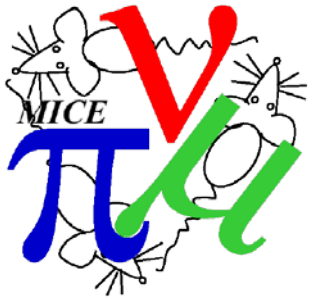

Field On Scattering

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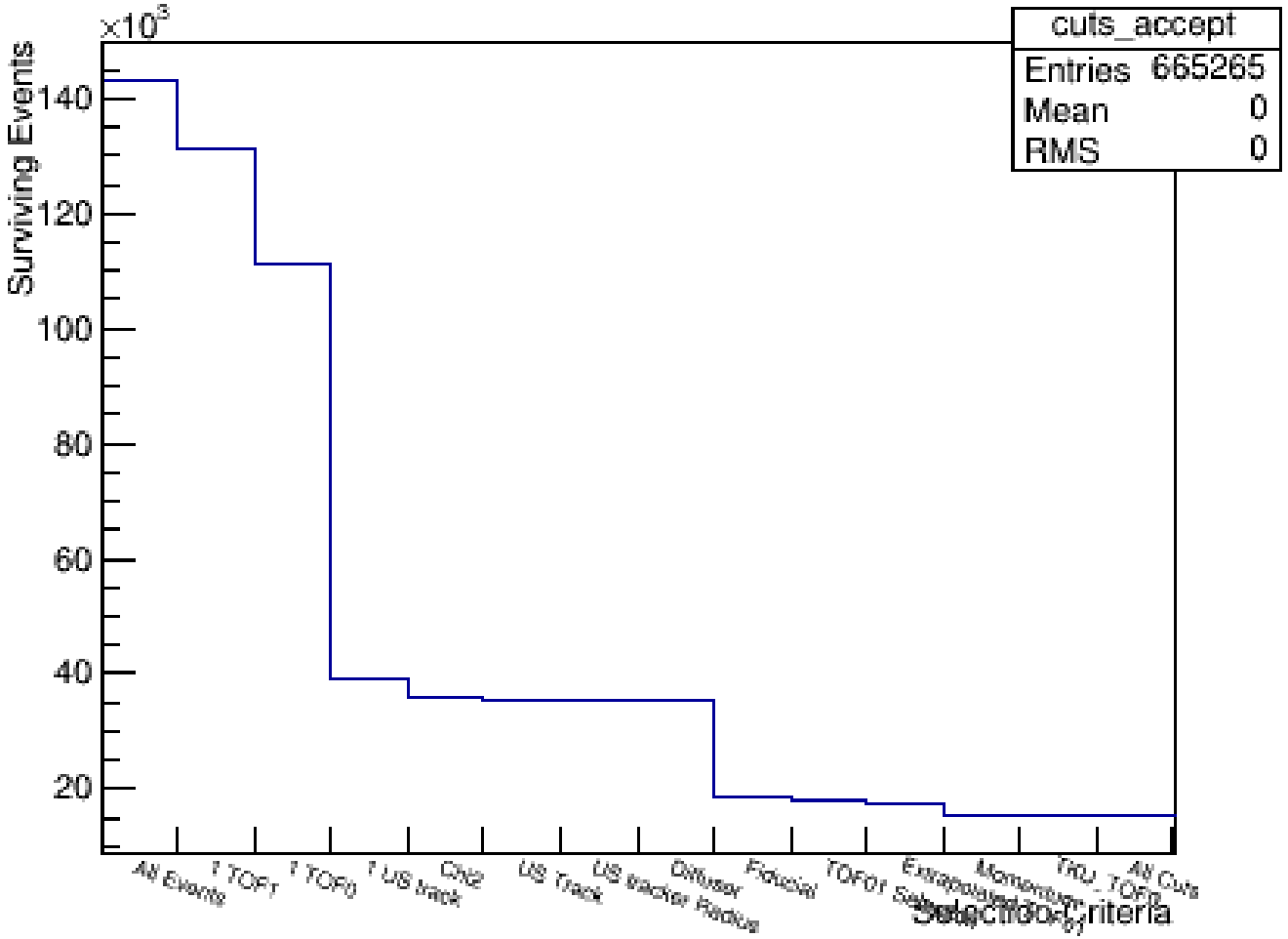
Code Status

- Analysis carried out using Maus 3.1.0
- Field on analysis code based on Field off code developed by R Bayes and J Nuggent.
- Globals implemented in data selection
- Additional cuts added to improve quality of data being analysed
- Access to MICE grid obtained
- Monte Carlo simulations of 200MeV/c with and without LiH absorber completed

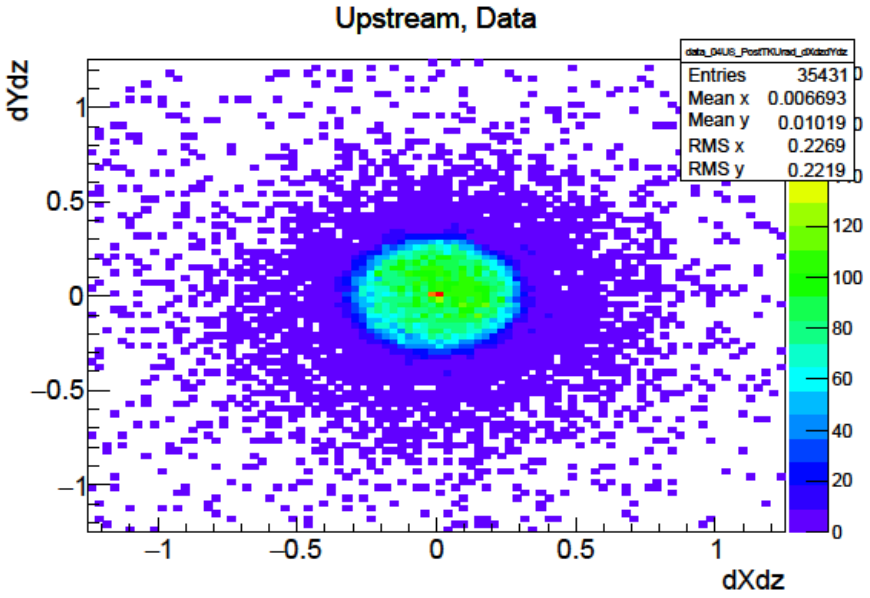
Data Selection

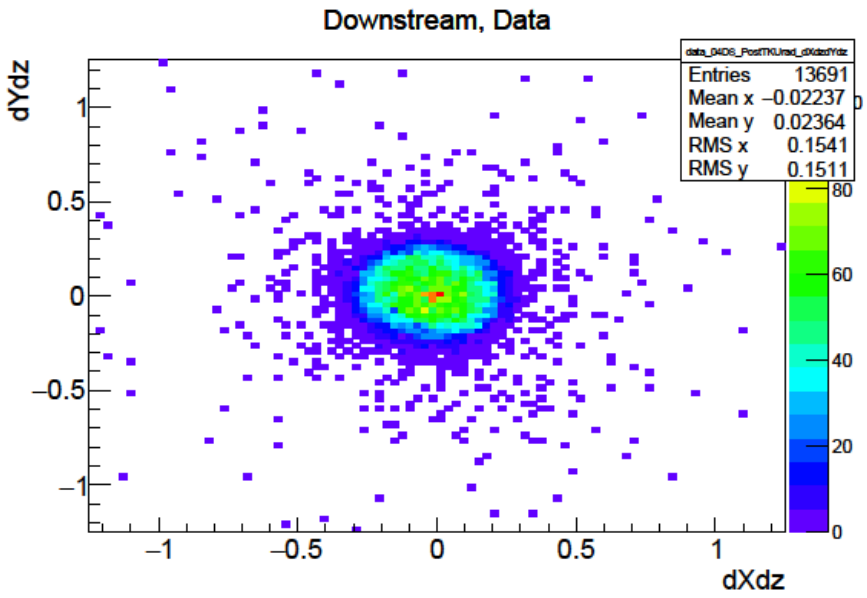
- Require exactly 1 TOF1 space point
- Require exactly 1 TOF0 space point
- Require exactly 1 track in Upstream Tracker
- Upstream tracker Chi2/dof<5
- Upstream tracker max radius < 150mm
- Diffuser max radius < 100mm
- TOF01 consistent with Muon Peak
- Extrapolated TOF01 consistent with muon hypothesis
- Successfully extrude track from Upstream tracker back to TOF0
- Fiducial Cut - Require the track from the upstream tracker, when projected downstream to be within a specific radius at a point downstream
- Select narrow range of Muon momentum to allow study of scattering as a function of momentum

Events surviving each cut

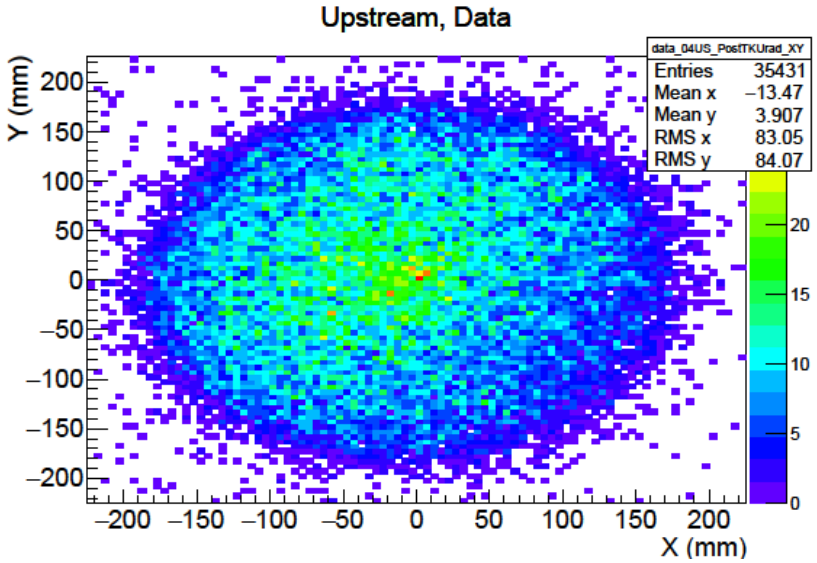


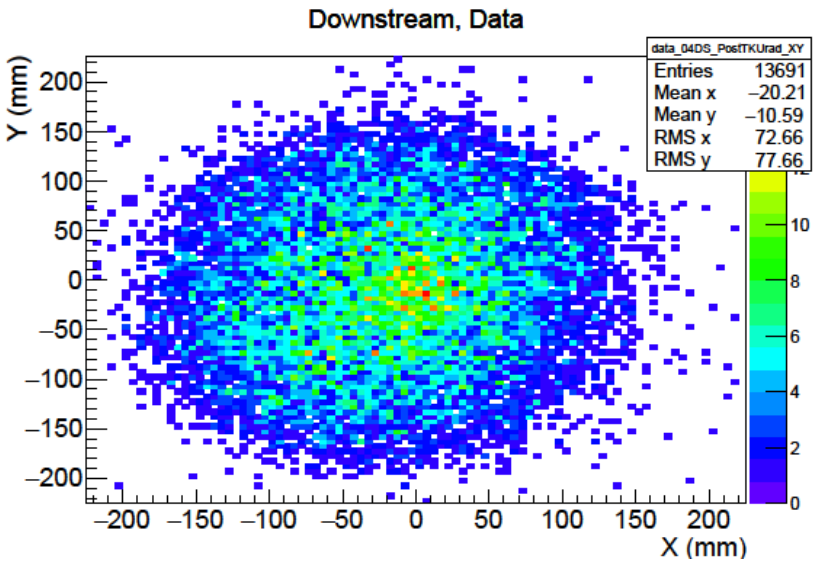
Angular 2D Histograms at centre of absorber



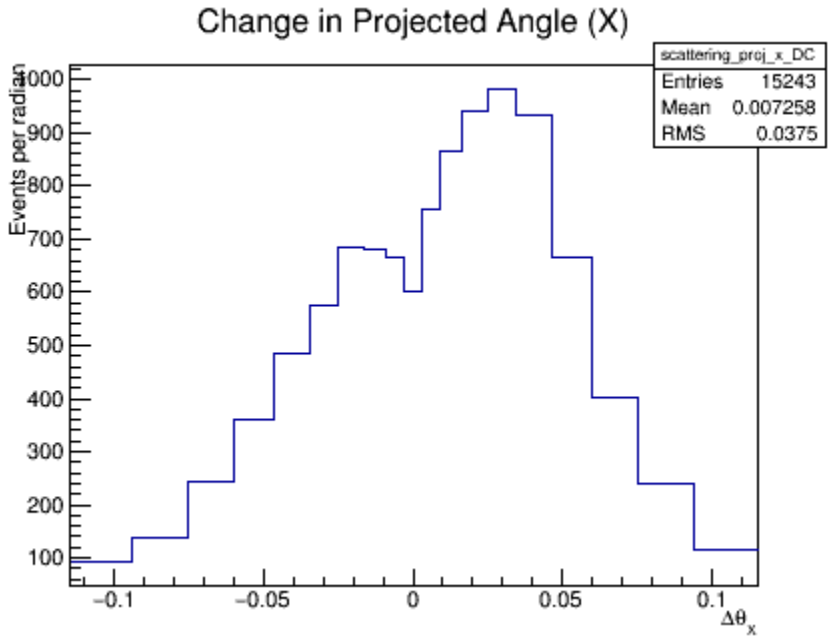


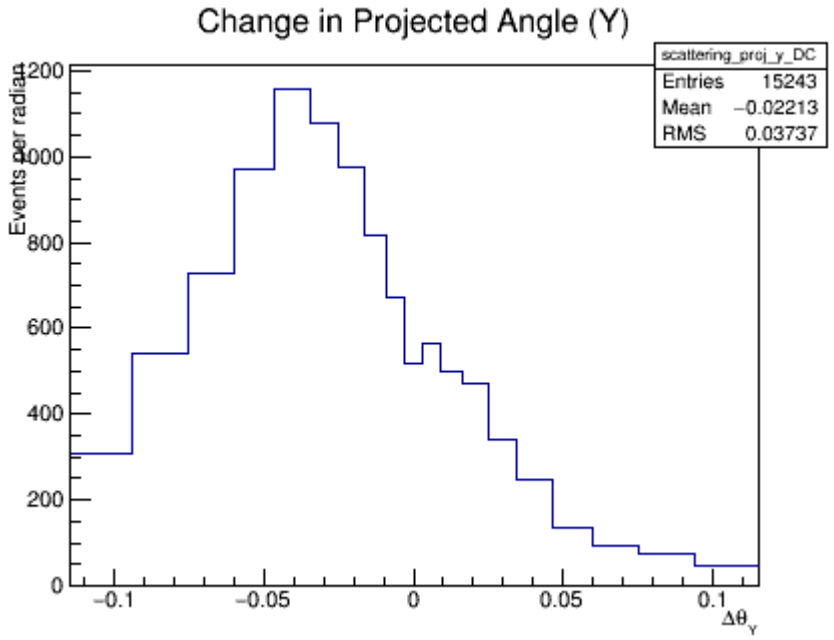
XY 2D Histograms at centre of absorber



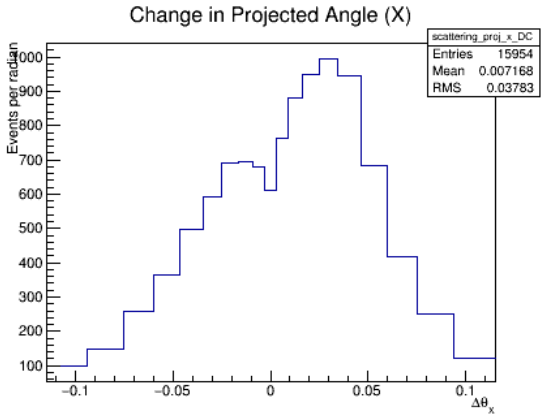


Asymmetry in scattering at absorber

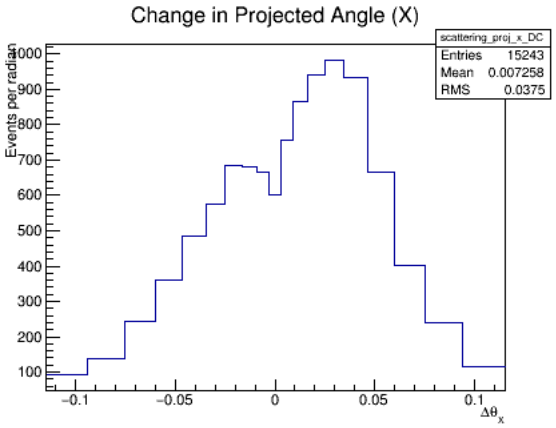




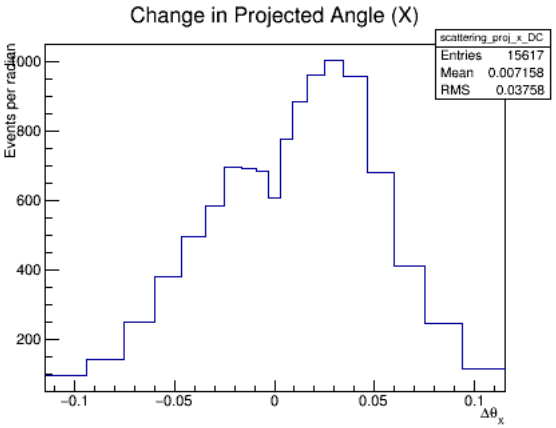
Scattering in X with different cuts



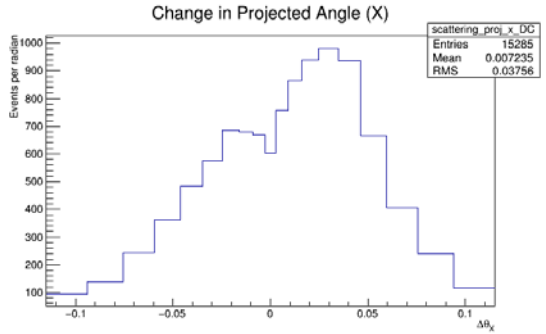
No Chi-squared/dof cut



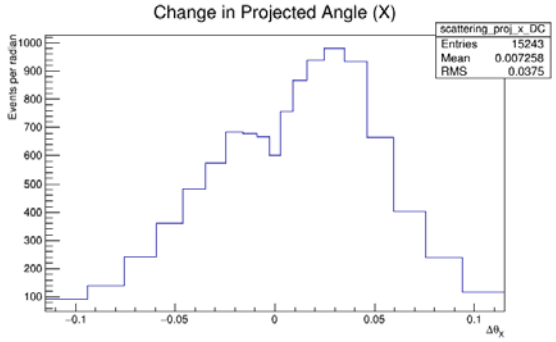
No Diffuser Radius cut



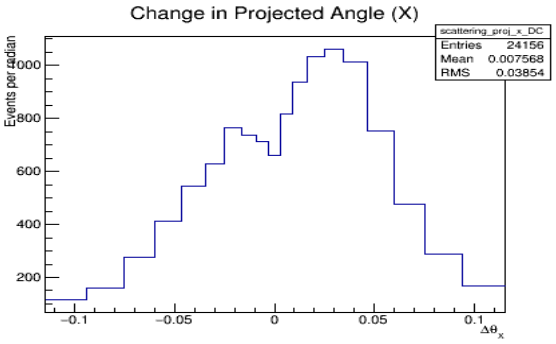
No TOF01 cut



No extrapolated TOF01 cut

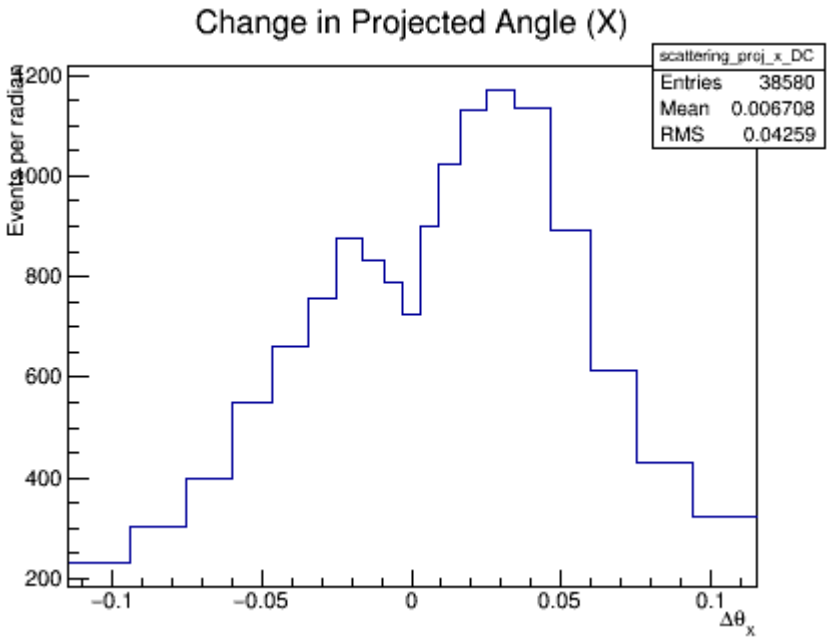


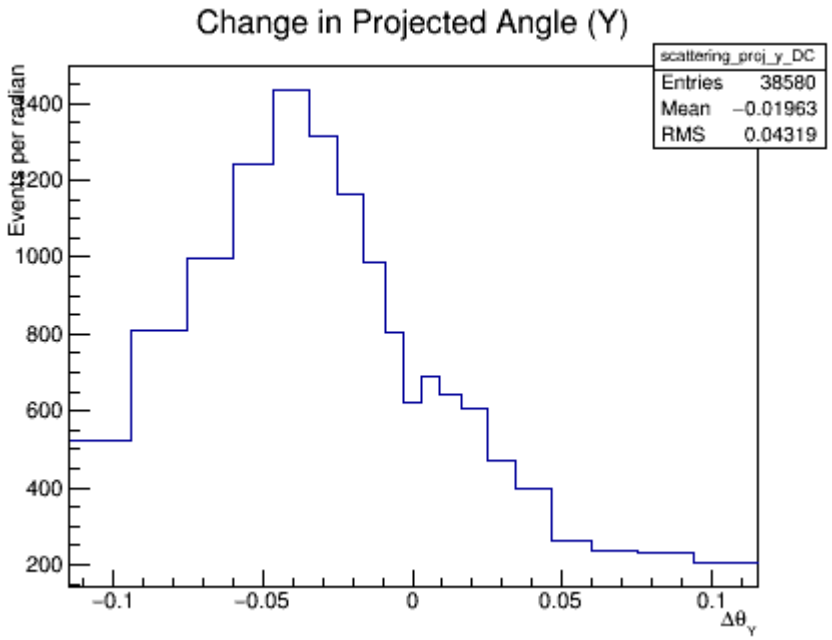
No extrude from TKU to TOF0 cut



No Fiducial cut

Scattering with minimum cuts



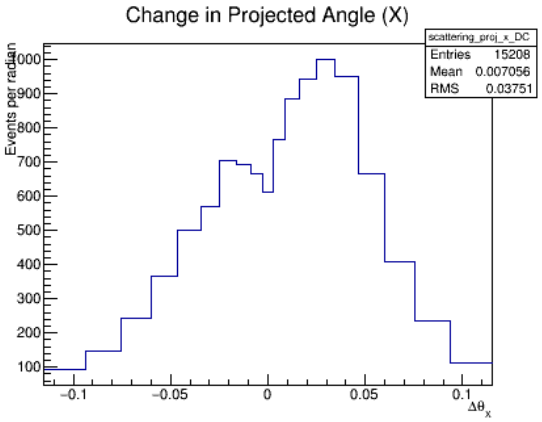


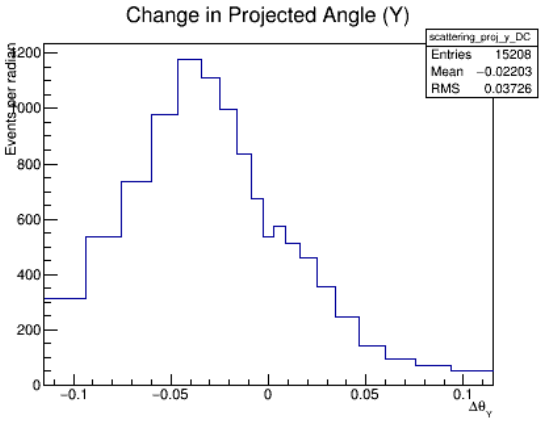
Cuts

- Require exactly 1 TOF1 space point
- Require exactly 1 TOF0 space point
- Require exactly 1 track in Upstream Tracker

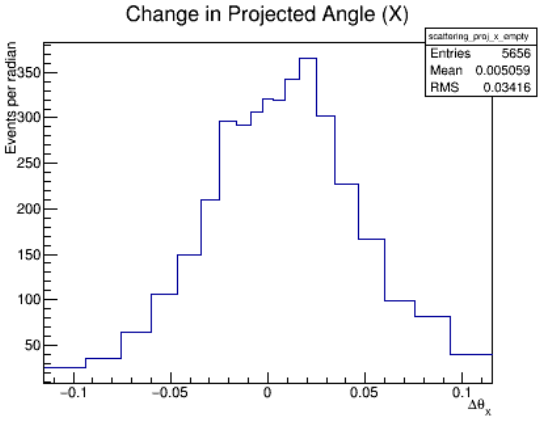
Change in projected angle for measured data

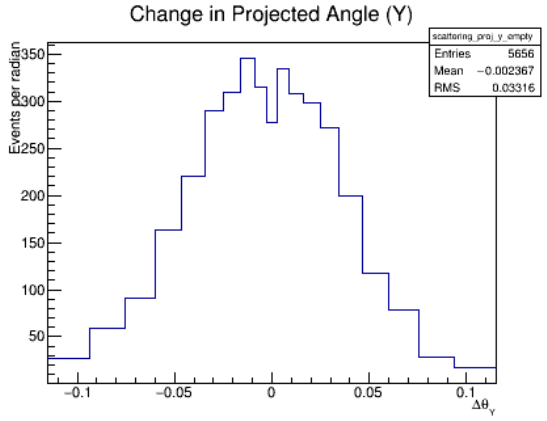
With LiH absorber





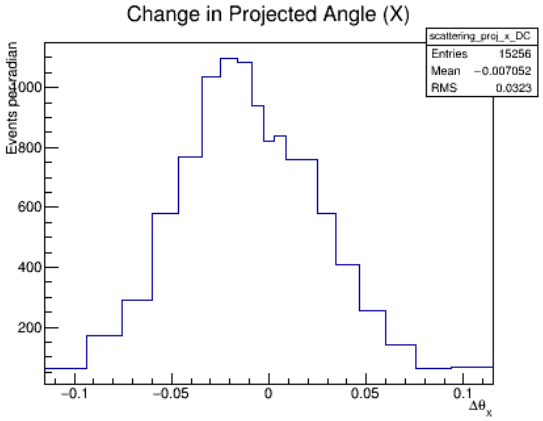
No Absorber

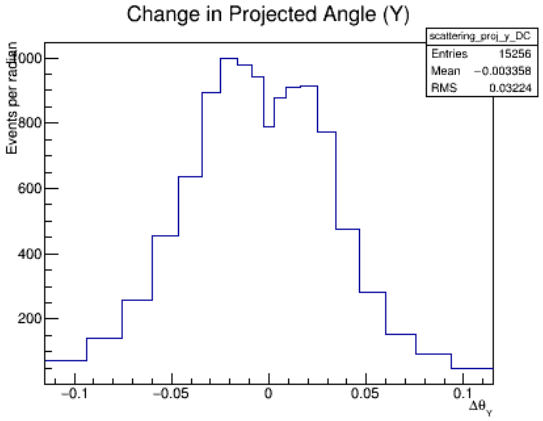




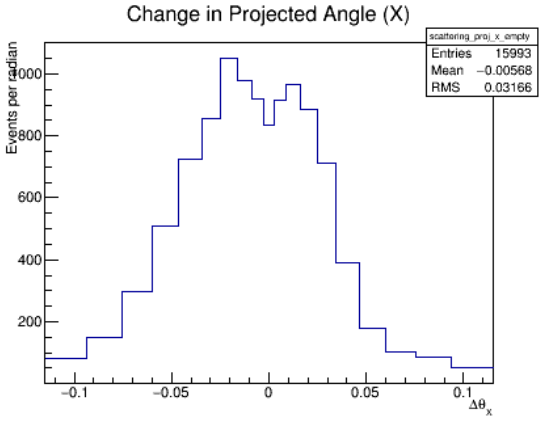
Change in projected angle for Monte Carlo data

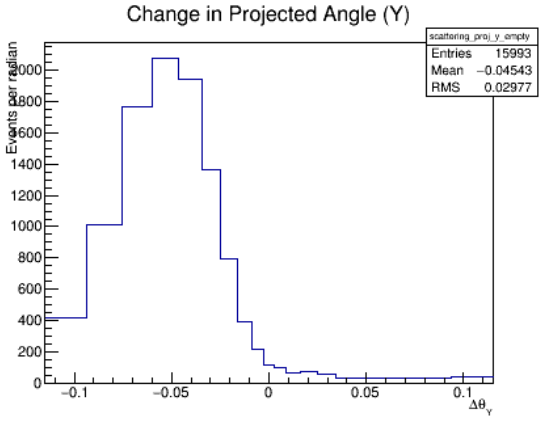
With LiH absorber





No Absorber





Summary

- Seeing an unexpected asymmetry in the projected scattering angles
  - Changing the cuts has no obvious effect
  - Asymmetry seen in both measured and Monte Carlo analysis
- Possible sources of asymmetry
  - Misalignment between trackers
  - Misalignment between magnets
  - Over/Under rotation of muons when propagating from tracker to centre of absorber