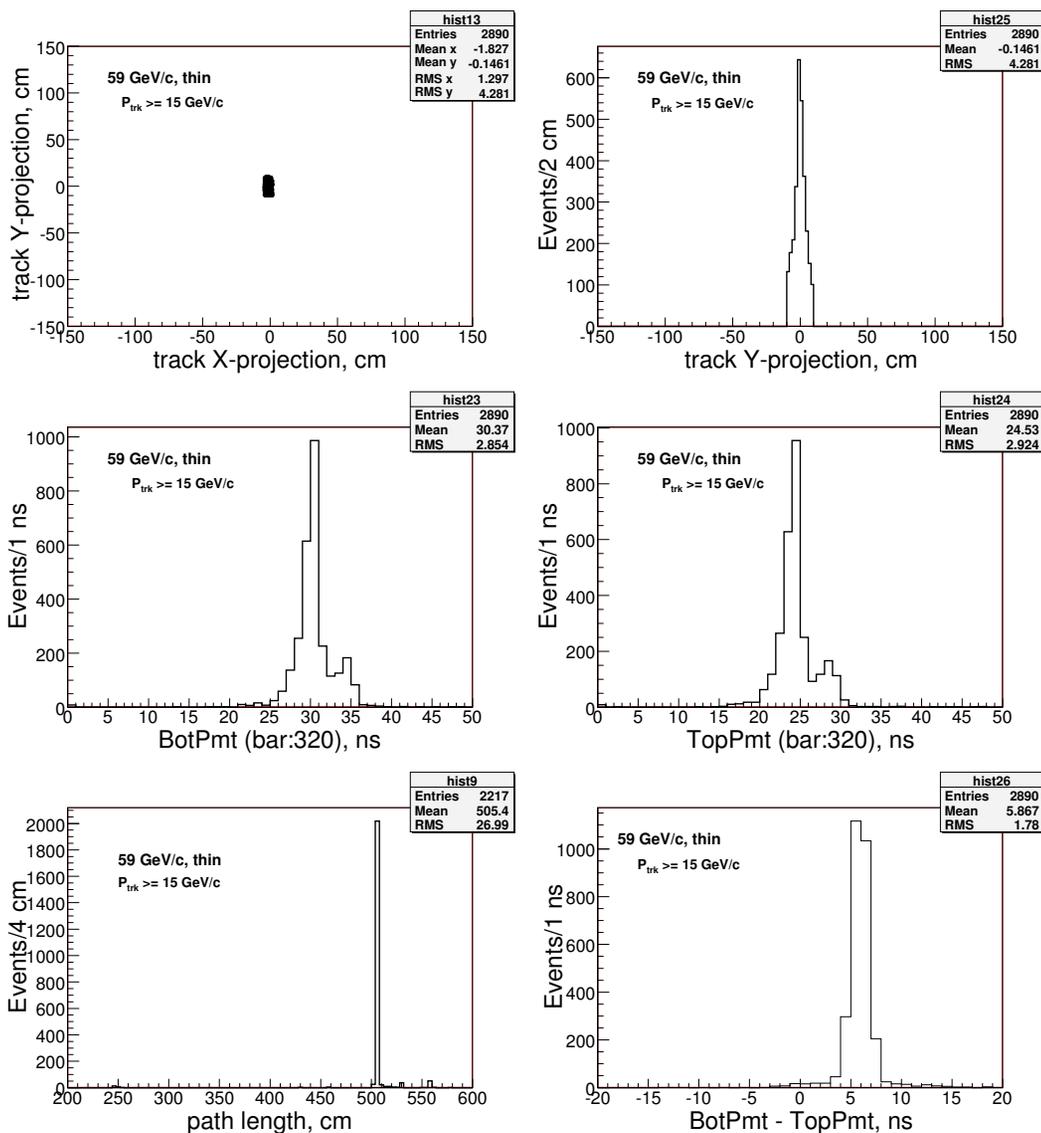


ToF Update

- Run analysis codes on the frozen release: R07.04.21
- Runs: 14083 - 14300
- Momentum - 59 GeV/c, thin targets
- Trigger: π , K and p beams and interactions
- Event/track selection cuts:
 - select clean events, $n\text{Trks} < 20$
 - use events with single beam track
 - select at least 3 track vertices
 - the vertex should be within the target sizes
 - the vertex should be associated with beam track
 - require the good quality tracks in the vertex: reasonable $n\text{TPC hits}$, timing
- Bars: 310 and 320; track - bar match, single track in bar

bar: 320



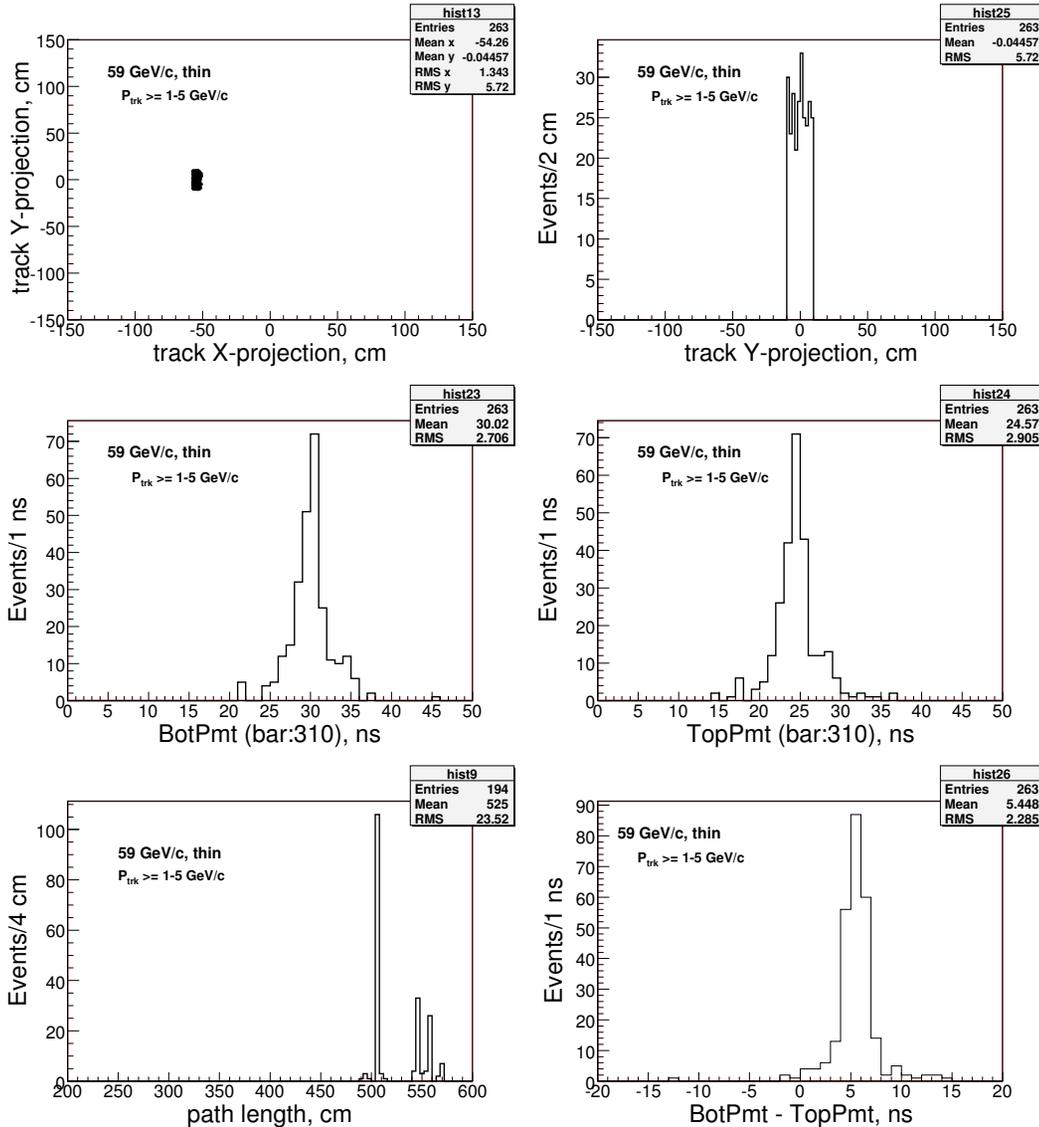
Top - track projections scatter plot (left) and track Y-projections (right).

Middle: Left plot is the bottom PMT distribution with mean value at 30.4 ns. Right plot is the top PMT distribution with mean value at 24.5 ns. Note1: the widths should be about 2ns, but they are wider. Note2: the peak positions should be the same, but they are not. Why? A)bar has Y offset vs the beam line. It is less likely. 5 cm offset will lead to time difference about less than 1 ns. B)TDC counts \rightarrow time converting coefficient(s) is off. And/or C)cable delays are off.

Note3: t_0 fluctuations can effect on the widths.

Bottom - track path length = 505 cm (on left) and BotPMT - TopPMT time difference on right plot.

bar: 310



Top - track projections scatter plot (left) and track Y-projections (right).

Middle: Left plot is the bottom PMT distribution with mean value at 30.0 ns. Right plot is the top PMT distribution with mean value at 24.6 ns. Why the mean values are differ? Why distributions are wider by factor 3?

Bottom - track path length (on left) and BotPMT - TopPMT time difference on right plot.

summary

Analysis of ToF data (bars 310 and 320) using the narrow beam spot allows to observe:

- The peaks on the time distributions from bottom vs top PMT's find to be differ by 5-6 ns, but should be close to 0. This difference is huge. Calculation of an average arrival time makes no sense.
- The full widths of the time distributions should be about 2-3 ns, but they at least 10 ns wide. One possible reason: t_o fluctuations.

Conclusion: ToF work to do should be concentrated on the reconstruction level.

Remark: I would be glad if I made a mistake on analysis