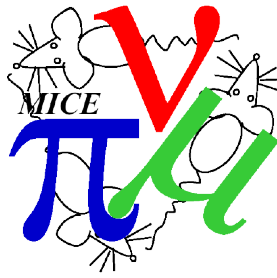
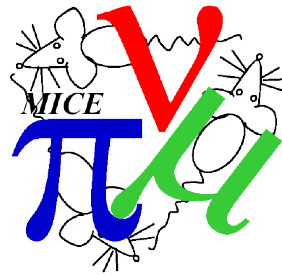


# MCS in LH2 (field-off)



## Content

- Selection update
- Alignment / fiducial radius
- Al+ LH2 path length / energy loss
- Normalised scattering distributions
- Future work



## Selection

TOF1 SP	US Track	TOF	Tracking region	Fiducial Selection	Diffuser cut
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Requiring a TOF1 hit

...one US track

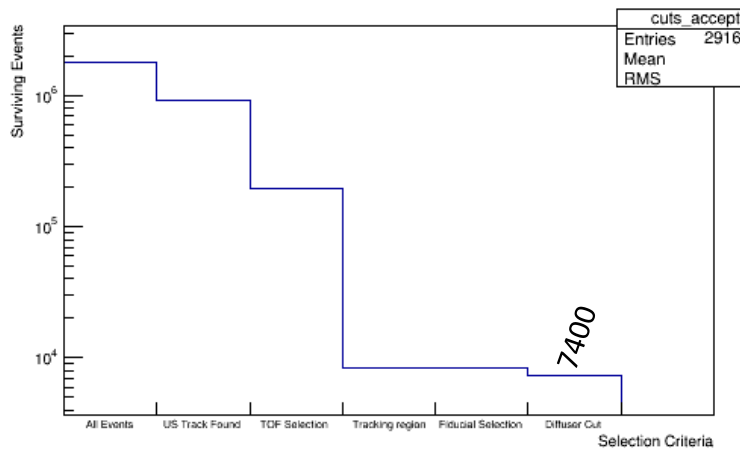
Currently  $\pm 150\text{ps}$  around muon peak

Tracks associated with events appearing at  $> 150\text{mm}$  in trackers are removed

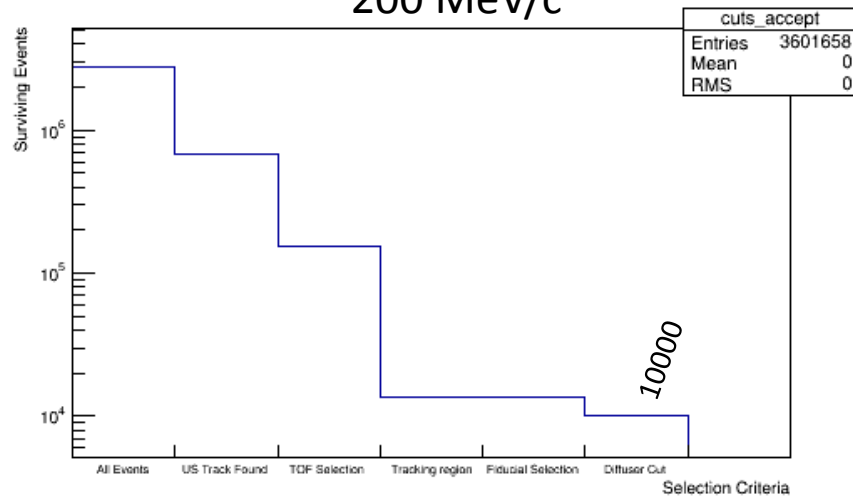
$R < 100\text{mm}$

$R < 90\text{mm}$

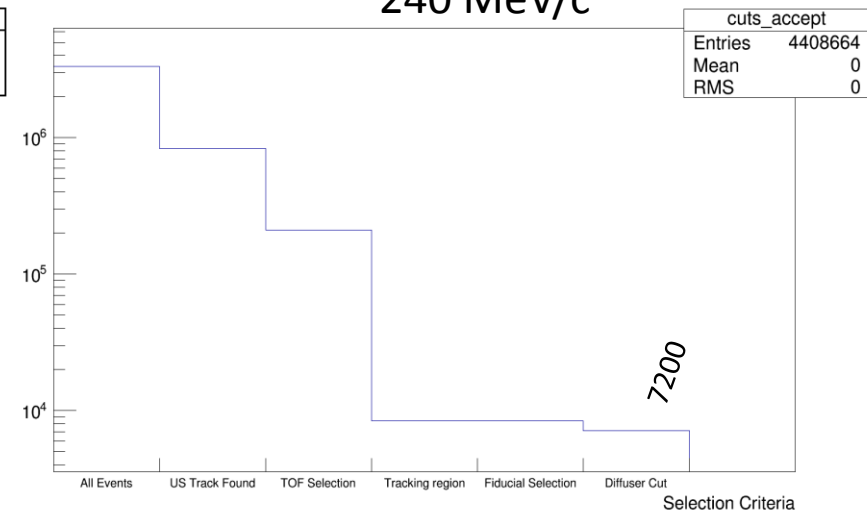
170 MeV/c



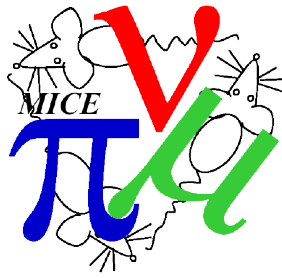
200 MeV/c



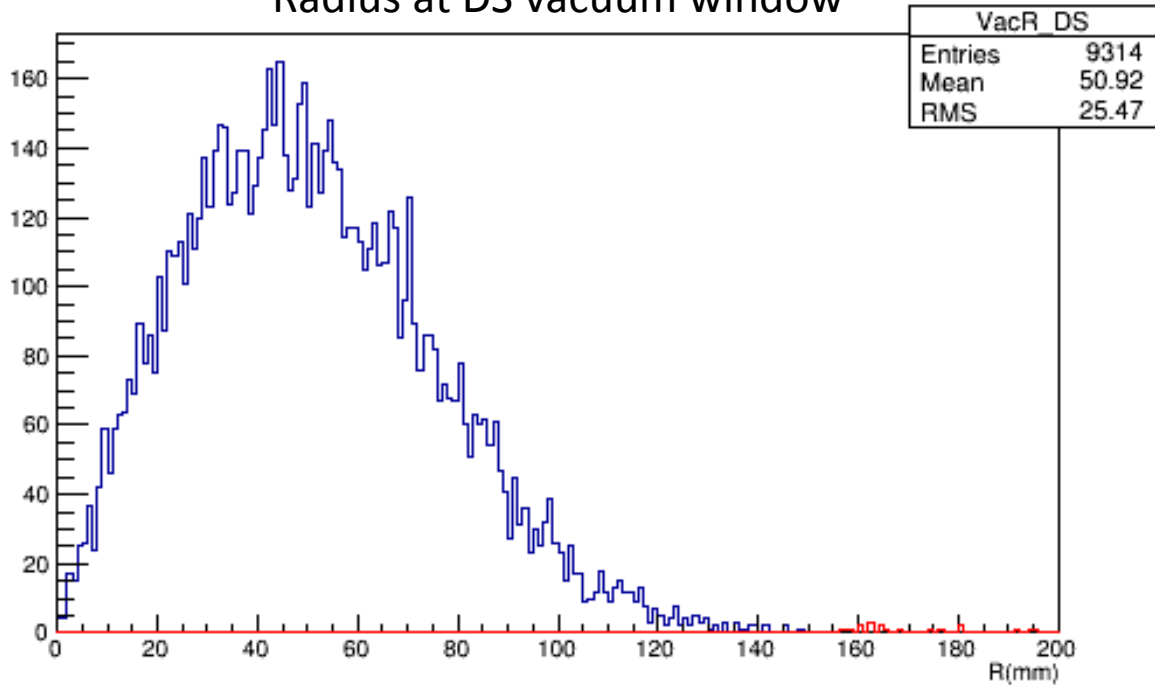
240 MeV/c



# MCS in LH2 (field-off)

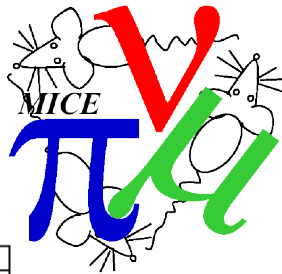


Radius at DS vacuum window



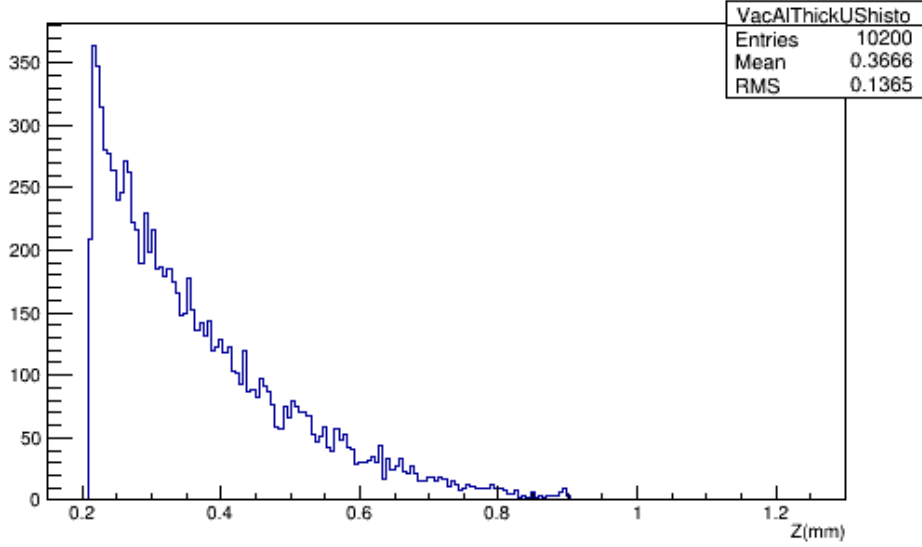
- For ~0.5% of selected beam, path length calculation is impossible
- Tracks are pushed to overflow bin

# MCS in LH2 (field-off)

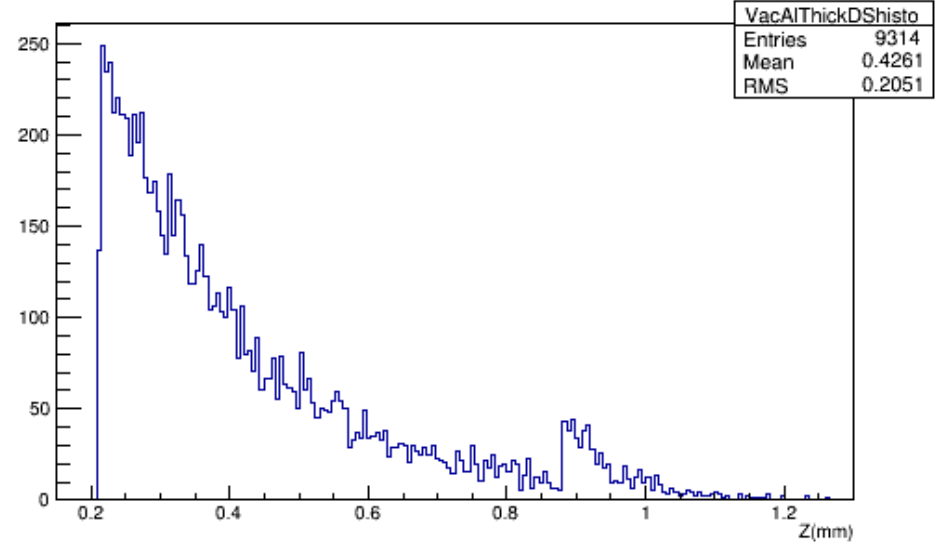


## Al thickness (z) for US & DS Vacuum window

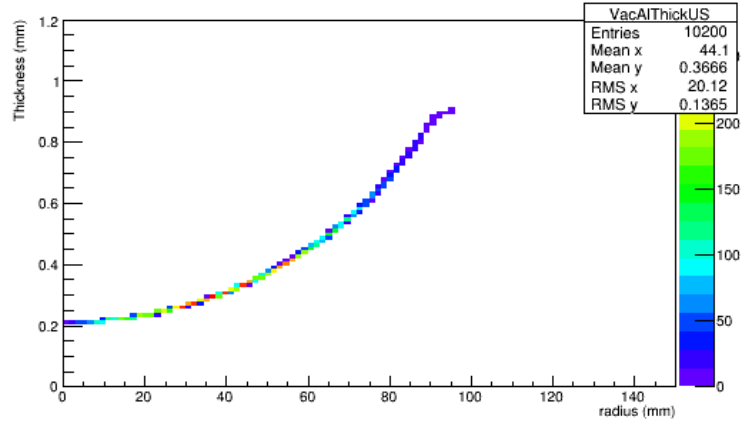
z in Al, US-Vacuum



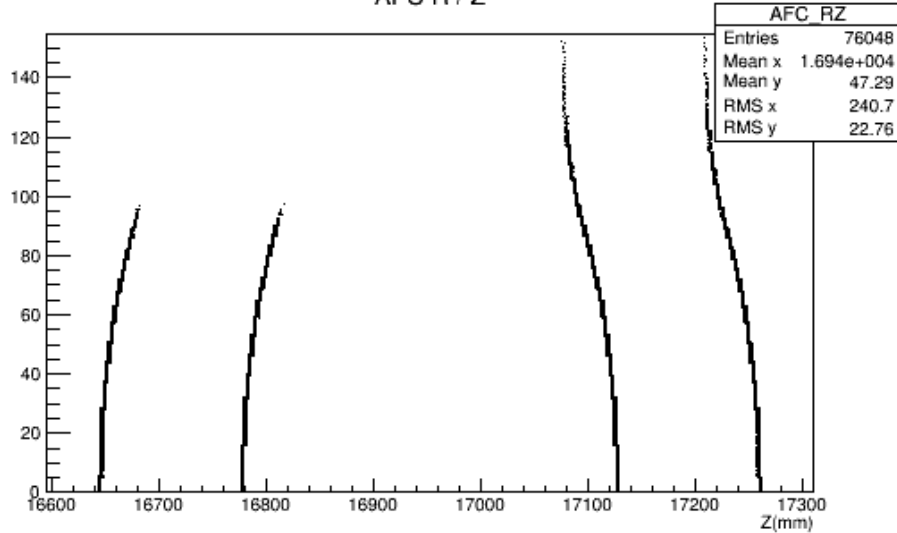
z in Al, DS-Vacuum



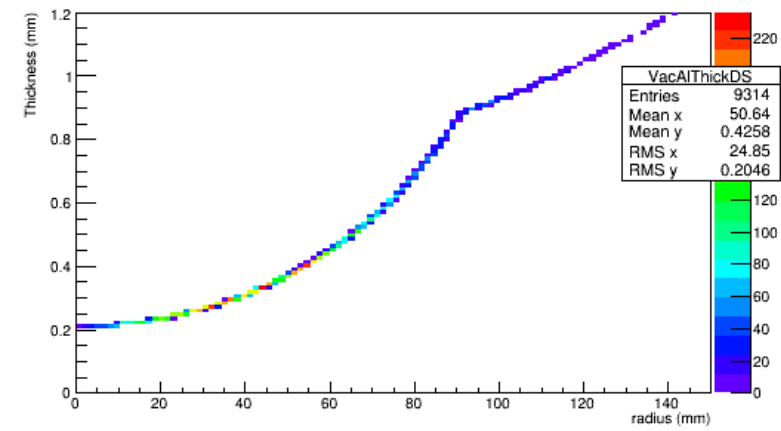
PL in Al, US-Vacuum



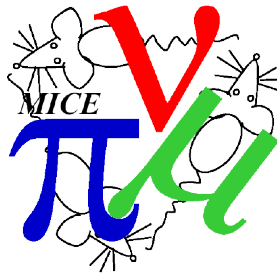
AFC R / Z



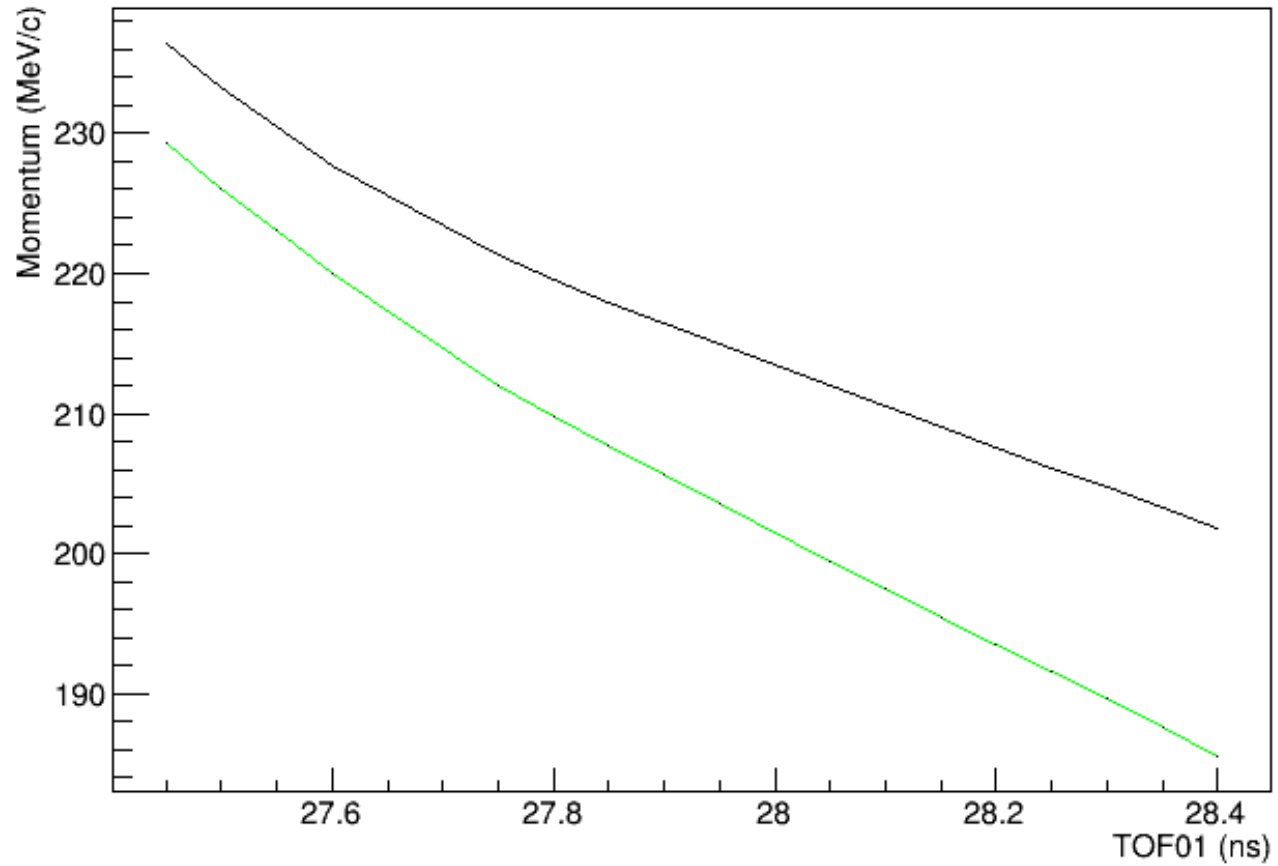
PL in Al, DS-Vacuum



# MCS in LH2 (field-off)

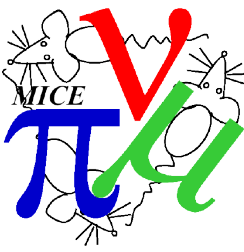


Energy loss (200MeV/c)



# MCS in LH2 (field-off)

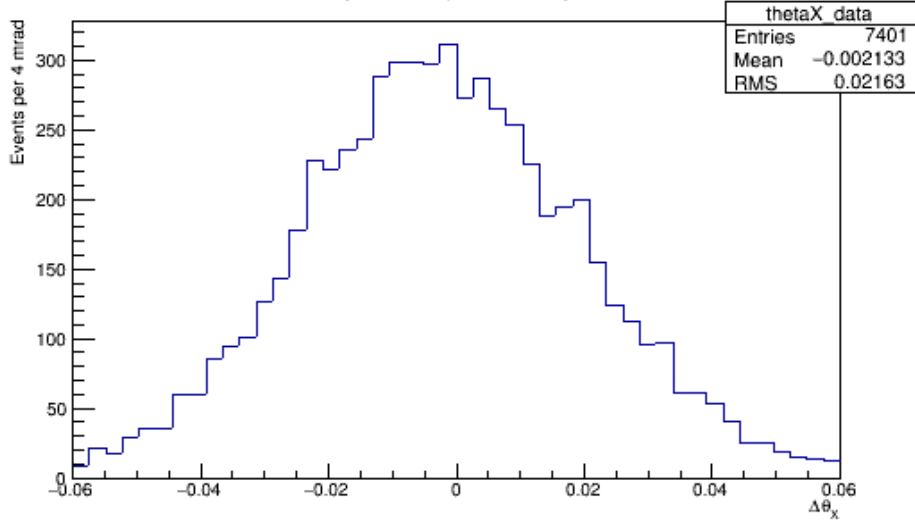
170MeV/c



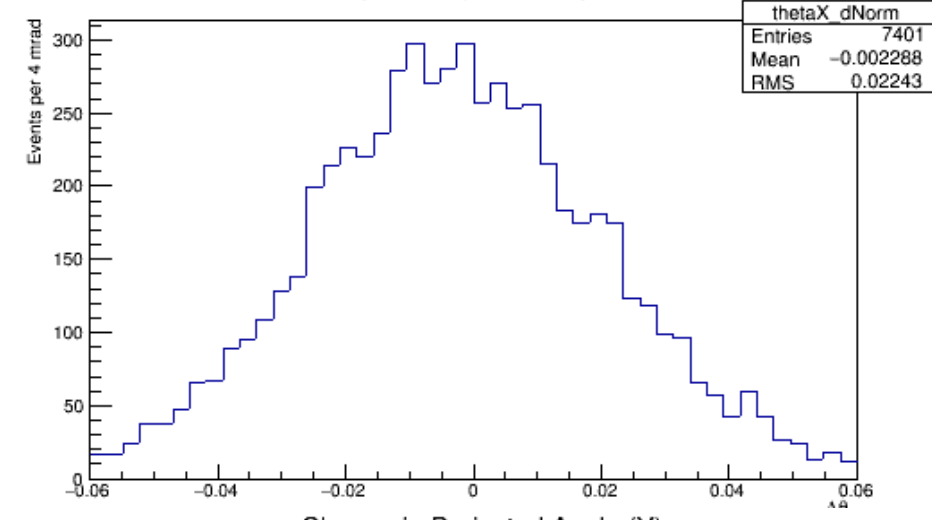
Before normalisation

Normalised

Change in Projected Angle (X)



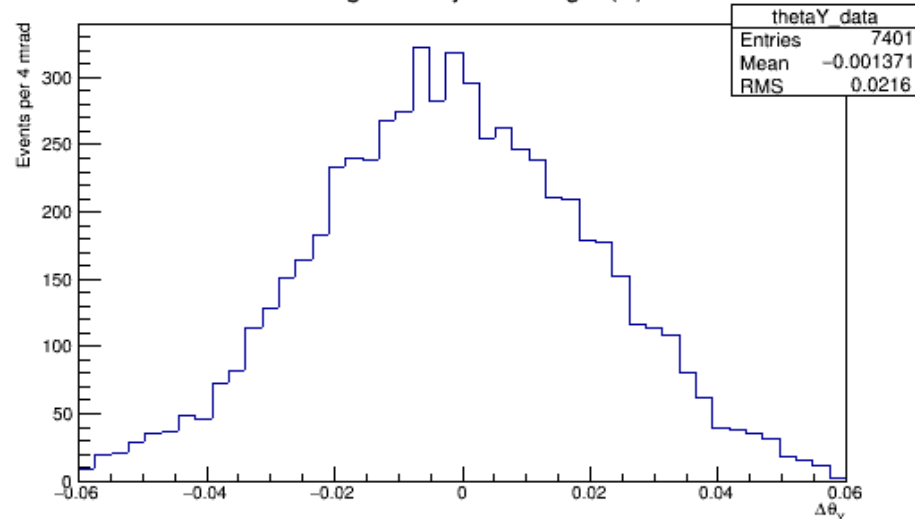
Change in Projected Angle (X)



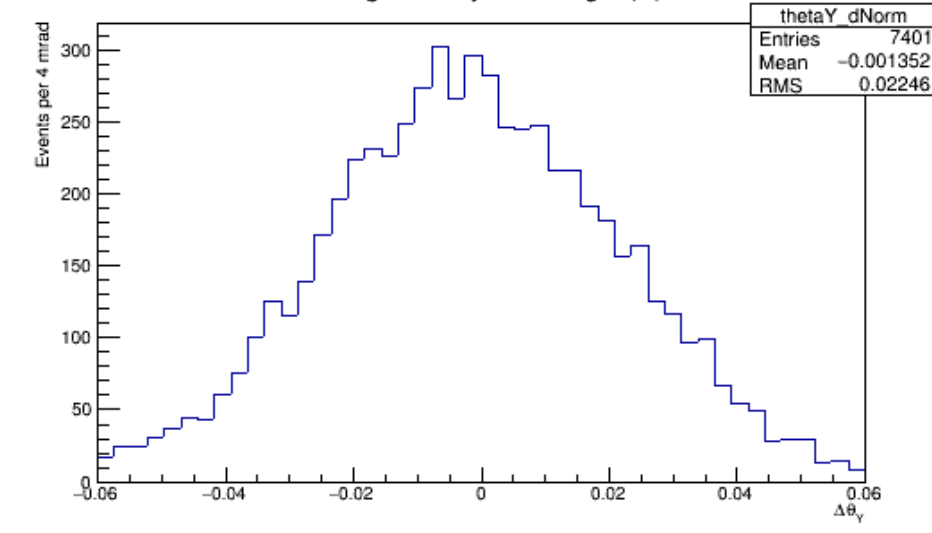
Normalisation:

$$\theta_N = \frac{350}{PL} \theta$$

Change in Projected Angle (Y)



Change in Projected Angle (Y)



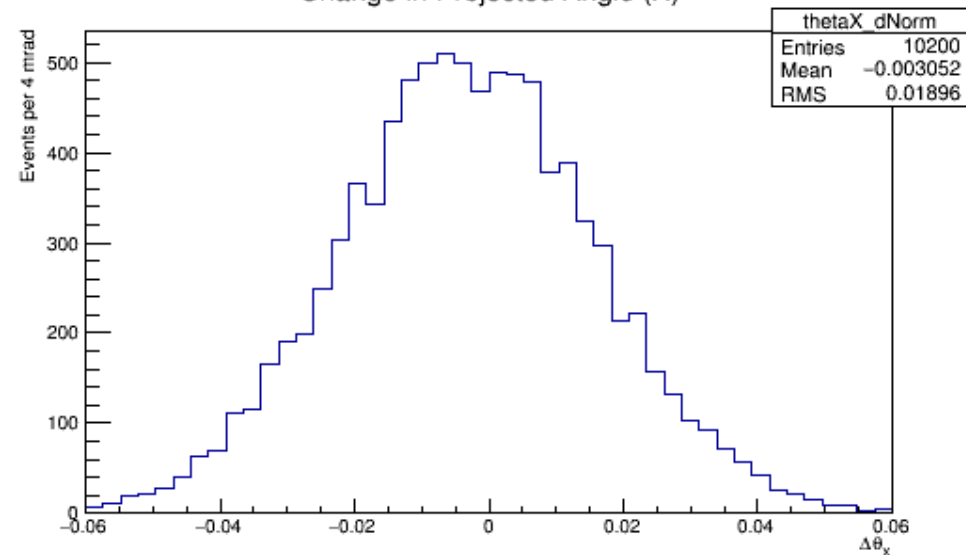
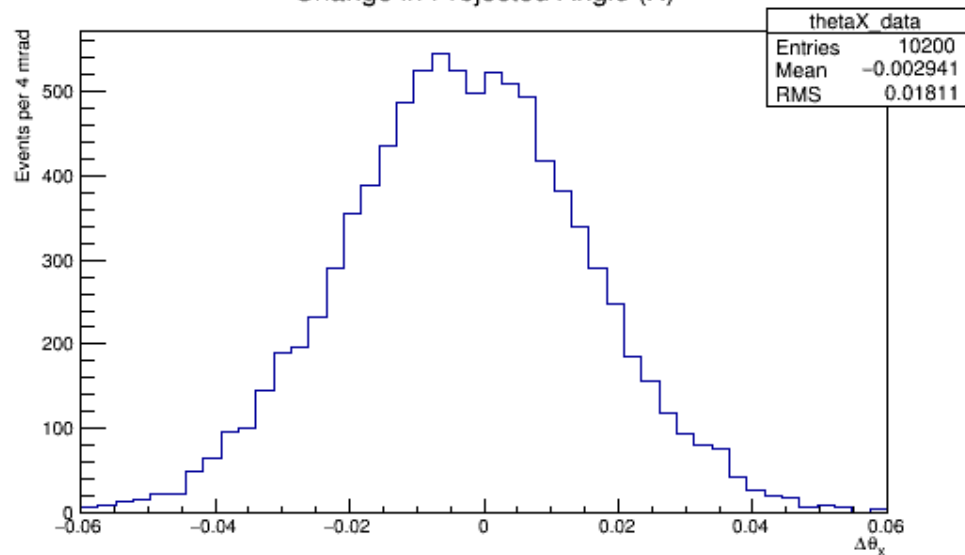
200MeV/c

Before normalisation

Normalised

Change in Projected Angle (X)

Change in Projected Angle (X)

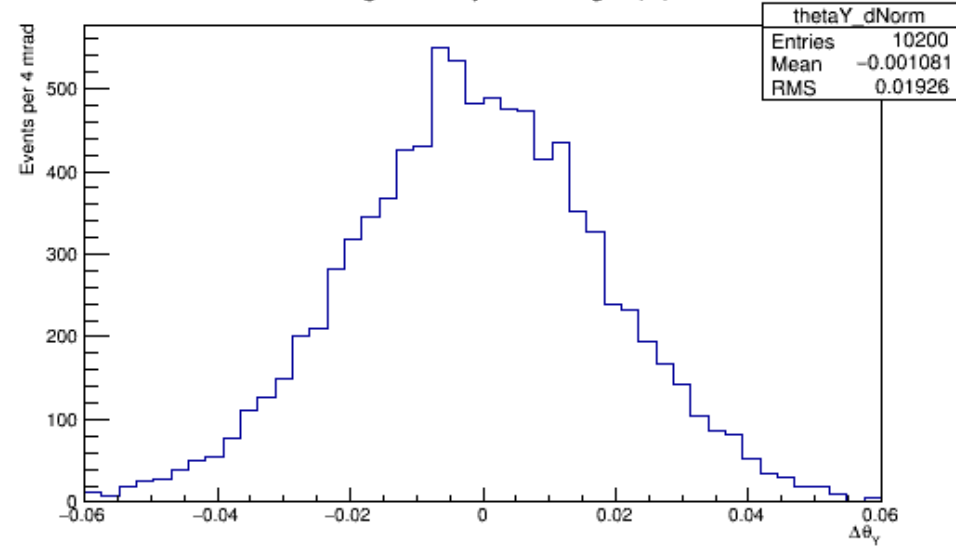
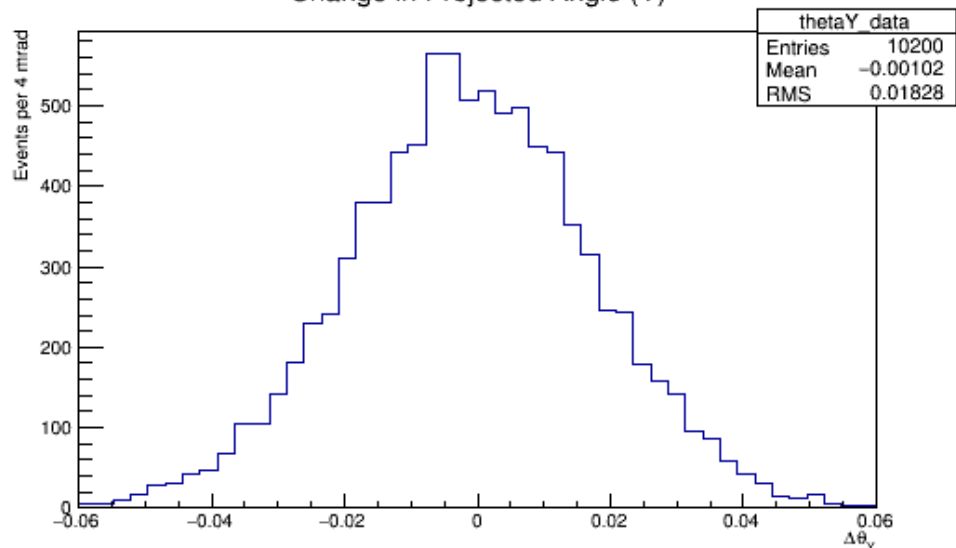


Normalisation:

$$\theta_N = \frac{350}{PL} \theta$$

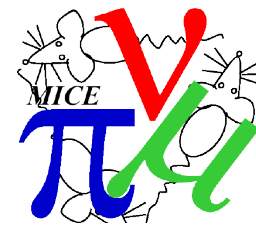
Change in Projected Angle (Y)

Change in Projected Angle (Y)



# MCS in LH2 (field-off)

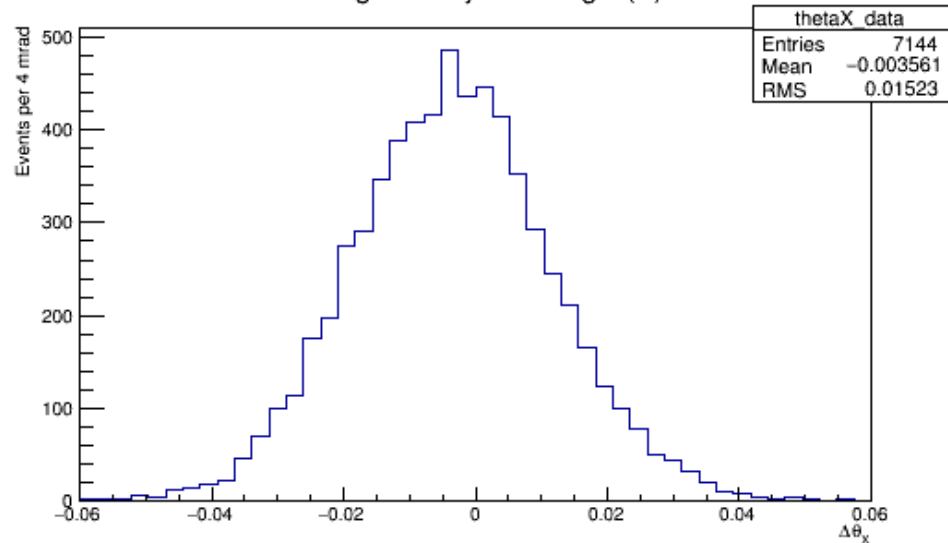
240MeV/c



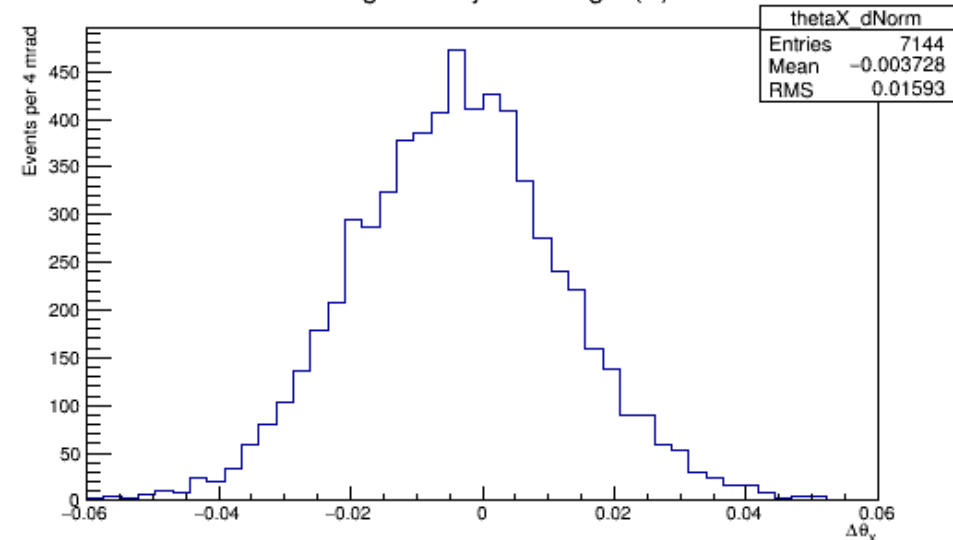
**Before normalisation**

**Normalised**

Change in Projected Angle (X)



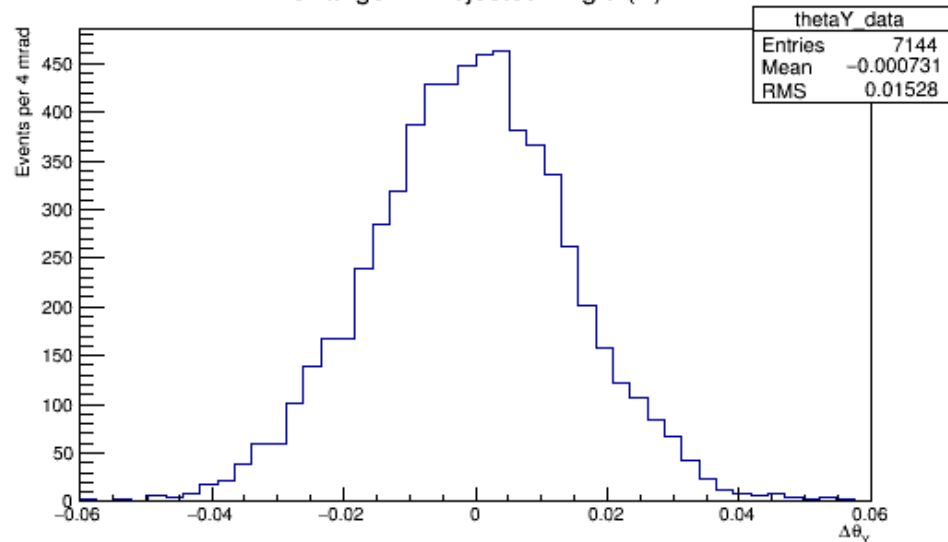
Change in Projected Angle (X)



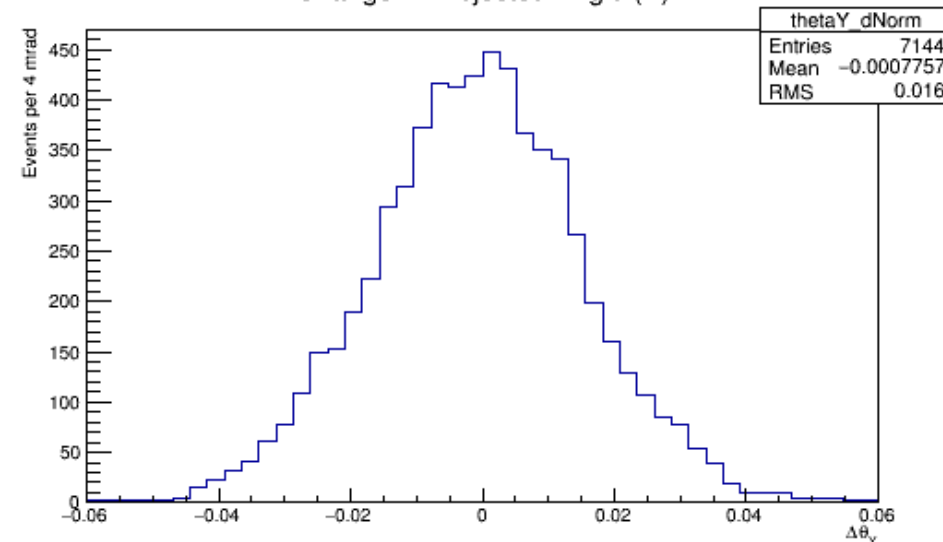
**Normalisation:**

$$\theta_N = \frac{350}{PL} \theta$$

Change in Projected Angle (Y)



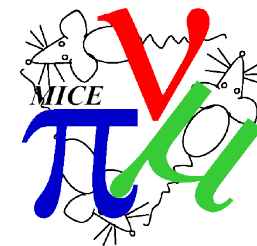
Change in Projected Angle (Y)





# MCS in LH2 (field-off)

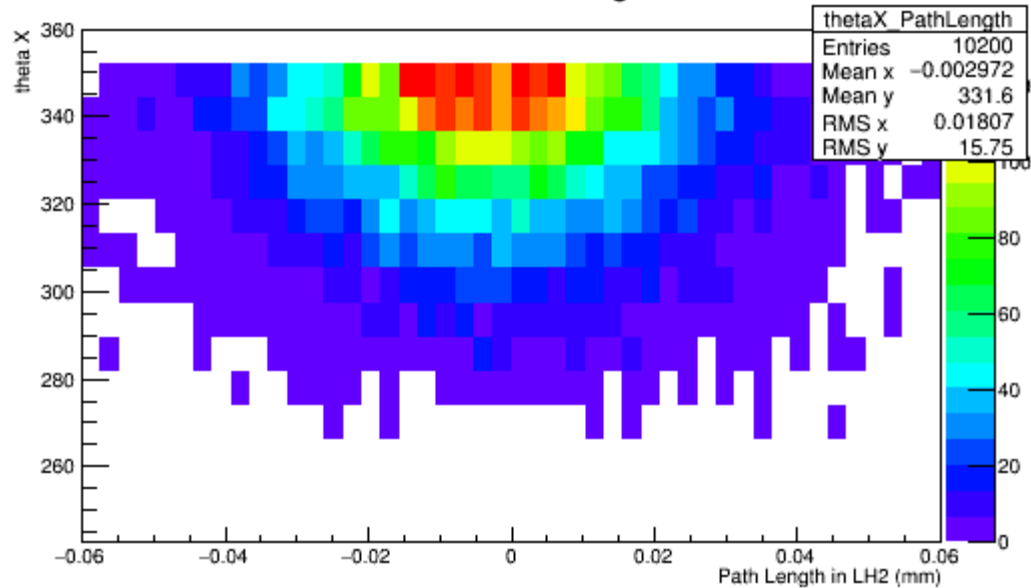
200MeV/c



Before normalisation

Normalised

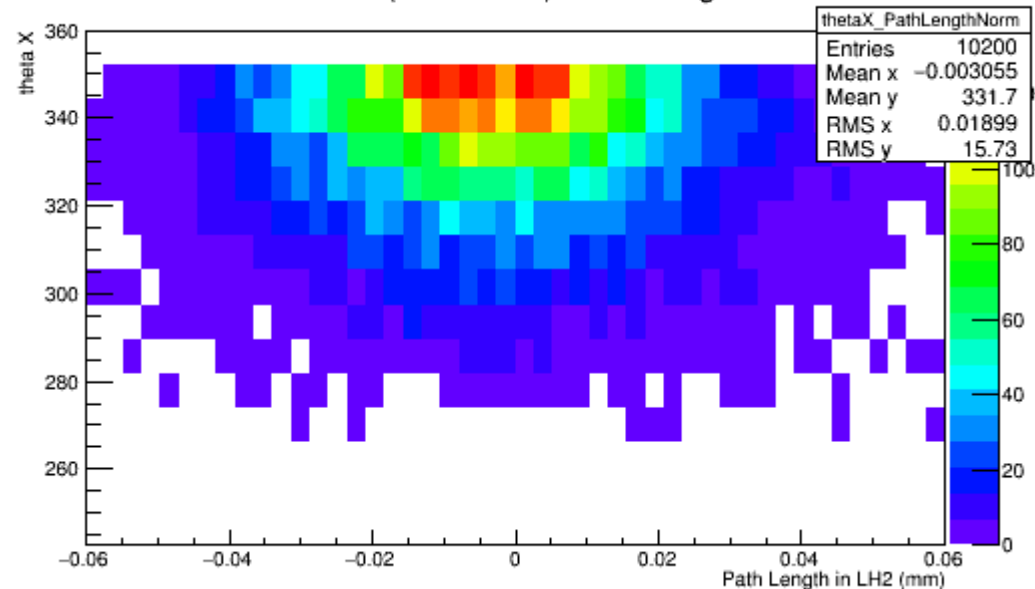
Theta X / Path Length



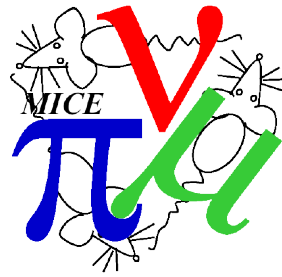
Normalisation:

$$\theta_N = \frac{350}{PL} \theta$$

Theta X(normalised) / Path Length

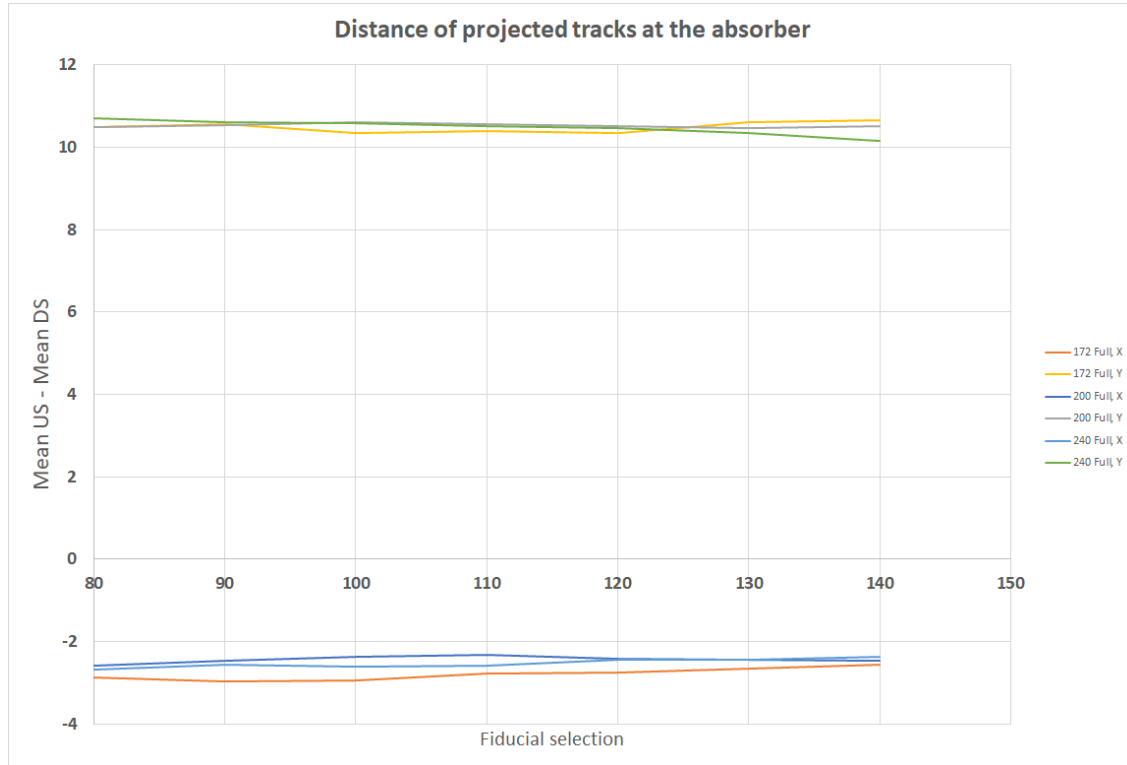


# MCS in LH2 (field-off)

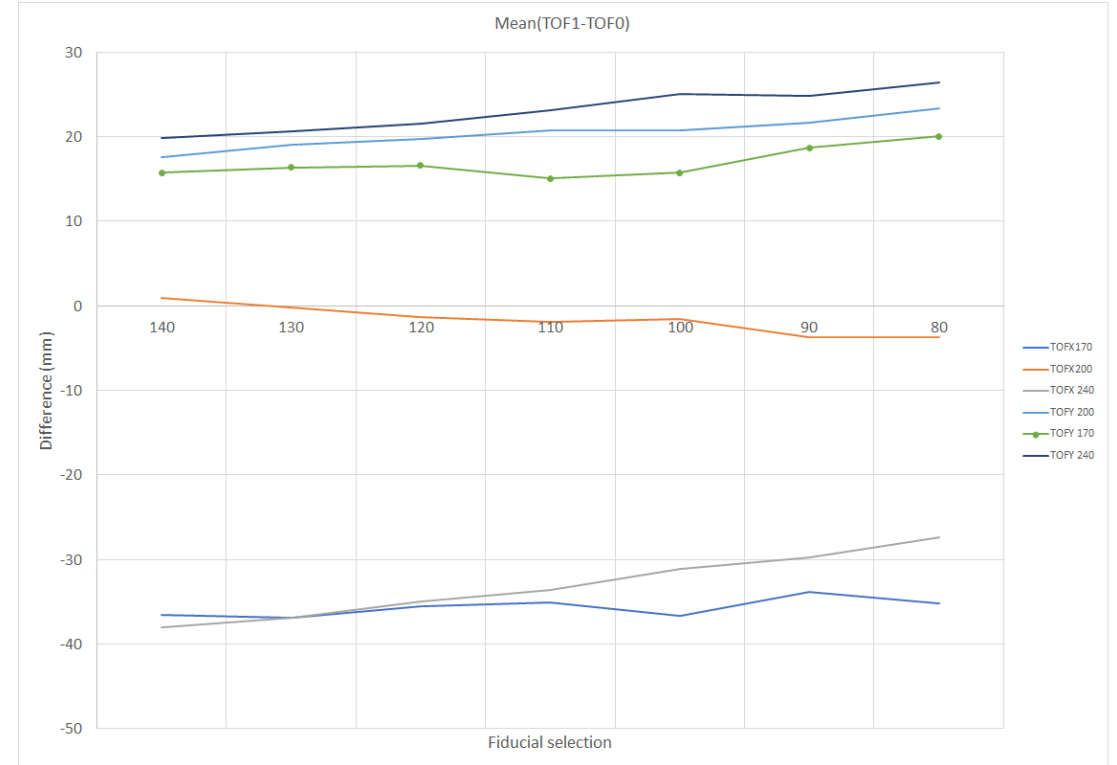


## Alignment

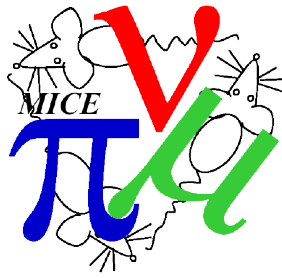
Trackers, projection at absorber



TOF Spacepoints



# MCS in LH2 (field-off)



## Future Work

- MC error calculation to LH2 path length
- Error calculation for Al. thickness
- Alignment
  - MC
  - Investigate applied alignment procedure
- PID