event/track selection requirements

- 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:
  - use proper T0 summed charge and T0 time differences (Andre codes)
  - select clean events, nTrks$<$20
  - use events with single beam track
  - select at least 2 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 nTPC hits, timing

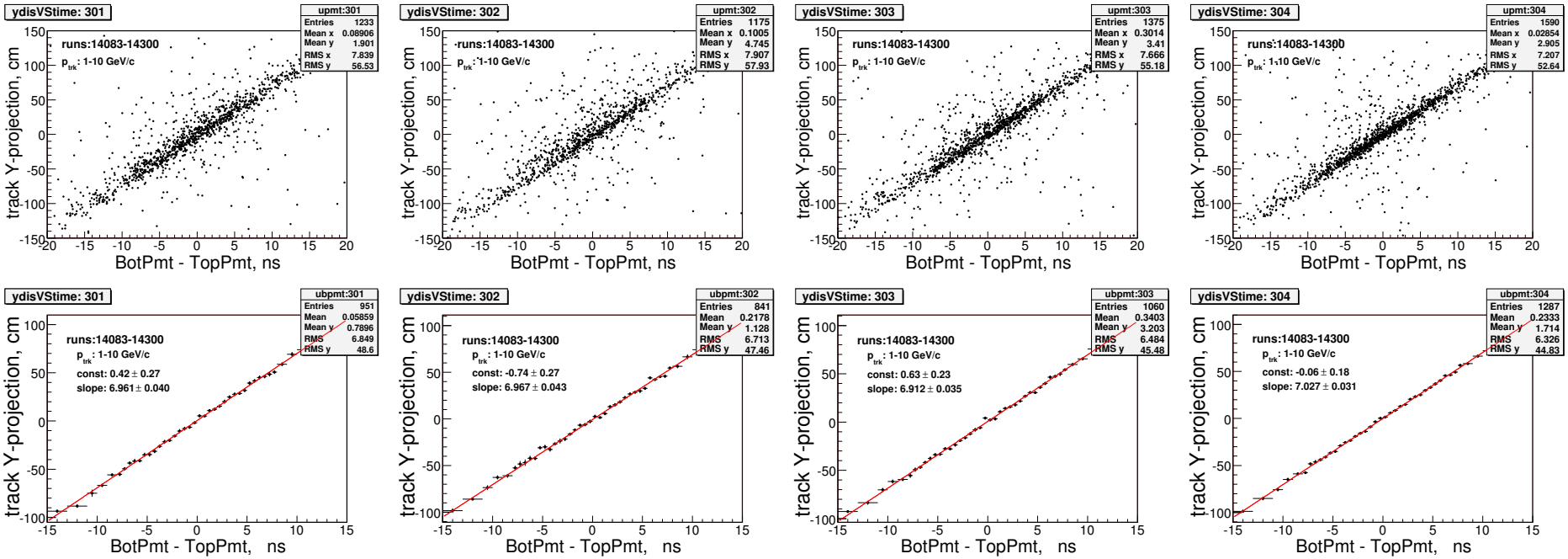
Find the speed of light in bar

apply temperature correction: Δt = (t^o - t^o_{ave})*TF, where t^o is a temperature for current event (smoothened), t^o_{ave} = 26°C and as a temperature factor (TF) use the numbers from table (ns/^{o}C) :

nPMT	Top	Bottom
301 - 320	0.608	0.566
321 - 340	0.287	0.343

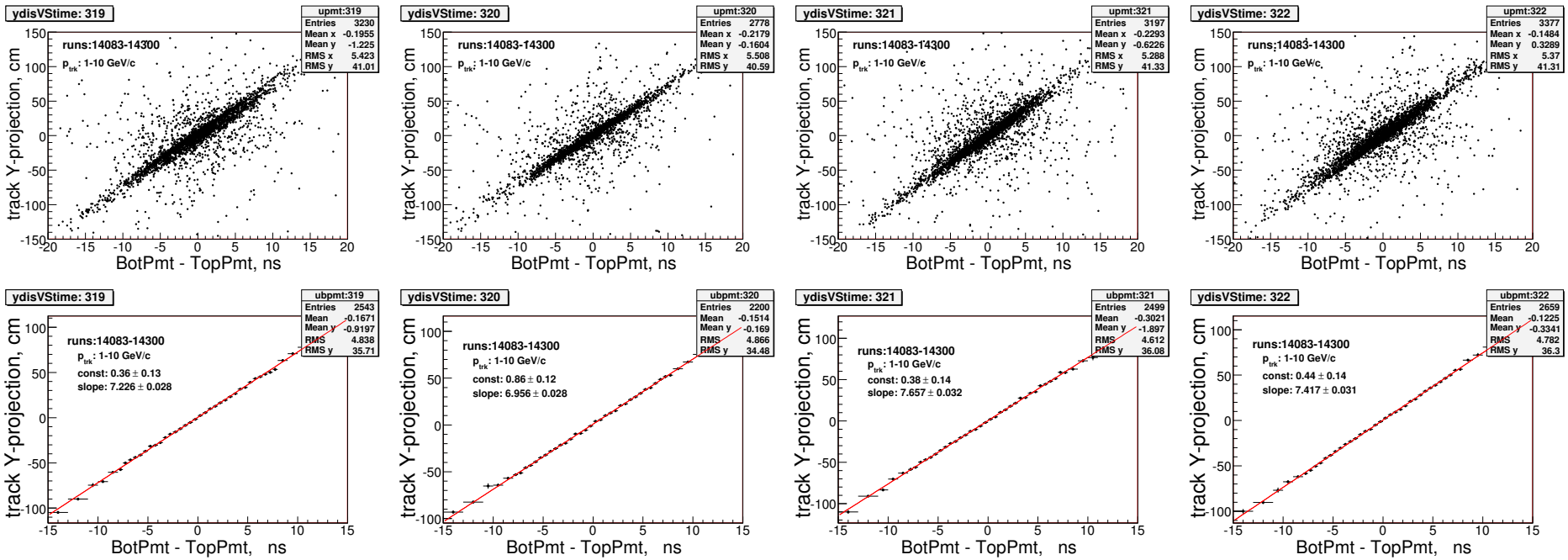
- use tracks in wide Y coordinate ranges: 0$\pm$150 cm.
- use track momentum within 1 - 10 GeV/c
- make scatter plot: Y coordinate vs Bottom-Top time (Δt) (for reference)
- make the Y vs Δt profile plot selecting events within $\pm\Delta$y along the expected line, make several iterations, final Δy=20 cm.
- fit the Y vs Δt profile plot, the slope is the half value of speed of light in ToF bar.

track Y coordinate vs Bottom-Top time: 301 - 304



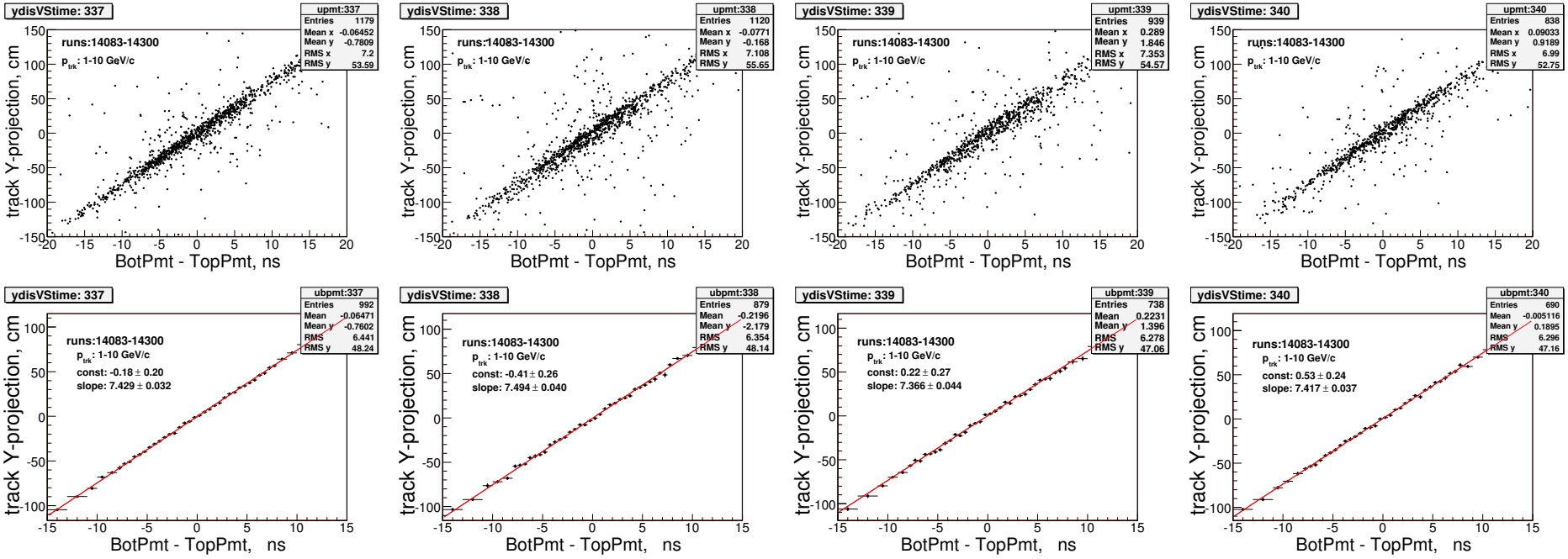
Top plots - the scatter plots of the track Y coordinate vs the Bottom- Top time differences for the East bars. The band width of data along the diagonal line defined by the track projection and particles arrival time uncertainties. Bottom plots - the Y vs Δt profile plots for the above data with the linear fit results.

track Y coordinate vs Bottom-Top time: 319 - 322



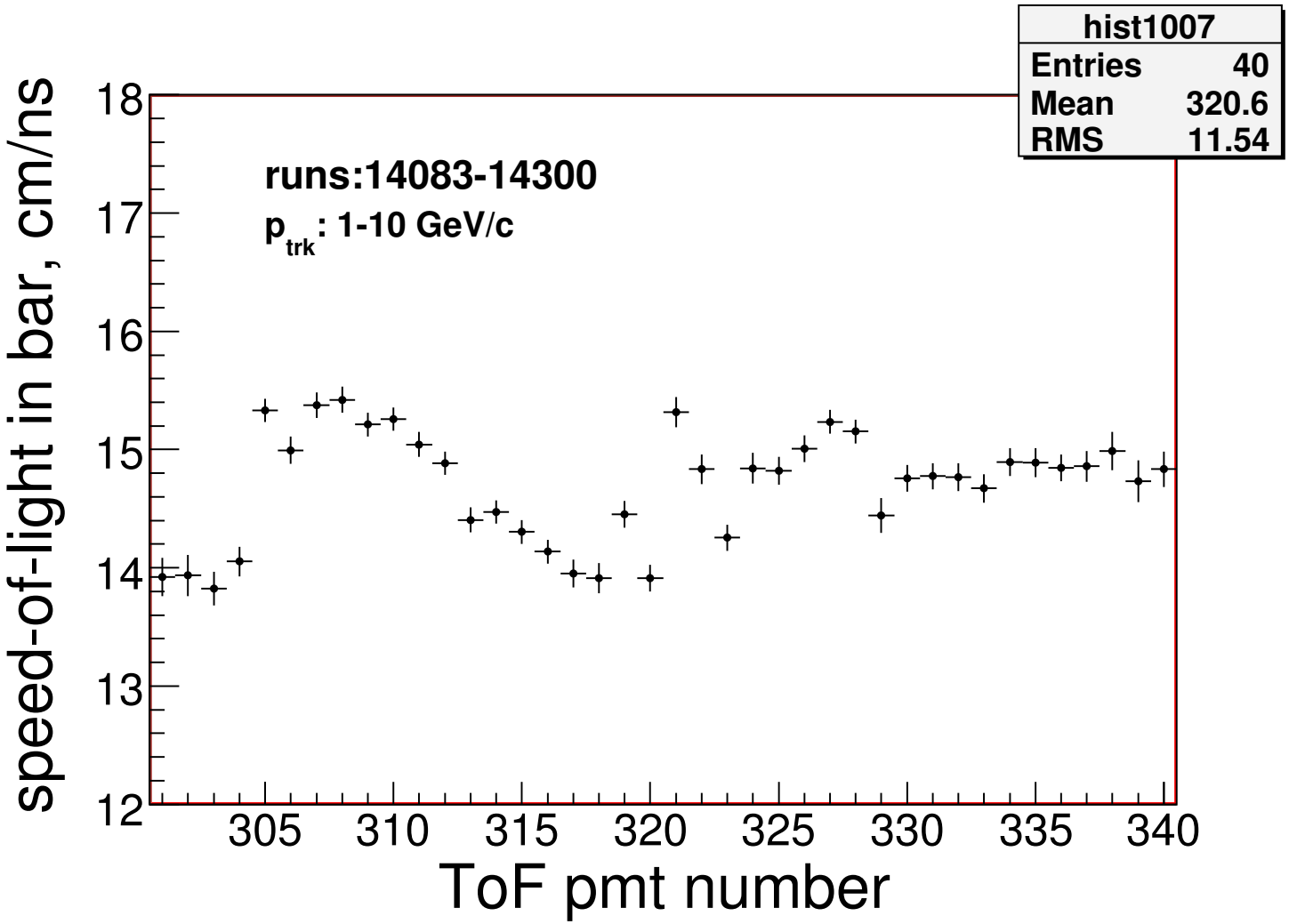
Top plots - the scatter plots of the track Y coordinate vs the Bottom- Top time differences for the central bars. Bottom plots - the Y vs Δt profile plots for the above data with the linear fit results.

track Y coordinate vs Bottom-Top time: 337 - 340



Top plots - the scatter plots of the track Y coordinate vs the Bottom- Top time differences for the West bars. Bottom plots - the Y vs Δt profile plots for the above data with the linear fit results.

speed of light in bar



What is next?

- put the speed of light values in DB?
- find the time offset for each pmt
- try to find the source for the time spread ???