

Flip mode emittance analysis update

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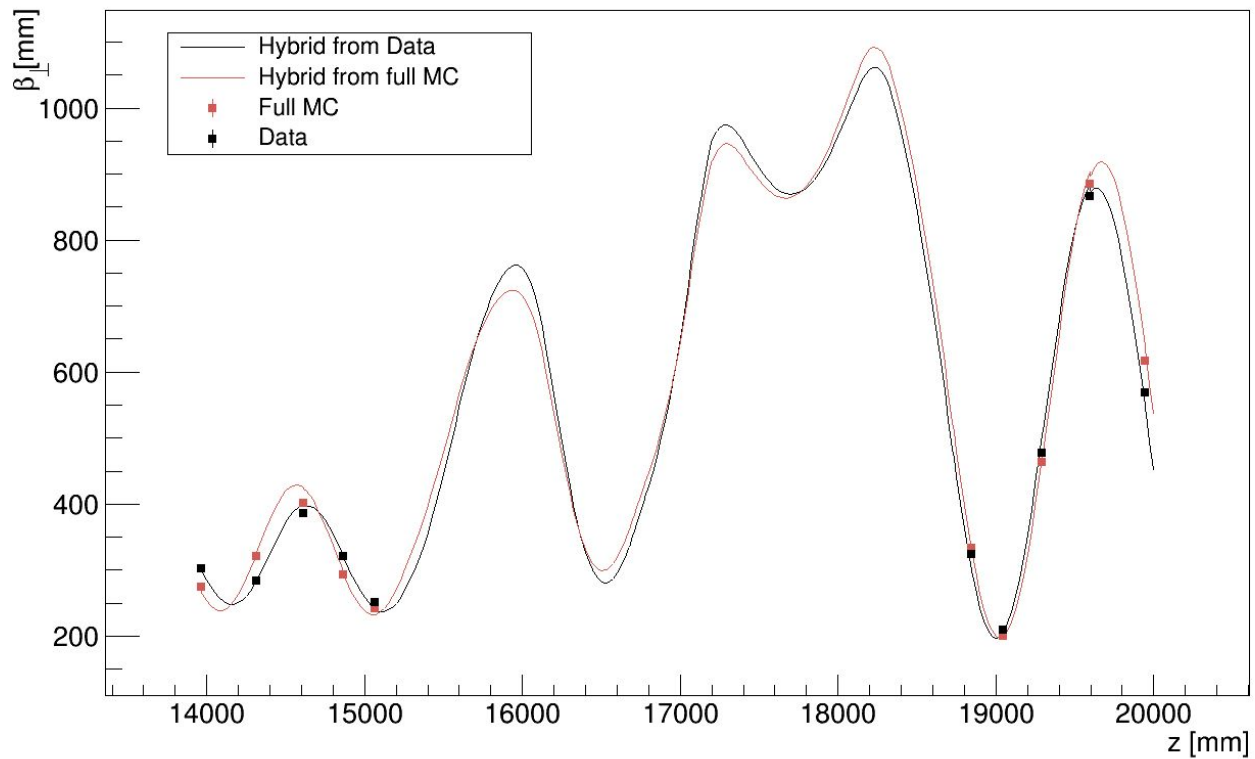
May 1, 2020

ICL Accelerator Meeting

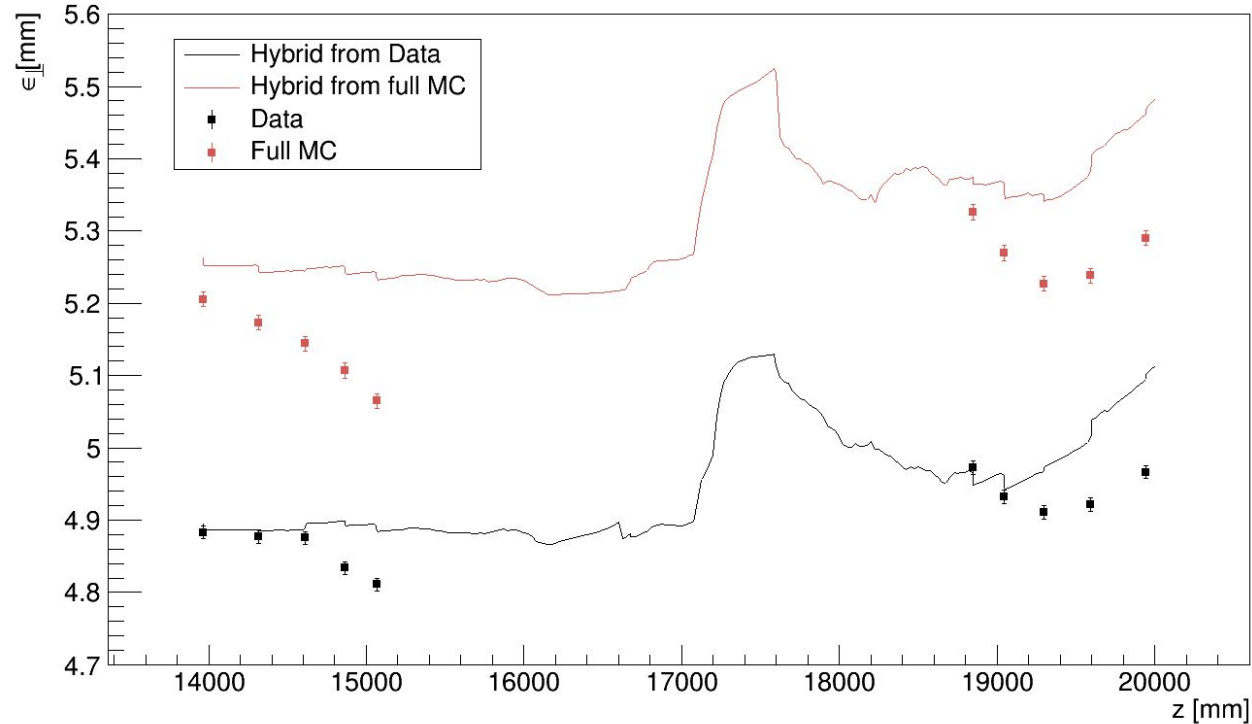
Hybrid MC (Truth)

- Extracted Data and full MC parent beams at TKU5 and produced hybrid MC simulations
- Simulated 15k particles
- Events in the simulated beams required to pass through all the virtual planes in the cooling channel (from TKU5 to TKD5)

Betatron function



Emittance including particle losses in Hybrid MC

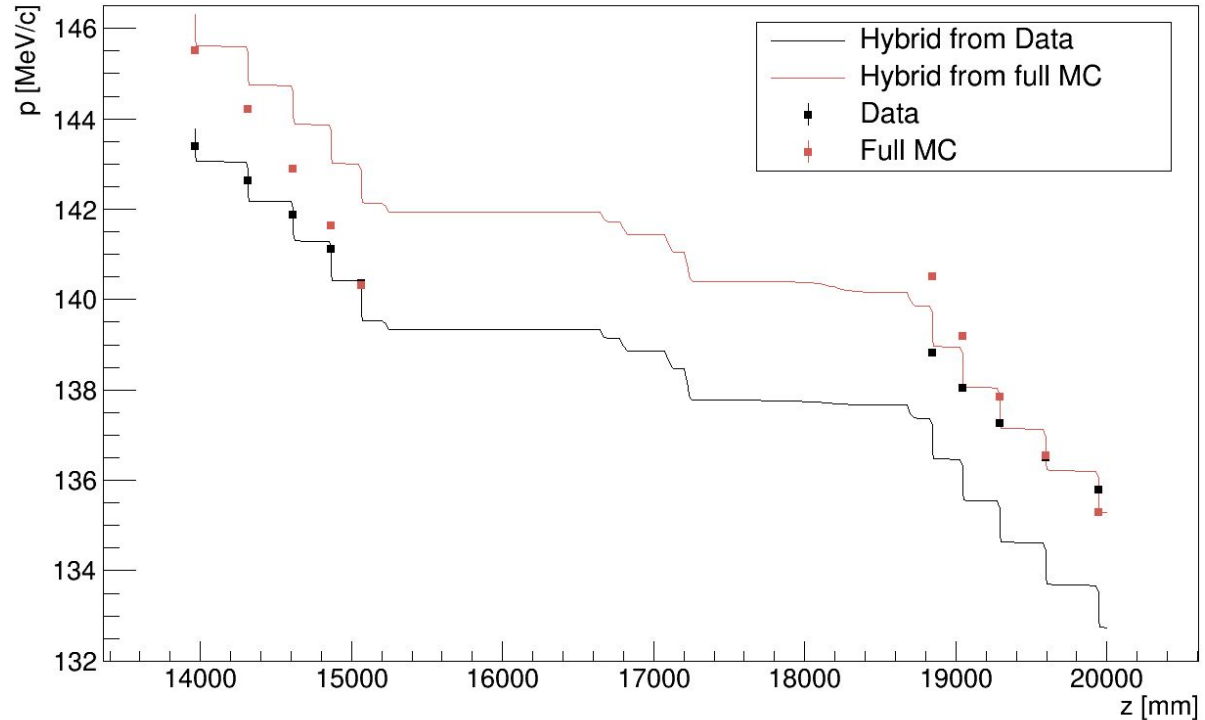


Momentum

More energy/momentum loss at tracker stations observed in the full MC than in Data. However, while in Data the beam losses 1.6 MeV/c by passing through the vessel windows, there is no loss (0.2 MeV/c 'gain') in the full MC.

Also, the energy loss at *tracker stations* in the full MC is greater than the loss observed in the Hybrid MC. I am aware the glue density in the tracker stations was changed in the full MC -> are the trackers descriptions the same in CR's full MC and my Hybrid MC?

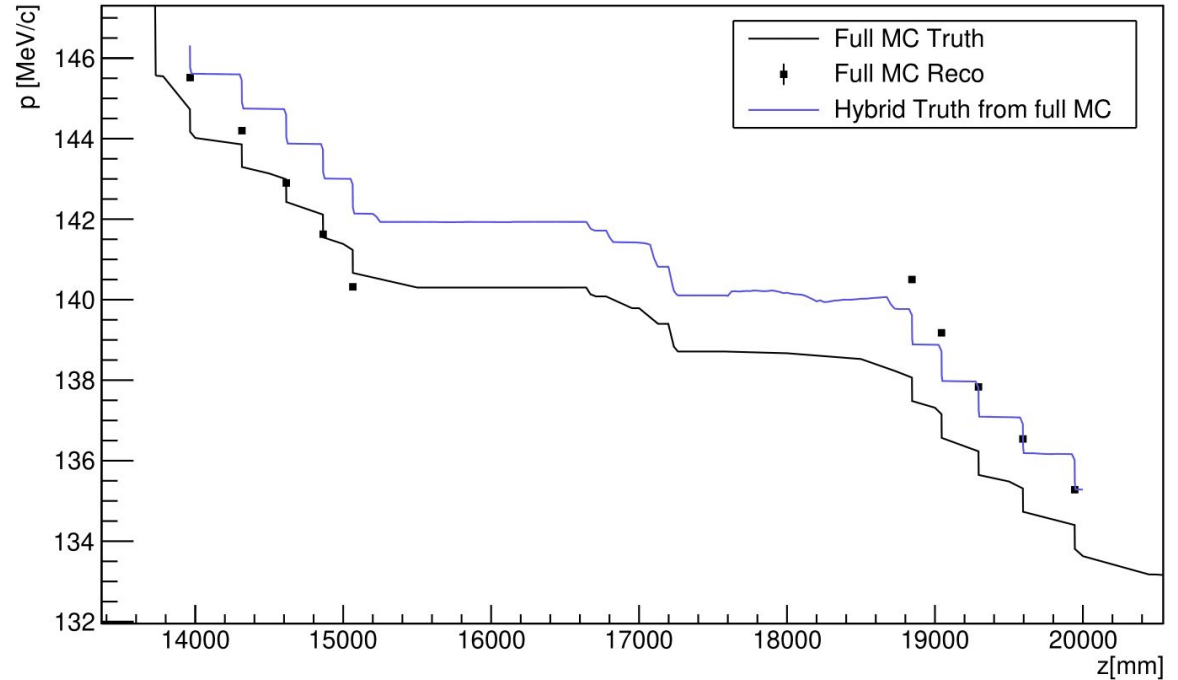
Also, the Hybrid MC observes the presence of the vessel.



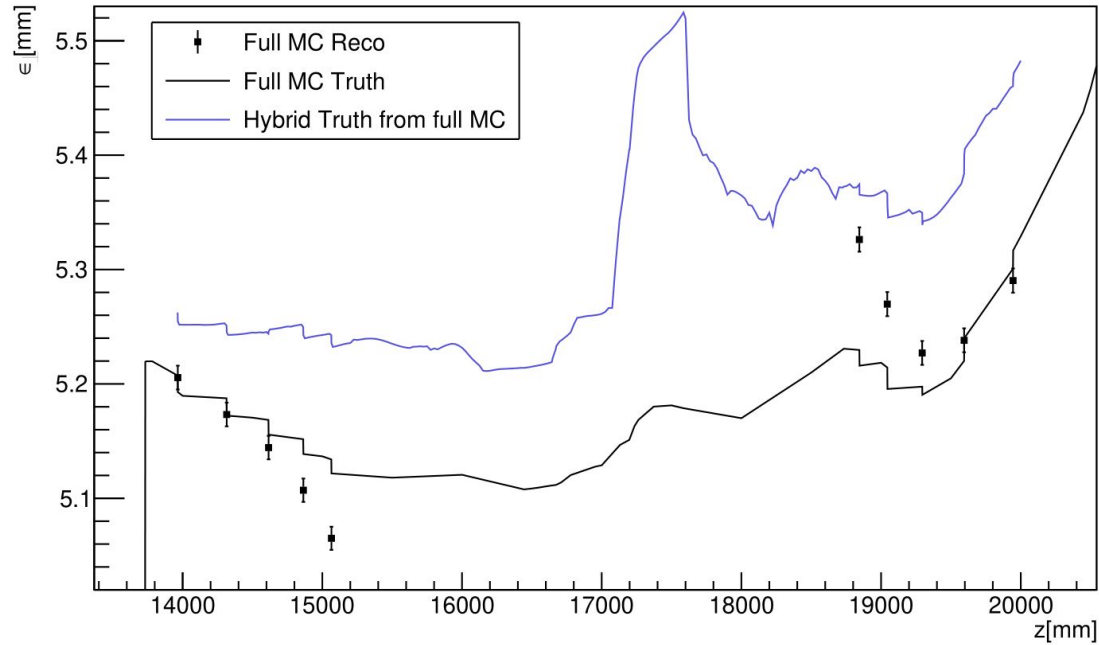
Full MC: Momentum Update

Same momentum loss
observed in Full MC Truth
and Hybrid Truth ->
descriptions consistent
between the two

Biased reconstruction

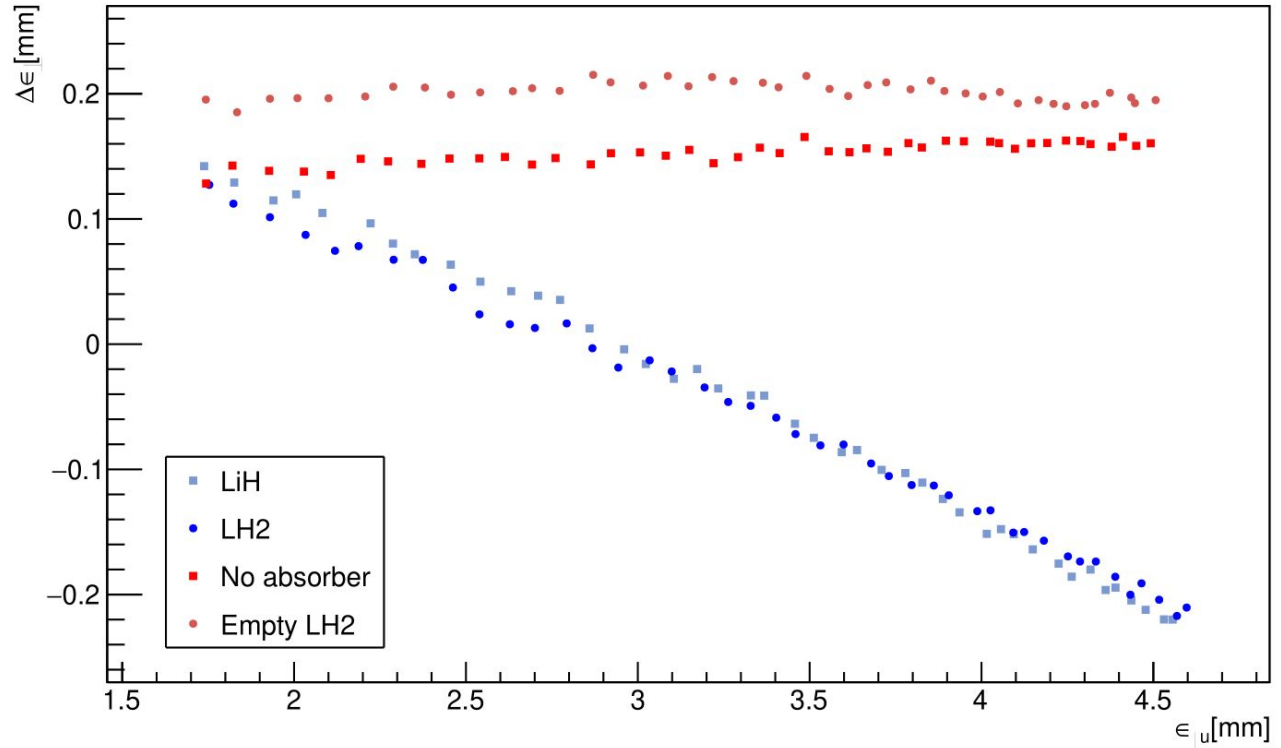


Full MC: Emittance Update

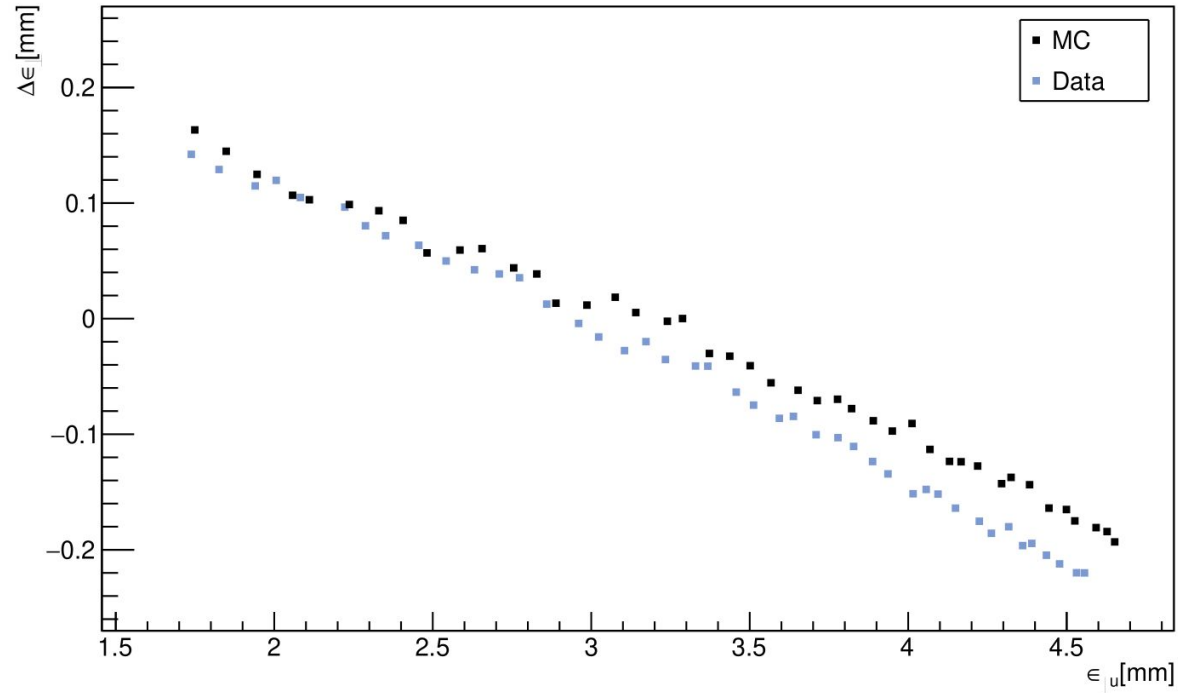


High level analysis update

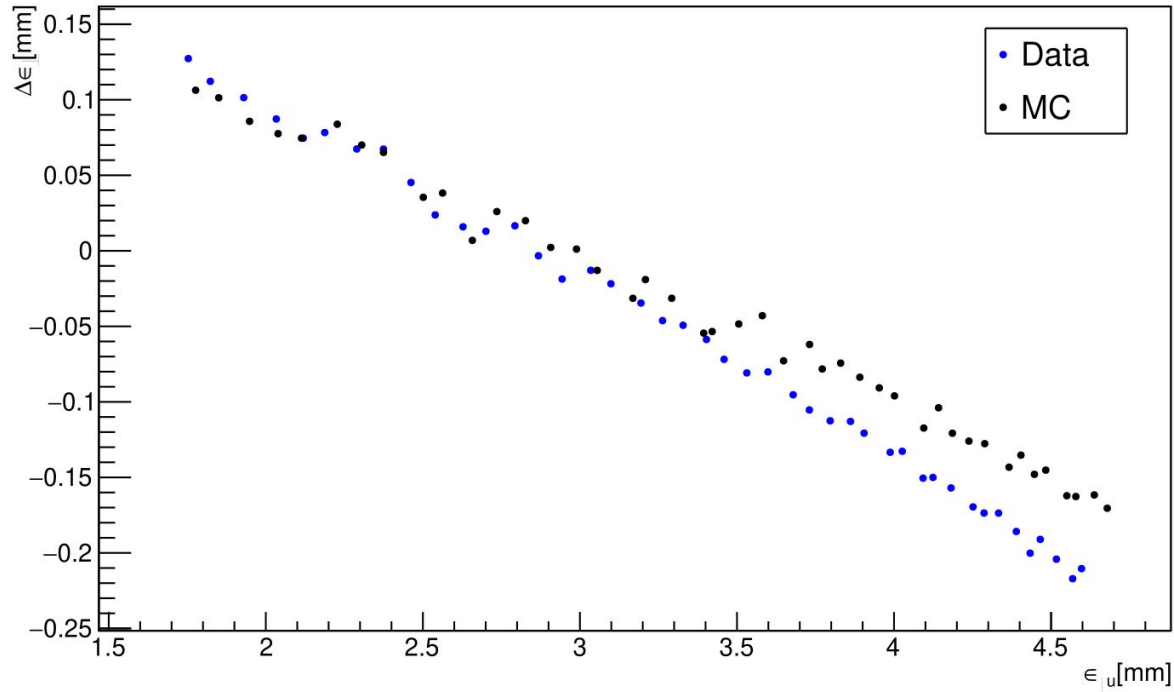
LiH analysis added



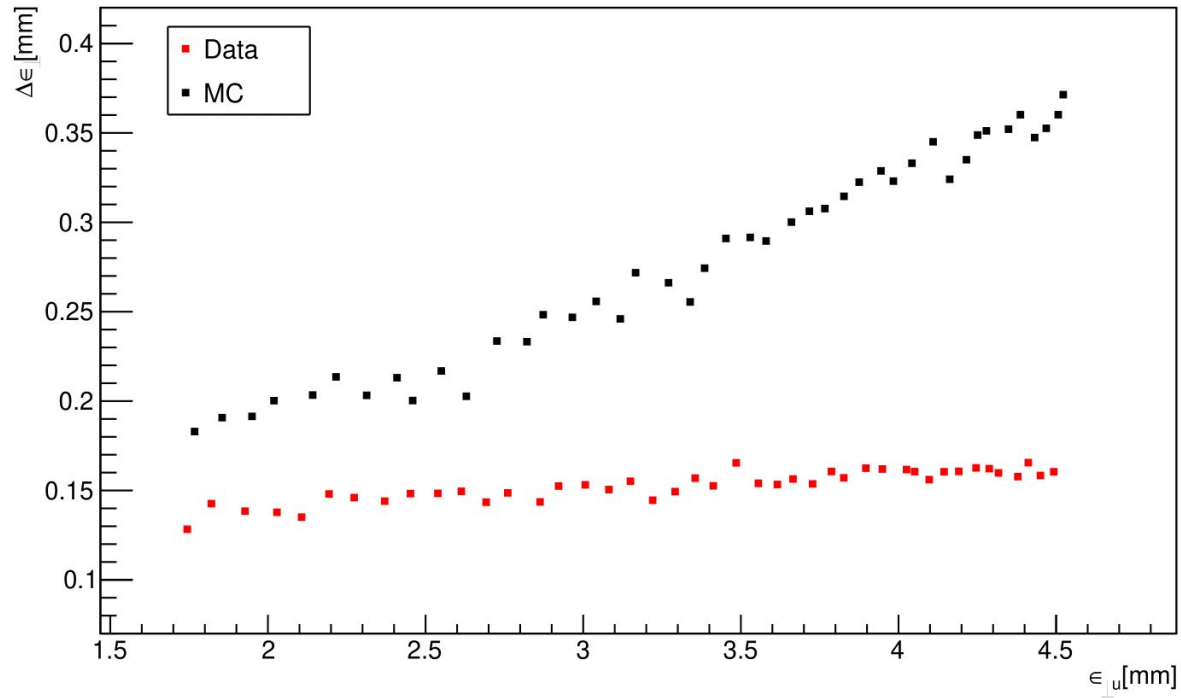
Data vs CR Full MC: LiH



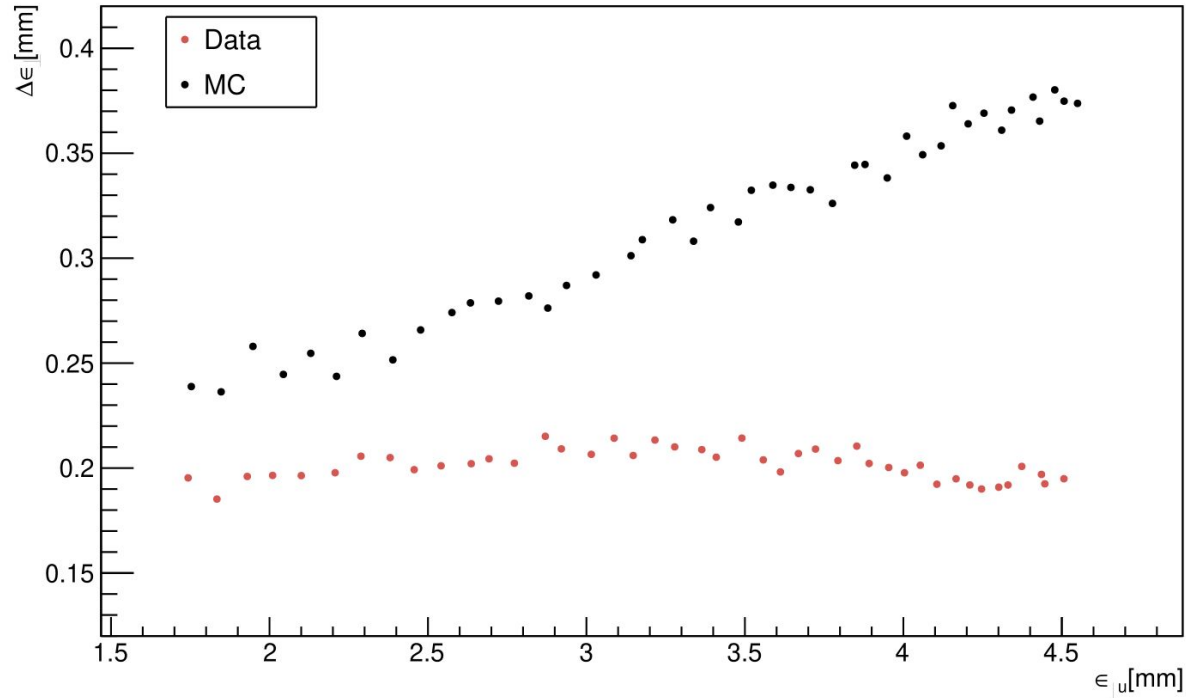
Data vs CR Full MC: LH2



Data vs CR Full MC: No absorber



Data vs CR Full MC: Empty LH2 vessel



Rejection Sampling Update

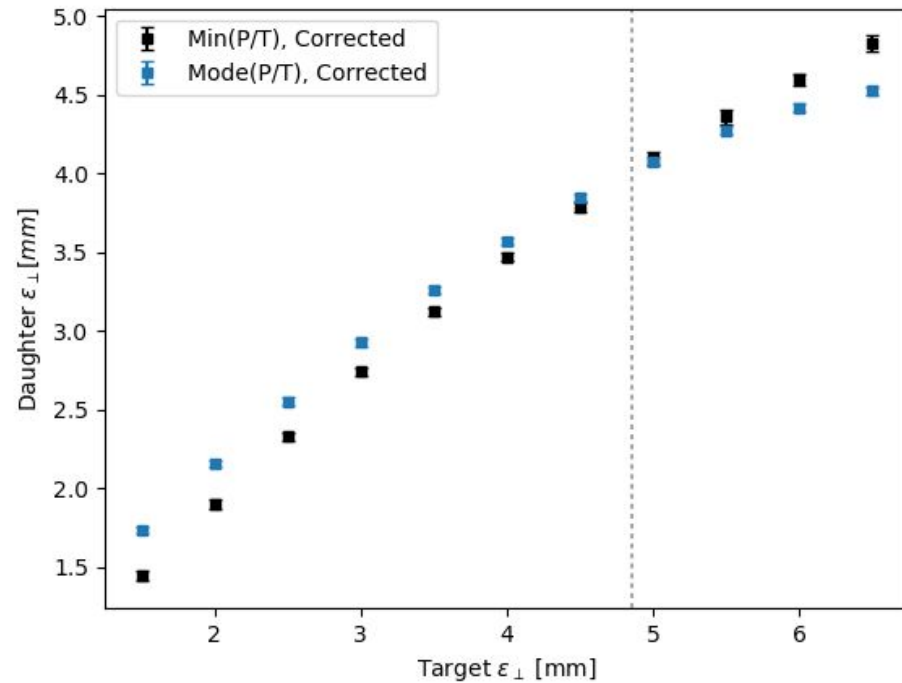
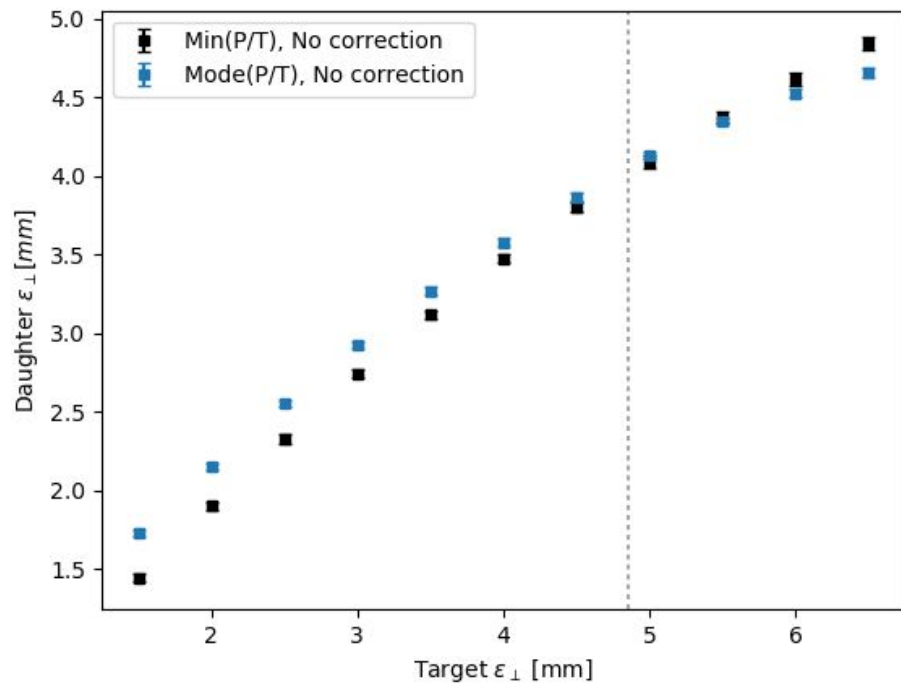
Generated parent beams with a specific set of parameters: [$\epsilon=4.85$ mm, $\beta = 282$ mm, $\alpha = 0.045$, $L = 1.1$]

Target parameters: [$\epsilon= [1.5 - 6.5; 0.5]$ mm, $\beta = 310$ mm, $\alpha = 0.0$, $L = 1.1$]

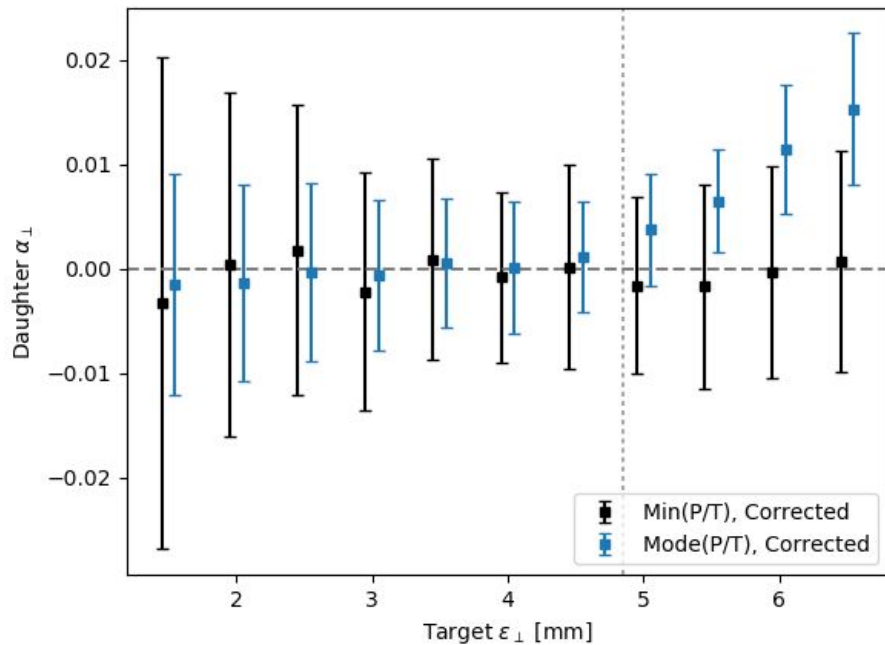
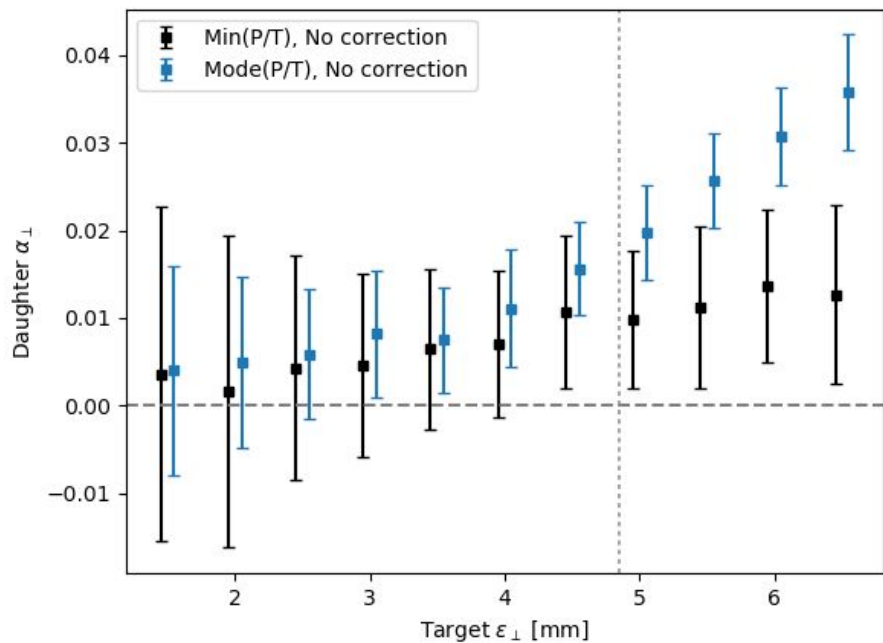
For each combination of parent and target parameters, repeated procedure 100 times

Update: applied correction to the α , β target parameters in order to obtain daughter values close to $\alpha = 0.0$ and $\beta = 310$ mm

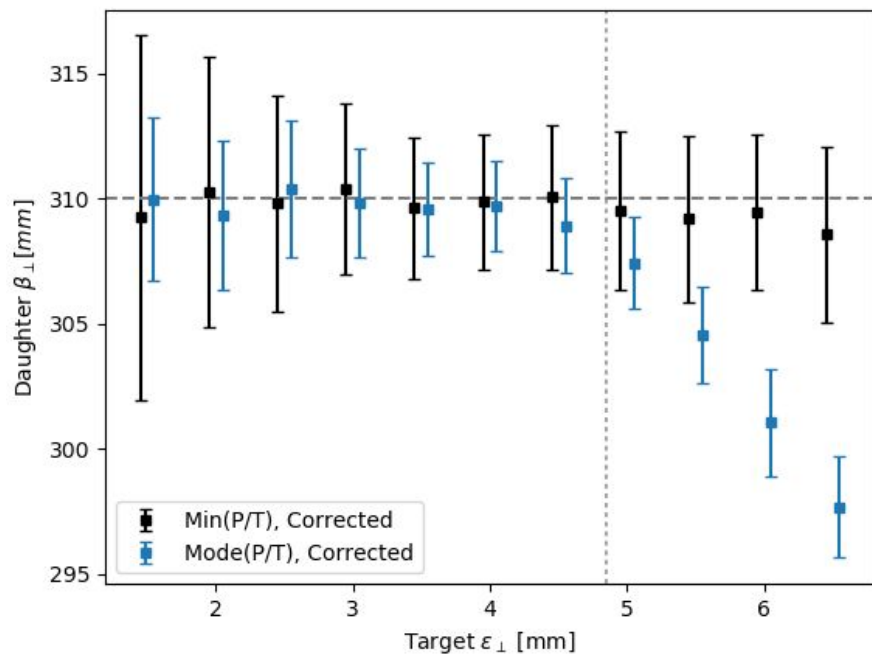
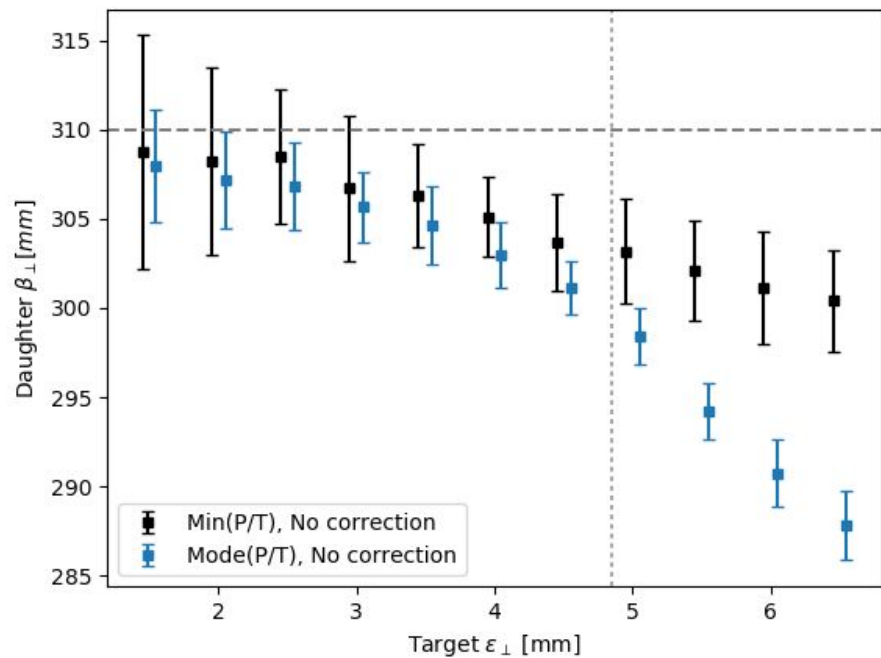
Emittance



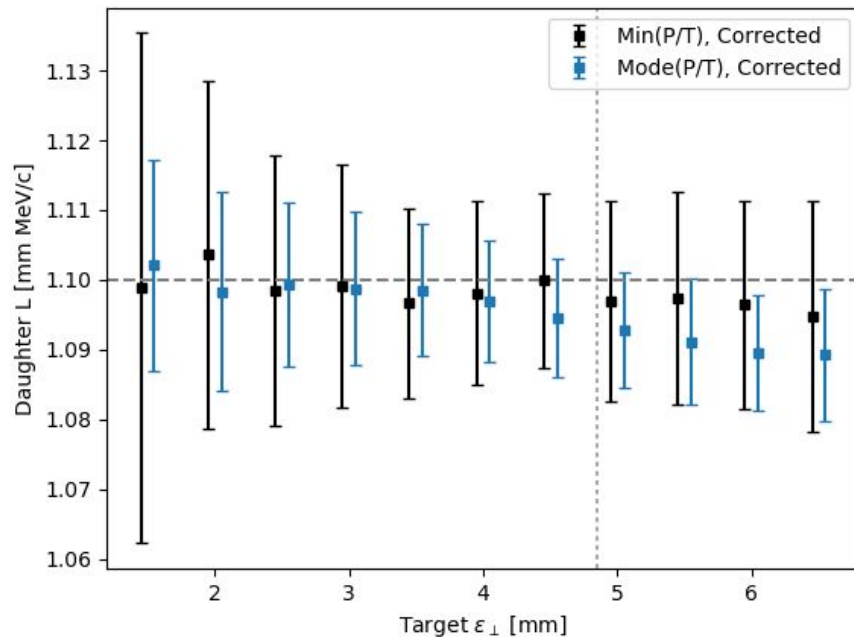
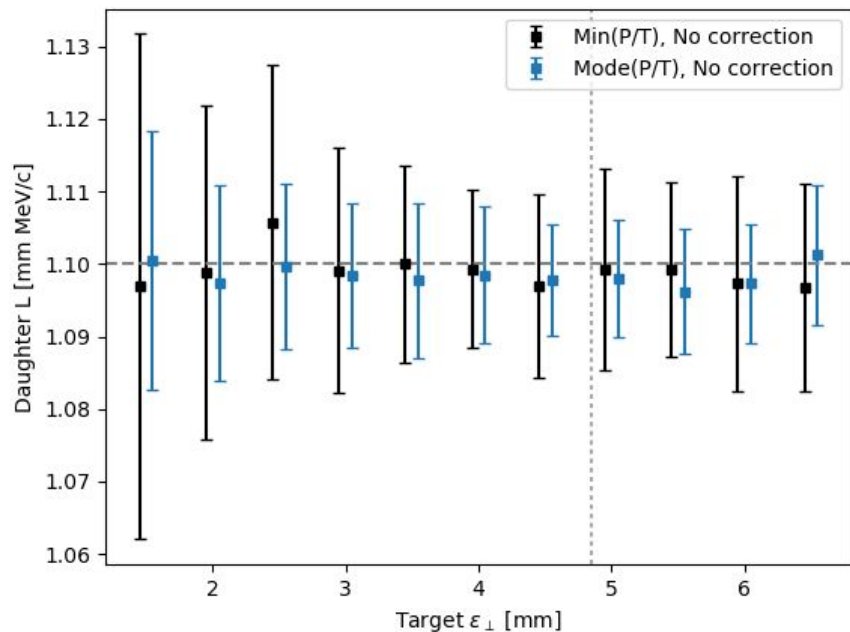
Alpha



Beta



Angular momentum term



Number of sampled particles

