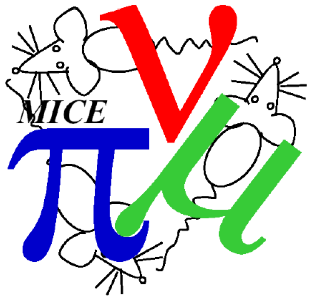

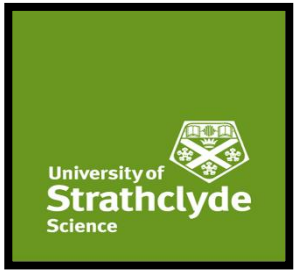

Field On Scattering

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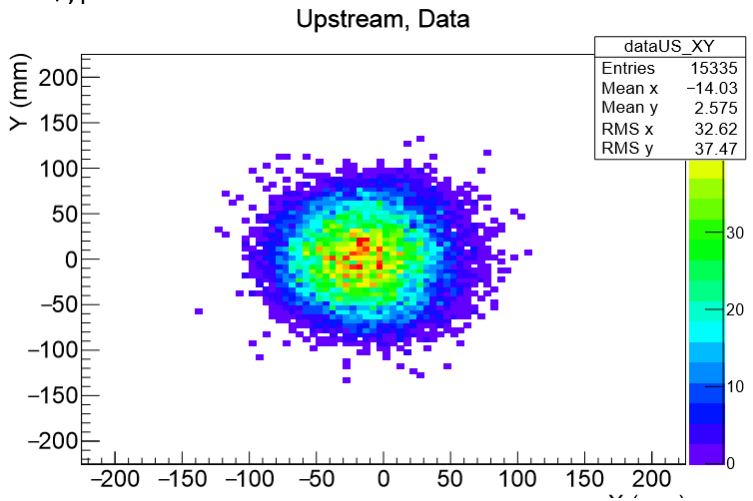
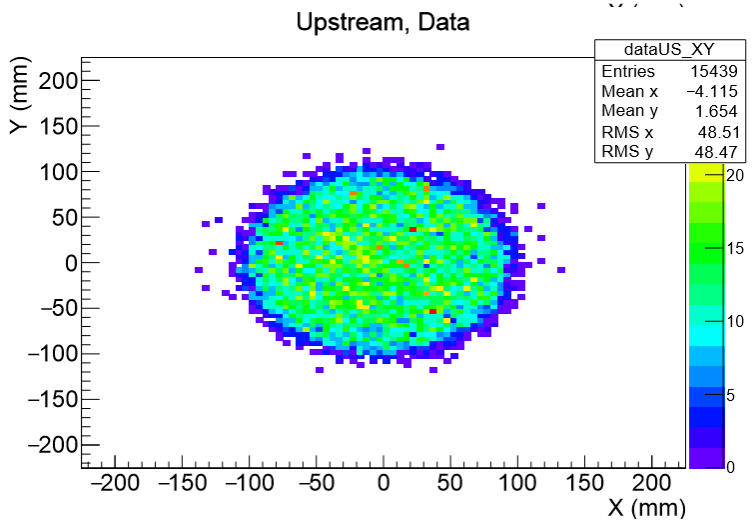
18th January 2018

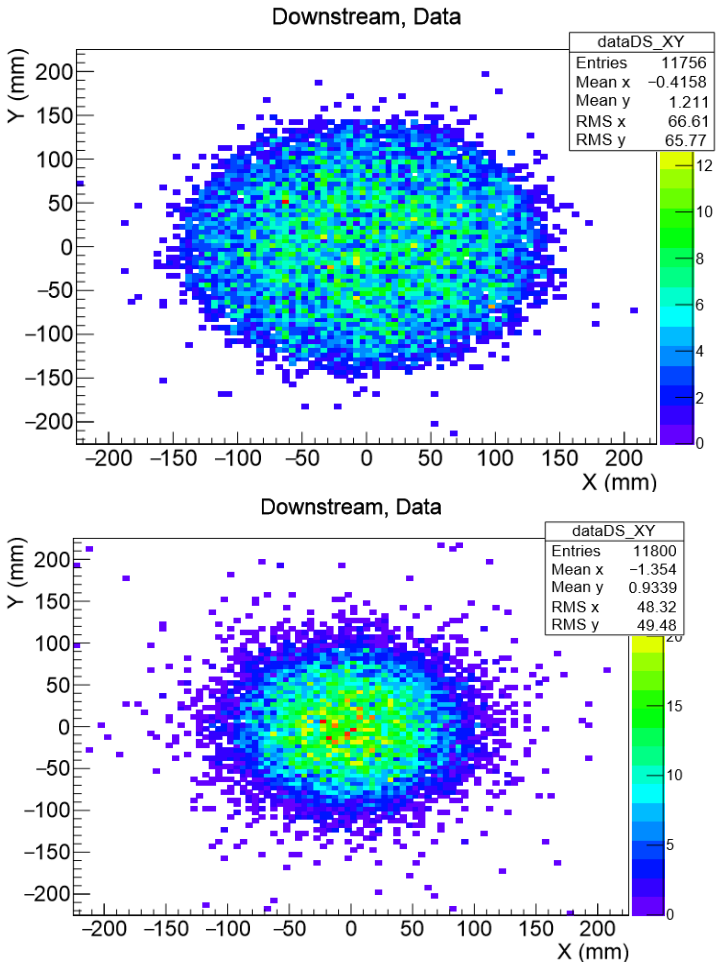
Illustration of change in XY distribution of Muons at Absorber when using projection and propagation





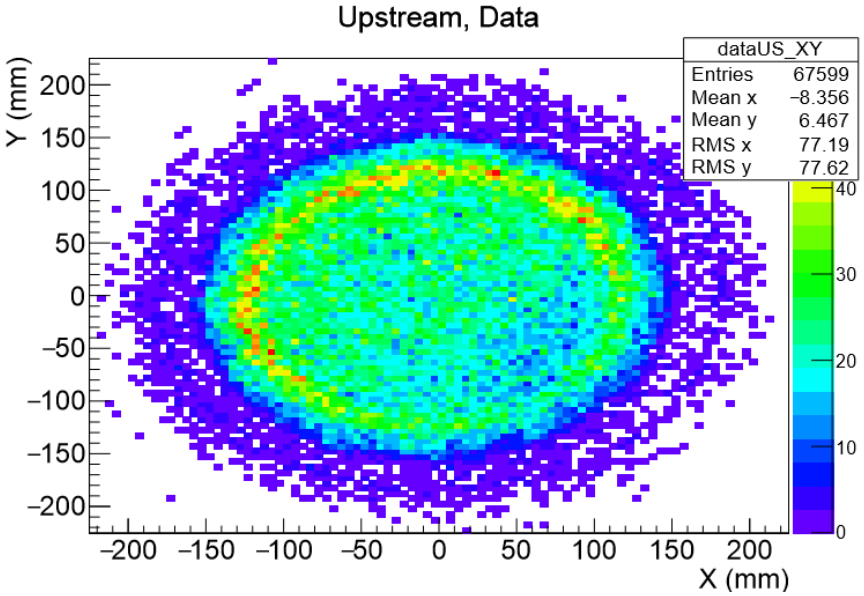
- Plots are for the same field off data set with the same cuts applied.
- Top plot uses linear projection to calculate XY coordinate of each muon for fiducial cut and at centre of absorber from upstream tracker
- Bottom plot uses Runge-Kutta propagation
- Looking to get a clearer idea of difference by producing Δx and Δy histograms.

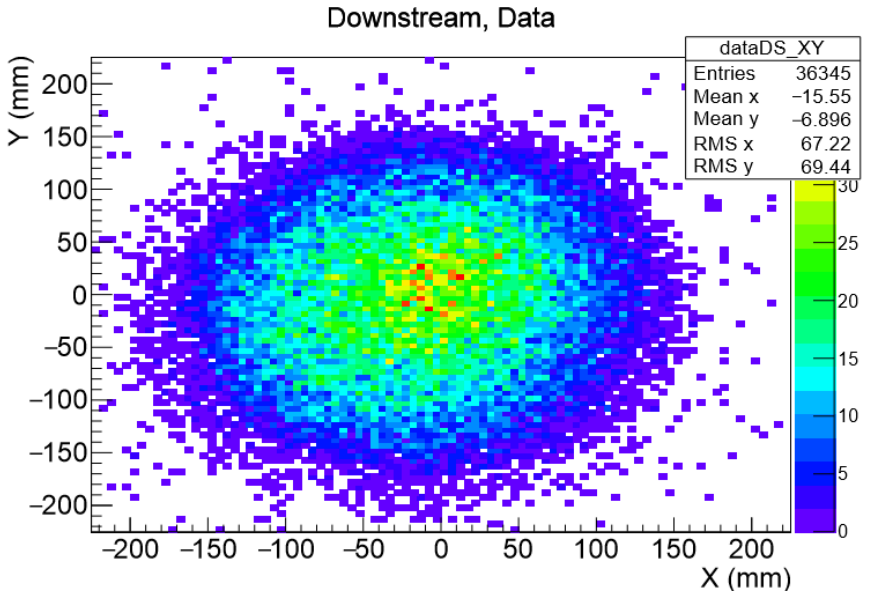
Illustration of change in XY distribution of Muons at Absorber when using projection and propagation



- As before but based on reconstructed track from downstream tracker

XY distribution of Muons at Absorber





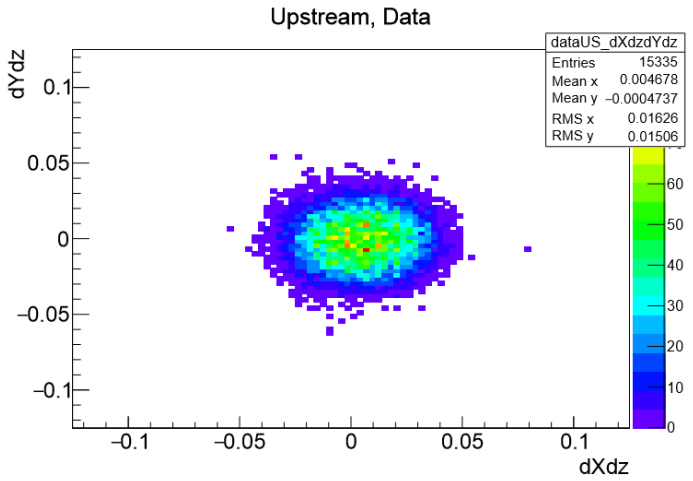
For reference plots from field on data

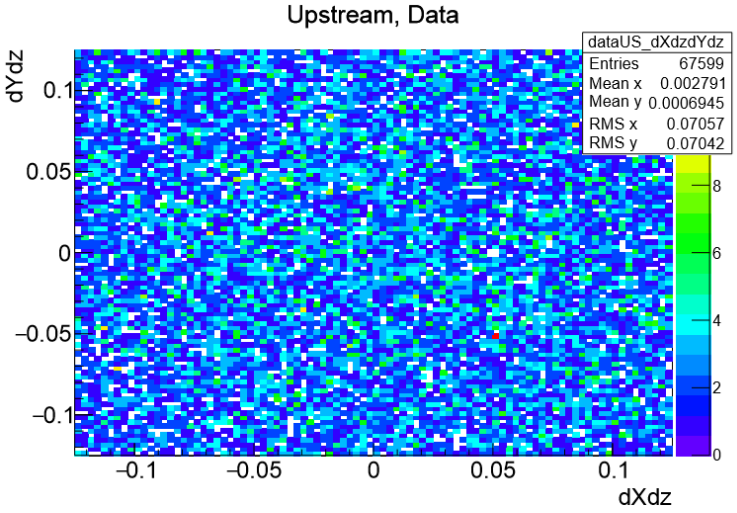
Data Selection

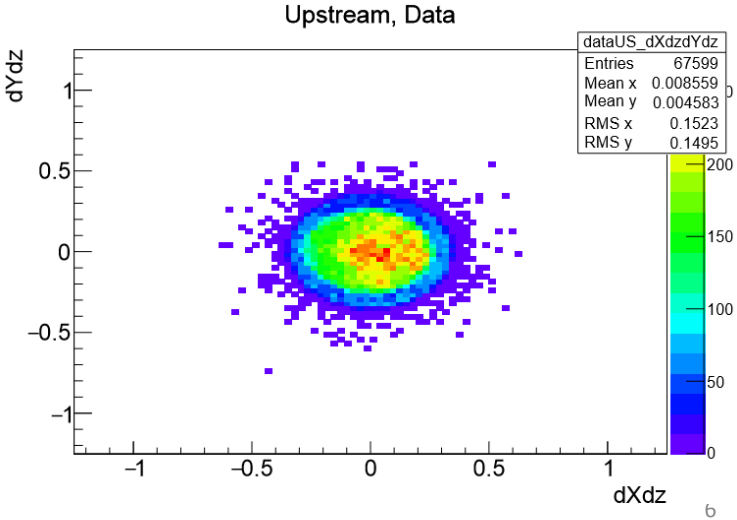
3 selection criteria

1. Upstream Cut - Require an reconstructed track in the upstream tracker.
2. **TOF timing Cut - Require a particular timing between TOF 0 and TOF 1.**
3. Fiducial Cut - Require the track from the upstream tracker, when projected downstream to be within a specific radius at a point downstream in each station of the downstream tracker.

dx/dz vs dy/dz distribution of muons at absorber







Field off scattering analysis uses a 200ps width TOF01 cut to segment momentum.

With Field on expect a greater momentum spread as muons with a greater transverse momentum between TOF 0 and 1 will be transmitted.

Field on data for analysis

Data runs with LiH Absorber from Step 4 User Cycle 2016/03

140MeV/c	170MeV/c	200MeV/c	240MeV/c
8445	8448	8450	8451
8446	8449	8454	8456
8447	8453	8455	8460
8452	8458	8459	8461
8457	8464	8463	8462
8465	8469	8468	8467
8466			
8470			
8471			

Next Steps

- Identify field on data runs with field empty absorber and LH2
- Monte Carlo simulations of Field on configuration
- Implement best method for selecting muon momentum
- Account for scattering in material other than absorber.