Weekly Meeting

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Job List

- Number of comments at CM (✓)
- Requested order of magnitude more MC - in progress
- Pulled all LH2 data from latest cycle (✓)
- Investigating fiducial selection (✓)
- Rotating vector definitions to cross-check (✓)
- P correction by Bethe-Bloch (✓)
- Impact parameter plot (✓)
- Update all plots and tables

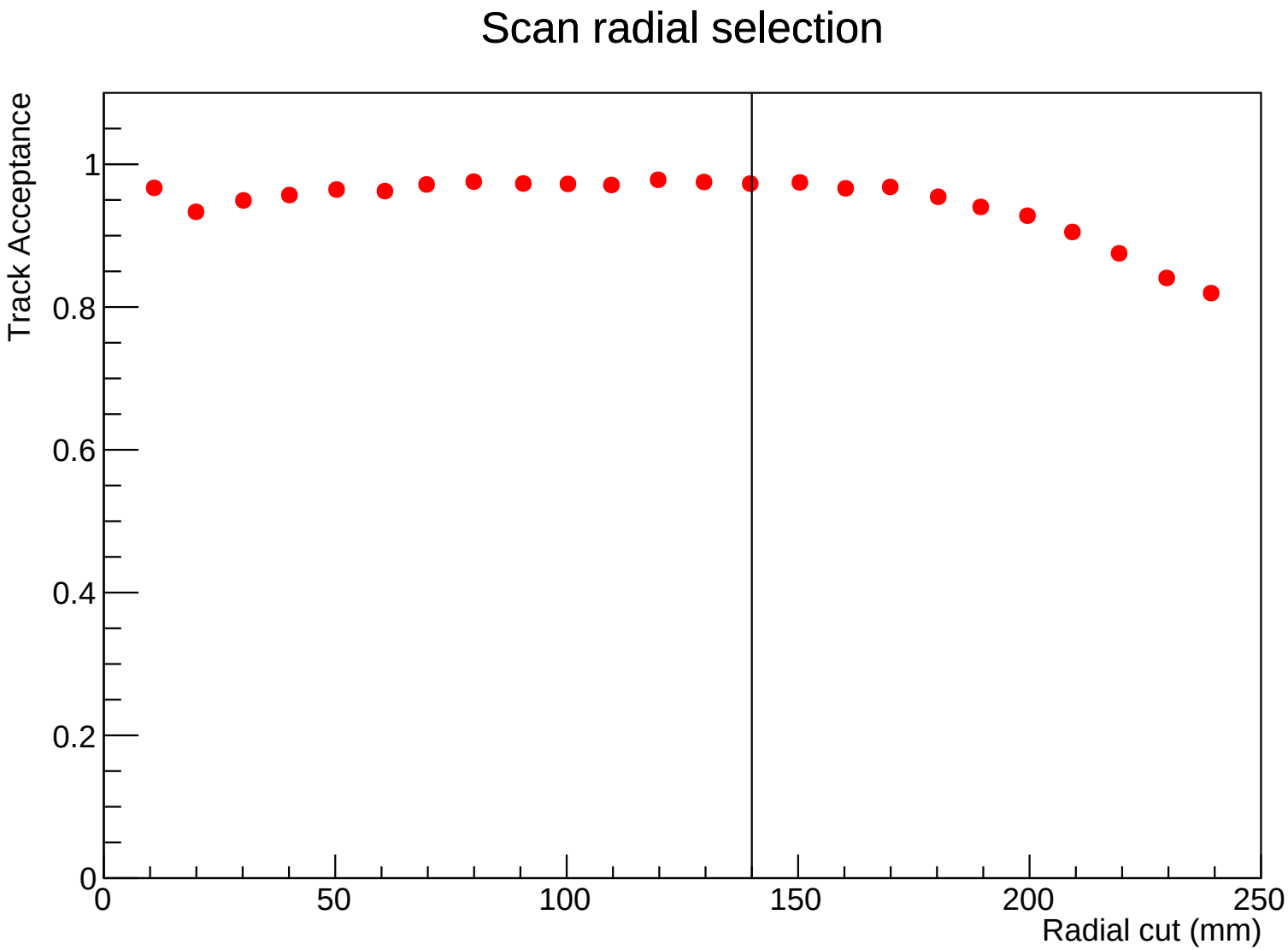
Fiducial Scan

- Ultimately want bin by bin correction for acceptance in θ
- $\therefore$ MC must be used, takes into account the efficiency, tracker resolution + selection. MC is treated in idential manner to data.

$$\frac{\text{No. of tracks in } \theta \text{ bin MC Truth that are reconstructed}}{\text{No. of tracks in } \theta \text{ bin MC Truth}} \quad (1)$$

- Detector efficiency know to be $\sim 100\%$ $\therefore$ selection acceptance must be $\sim 100\%$. If not then there is geometric acceptance effect which is a bias in scattering measurement
- Track upstream is propagated to most downstream plane in DSS, nominal scattering fixed 40 mrad.
- Scan cut applied to analysis and calculate track acceptance
- Justify cuts based on acceptance scan

Fiducial Scan

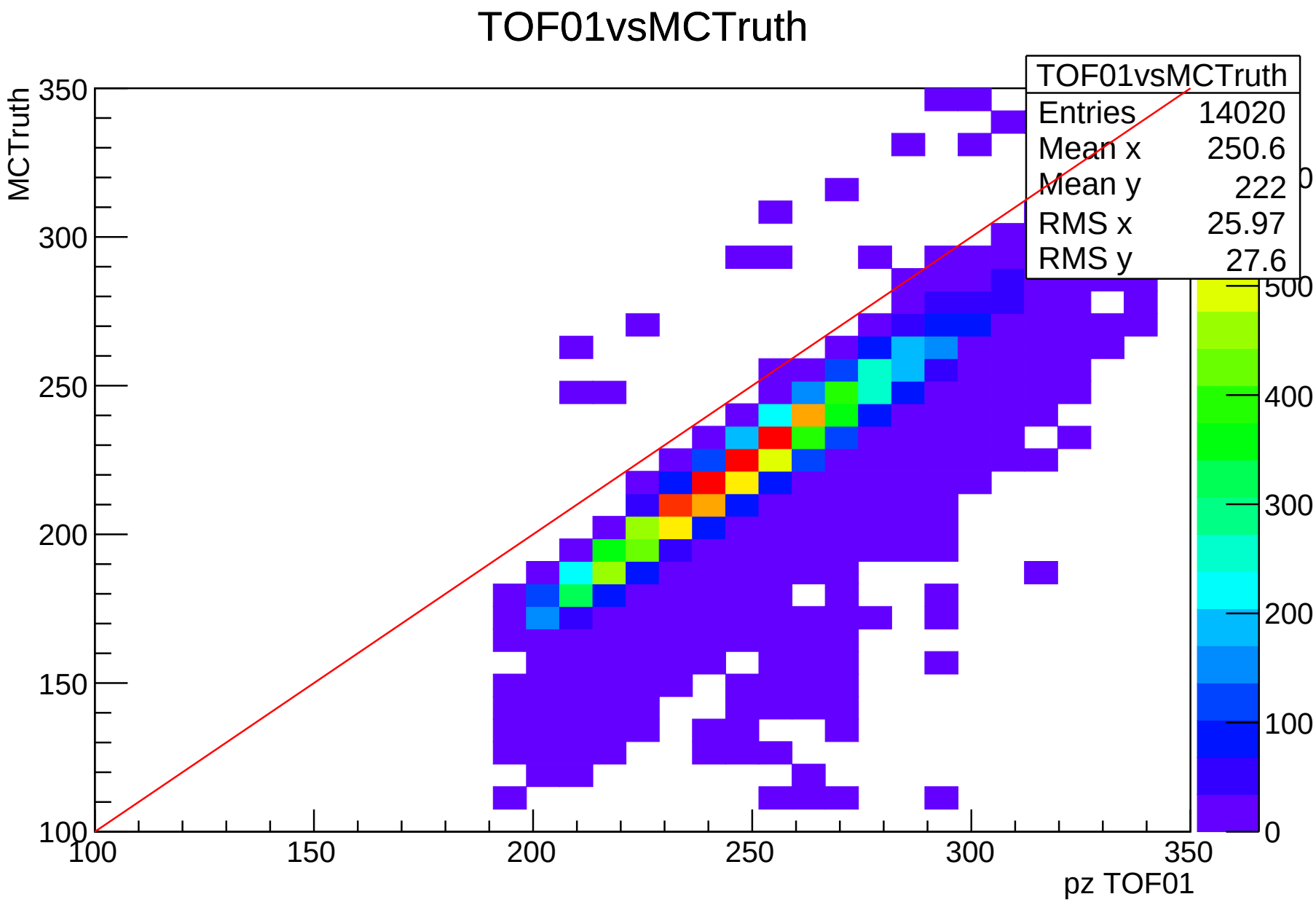


Momentum Correction

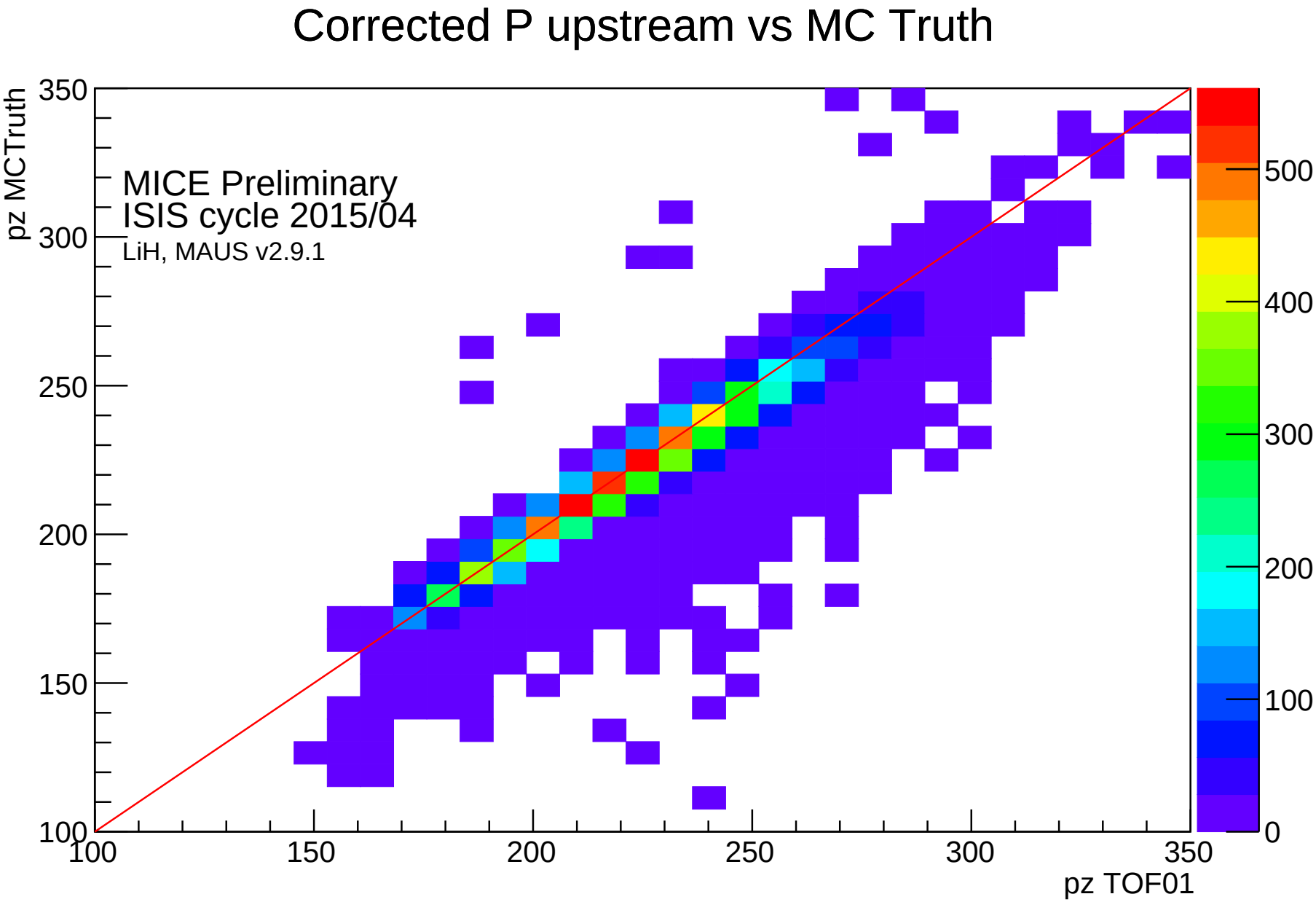
- Developed analytic formula for momentum correction over the summer - works fine
- For greater transparency now use Bethe-Bloch most probable energy loss for known material budget in channel

$$\Delta_p = \xi \left[\ln \frac{2mc^2\beta^2\gamma^2}{I} + \ln \frac{\xi}{I} + j - \beta^2 - \delta(\beta\gamma) \right] \tag{2}$$

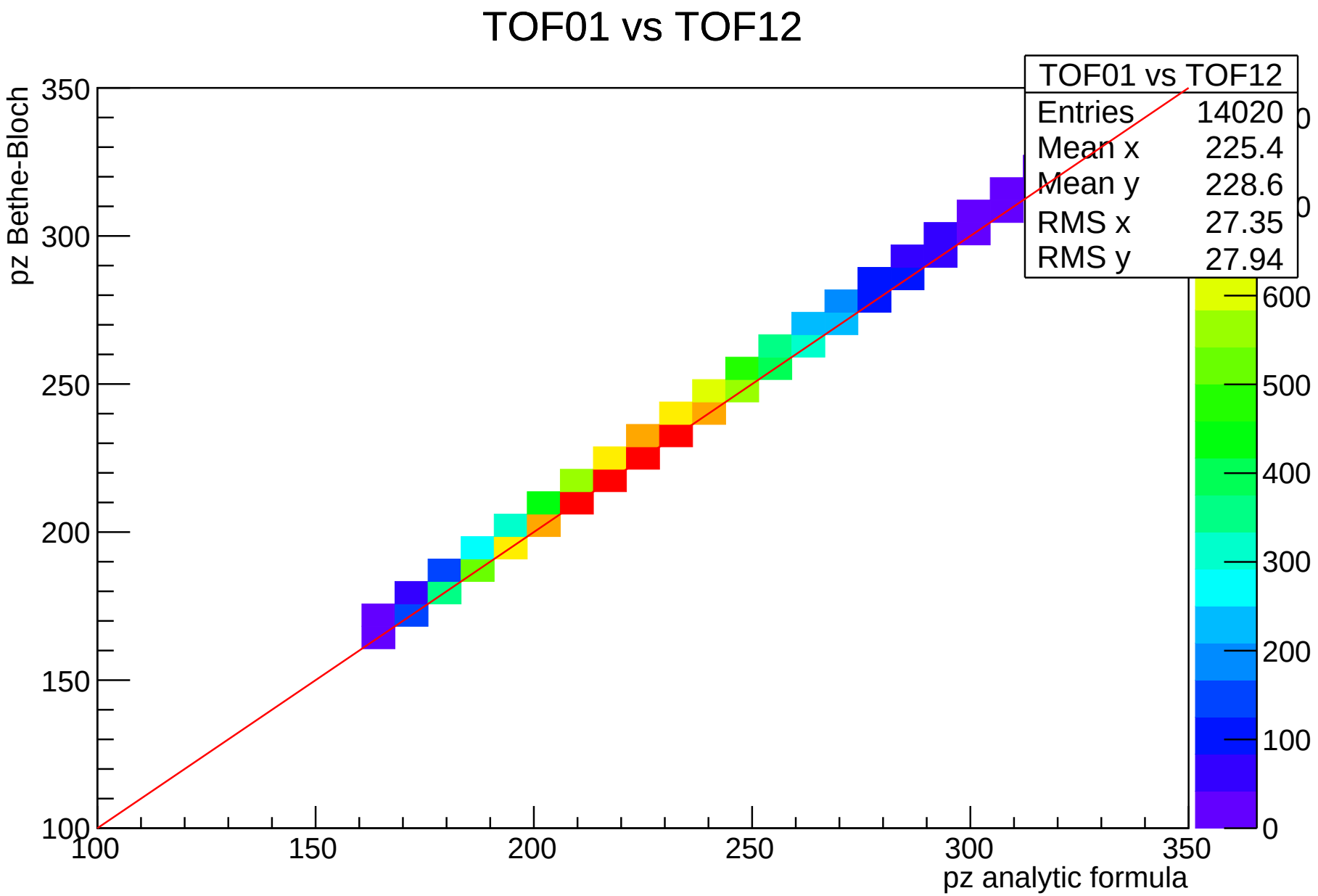
Compare Before Correction with MC



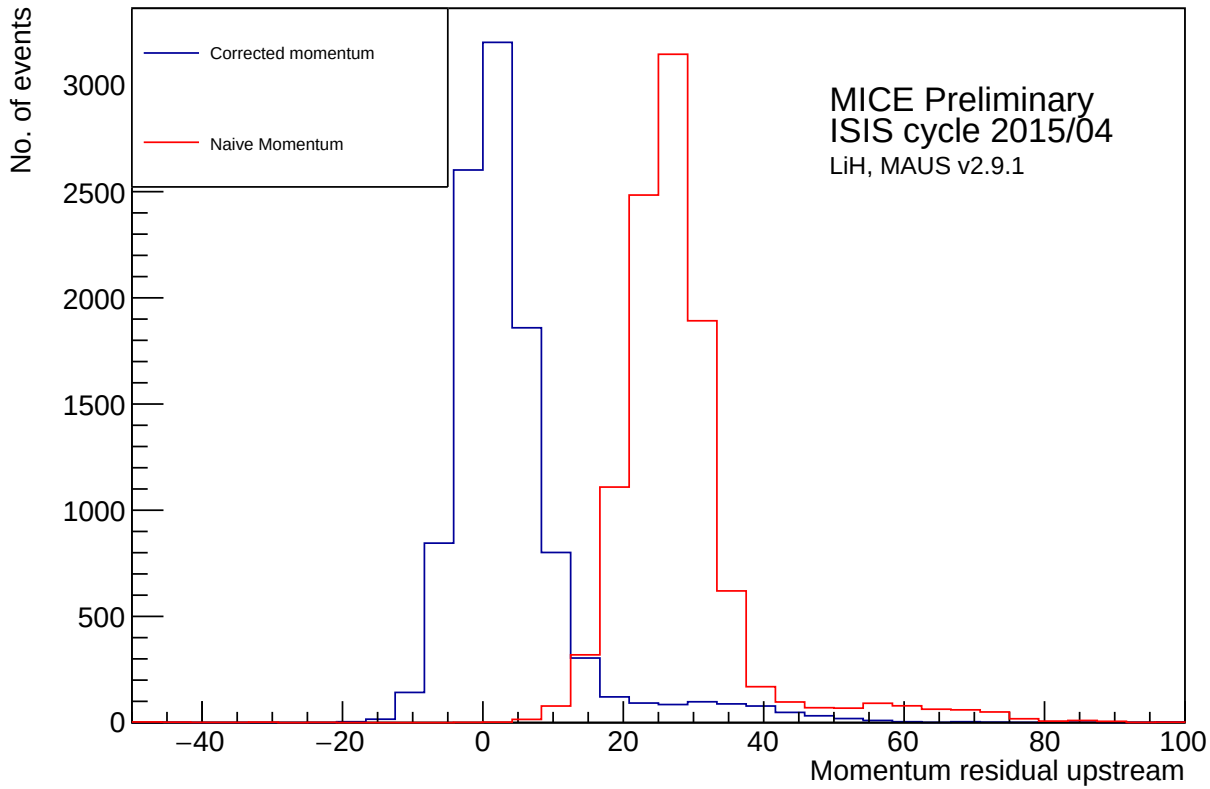
Compare Bethe Bloch Correction with MC



Compare Bethe Bloch Correction with Analytic formula



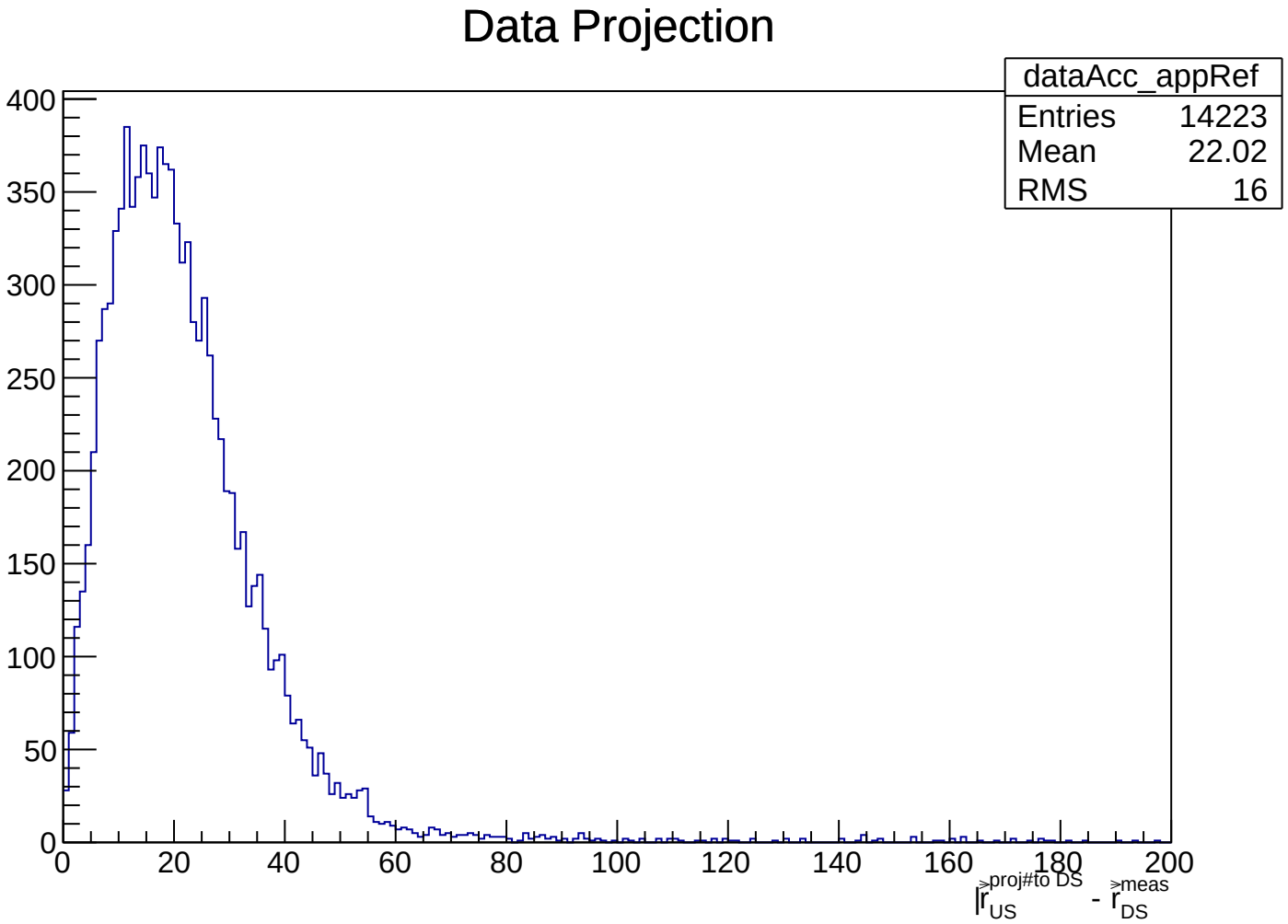
Before After Correction Residuals



Transverse Distance at Absorber

Request to understand distance between projected tracks at absorber centre

Project tracks to centre of absorber and calculate transverse distance



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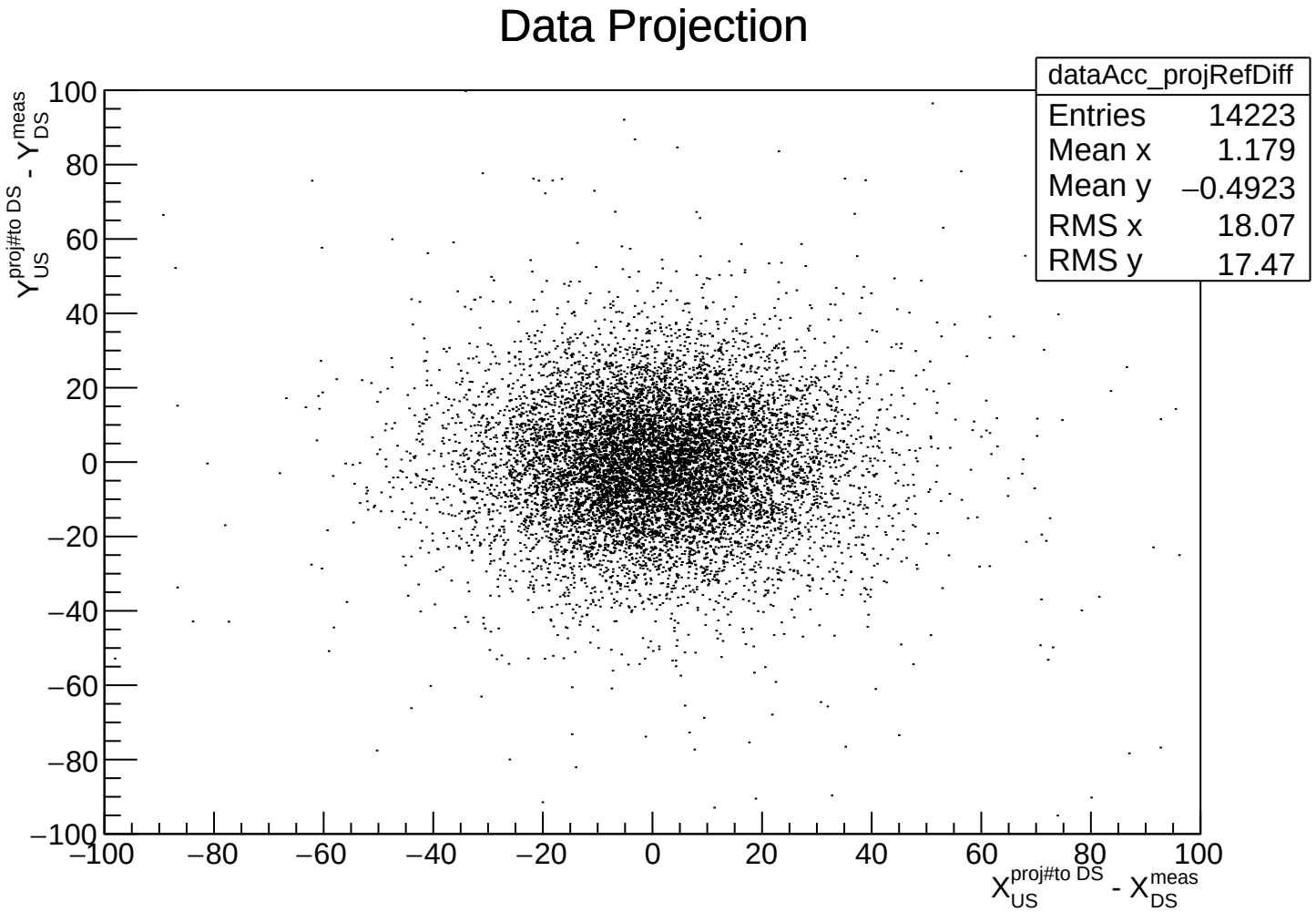


Rotate Angle Definitions

Definition of scattering angles comes from Cobb Note

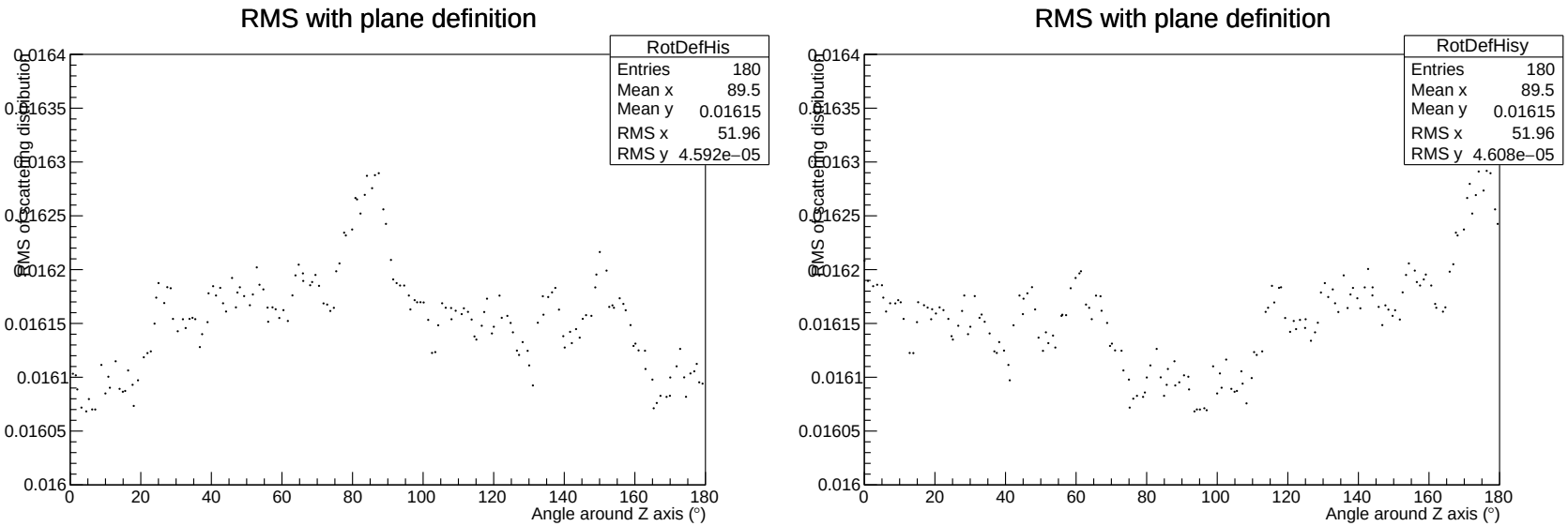
$$\tan\theta_p = \frac{\vec{d}\cdot\vec{v'}}{\vec{d}\cdot\vec{u}} \tag{3}$$

where

$$\vec{v} = \vec{s}\times\vec{u} \tag{4}$$

where $\vec{s}$ is arbitrary defined as $\vec{s} = (0, -1, 0)$
Test that this definition is arbitrary by rotating around the z-axis and plot RMS of scattering distribution

Rotate Angle Definitions



Left: θ"$_x$" Right: θ"$_y$"