(Back) Tracking

Norman Graf (SLAC)

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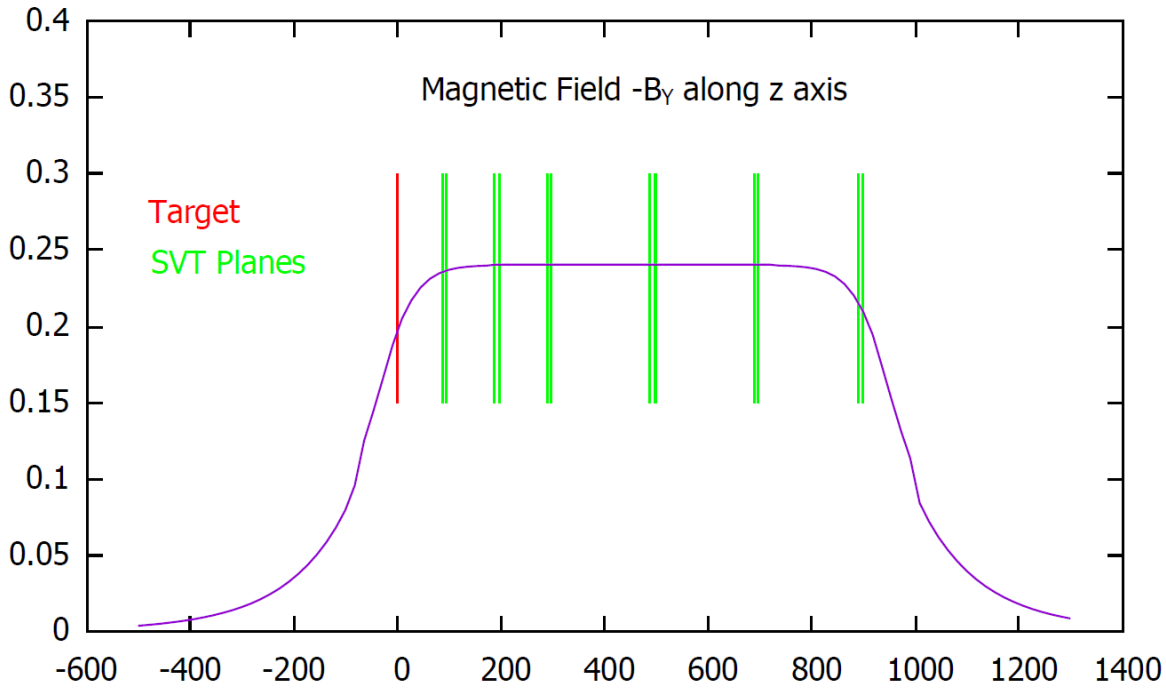
Overview

- Some concern that full field effects are not being accounted for in our current track-fitting.
  - BY @ Layer 1 98%
  - BY @ Layer 6 87%

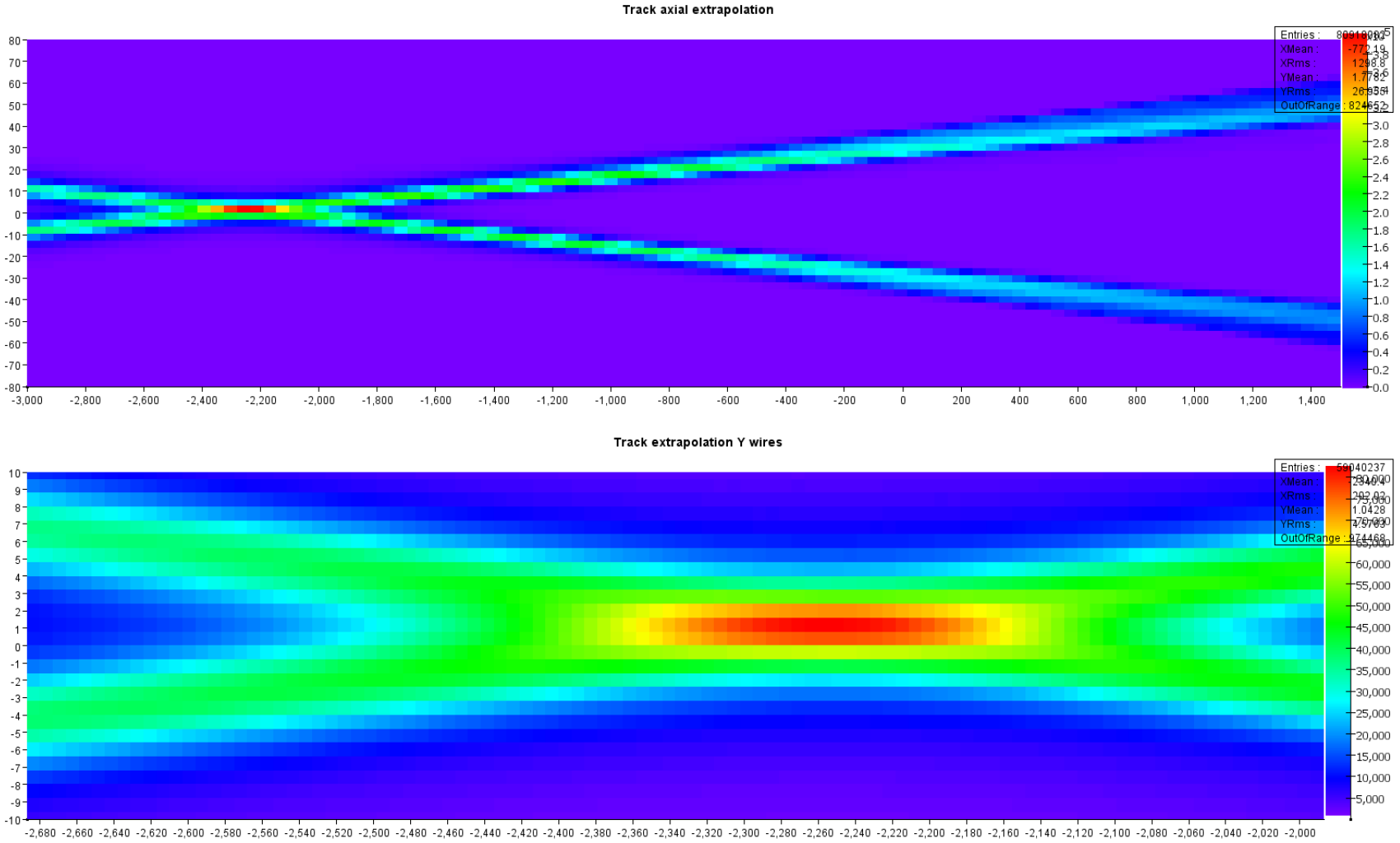


- Concentrating on the 2016 field-off data for alignment studies.

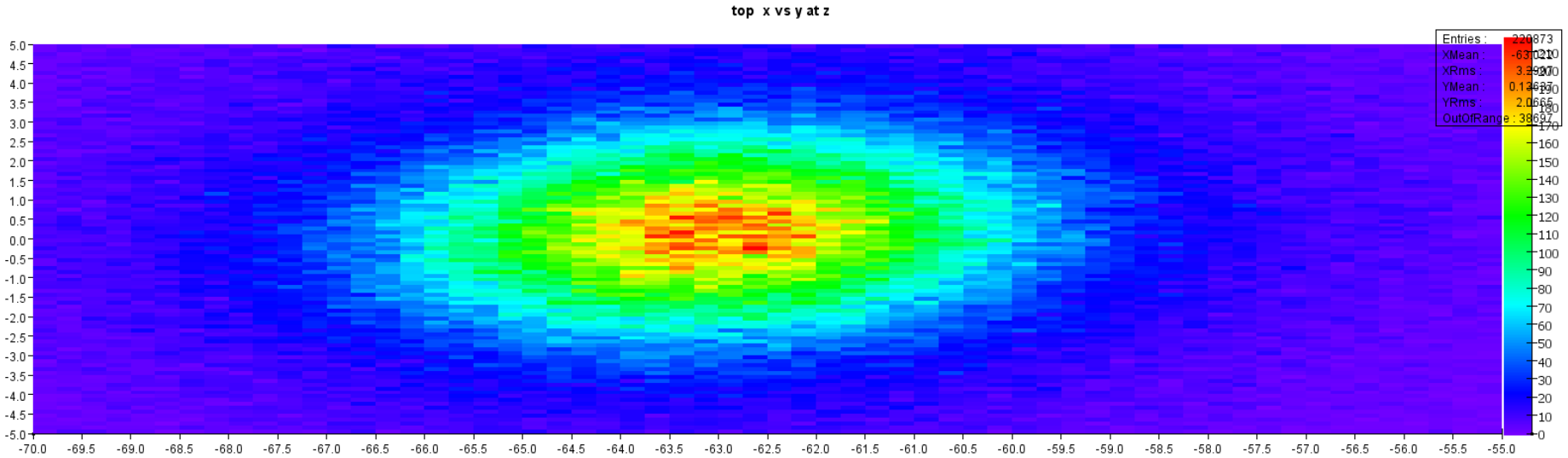
Event Samples

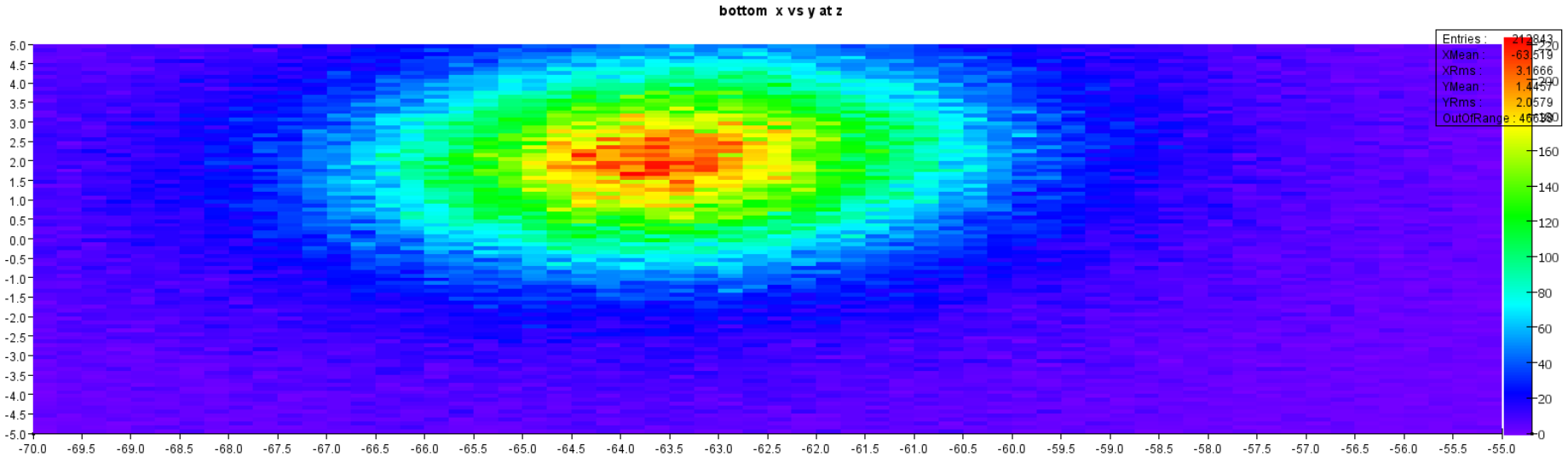
- Have skimmed off events in evio format for run 8100
- Require hits in all 12 modules
- Reconstruct these from scratch using the latest git master snapshot and a dedicated field-off Driver for pattern recognition and fitting.
- HPS-PhysicsRun2016-Nominal-v5-0-fieldmap

Straight-Track Projection

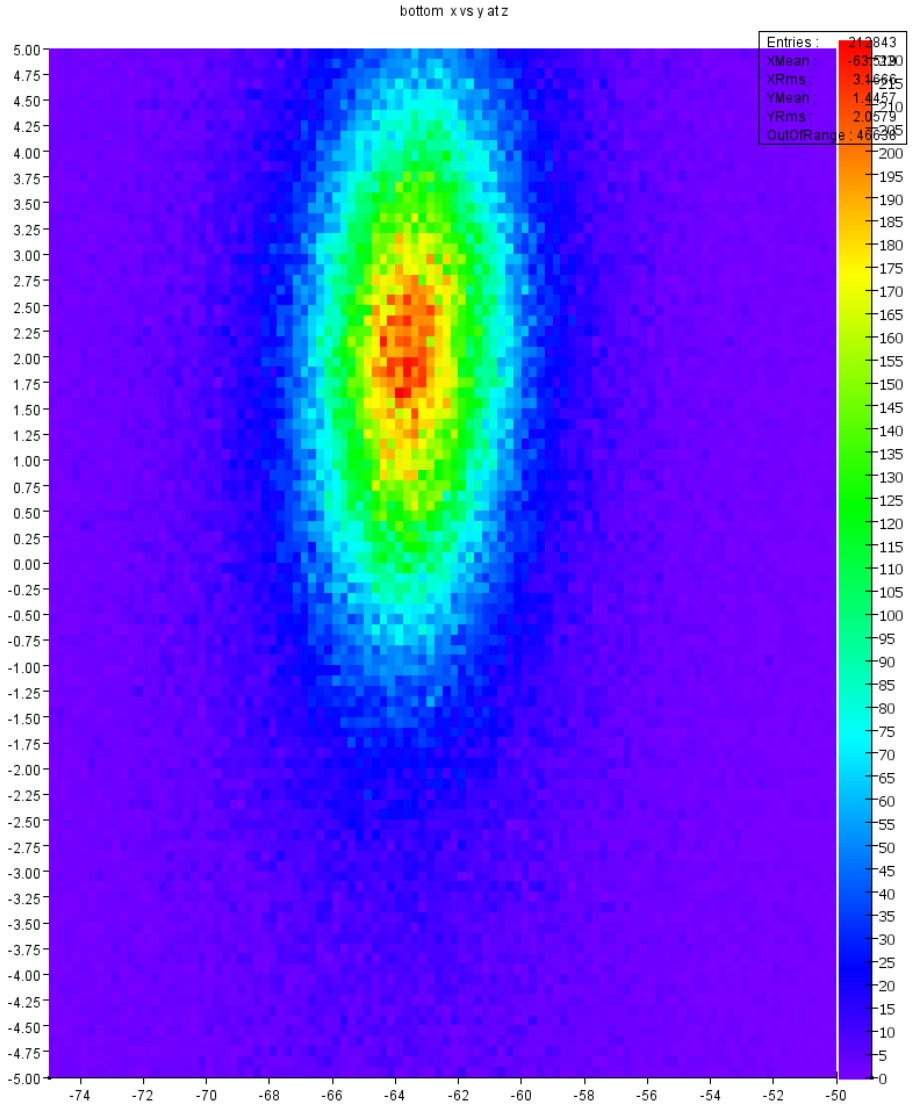


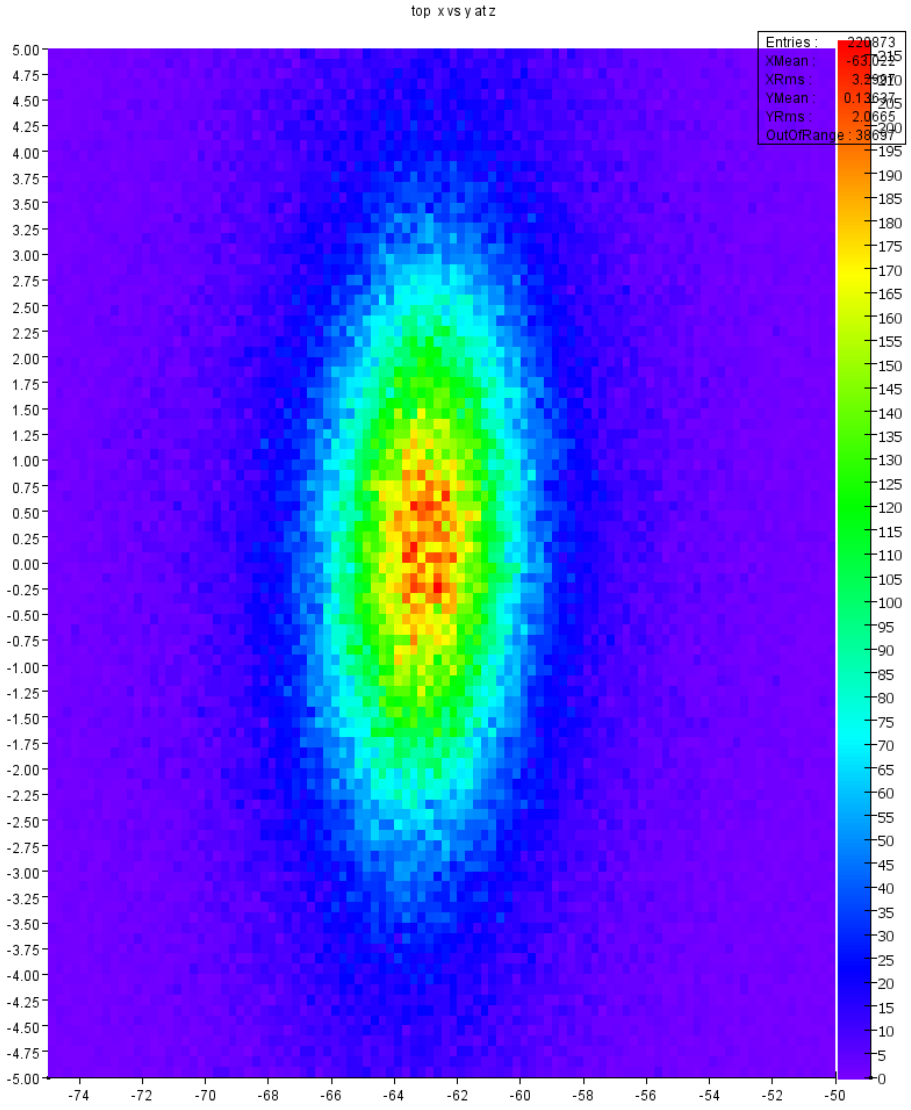
Track x-y @ z=-2337





Track x-y @ z=-2337



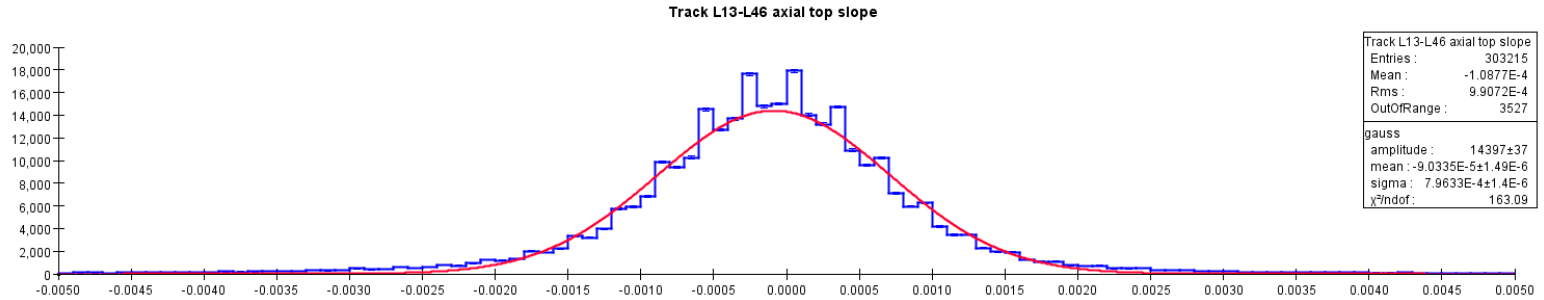


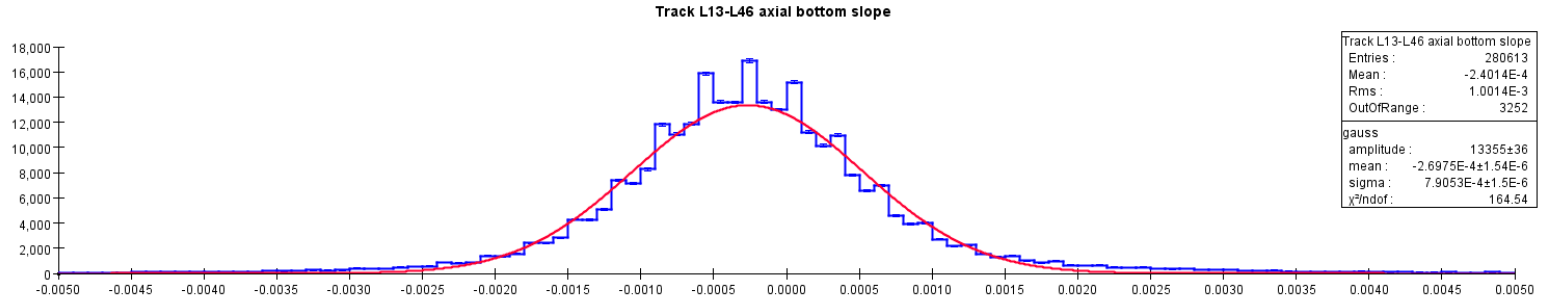
Track Projection

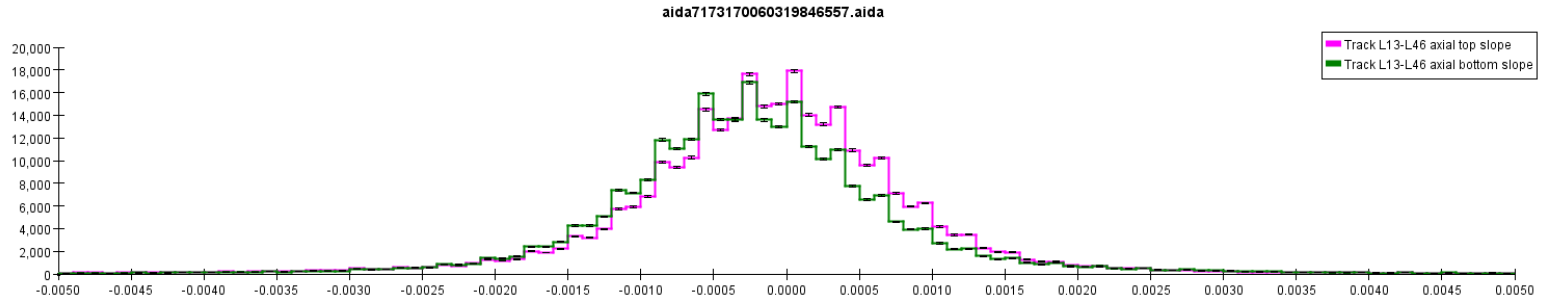
- Differences in track projection back to nominal z of HARP wire.
  - X expected at -68, seen at -63
  - Y expected at 0, bottom tracks reconstruct 2mm high
- Working on straight-track vertexing code in order to reconstruct 3D vertex spot for tracks in upper and lower halves.

SVT Opening Angle

- Fit hits in Layers 1-3 and 4-6, compare dΘ



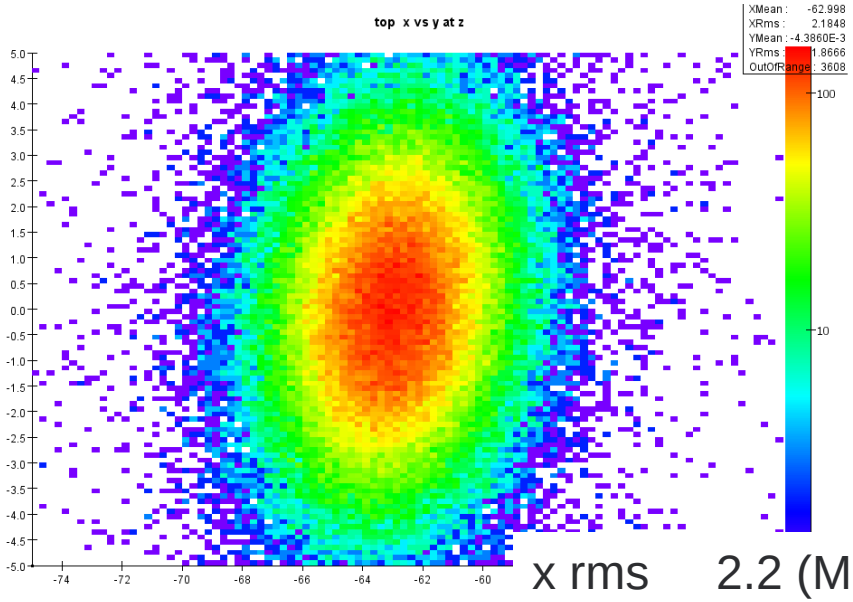


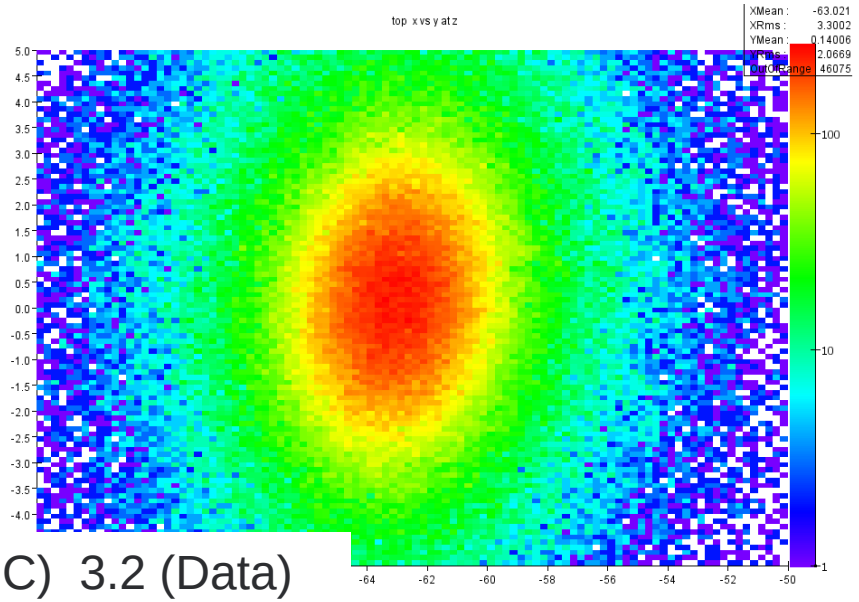


SVT Opening Angle

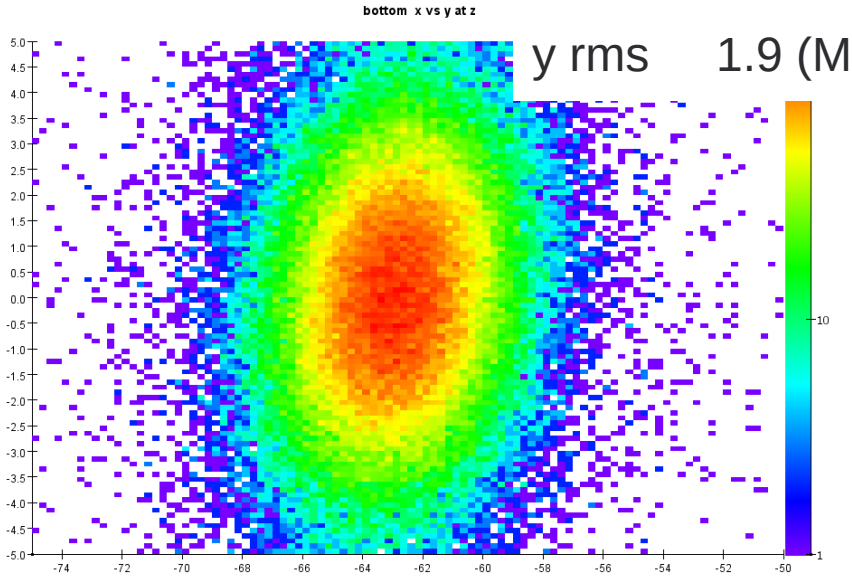
- Create field-off detector for MC studies
  - HPS-PhysicsRun2016-Nominal-v5-0-nofield
- Generate 2.3GeV electrons at (-64, 0., -2338)
- Will be using to study alignment techniques, but for now just using to compare resolutions

MC-Data Comparison

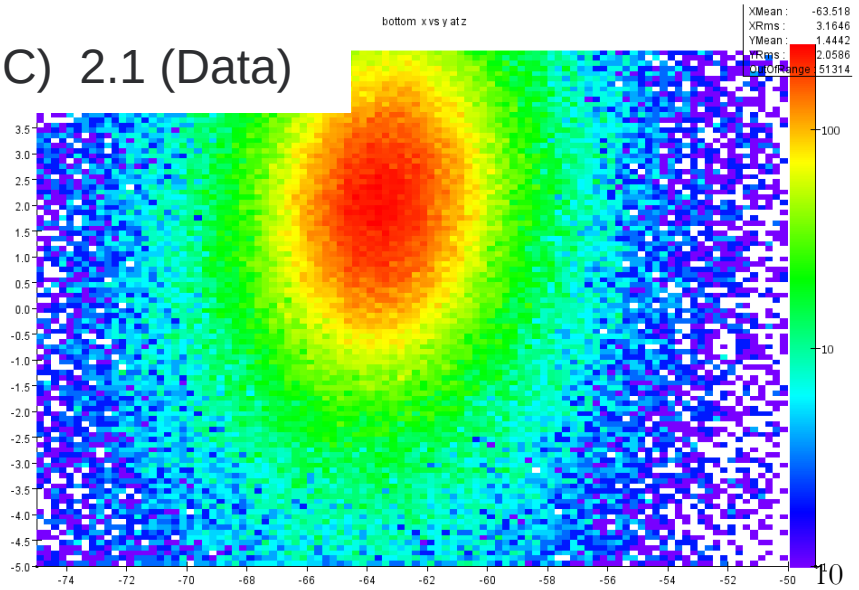




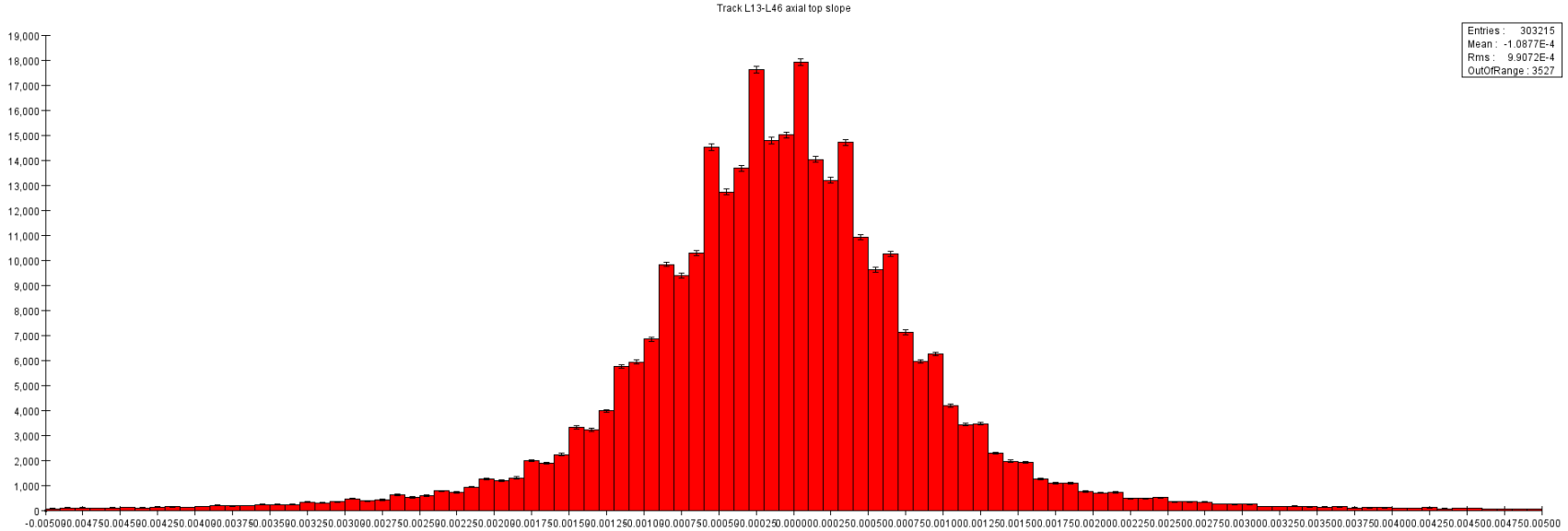
x rms 2.2 (MC) 3.2 (Data)

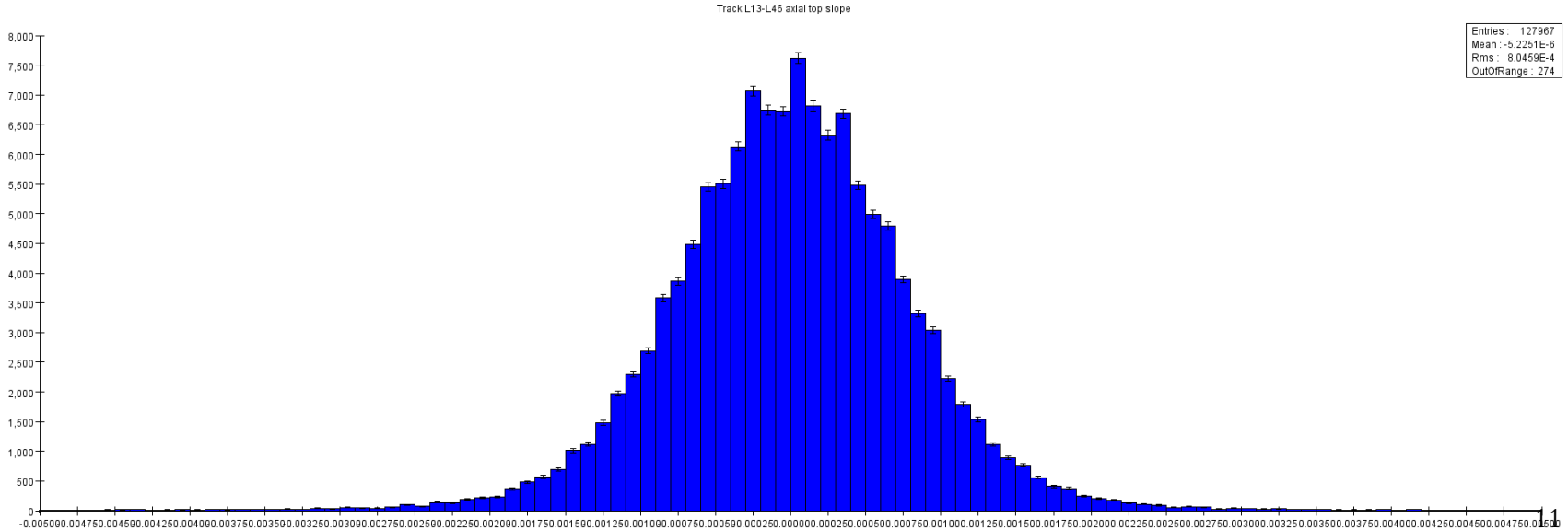


y rms 1.9 (MC) 2.1 (Data)

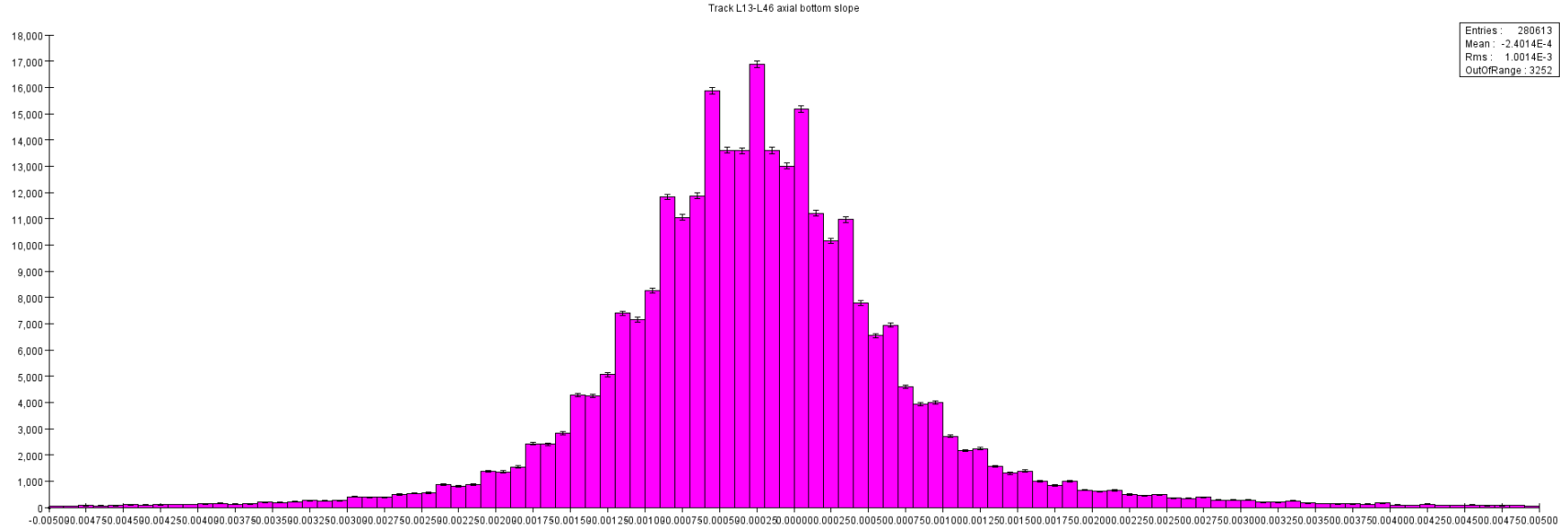


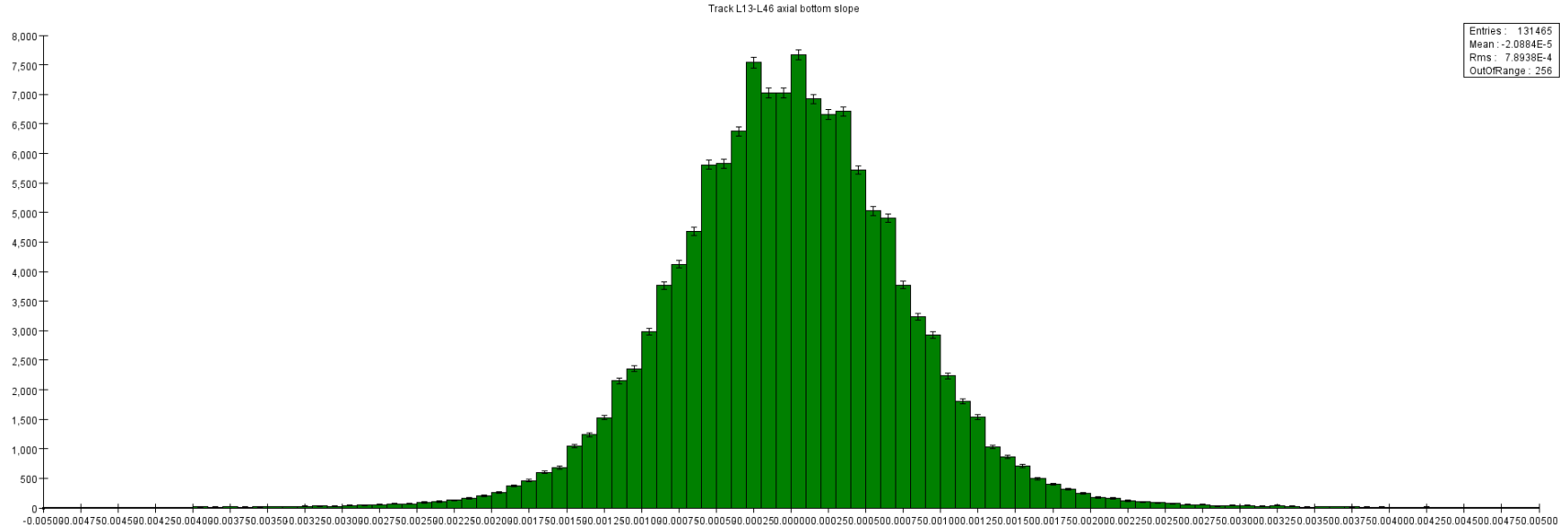
L13-L46 top dΘ MC-Data





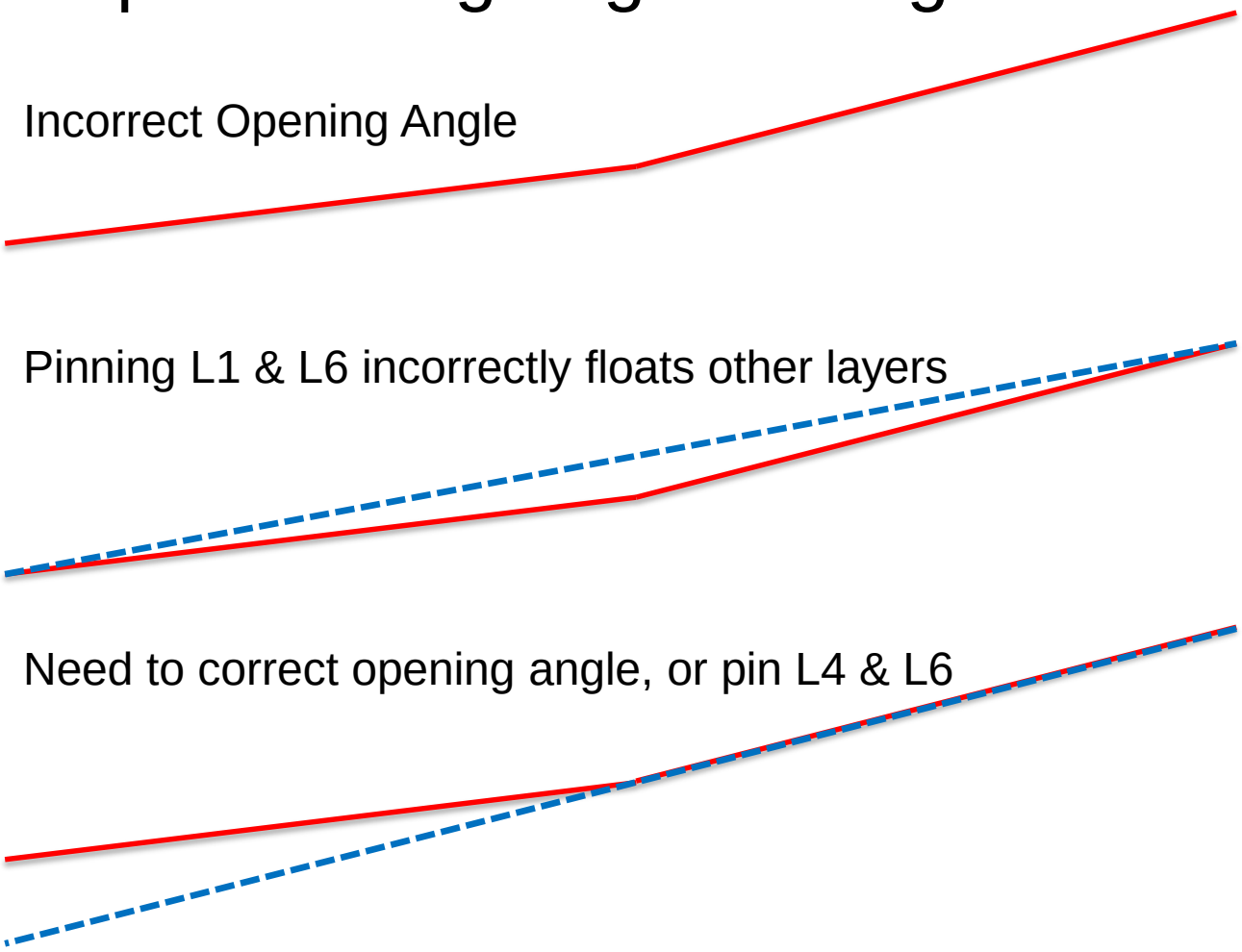
L13-L46 bottom dΘ MC-Data





SVT Opening Angle

- Currently working to correct for opening angle before proceeding to global alignment.



Status

- Most of the tools and data are now in place. Will proceed deliberately to try to understand and correct the field-off straight tracks.
  - Explicit vertexing code not yet written, but *straight*forward
- Working on documentation.
- Working on run requirements to make sure we have sufficient quantity and types of calibration/alignment data early on.