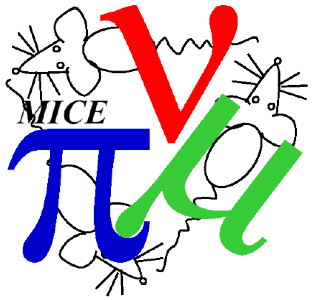

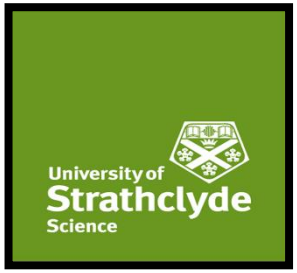

Field On Scattering

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10th January 2019

Data Selection

Stage 1 – Preliminary stage where data is prepared for analysis

- Stage 1a - Data read from root file and following cuts applied.
  - Require exactly 1 TOF1 space point
  - Require exactly 1 TOF0 space point
  - Require exactly 1 track in Upstream Tracker
  - Upstream tracker Chi2/dof<5

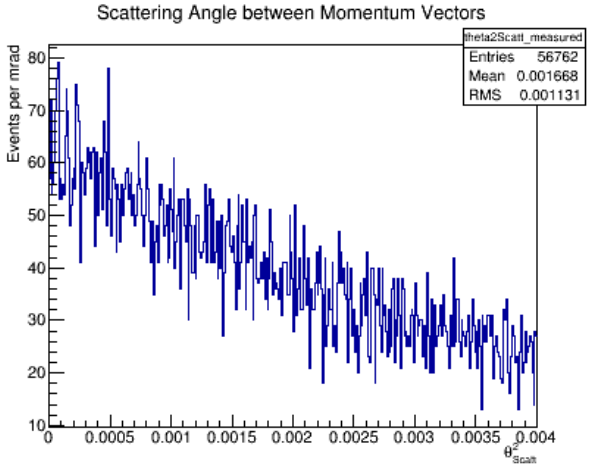
- Stage 1b - Properties of particles that pass the above cuts are determined at key axial positions that are used in the next stage of cuts. If available this is taken from Globals, otherwise calculated using globals::propagate.
  - Upstream tracker max radius < 150mm
  - Diffuser max radius < 100mm
  - 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
- Properties of Muon at centre of absorber as predicted by upstream and downstream trackers are saved.

Stage 2 – Main analysis stage where final cuts are made and scattering analysis code run

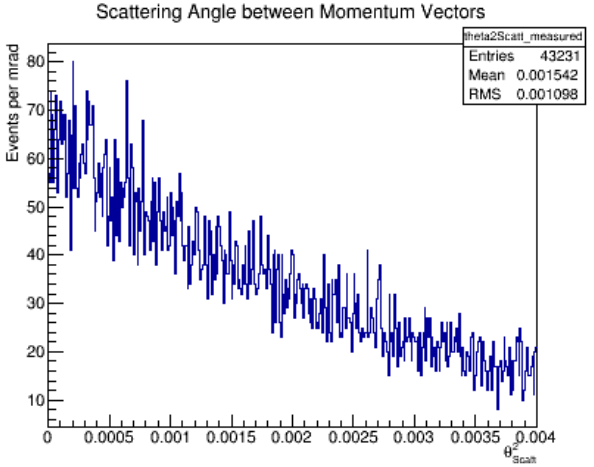
- Select narrow range of muon momentum to allow study of scattering as a function of momentum

Measured Scattering Angles

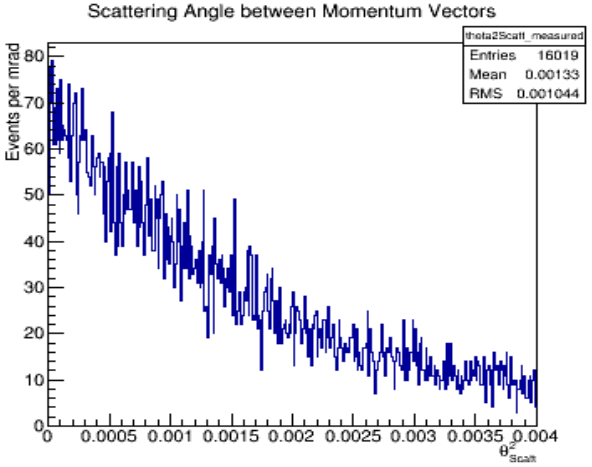
140MeV/c



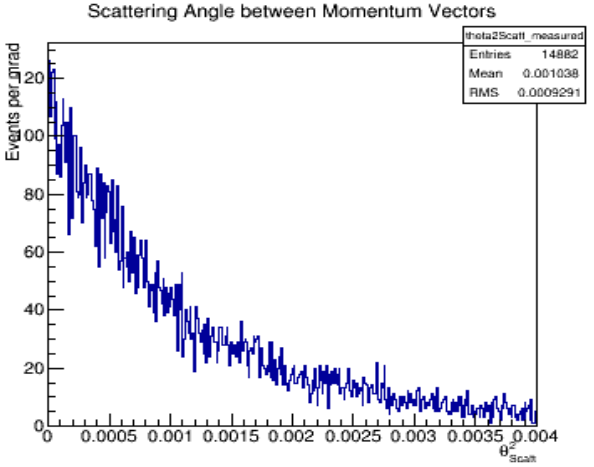
170MeV/c



200MeV/c

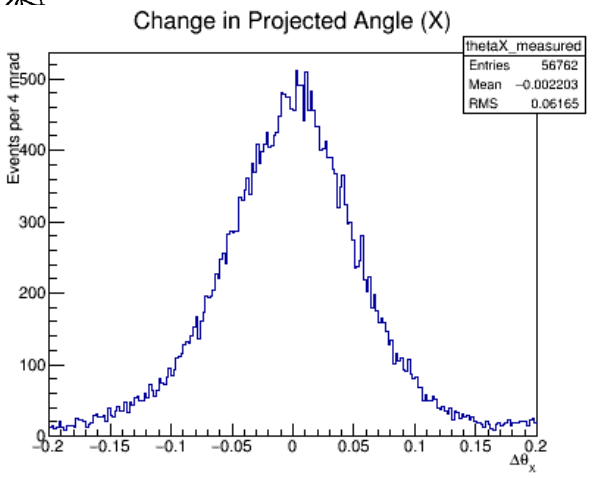


240MeV/c

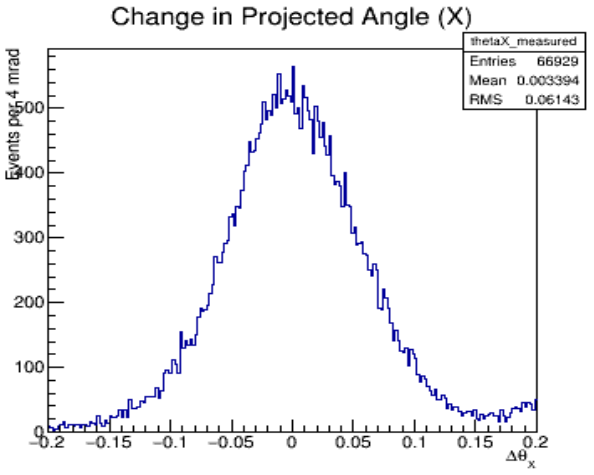


Measured Scattering Angles

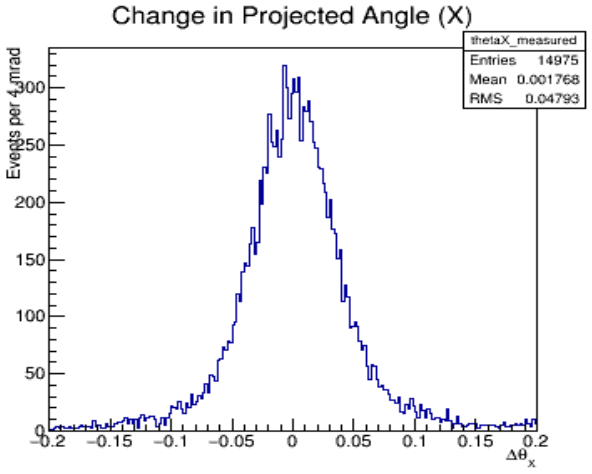
140MeV/c



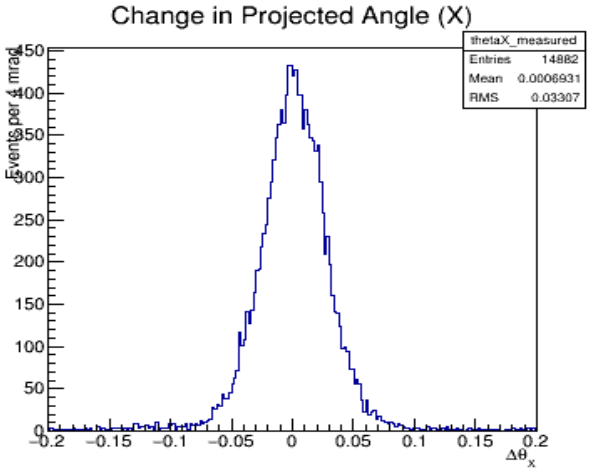
170MeV/c

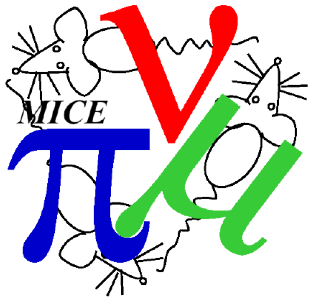


200MeV/c

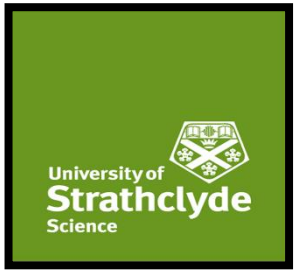


240MeV/c





Summary



- Starting to run analysis code over full data set, but it is slow
  - Introduced a 2-stage process, where most computational intensive part of data preparation process is run separately from momentum selection and analysis
- Analysis at sample momentums show a decrease in the amount of scattering as momentum increases

Current Work

- Full analysis will require access to grid computing resource, which is currently being pursued
  - Grid certificate obtained
  - Can connect to MICE VO
  - Need to devise a method to submit jobs
- Control scripts for error analysis to be prepared
  - Control scripts for field off analysis already available
  - Adapting these scripts to work with 2-stage field on analysis