

Propagation Time Correction

1D Fit to extract the constants

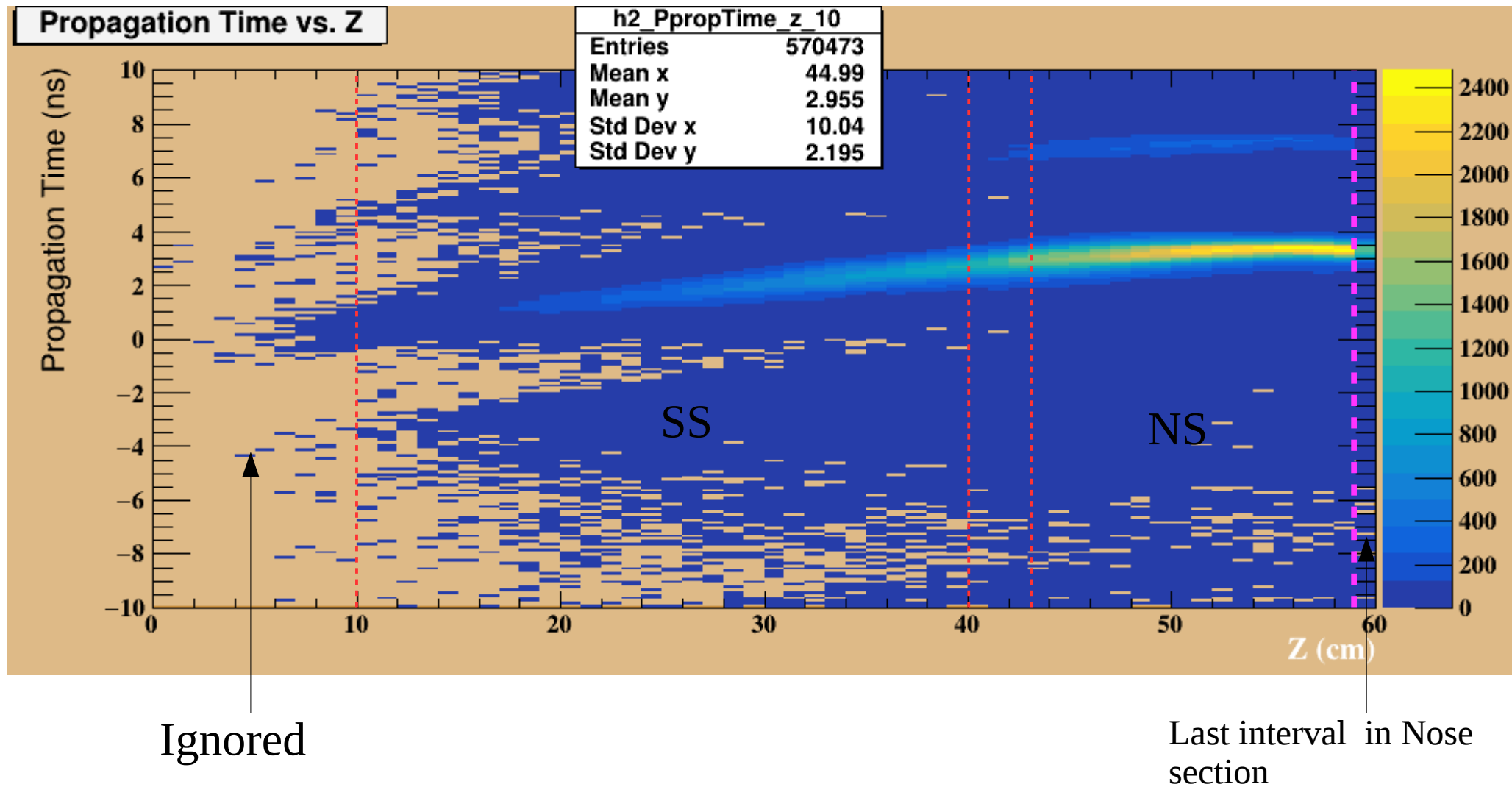
Mahmoud Kamel

Propagation Time Corrections

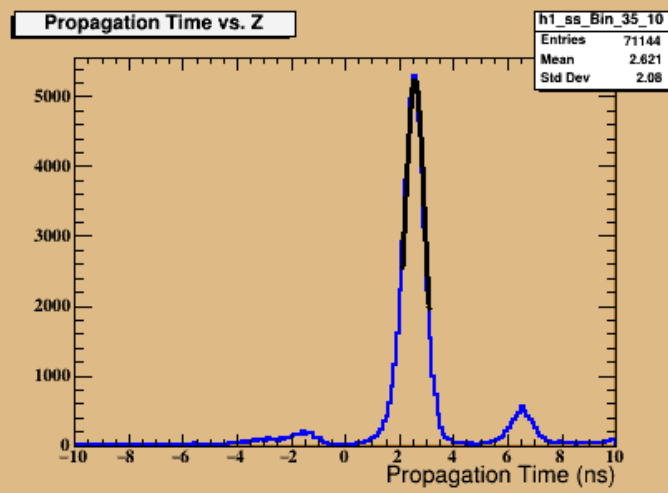
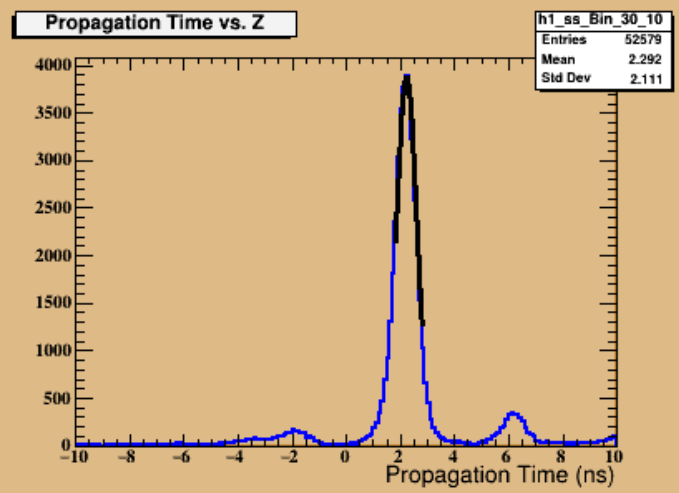
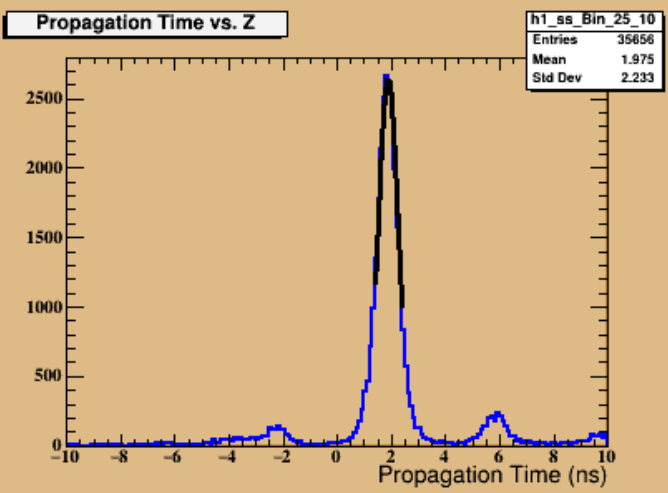
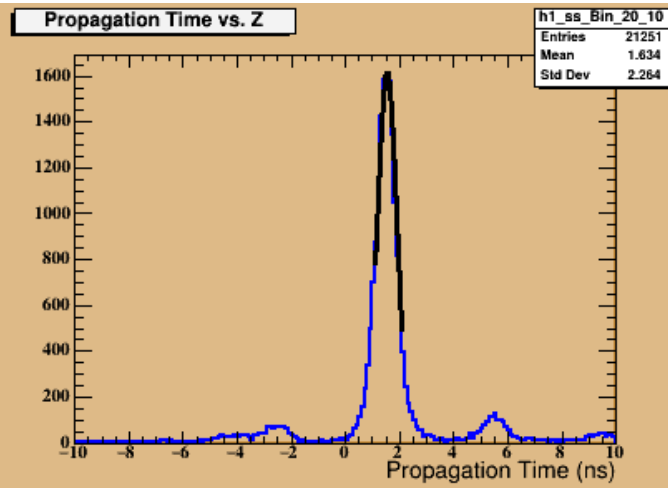
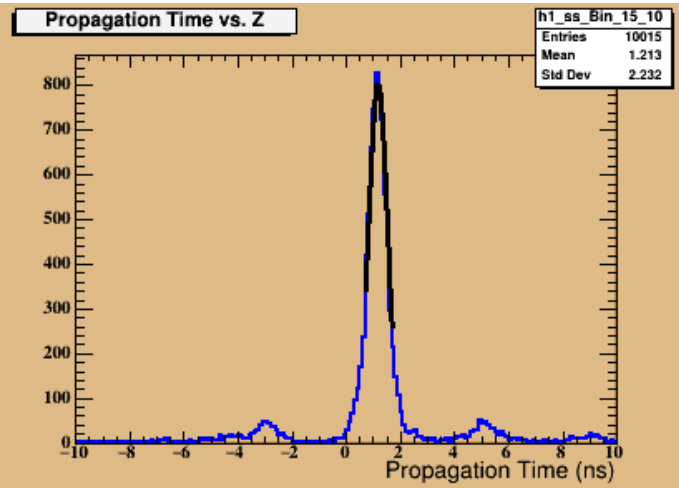
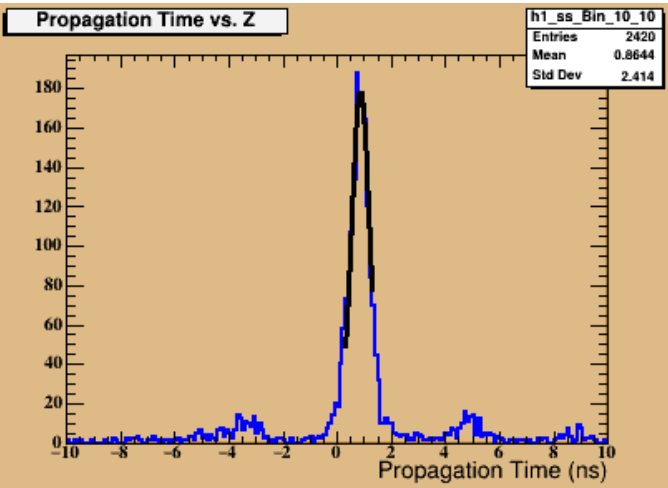
- Find a good track matched to the TOF and not the SC. Determine the RF time based on this track.
- Find a good track matched to the start counter. Obtain the walk corrected sc time and the flight time.
- Calculate the propagation time $PT = T_{wc}^{sc} - T_{ft}^{sc} - T^{rf}$
- Plot the PT vs the z (path length along the paddle).
- Ignore the first 10 cm upstream of the straight section and divide the rest of straight section to 6 intervals. Divide the bend section to 3 intervals and the nose section to 9 intervals
- In each interval get the PT and fit Gaussian.
- Plot the mean of the fit vs the central value of z interval.
- The plots shown are for Run 42241 sector 10

SC time vs Z before Applying the PTC

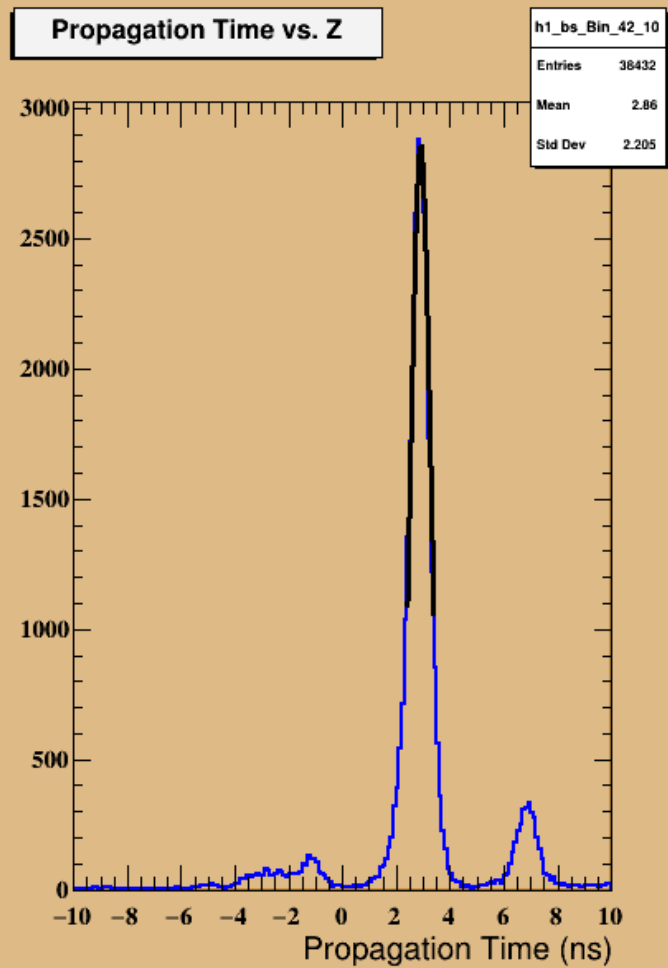
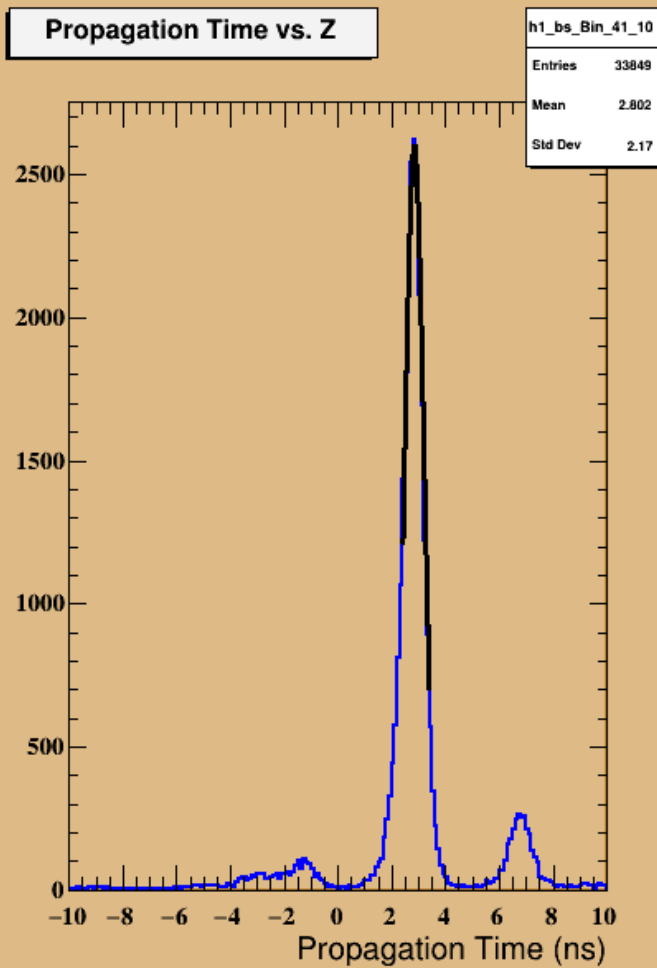
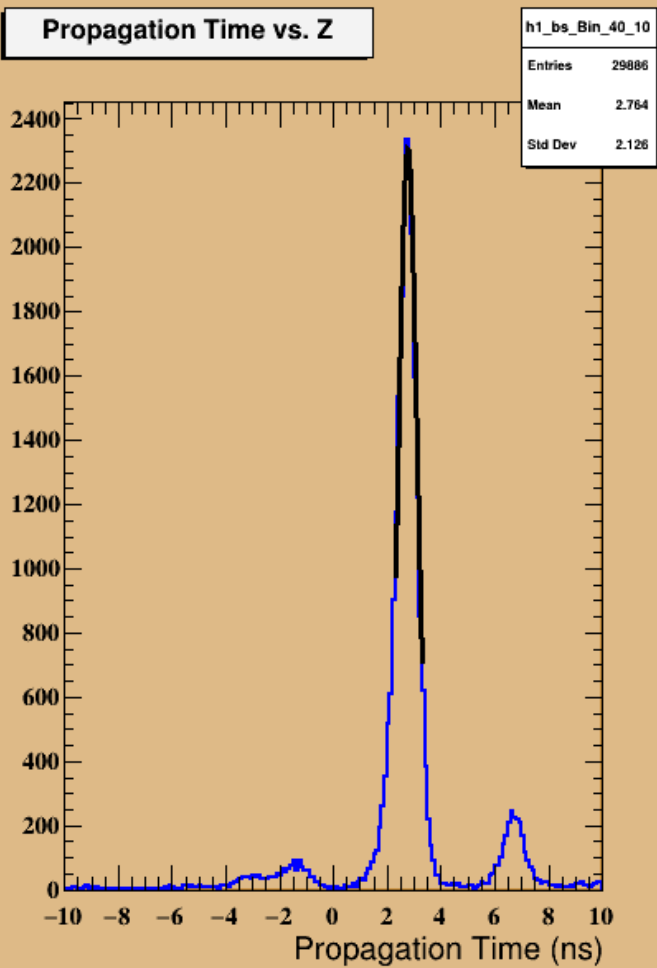
Full Run 42241, Sector 10



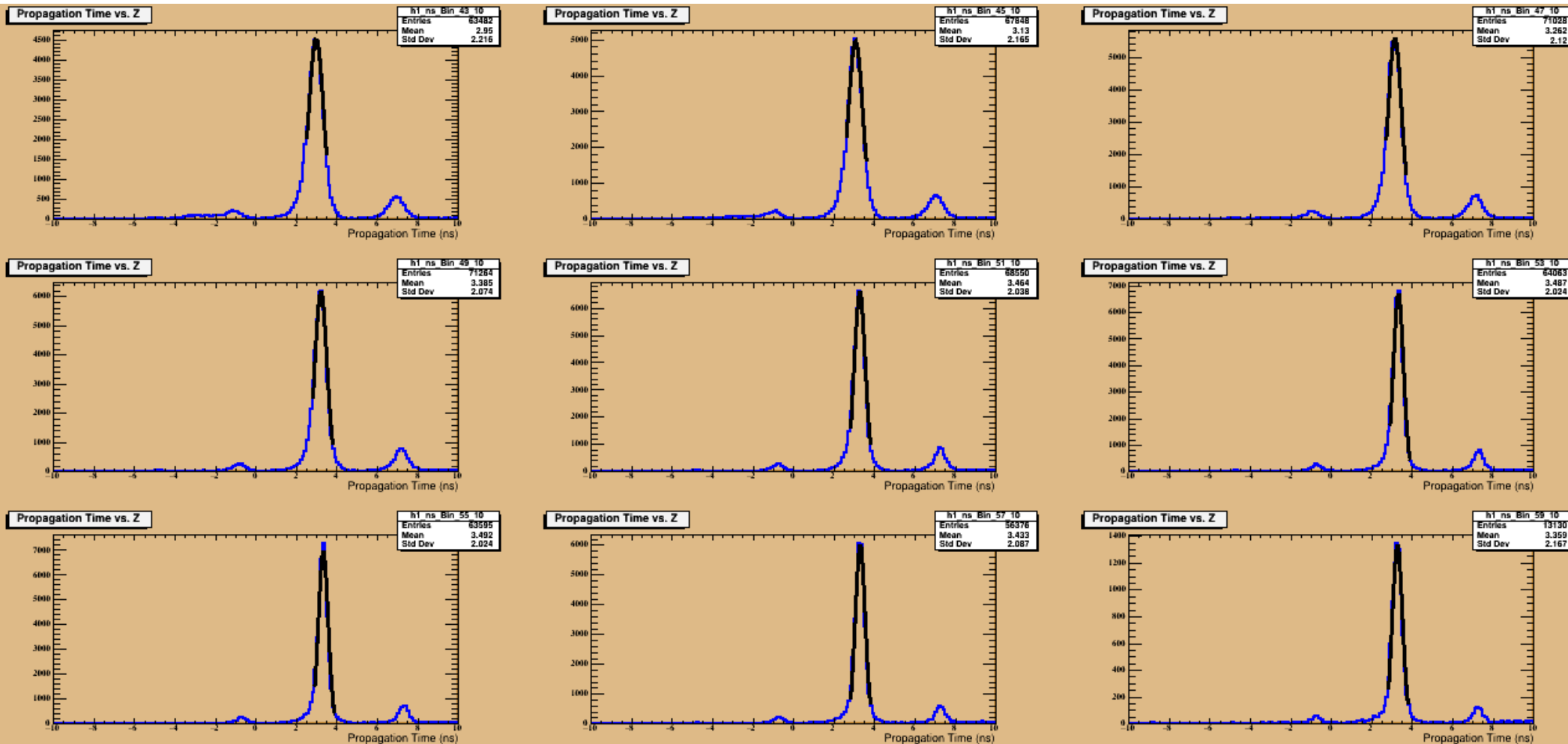
Propagation time for straight section interval



Propagation time for bend section intervals

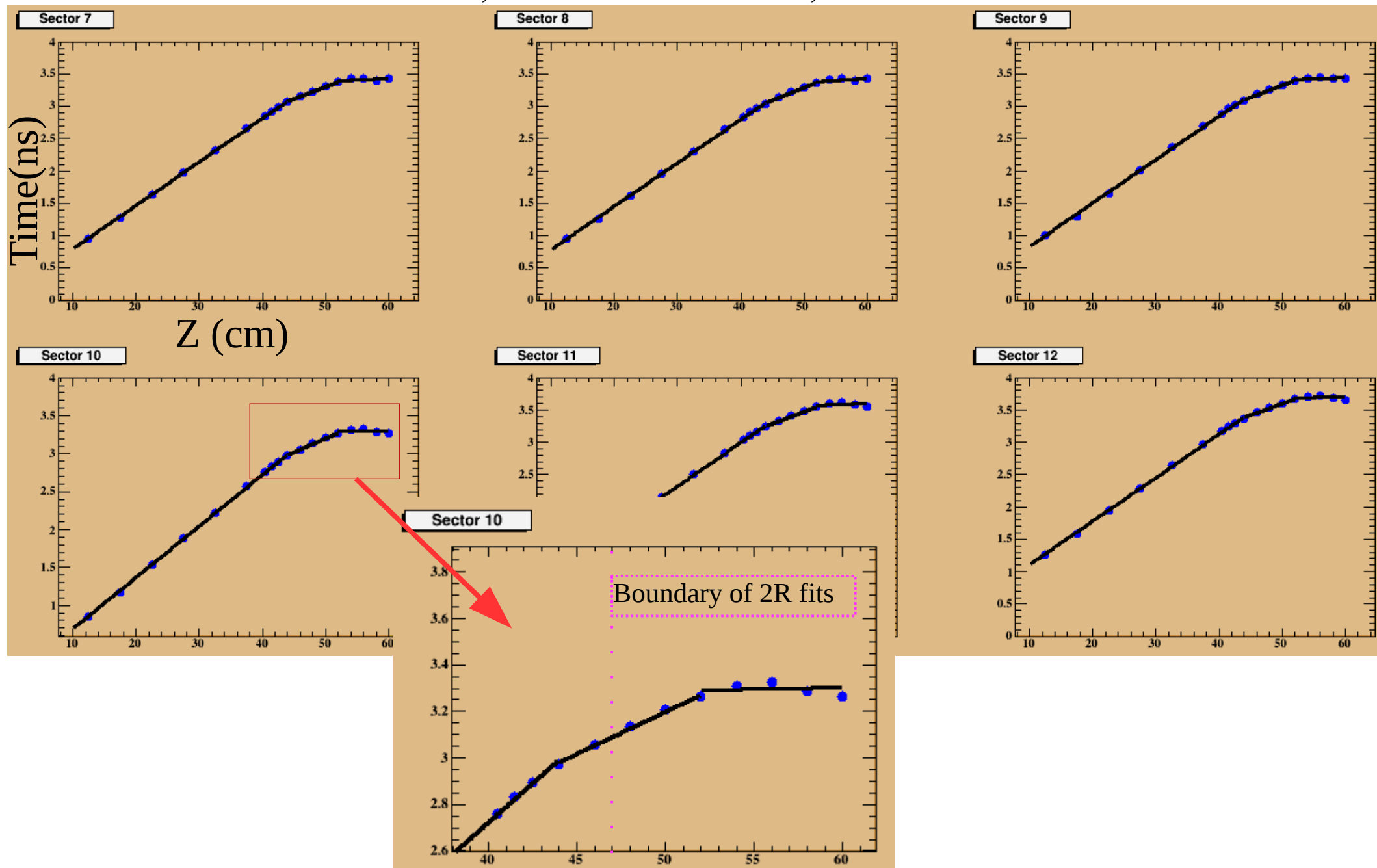


Propagation time for nose section intervals



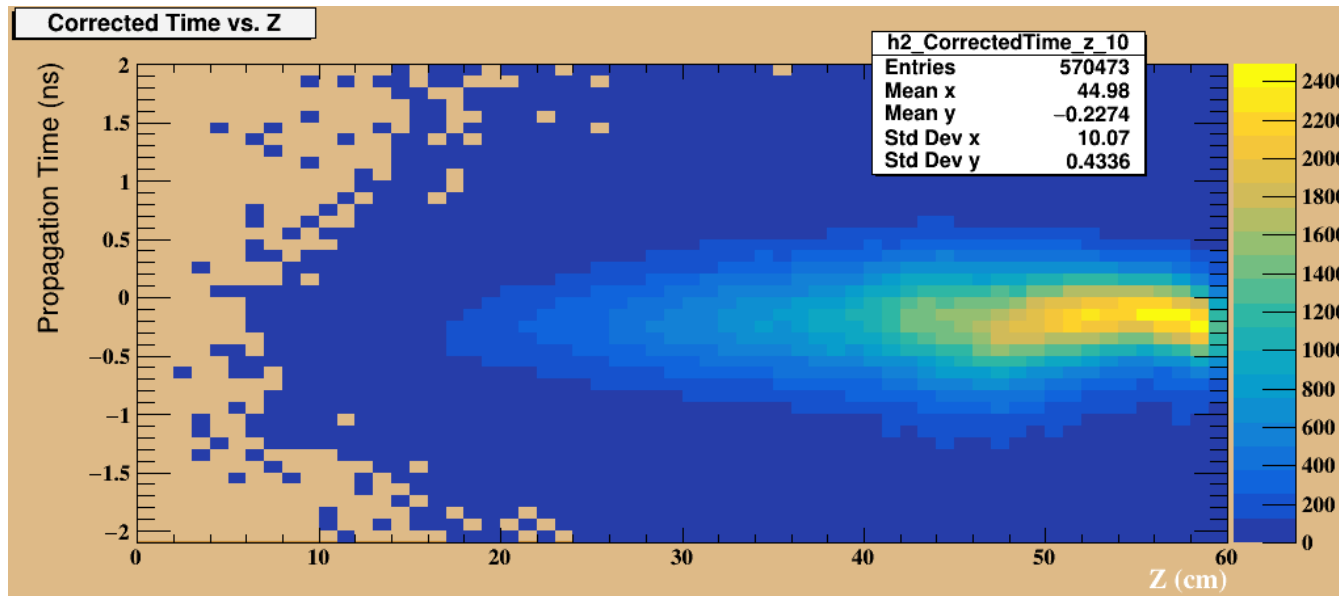
1D fits for SC_time vs Z using three distinct regions (3R fits).

$Z \leq 44.0$ cm, 44.0 cm $< Z \leq 52.0$ cm, and $Z > 52.0$ cm

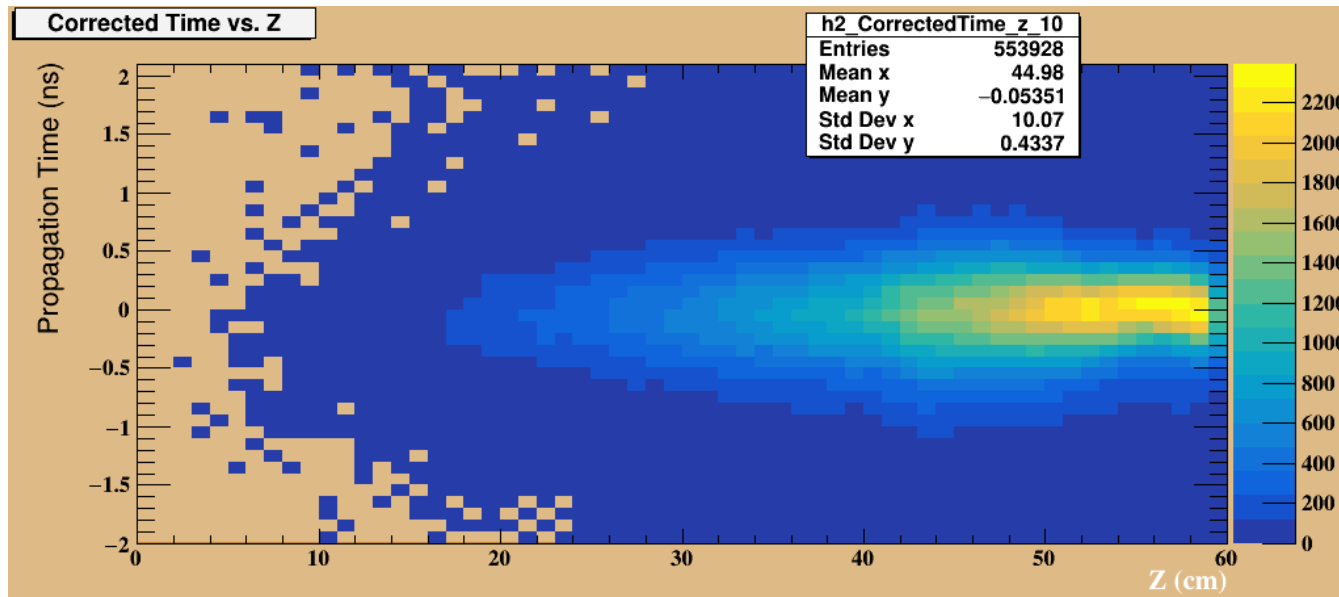


SC time after PTC using two regions or Three regions fit

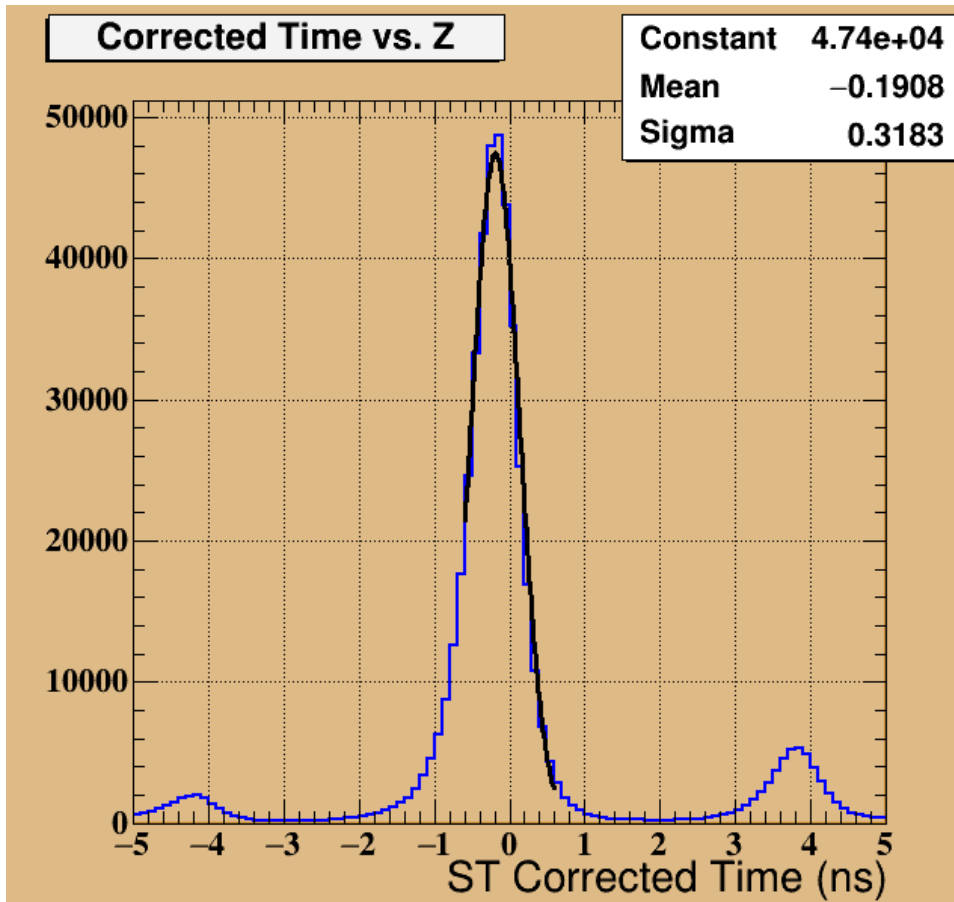
2R fit
constants



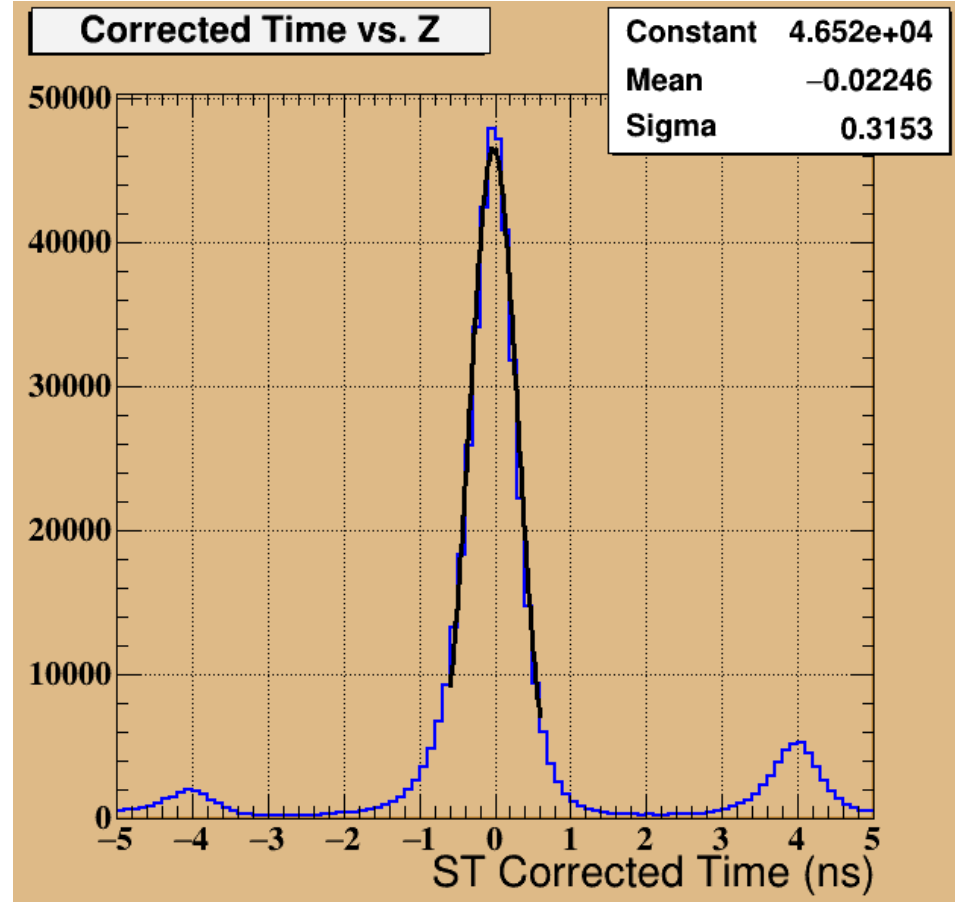
3R fit
constants



Time Resolution (sector 10)



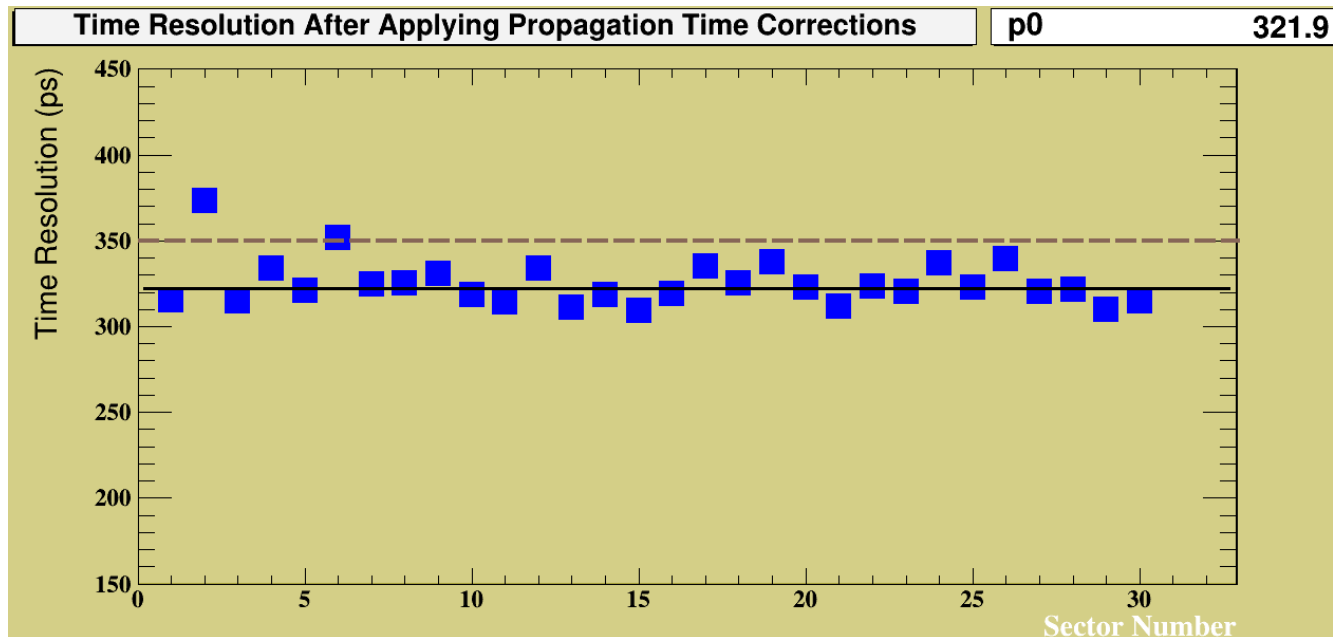
2R fit constants



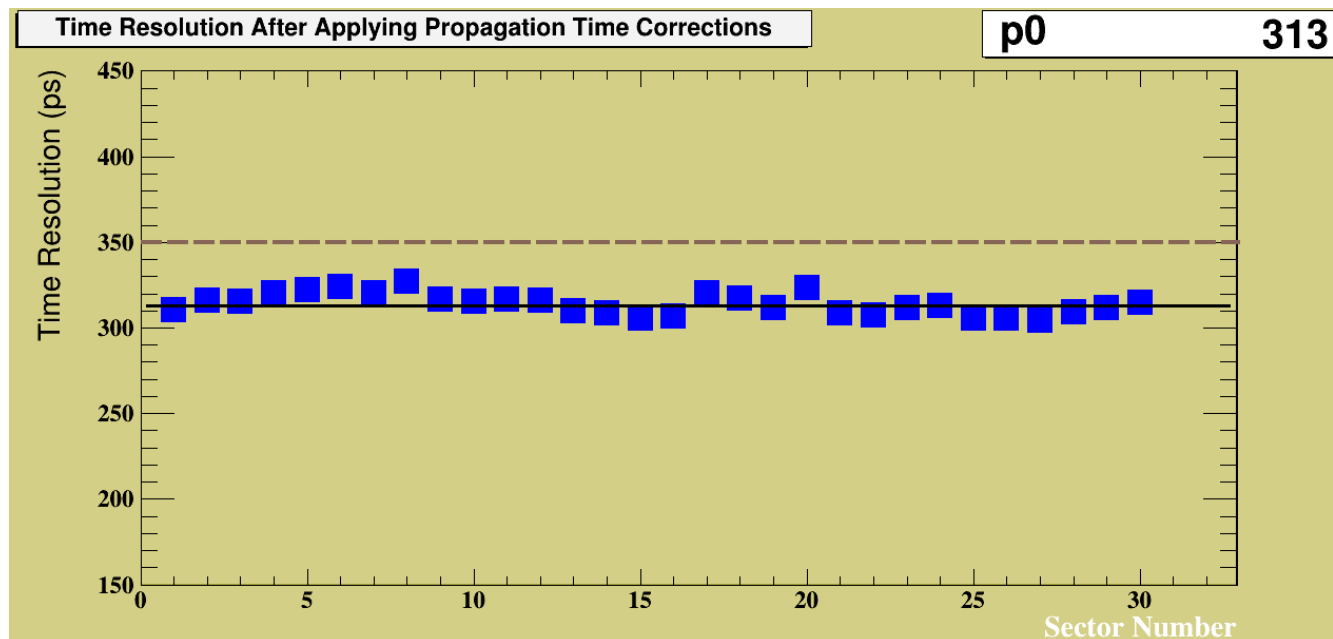
3R fit constants

Time resolution from the PT plugin before and after corrections

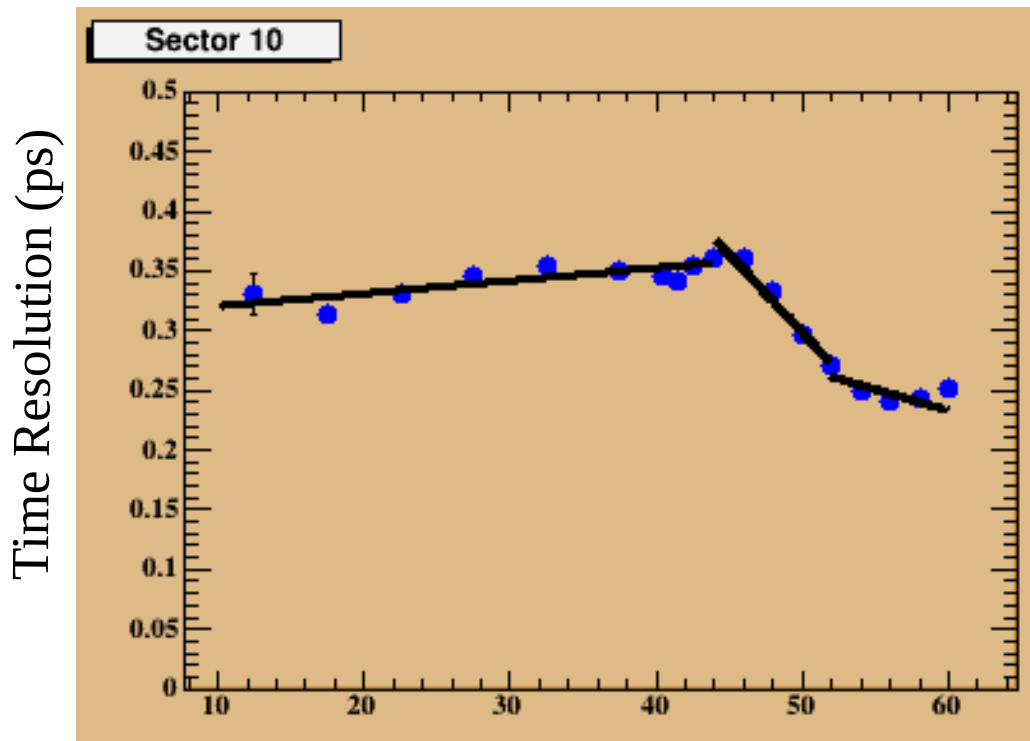
2R fit constants



3R fit constants

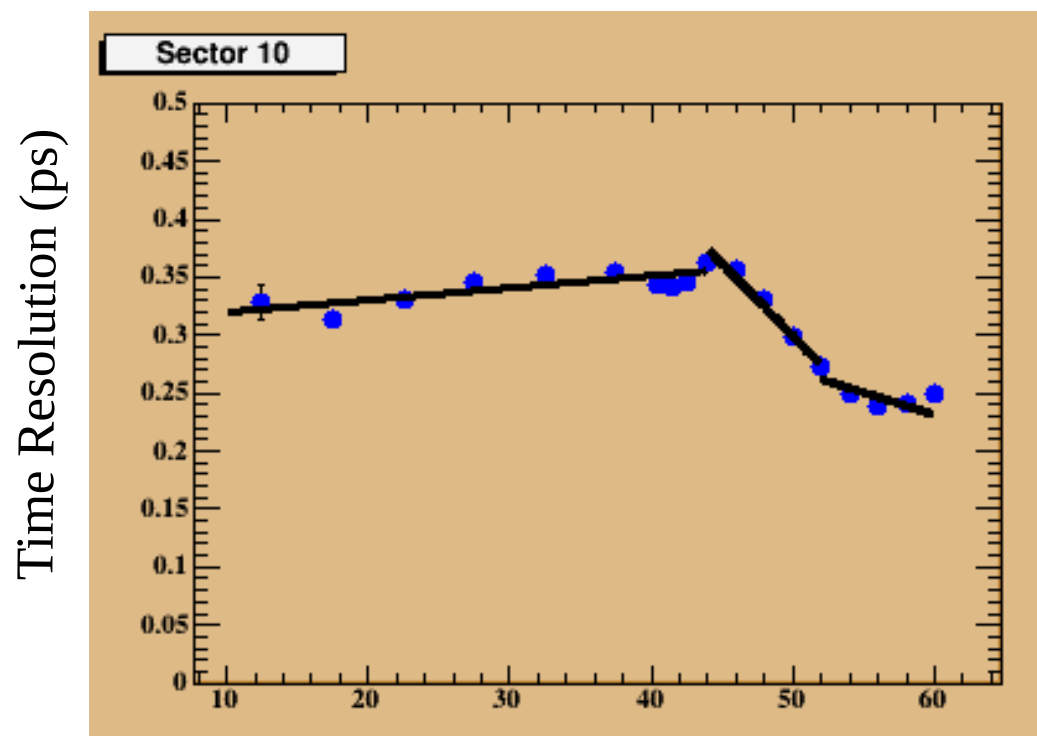


Time resolution from the PT plugin after corrections as a function of z



Z (cm)

2R fit constants



Z (cm)

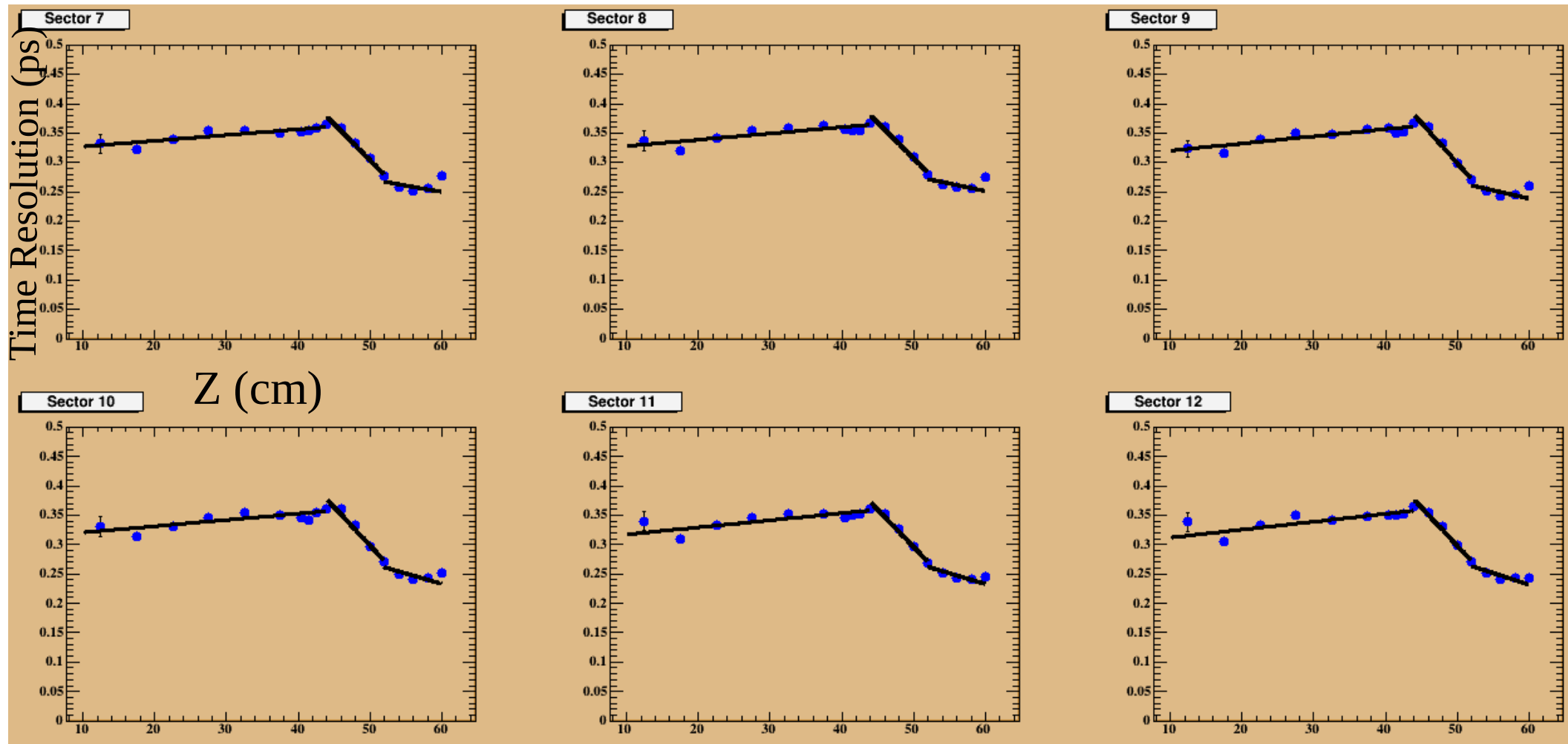
3R fit constants

Summary

- New propagation time constants is obtained using one dimensional fits.
- 2R and 3R fits were tested. The 3R fits showed better corrections and resolution.
- Future work: calculate the time resolution from ST_Tresolution plugin where the RF time is determined based on the hit to the SC.
- Push the changes to github and the constants to CCDB.

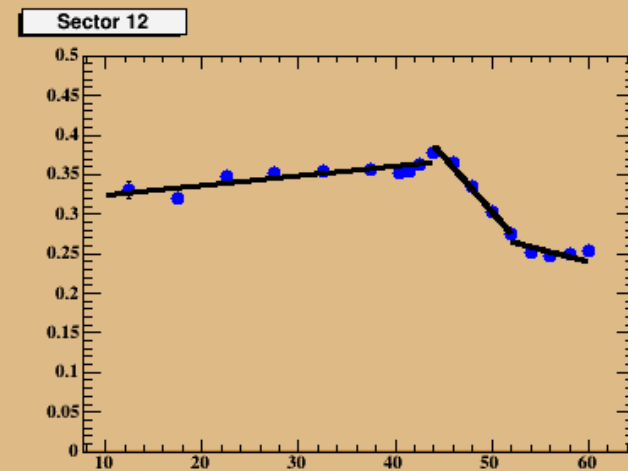
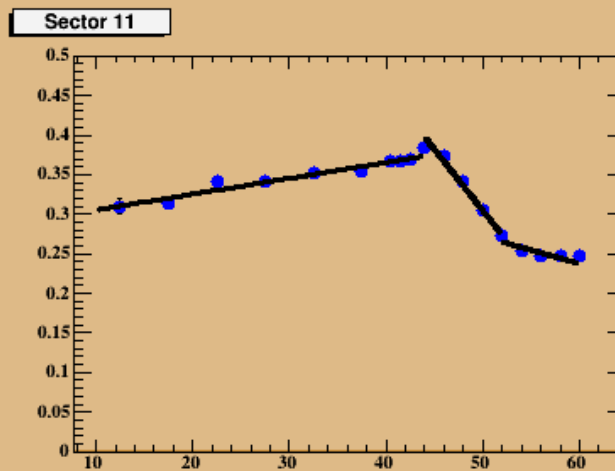
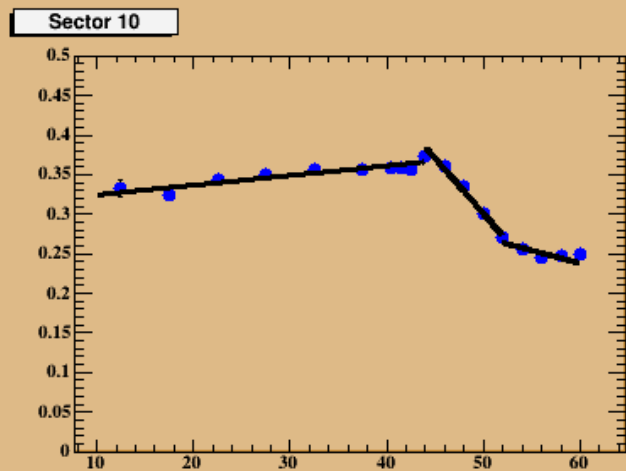
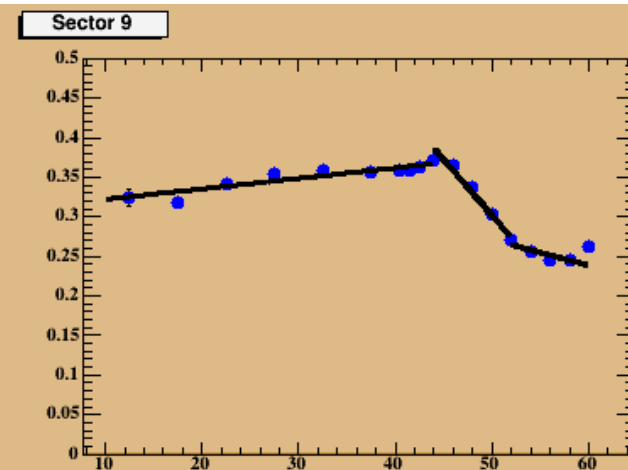
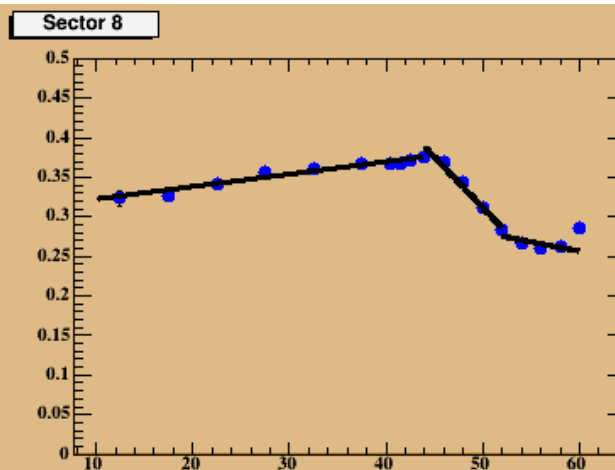
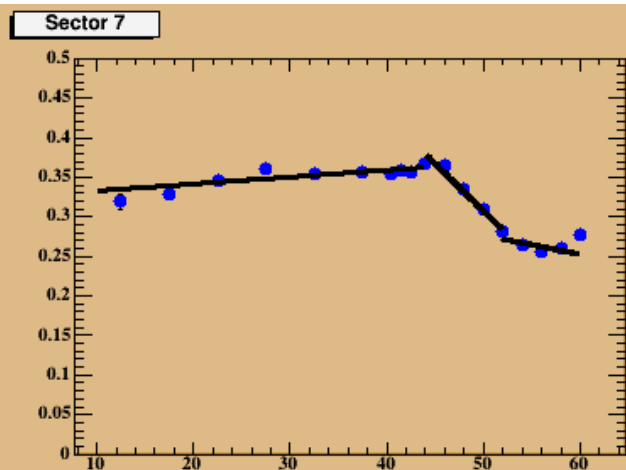
Back Up Slides

Time resolution from the PT plugin after corrections as a function of z Using 2R fit PTC



Time resolution from the PT plugin after corrections as a function of z

Using 2R fit PTC (Run 41106)



Time resolution from the PT plugin after corrections as a function of z

Using 3R fit PTC

