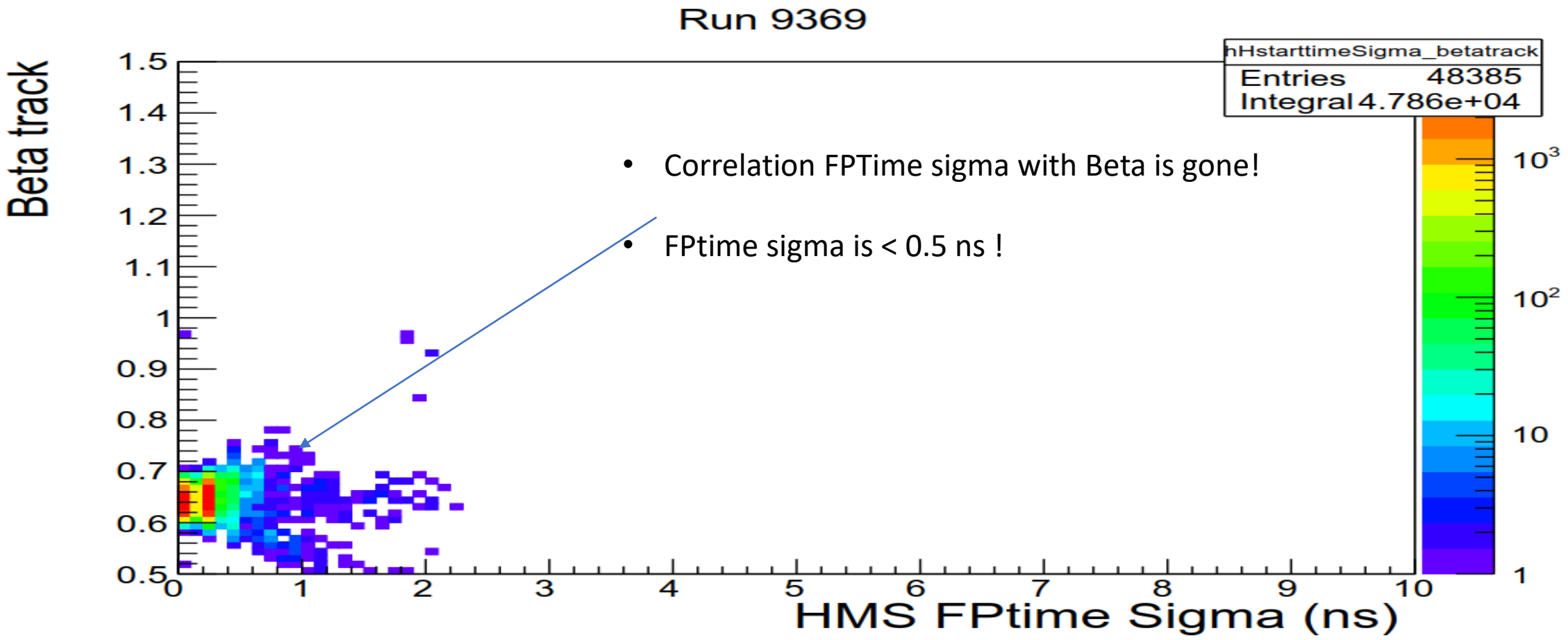
Problem found in THcHodoscope::CoarseProcess

- The focal plane time for spectrometer is calculated using the track momentum and particle mass in kinematics file to calculate the TOF correction for each hodoscope plane time to its focal plane time.
- But the track momentum was calculated in THcHallCSpectrometer::FindVertices which is called after THcHodoscope::CoarseProcess.
- Track momentum was kBig so beta was always 1 for the TOF correction.



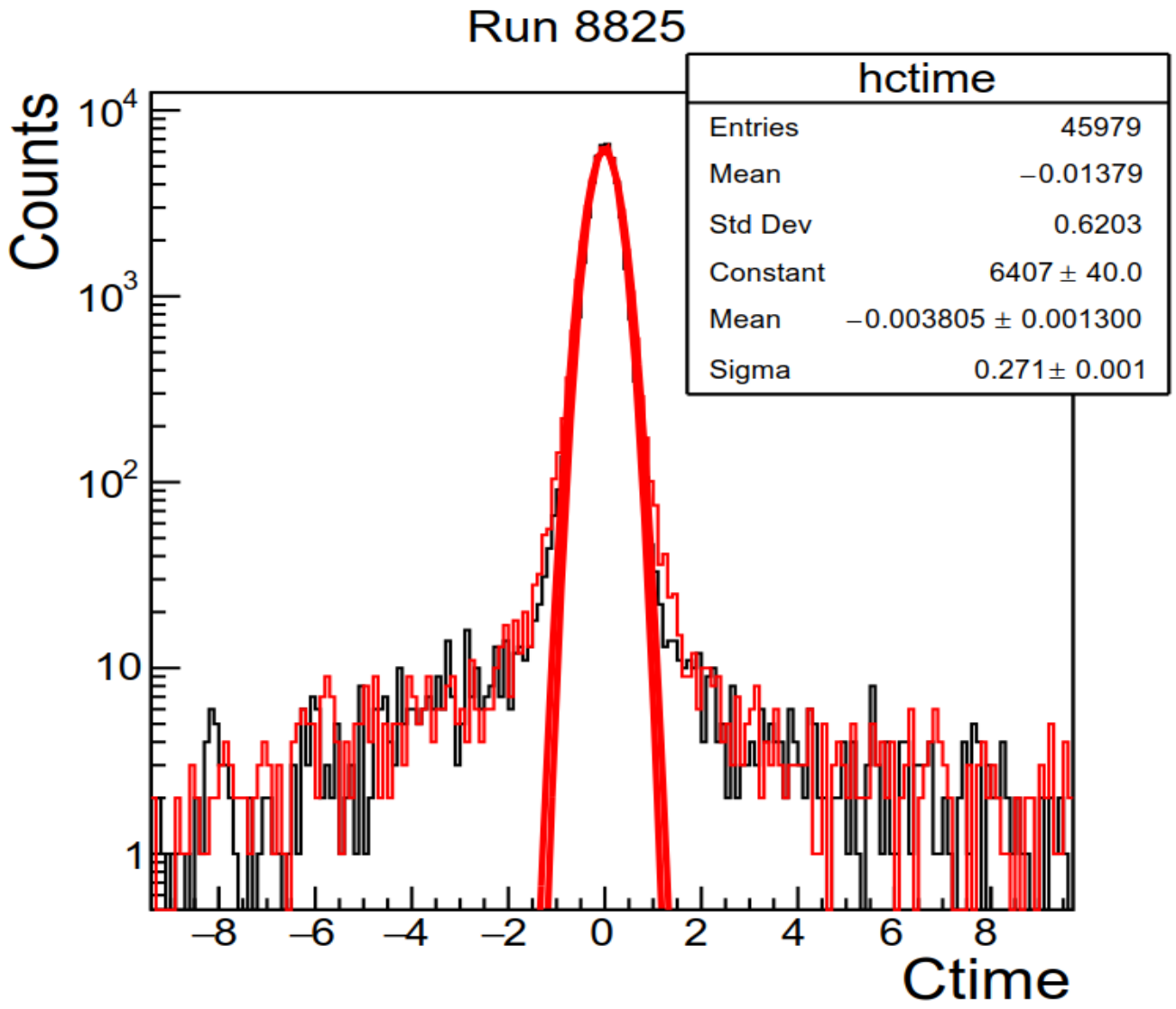
Fix to Problem found in THcHodoscope::CoarseProcess

- Moved calculation of track momentum (and all target quantities) to THcDC::CoarseTrack which is called before THcHodoscope::CoarseProcess.
- Note that the correction for raster and extended target is still done in THcExtTarCor.

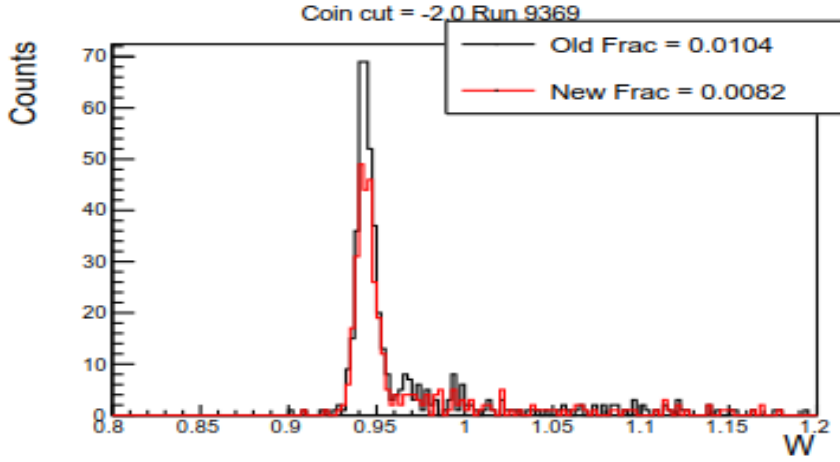


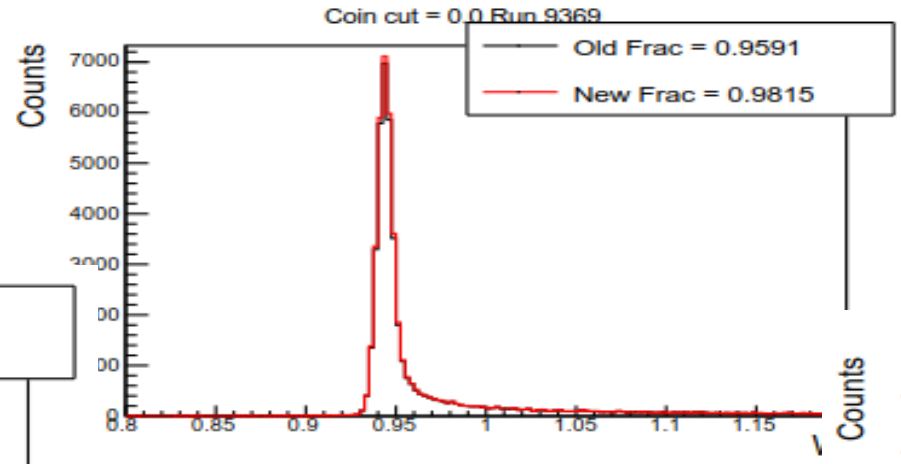
Coincidence time in elastic runs after fix

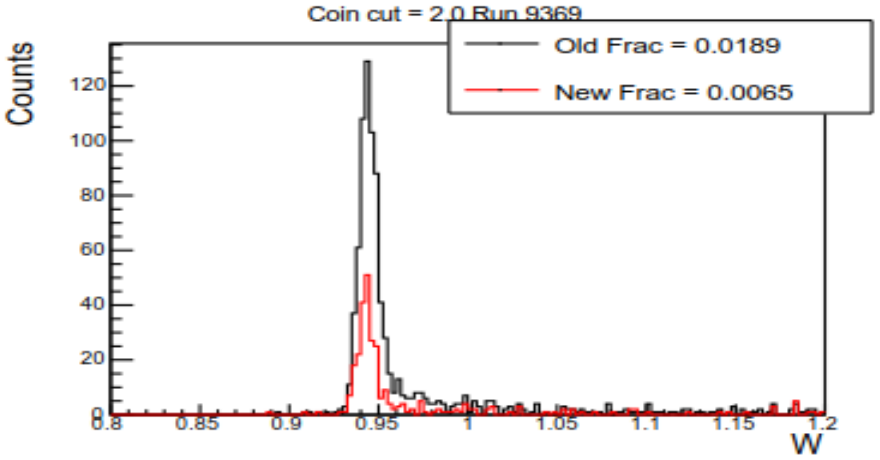
- Black line is elastic run 8825 at p = 0.890
- Red line is elastic run 9369 at p=0.795
- Sigma = 0.3 ns

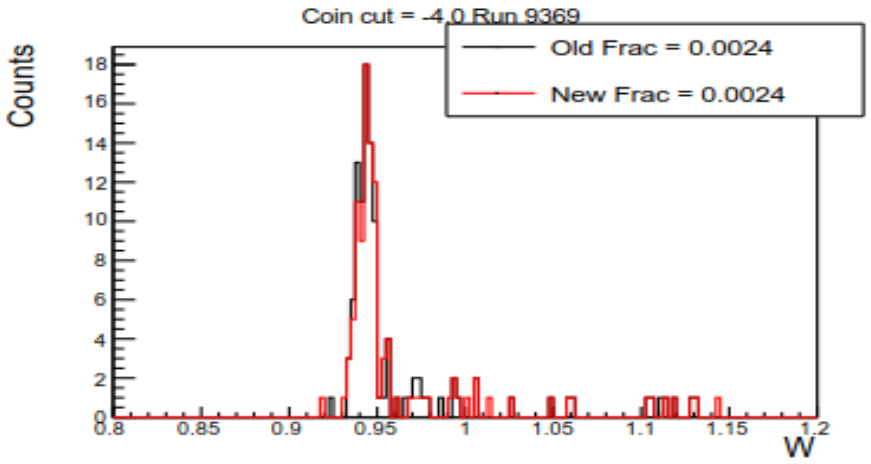


Compare OLD to New HCANA for one elastic run

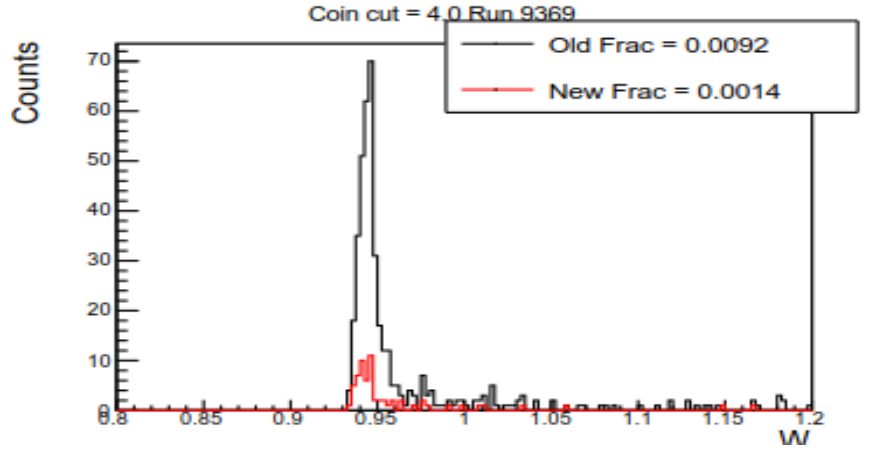




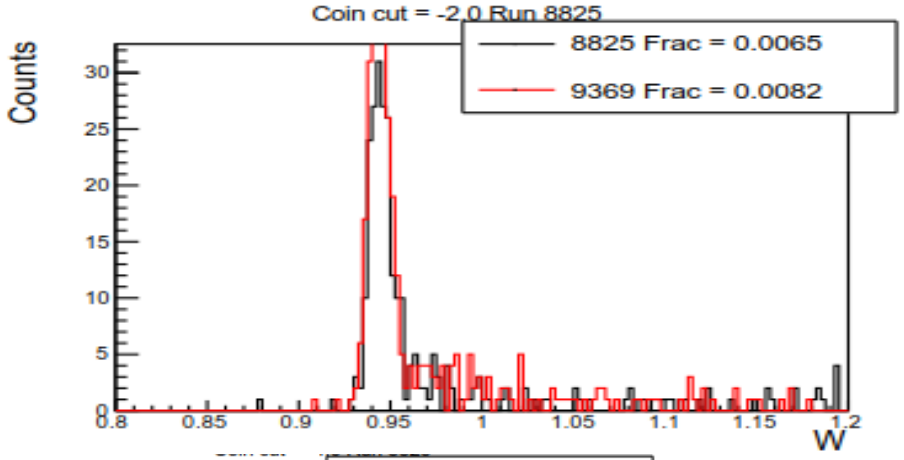


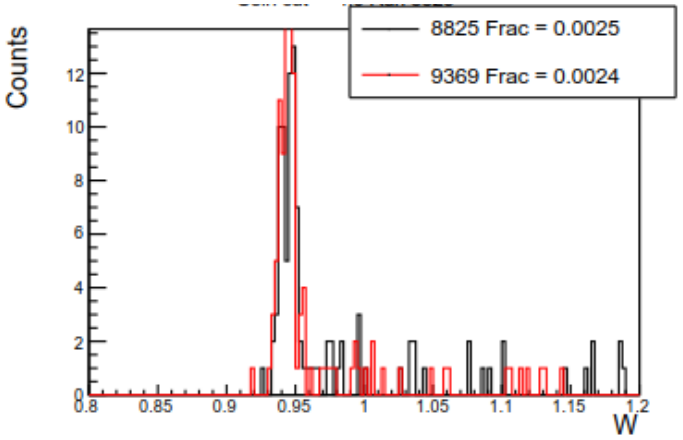


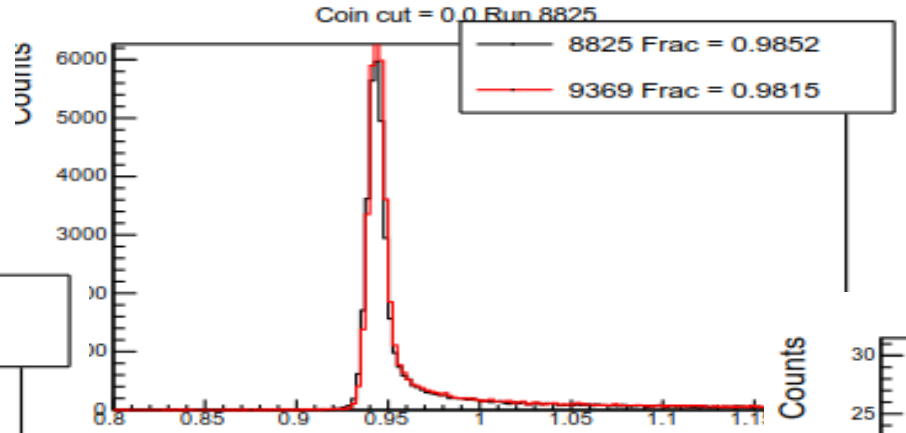
Bin	OLD	NEW
-4ns	0.2%	0.2%
-2	1.0%	0.8%
0	95.9%	98.1%
2	1.9%	0.7%
4	0.9%	0.1%



Compare two elastic runs







Bin	8825	9369
-4ns	0.2%	0.2%
-2	0.7%	0.8%
0	98.5%	98.1%
2	0.4%	0.7%
4	0.1%	0.1%