Energy Loss Analysis

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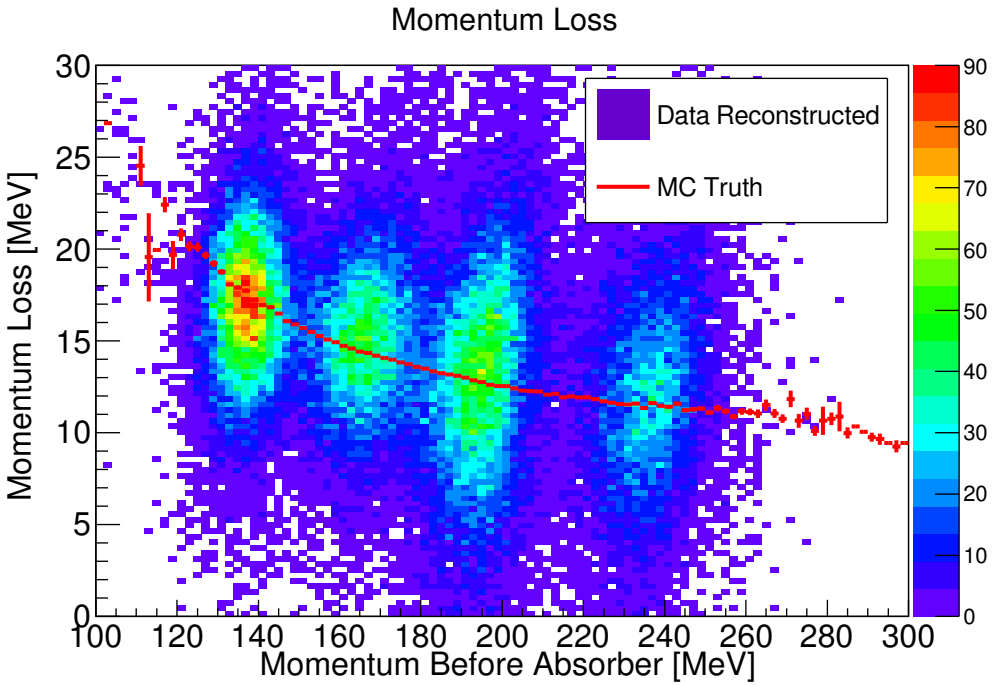
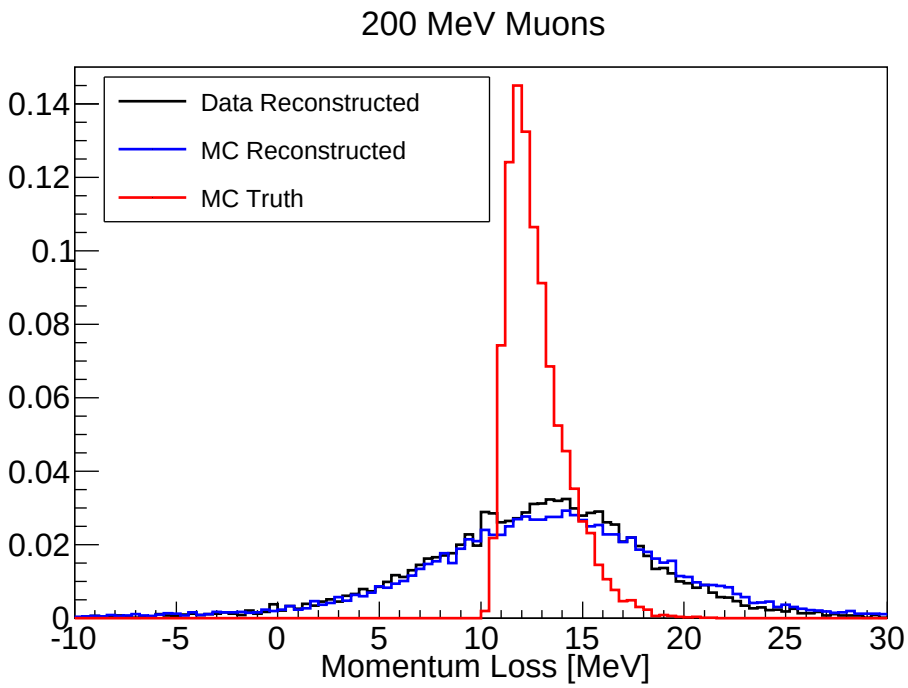
Momentum Loss Measurement



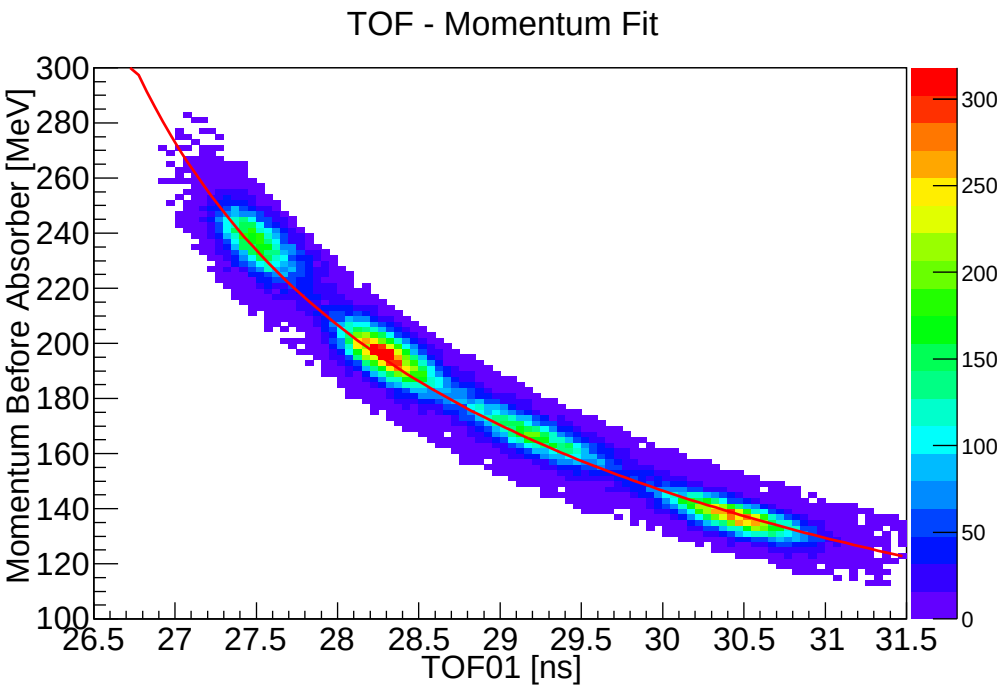


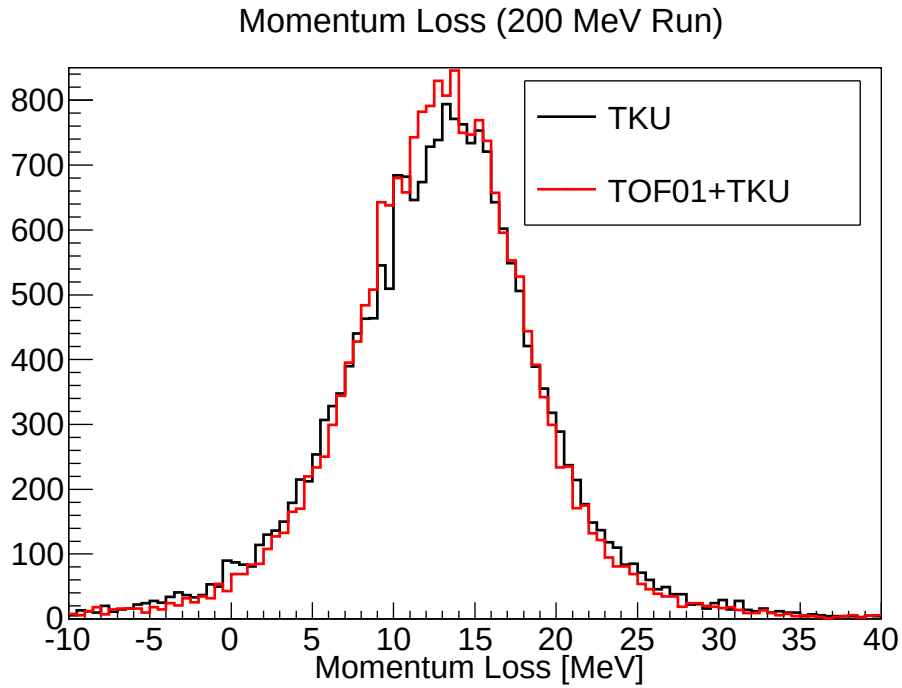
- With two working trackers, simple measurement is easy
- 200 MeV MC: (13.3 ± 5.9) MeV
  200 MeV Data: (12.8 ± 5.3) MeV
- Trying to improve upon the simple measurement

Sample Selection

- Exactly one helical track upstream and downstream
- Loose TOF01 - TKU cut to cut out pions and scraped muons
- $p_T/p > 0.1$ to ensure momentum is well-measured

Adding TOF





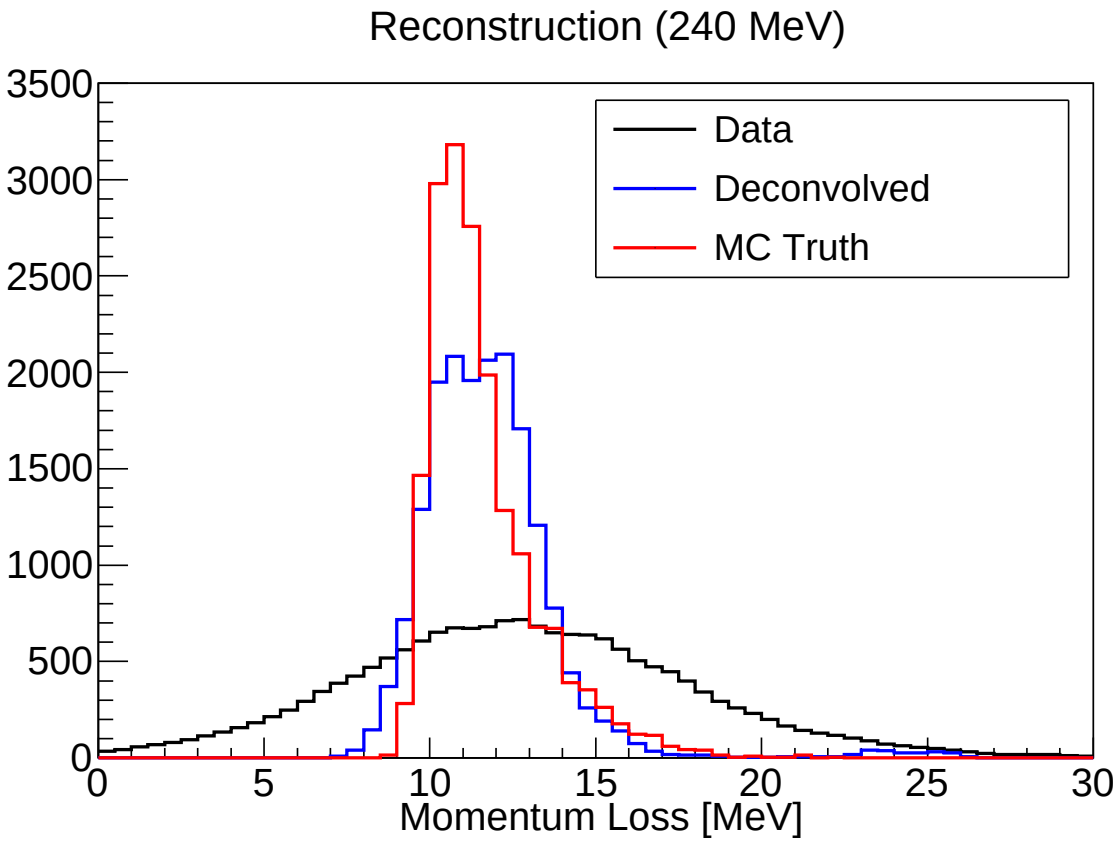
- TOF01 gives a momentum measurement with similar precision to the tracker
- Combining TOF and tracker measurements improves the upstream resolution

Convolution Fit

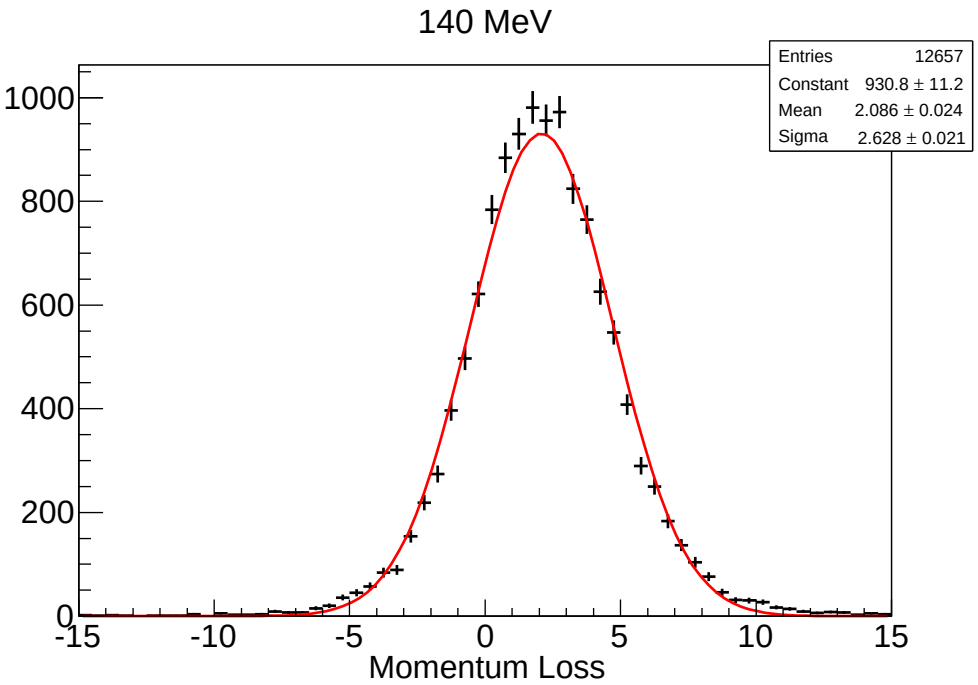
Previously, deconvolved LiH data using empty absorber data to extract Landau

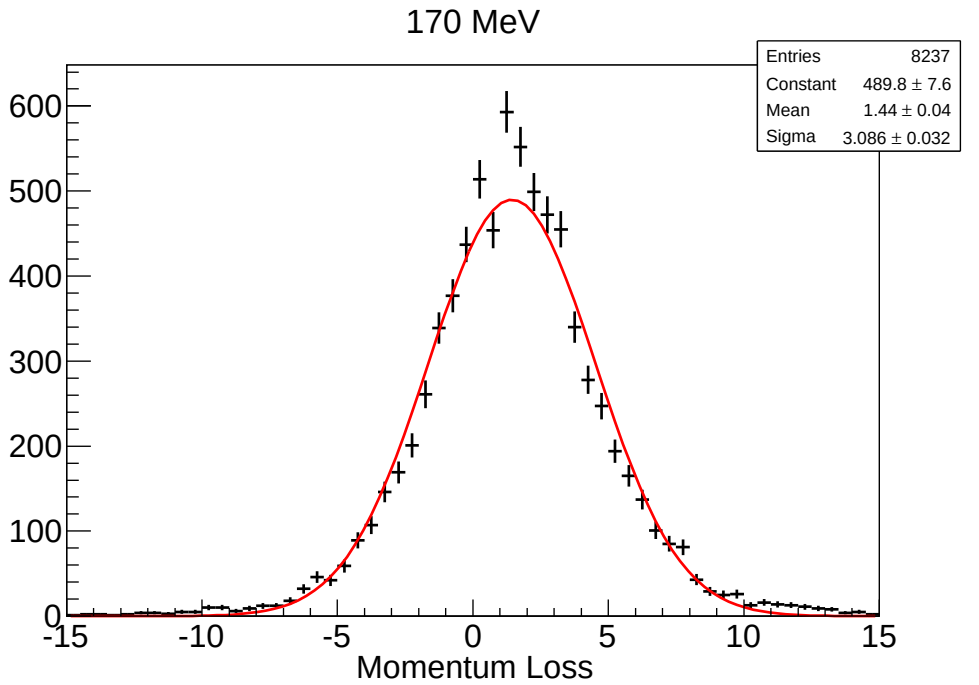
- Now: fit empty absorber data to find resolution
- Fit LiH absorber data to convolution of landau and gaussian
- Results in better match to theory and no deconvolution artifacts

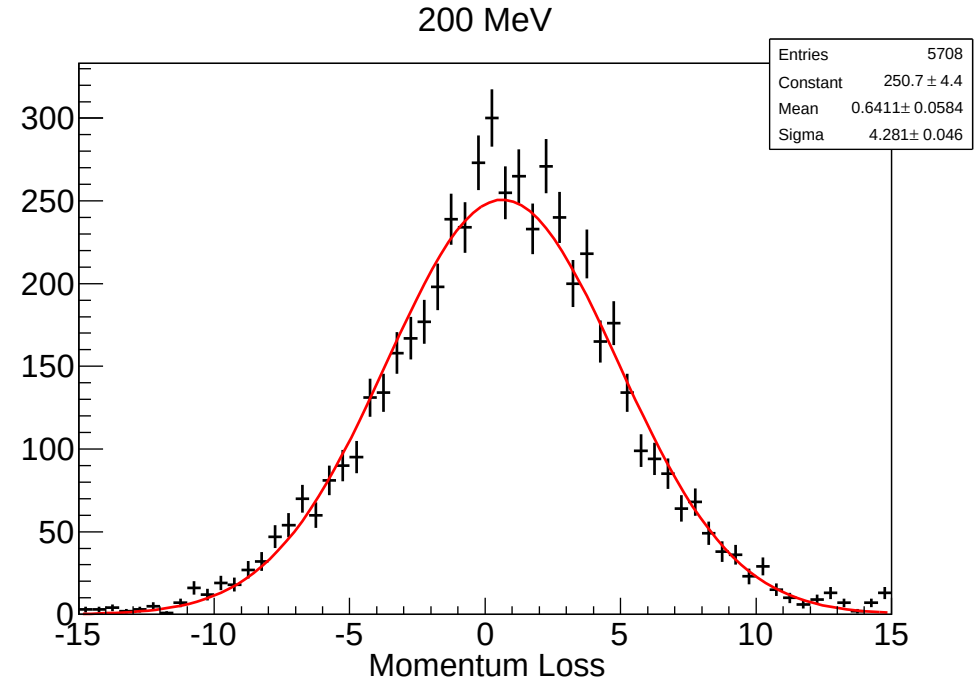
Old:

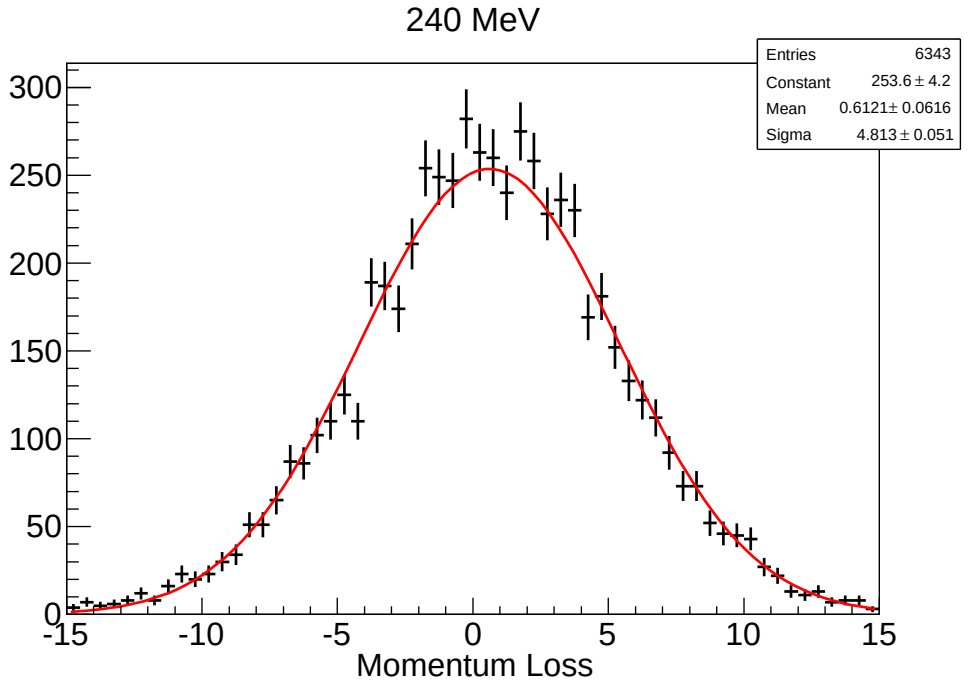


Empty Absorber Fits



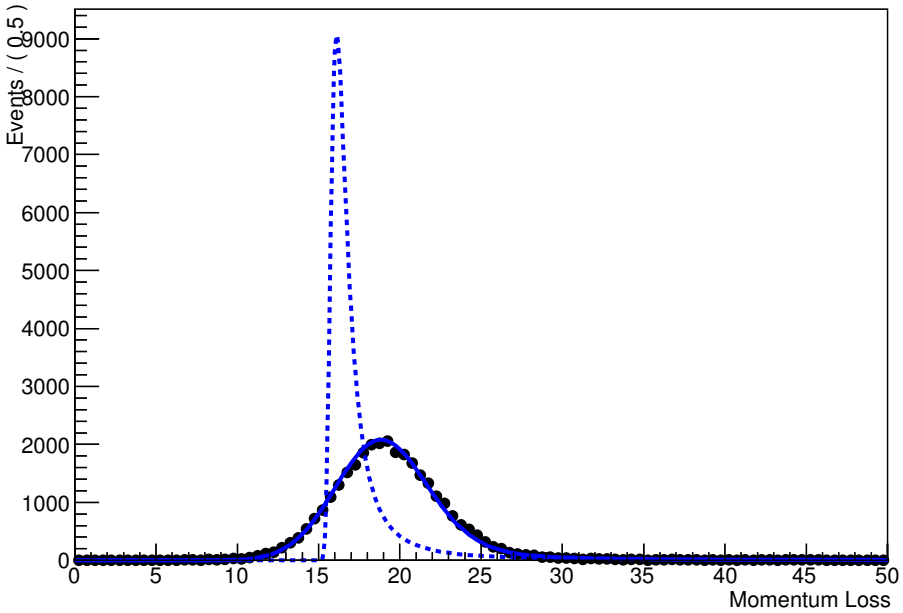




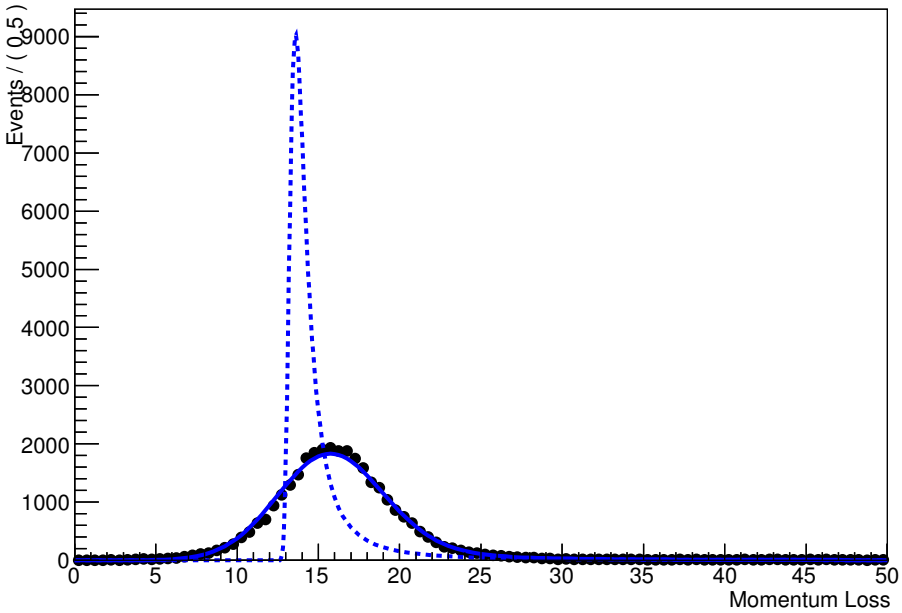


Convolved Energy Loss Fits

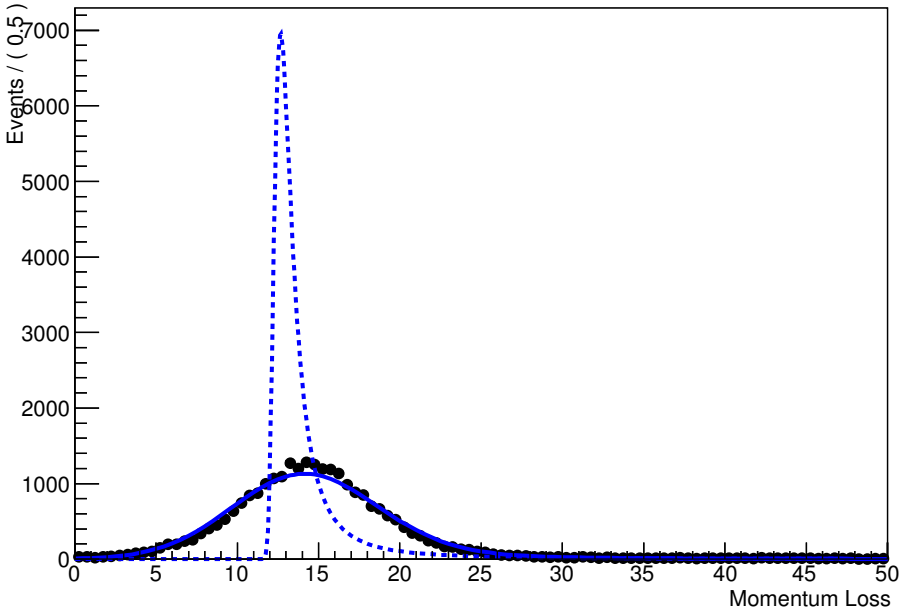
140 MeV



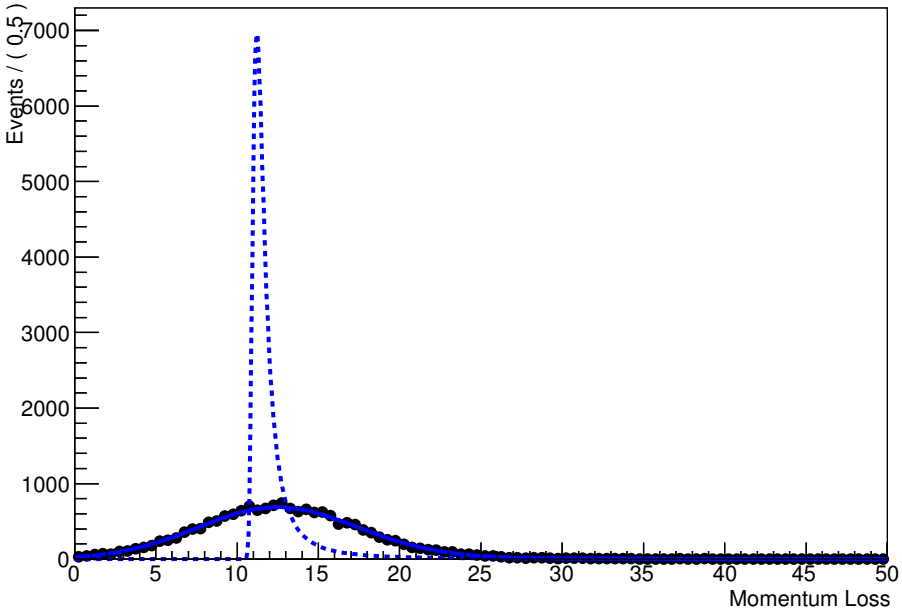
170 MeV



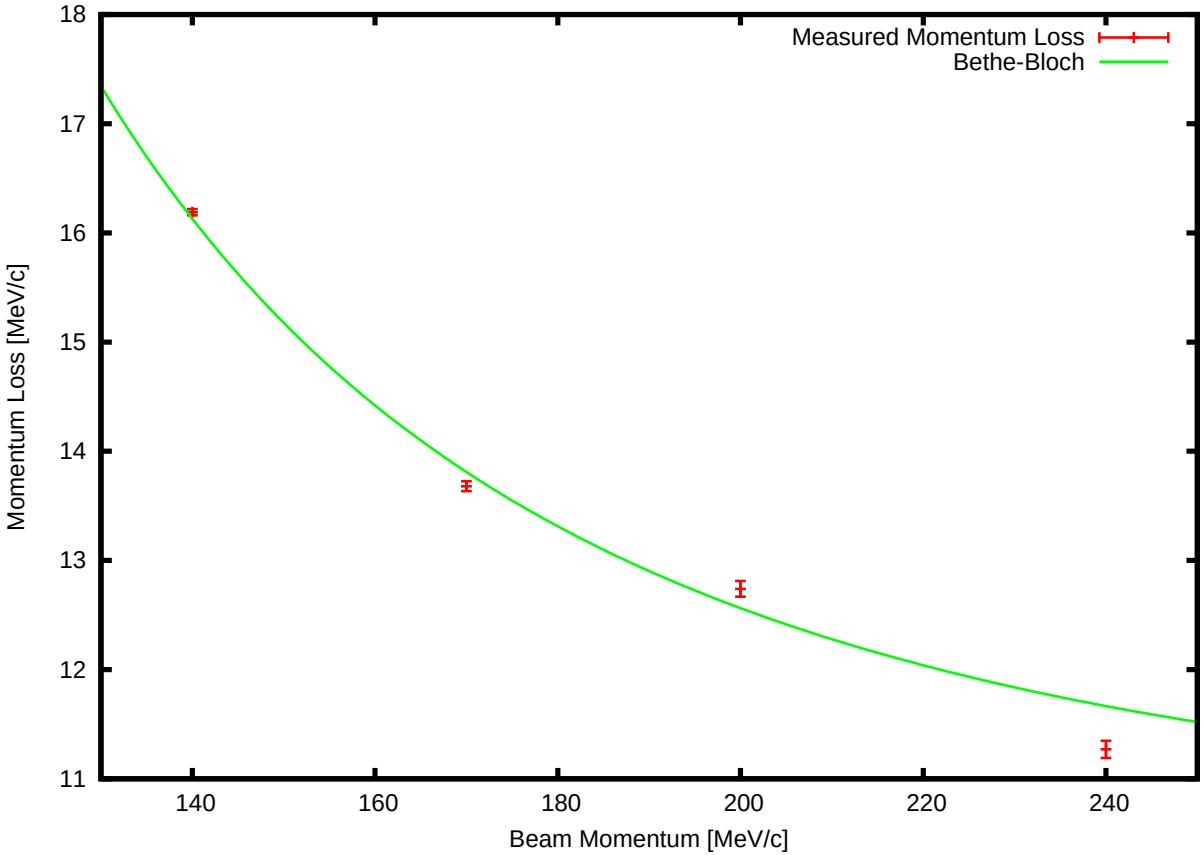
200 MeV



240 MeV



Comparison to Theory



- Fits theory better than deconvolution method

Next Steps

- Improve error estimation
- Analyze Neon (and eventually Hydrogen) data