

Field Off Scattering Studies: Current Status

John Nugent

University of Glasgow

john.nugent@glasgow.ac.uk

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Job List

- Study selection - scan in radial cut compare recon and truth for scattering distribution
- Analyse pencil beam - currently building
- Check against χ^2/NDF for MC Truth scattering distribution

Gold Algorithm

$$x' = H'x \quad (1)$$

- where $H' = H^T H H^T$ and H^T is a Toeplitz matrix¹. x' is known from data, and the method iterates over:

$$x_i^{(k+1)} = \frac{x'_i}{\sum_{m=0}^{N-1} H'_{im} x_m^{(k)}} x_i^{(k)} \quad (2)$$

where

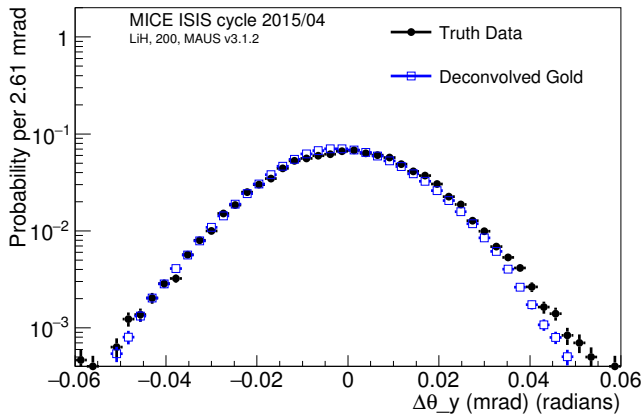
$$\begin{aligned} i &= 0, 1, \dots, N-1, \\ k &= 1, 2, 3, \dots, L, \\ x^0 &= [1, 1, \dots, 1]^T \end{aligned} \quad (3)$$

where L is the number of iterations.

¹A Toeplitz matrix is an $n \times n$ matrix $T_n = [t_{k,j}; k, j = 0, 1, \dots, n-1]$ where $t_{k,j} = t_{k-j}$

MC Data comparison

Current situation

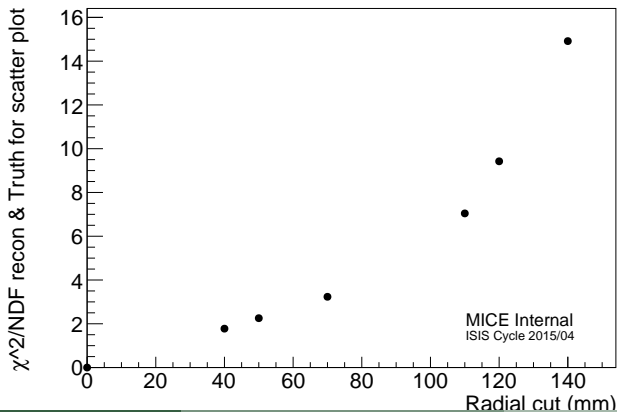


- 200 MeV/c case
- trkr acceptance + Gold iter 10

Deconvolved scattering distribution

Scan parameters as a function of radial cut

- Asymmetry - shows no clear trend and is consistent with 0
- mean - shows no clear trend and is consistent with 0
- skew - shows no clear trend and is consistent with 0
- Use χ^2/NDF between recon and truth and shows a nice trend



LH₂ Scattering

- Gavriil is continuing to study the effects of the absorber vessel on the scattering measurement
- Next job will be to study the PID in the π beam for the scattering measurement

Job List

- Include all updates in Note