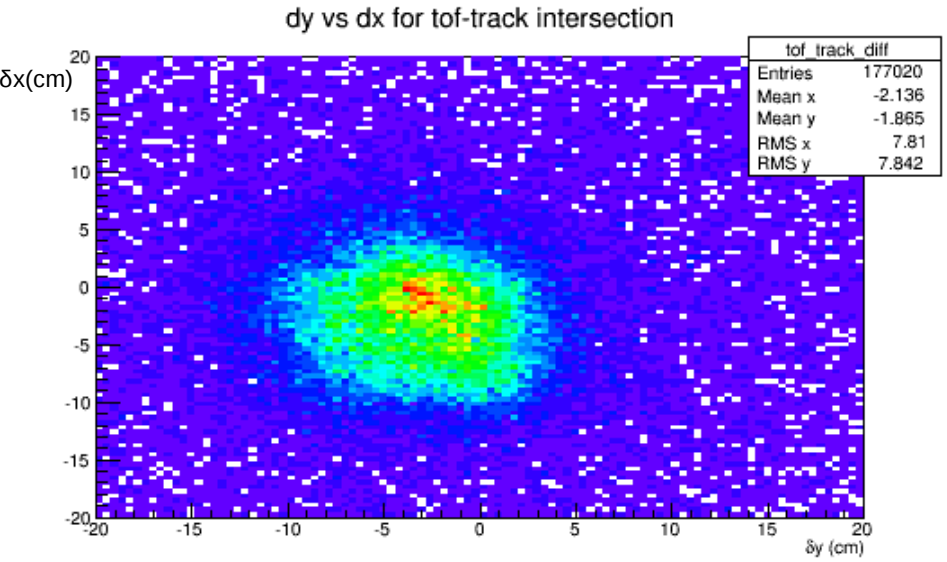
Tracking Update

Simon Taylor (JLab)

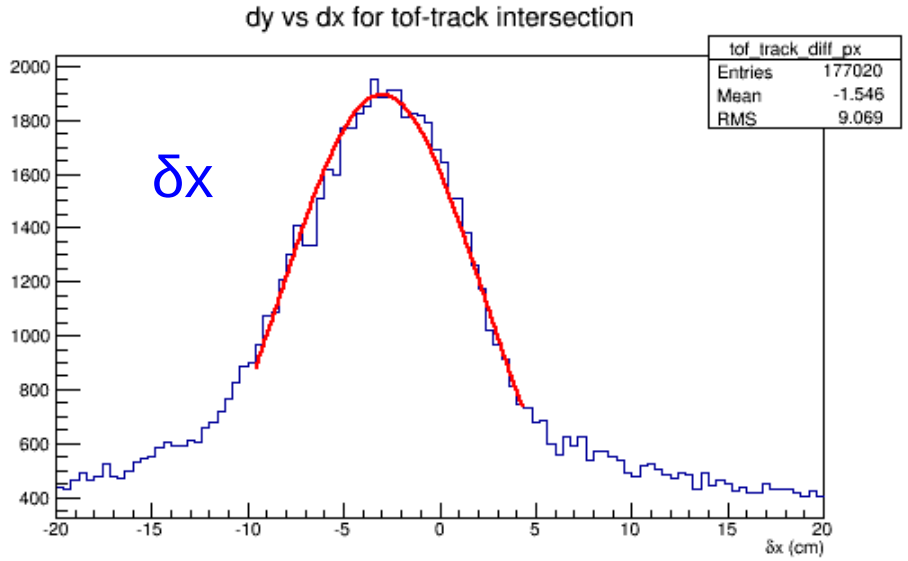
- Matching tracks to other detectors
- Vertex distributions
- Track efficiency study

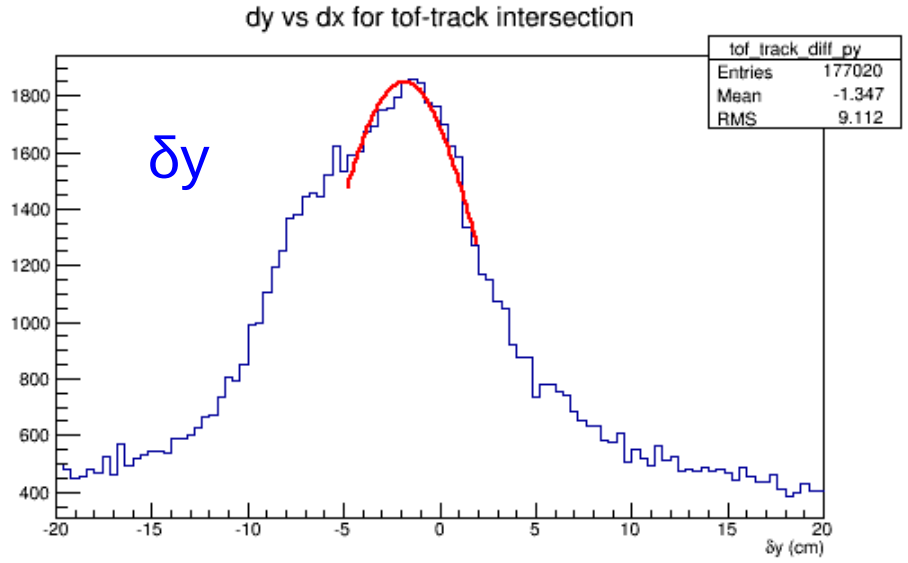
Track matching to TOF, then

This was the quality of track matching to TOF in the fall (from run 1505):



using DTOFPoint

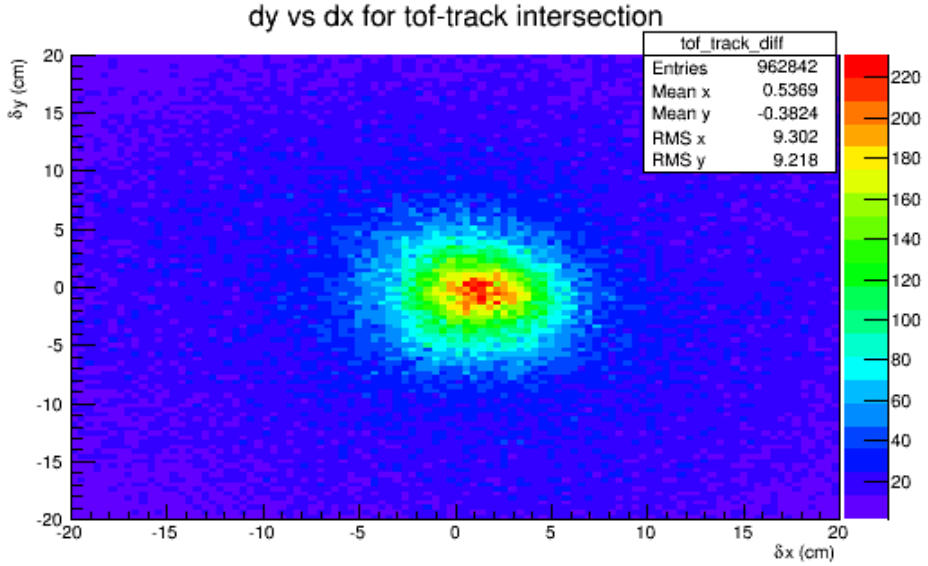




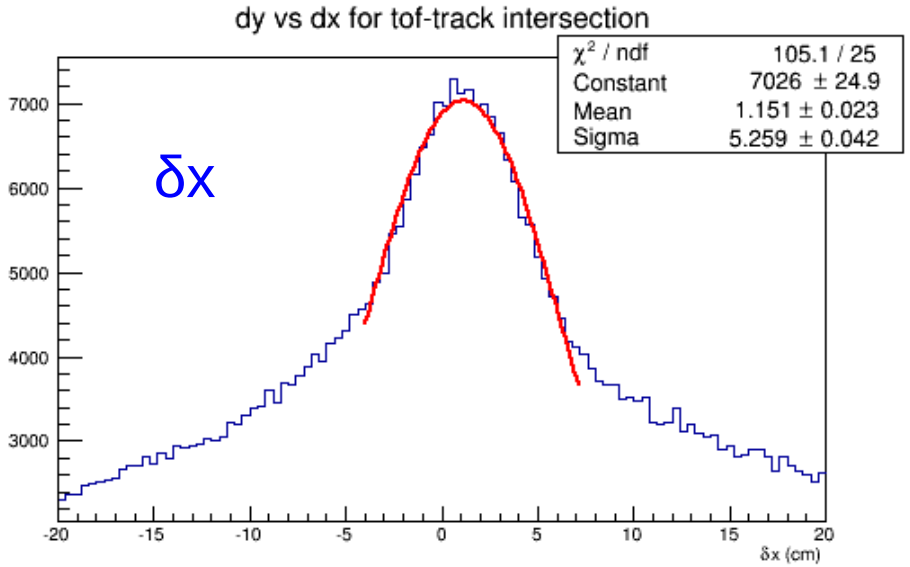
Track matching to TOF, now

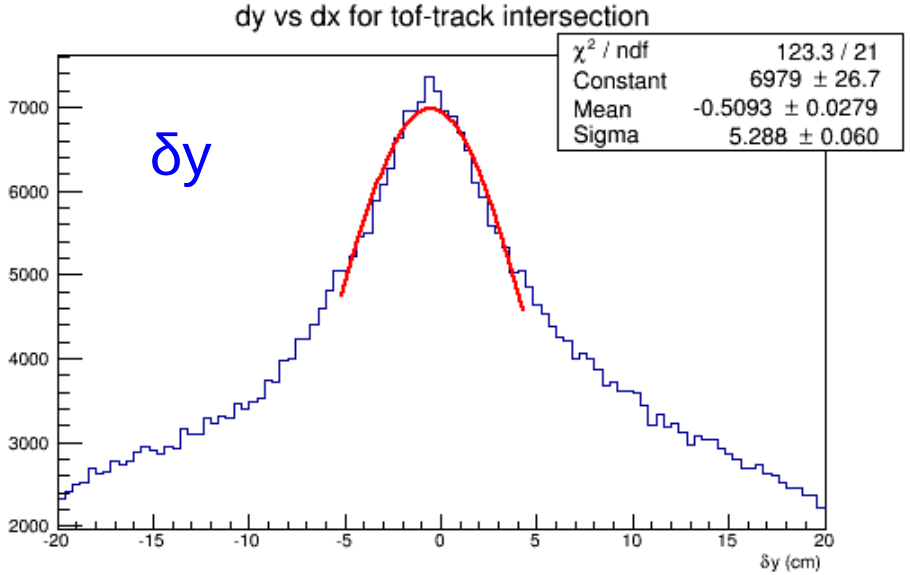
Beni provided a counter-to-counter calibration for double-ended TOF paddles.

For run 3079:



using DTOFPoint

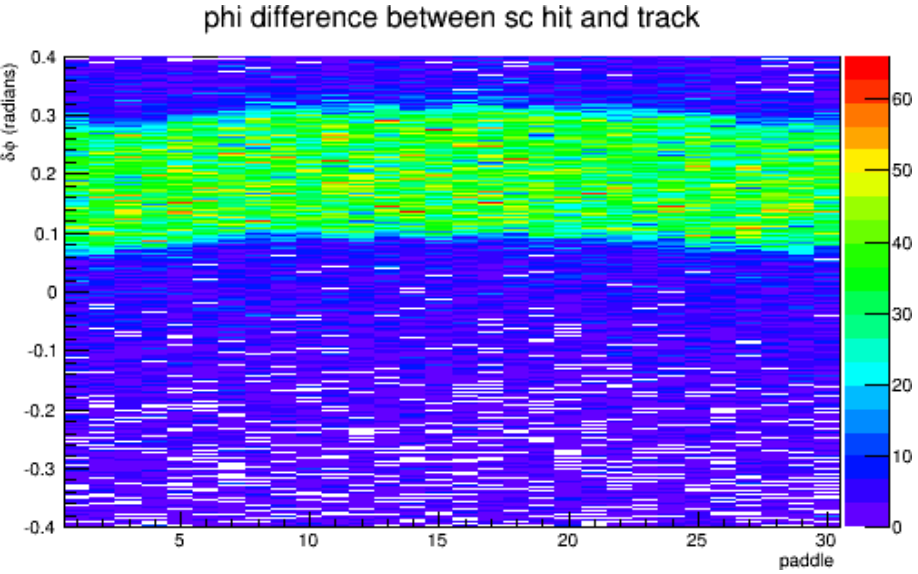




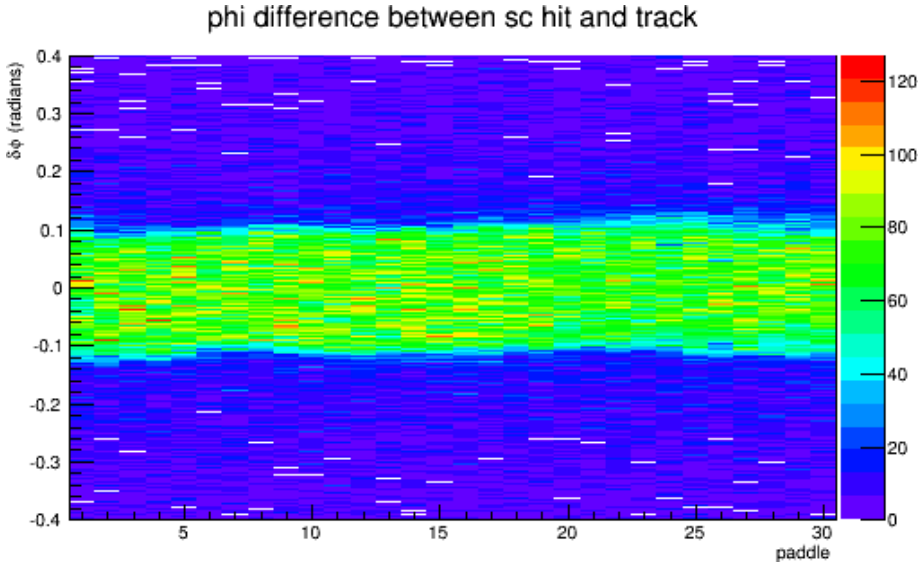
Matching tracks to Start Counter

- Survey before Spring run
  - Large rotation of 11.25° in φ, small rotations about x and y axes

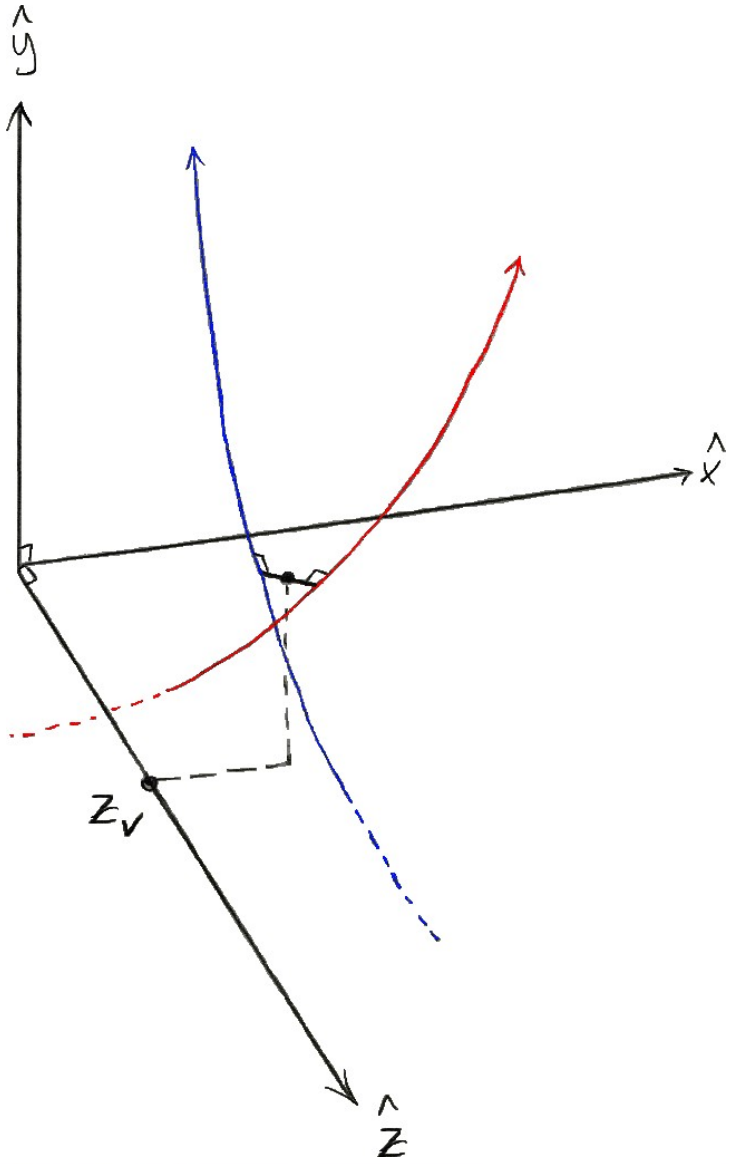
Before applying survey numbers:



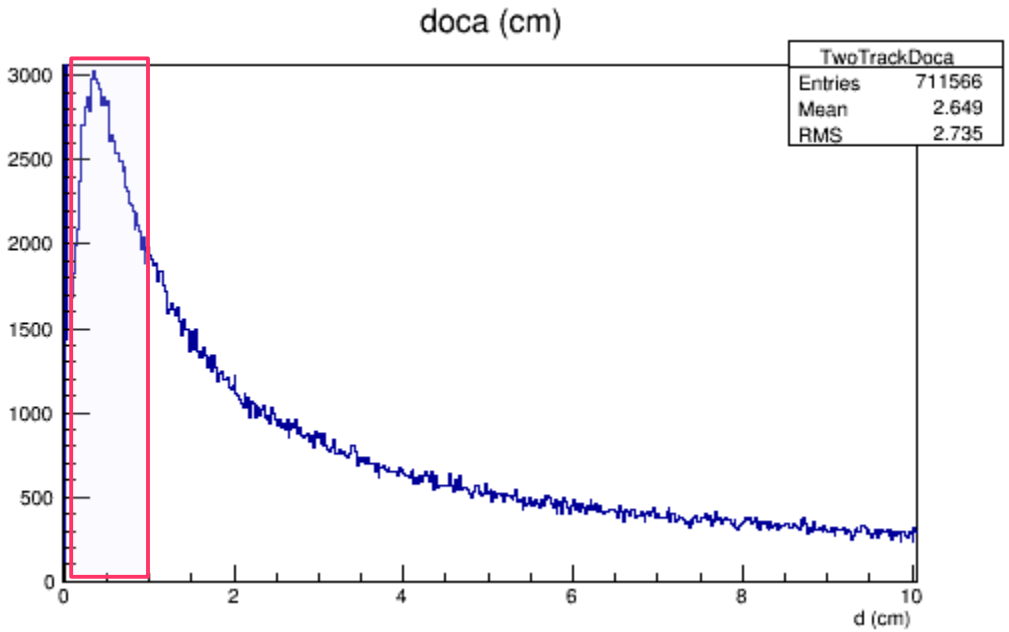
After applying survey numbers:



Vertex reconstruction



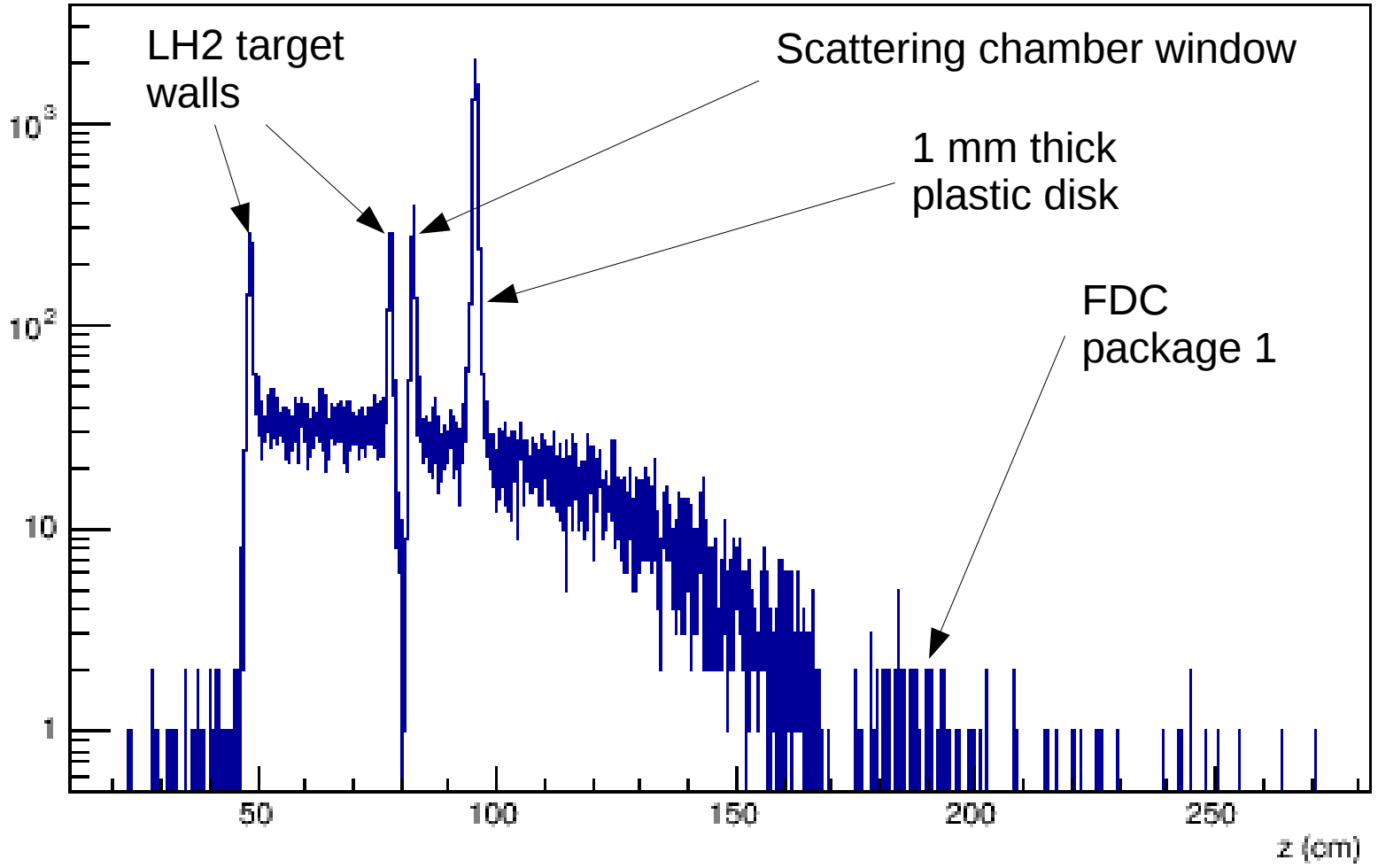
- Find position of closest approach between two tracks
  - Line segment between points on each track ⊥ to both tracks
  - Position = midpoint of line segment



Beam line features

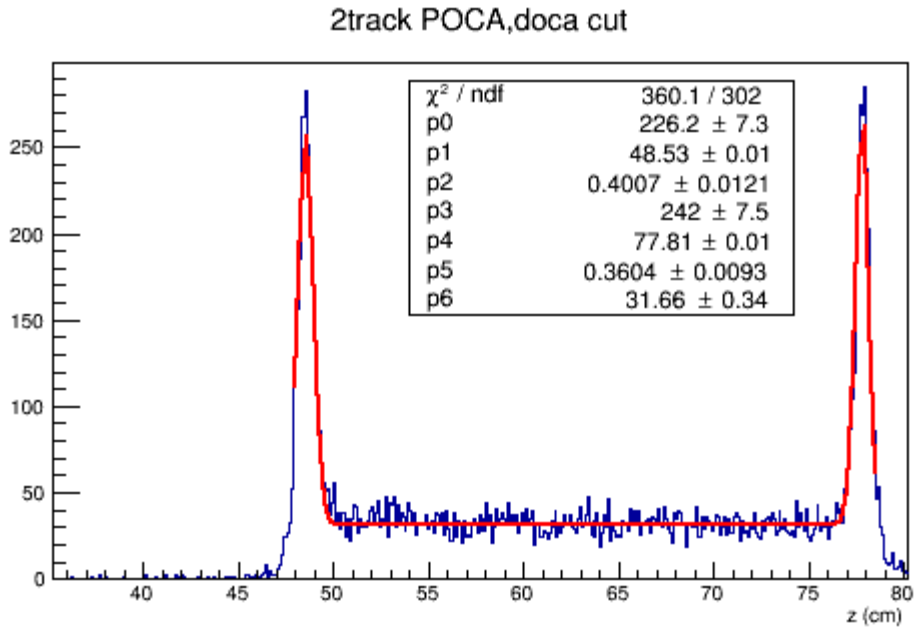
Empty target runs 3082, 3084

r < 0.2 cm



Empty target reconstruction

- Distance between entrance and exit windows of target = 29.9 cm (C. Keith)
  - Window thickness = 0.0127 cm, material=Kapton
- "Empty" target contains H_2 gas at 33 psia and 30 K
- Positions of chambers in XML set according to survey results

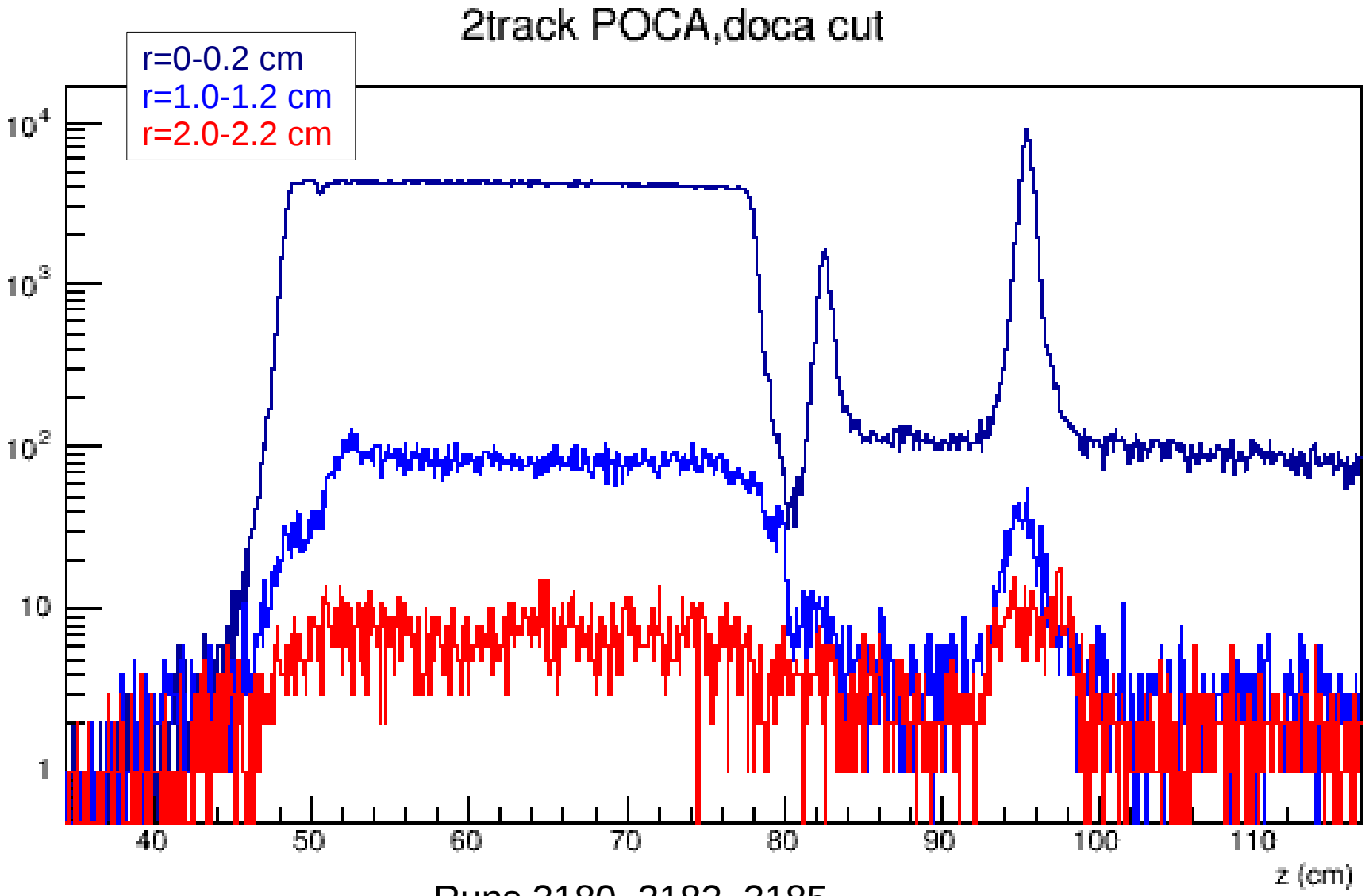


Require doca < 1 cm, r<2 mm

Measured distance between windows = 29.28±0.01 cm

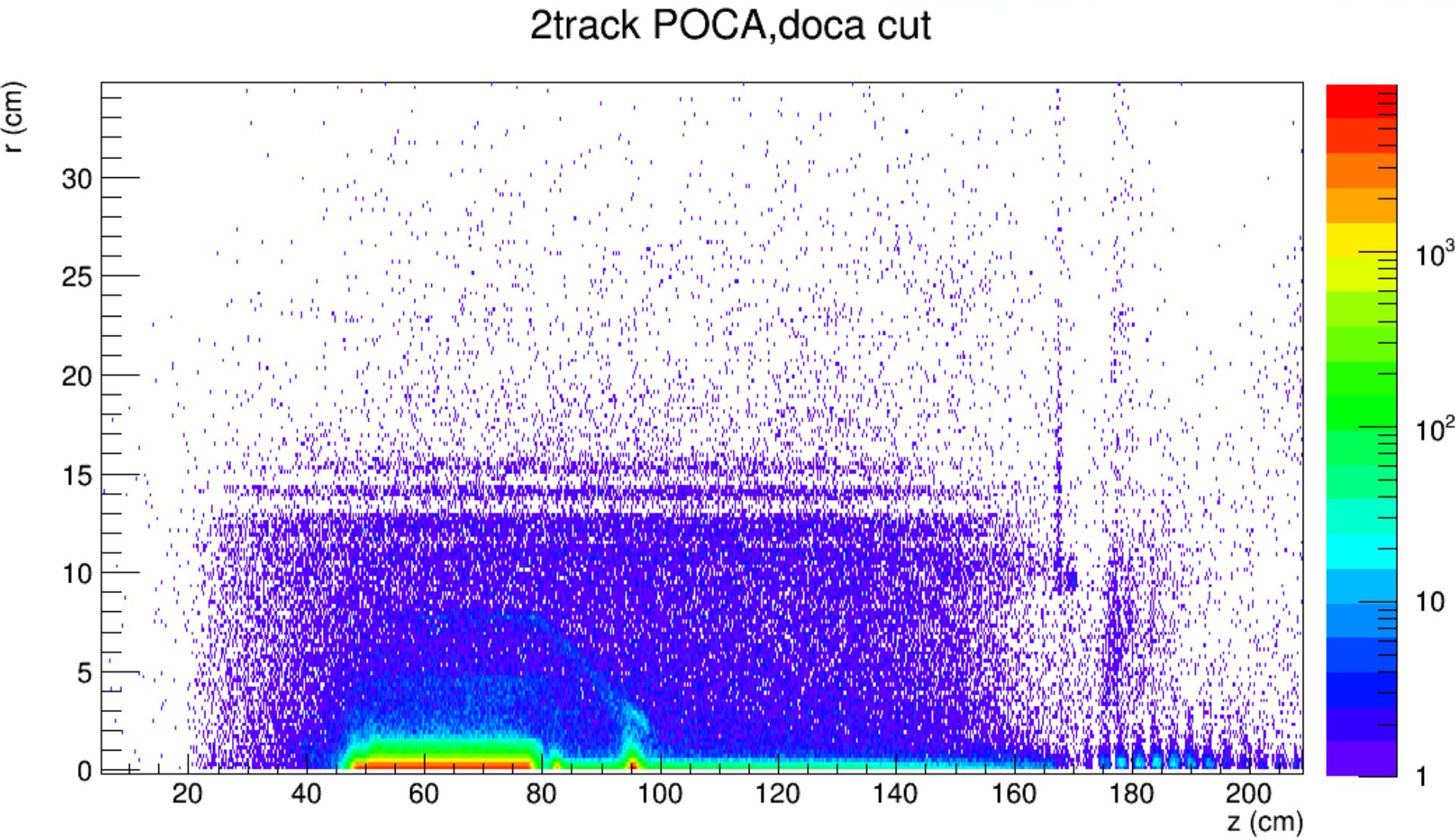
Target center:
- Survey: z=63.816 cm
- Measured: z=63.17 cm

Full target vertex distribution

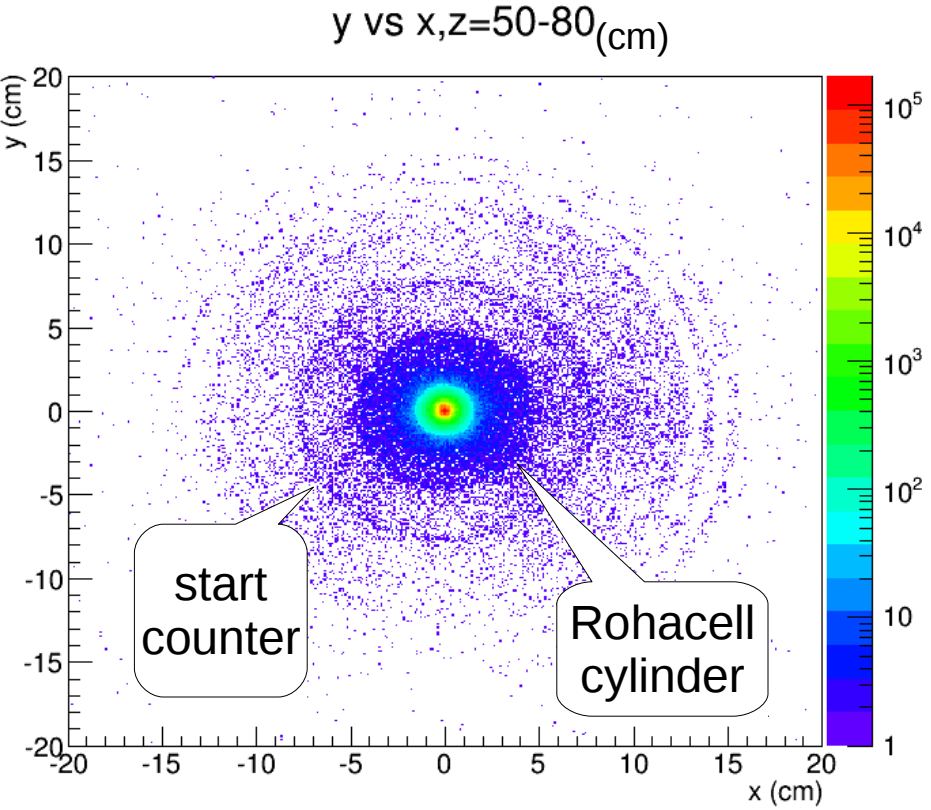


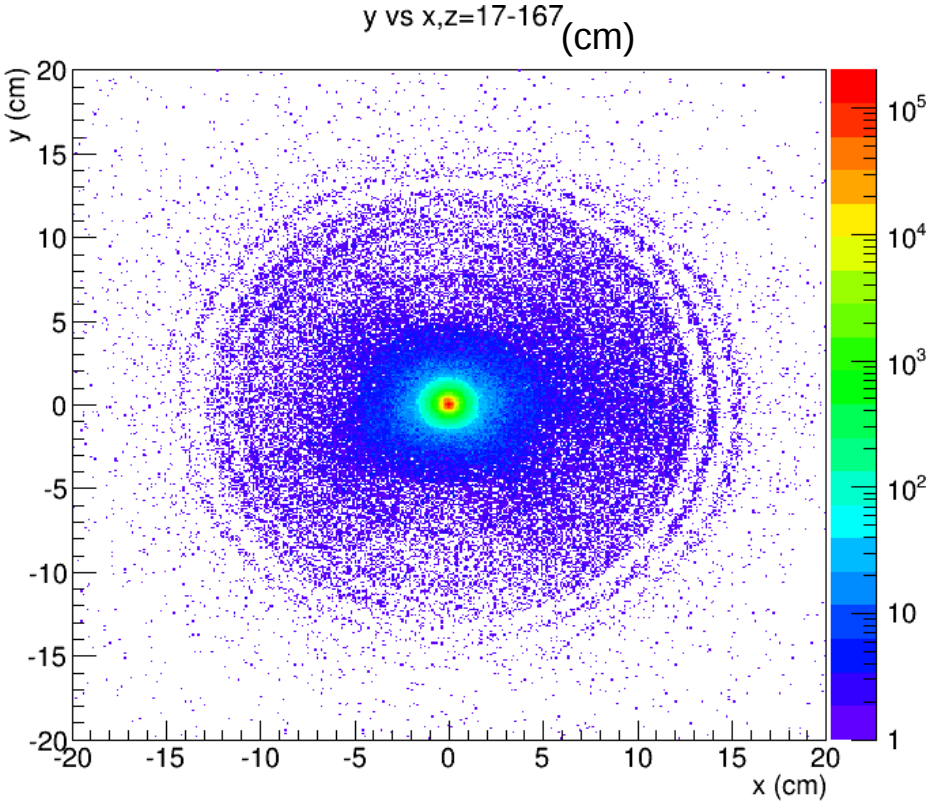
Runs 3180, 3182, 3185

Vertex positions: r vs. z



Vertex positions, y vs. x



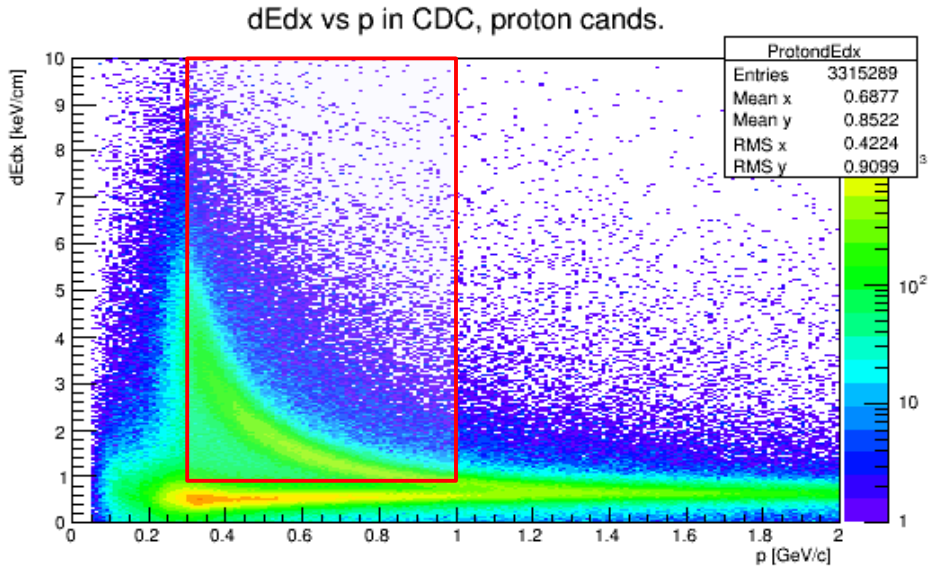


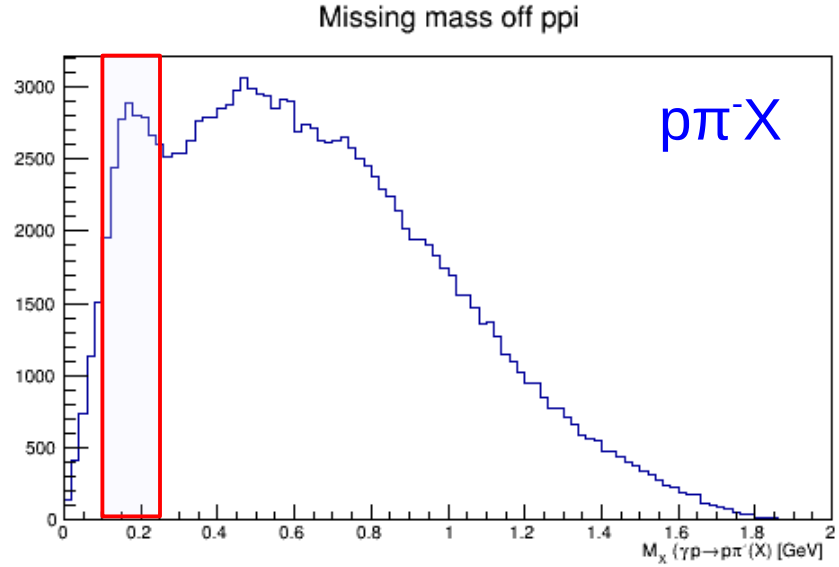
Innermost axial CDC layers can be imaged!

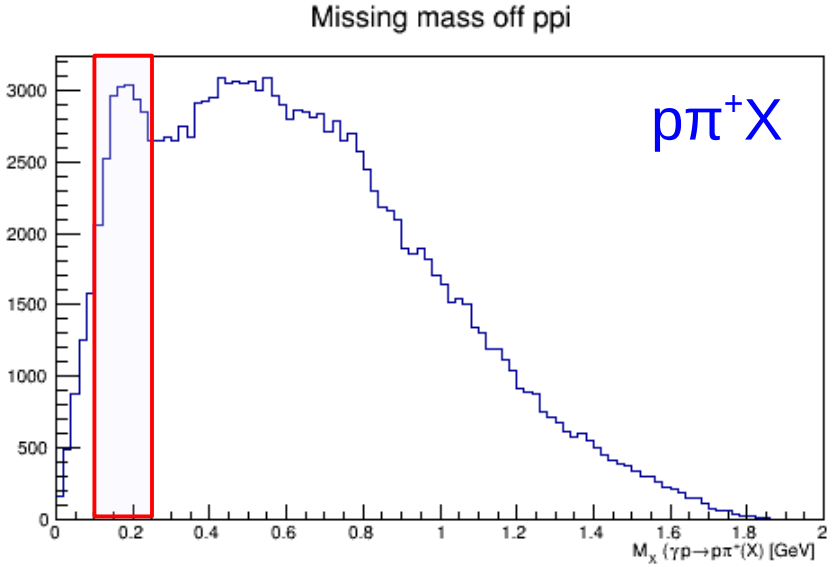
Preliminary efficiency study

- Strategy:
  - Start with events with at least 2 tracks
  - Identify proton in CDC using dE/dx
  - Compute missing mass off pπ pair
  - Cut around pion peak in missing mass
  - For $p\pi^+$ pairs, look for π^-
  - For $p\pi^-$ pairs, look for π^+

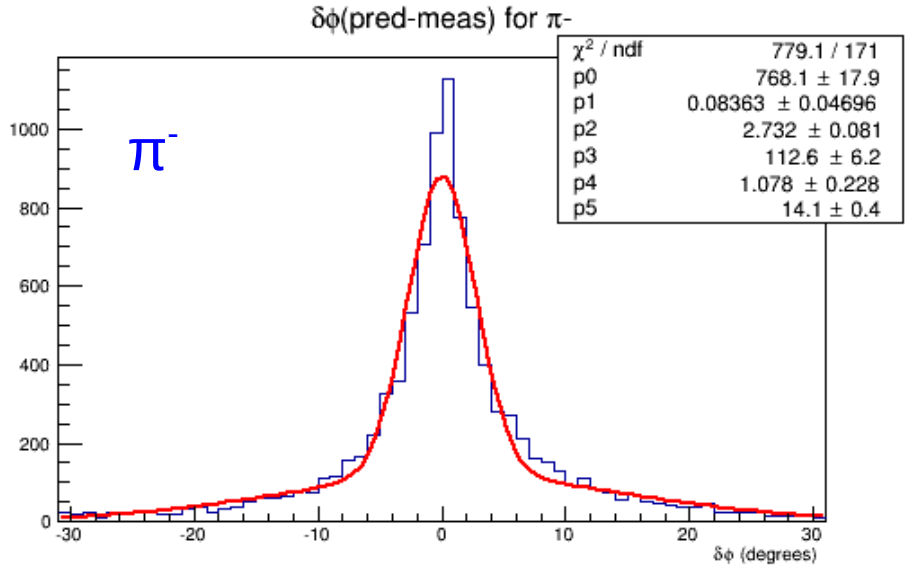
All tracks: CL>0.001

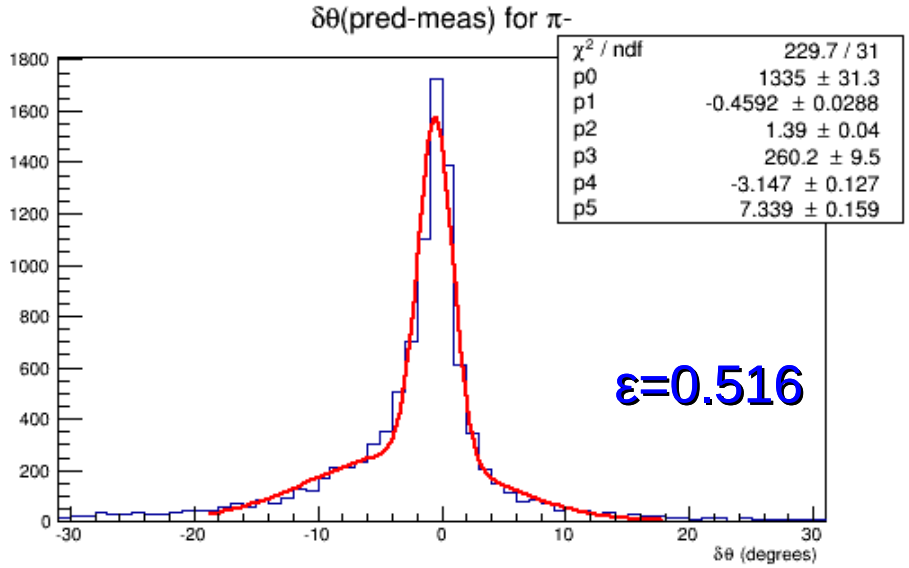


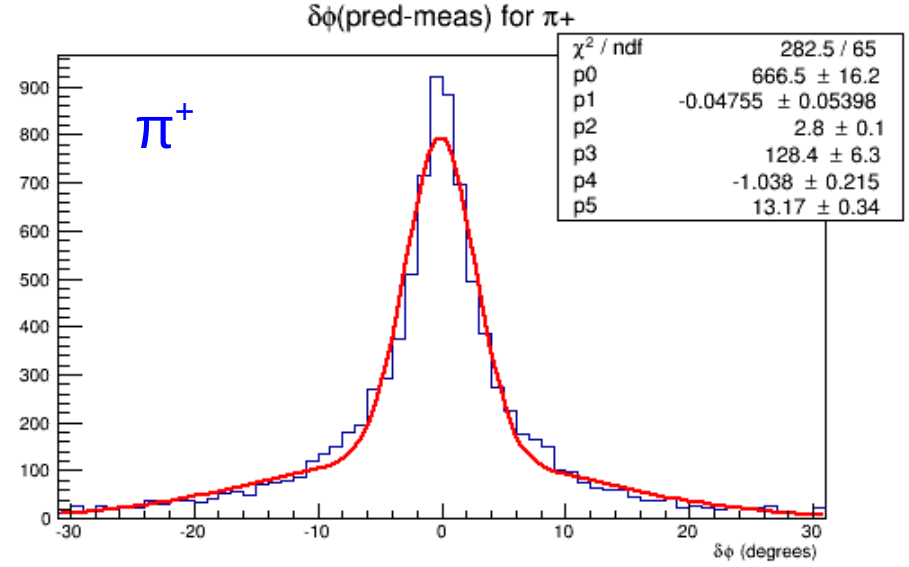


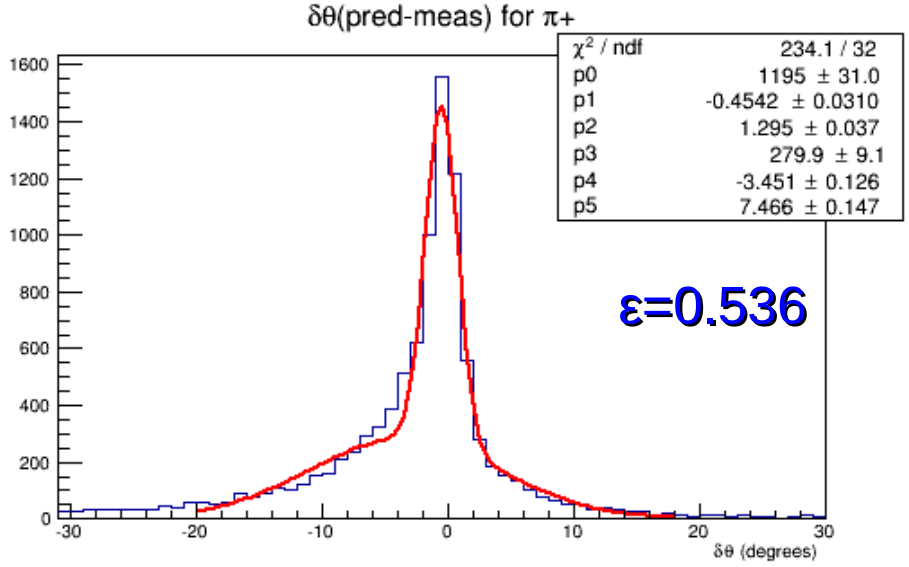


Efficiency study, continued









Summary

- Track matching to TOF improved due to improved TOF counter-to-counter timing
- Track matching to Start Counter confirms -11.25° rotation about z-axis
- Target walls and other beam-line features reconstructed, shifts in z and dimensions of target cell need to be understood...
- Preliminary look at tracking efficiency – needs more work...