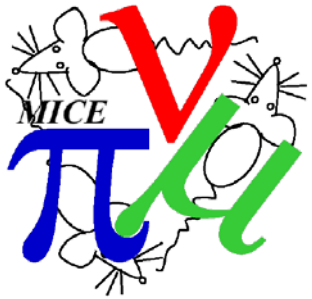

Field On Scattering

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Code Status

- Analysis carried out using Maus 2.9.1
- Field on analysis code based on Field off code
  - Muons motion prediction uses Globals::propagate feature of Maus rather than straight line projections of field off code
  - Trajectories calculated from upstream and downstream tracker measurements are propagated to the centre of the absorber, where the same analysis as the field off case is carried out.

Data Selection

3 selection criteria

- Upstream Cut - Require an reconstructed track in the upstream tracker.
- TOF timing Cut - Require a particular timing between TOF 0 and TOF 1.
- Fiducial Cut - Require the track from the upstream tracker, when projected downstream to be within a specific radius at a point downstream.
    - For Field off analysis this is a reference plane downstream from absorber.
    - For field on analysis this is each station of the downstream tracker.

Results of Analysis with fields off

Three cases presented:

- Case 1 – Unaltered field off analysis code, assumes all trajectories are straight lines.
- Case 2 – Utilise globals propagation to calculate tracks from Upstream and Downstream trackers to absorber for analysis.
- Case 3 – As case 2 with new fiducial cut requiring upstream track without scattering to pass through every station in downstream tracker within a specified radius.

Data Selection

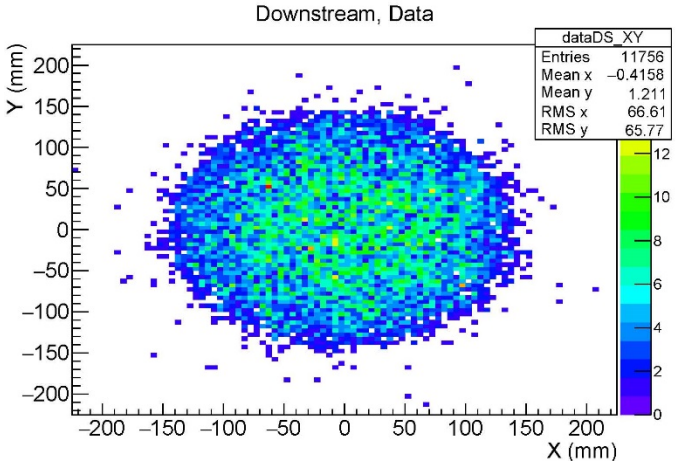
Number of events in data set is 2,001,403

	Case 1	Case 2	Case 3
Require upstream track	262855	262855	262855
TOF timing cut	21210	21210	21210
Fiducial cut	11756	11800	8134

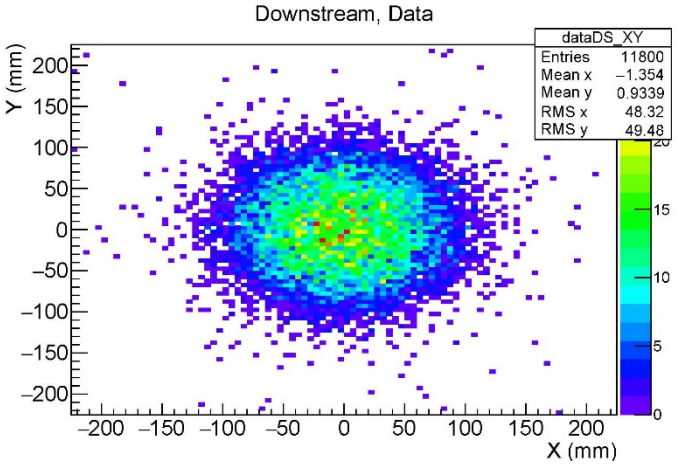
- Number of events after the upsteam track requirement significantly less than expected.
- During code execution approximately 10% of tracks reporting no upstream track present.

X Y plots of muons in Downstream tracker

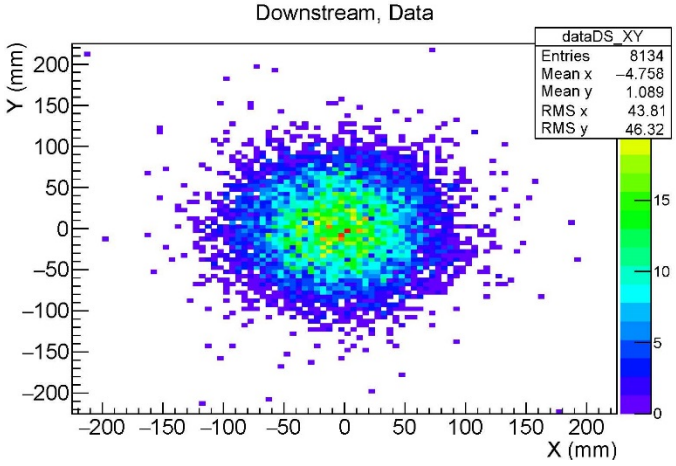
Case 1



Case 2

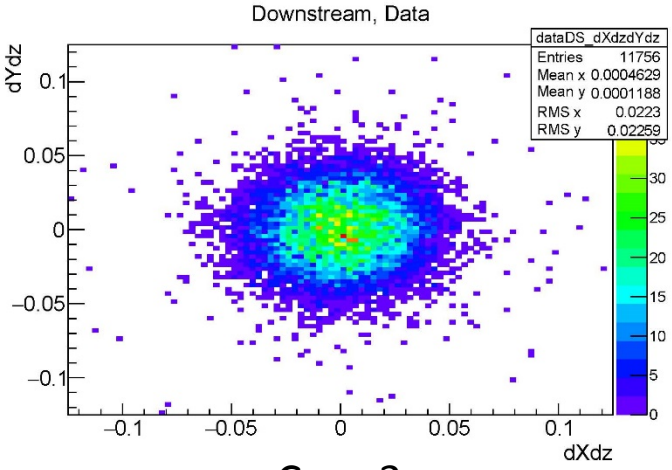


Case 3

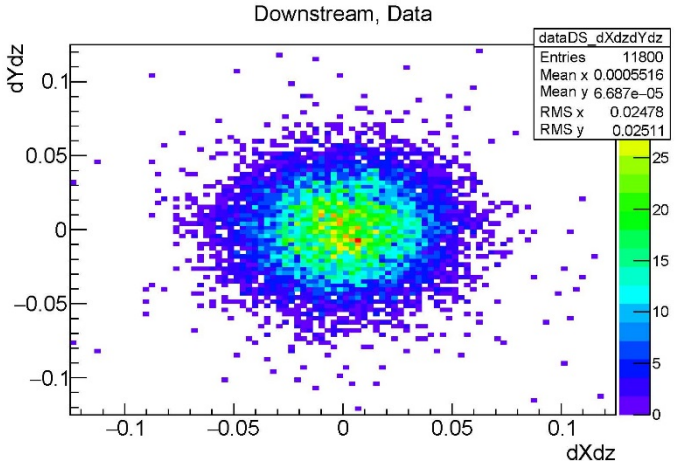


Rate of change of X vs rate of change of Y in downstream tracker

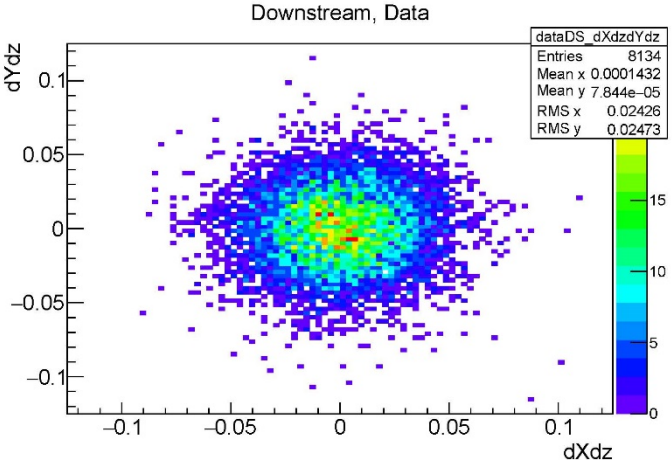
Case 1



Case 2

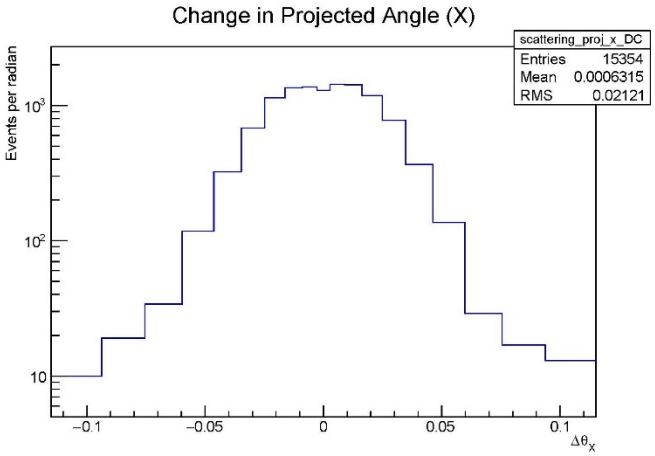


Case 3

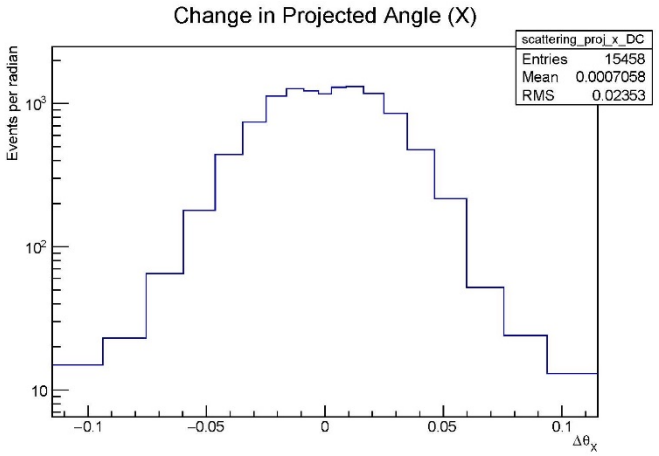


Change in X projection of scattering angle

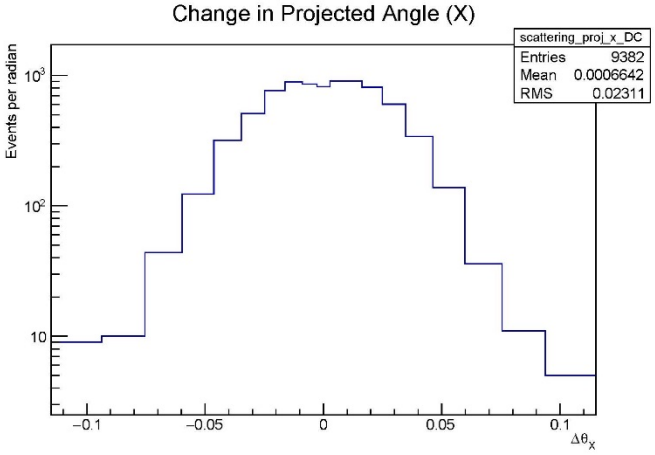
Case 1



Case 2

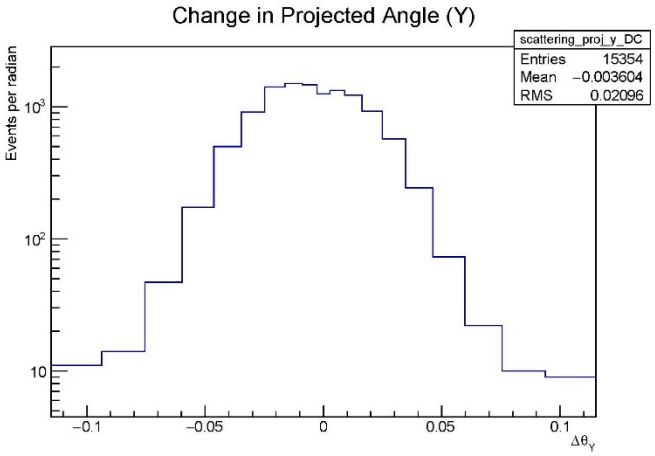


Case 3

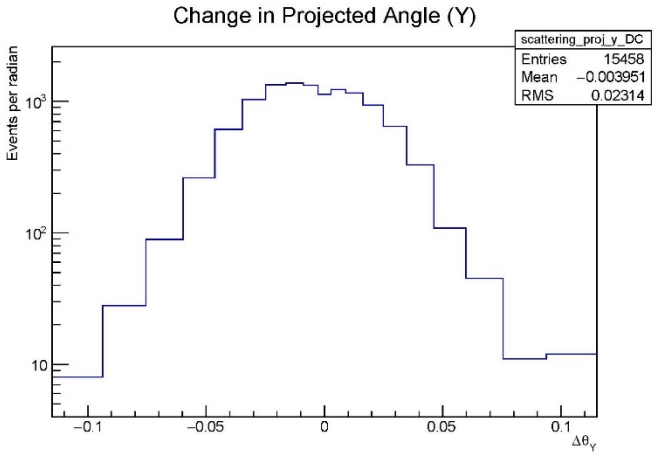


Change in Y projection of scattering angle

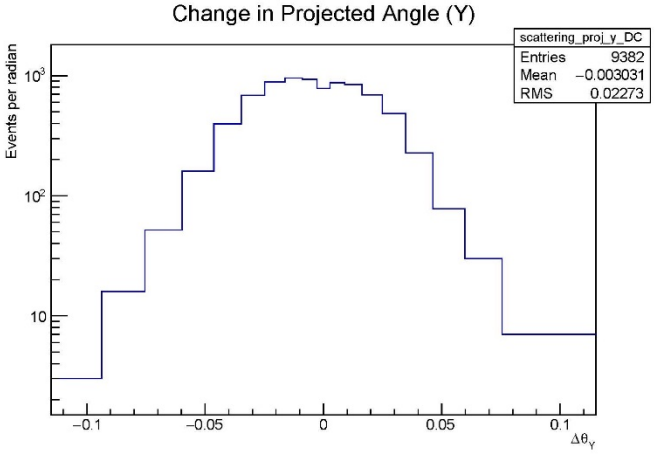
Case 1



Case 2



Case 3



Future Work

- Understand inconsistencies in number of events
  - Why from approximately 2 million events are only 262855 recording an upstream track.
  - How are there more events in the scattering plots than events passing all cuts.
- Is scattering significant outside absorber and if so how to accommodate this.
- Choose and prepare field on data for analysis