

Wirecell Group Updates

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April 30, 2026

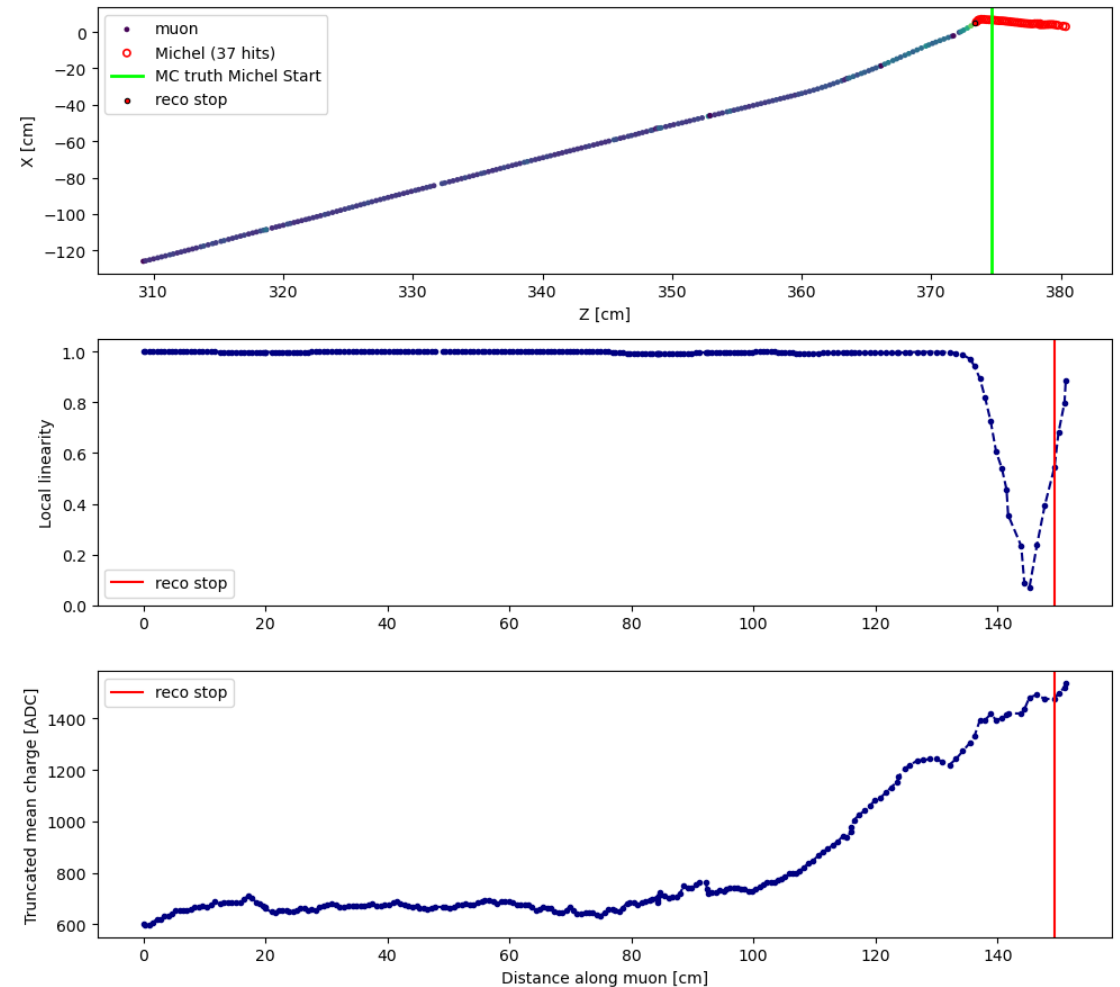
Louisiana State University

LSU

Louisiana State University

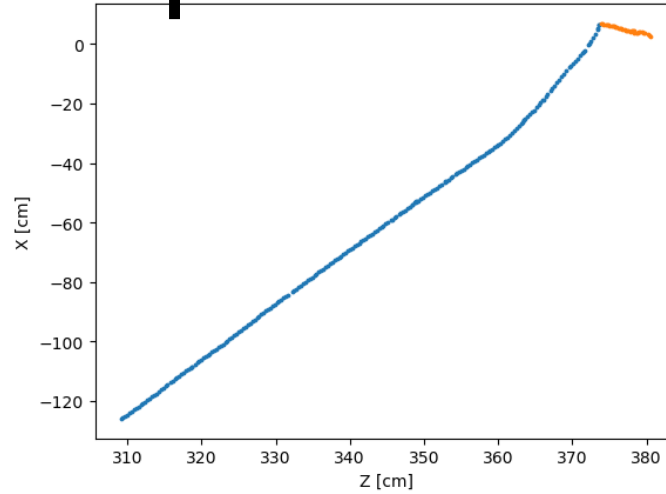
Some questions/motivations

- How does charge get accurately reconstructed?
- Do spacepoints get clustered? Are they (typically) evenly spaced?
- Truncated mean charge calculation is not modeling the track profiles well, meaning the Michels aren't getting properly tagged

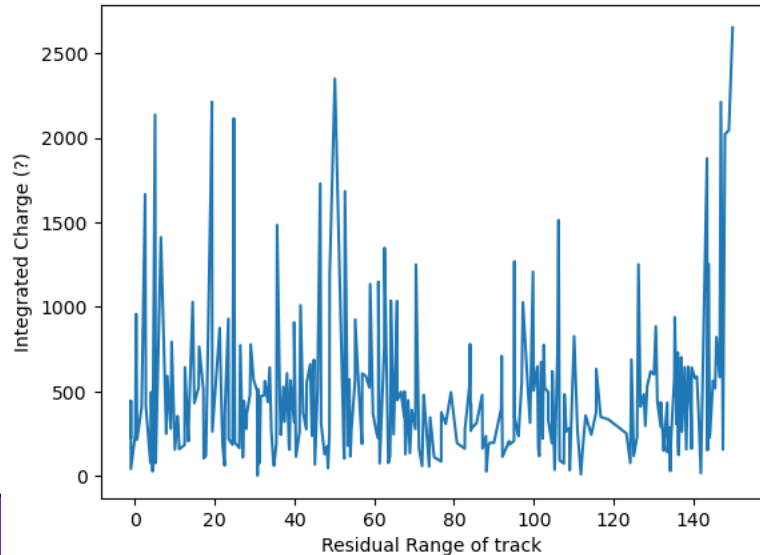


Charge vs residual range profiling shows a distinct “peak” then drop

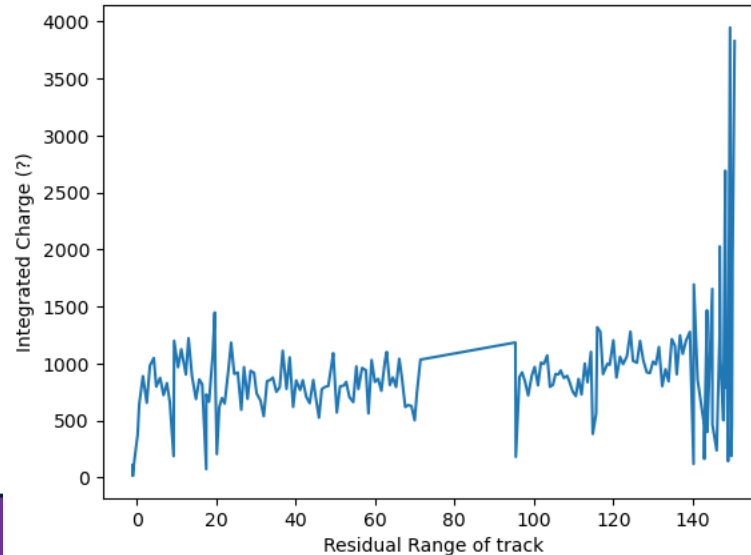
Charge + res range have same size as spacepoint array, as expected



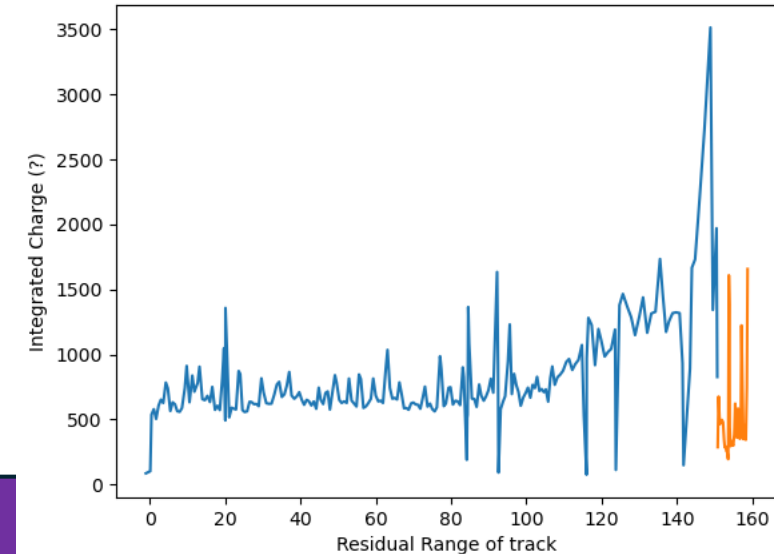
Integrated charge for track along plane 0



Integrated charge for track along plane 1



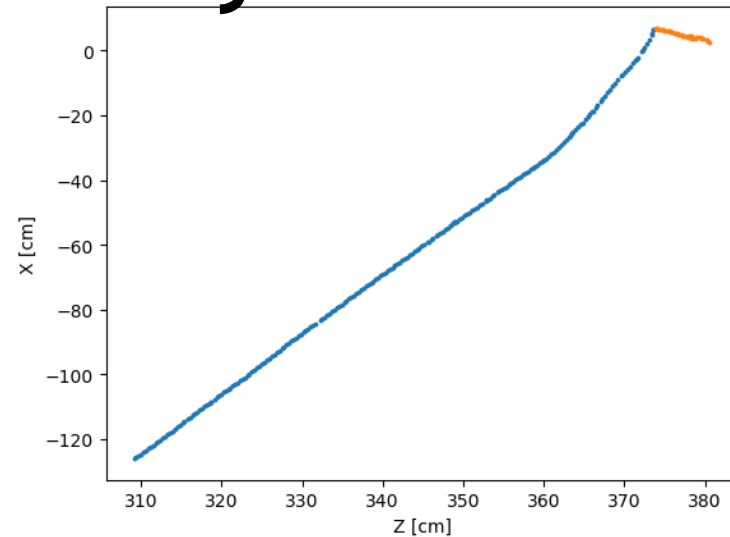
Integrated charge for track along collection plane



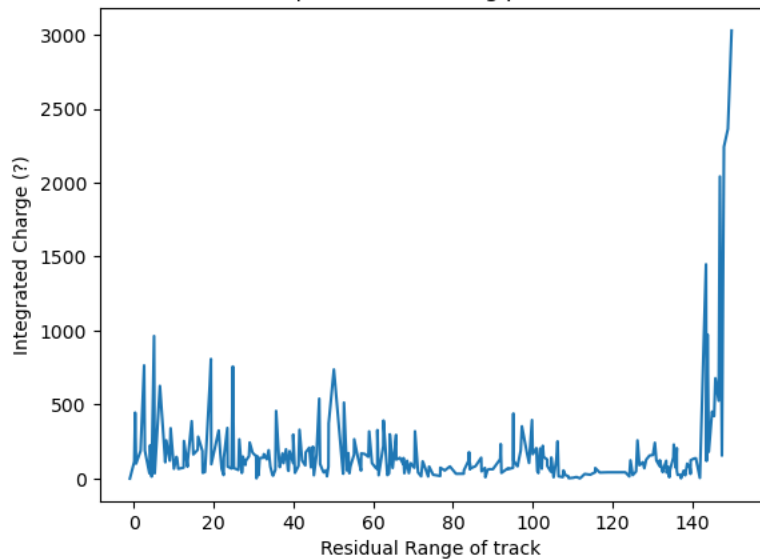
Looking at dqdx information shows a somewhat different story

Same size as sp array, as expected

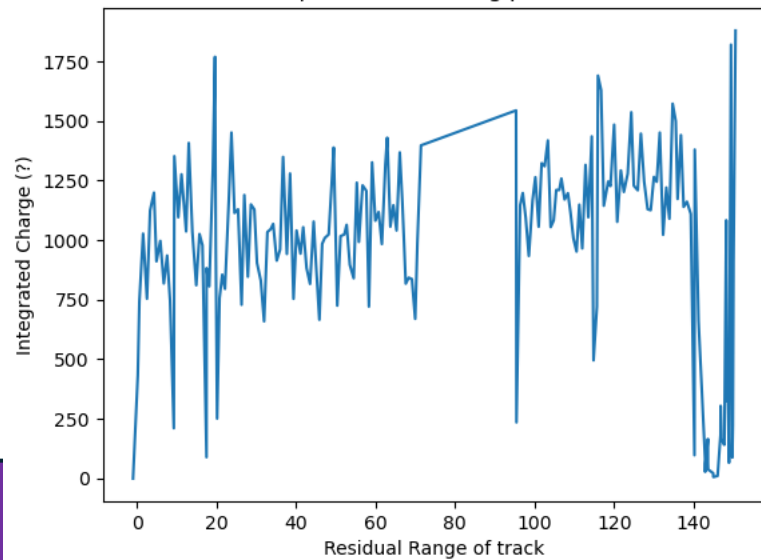
dqdx as calculated in ntuple



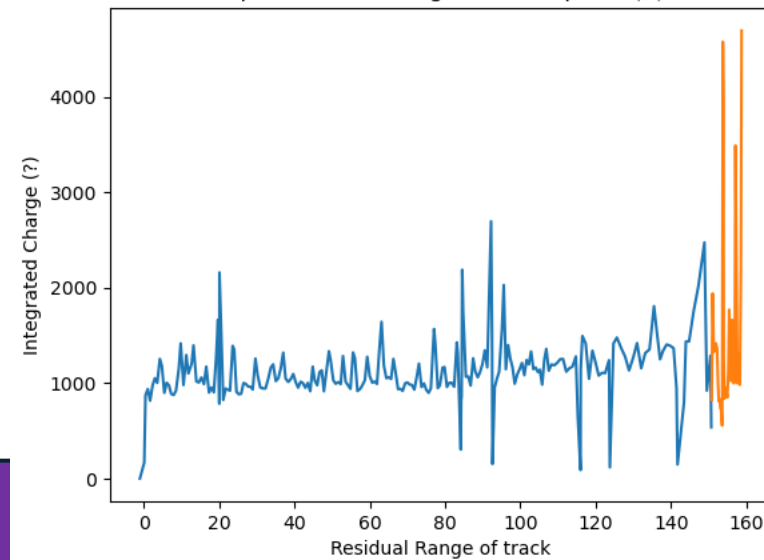
dqdx for track along plane 0

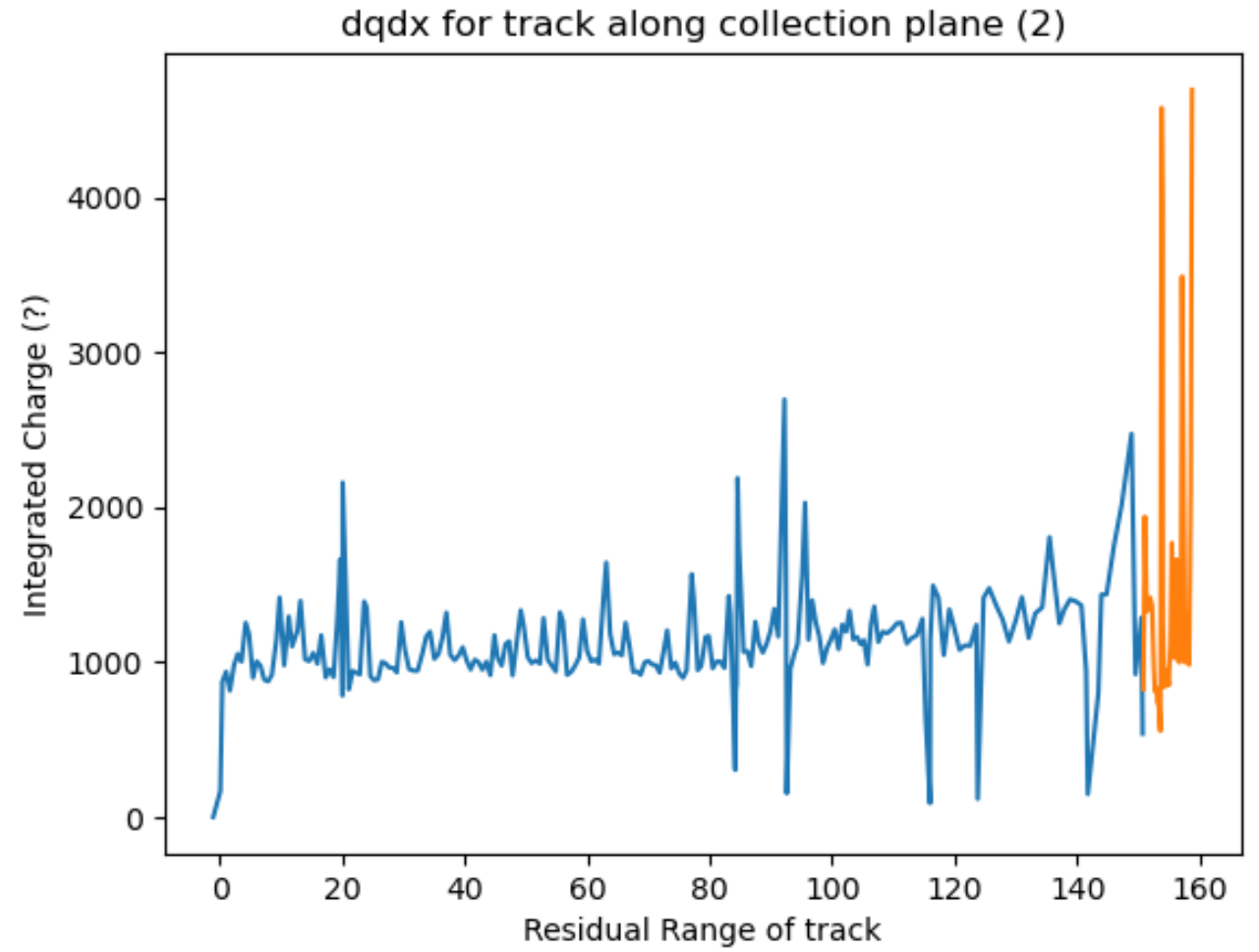
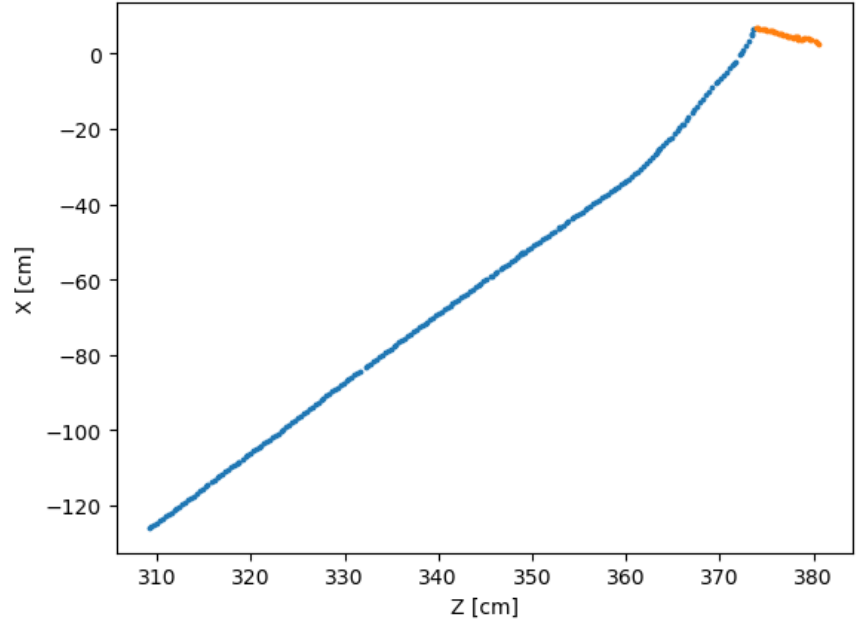


dqdx for track along plane 1



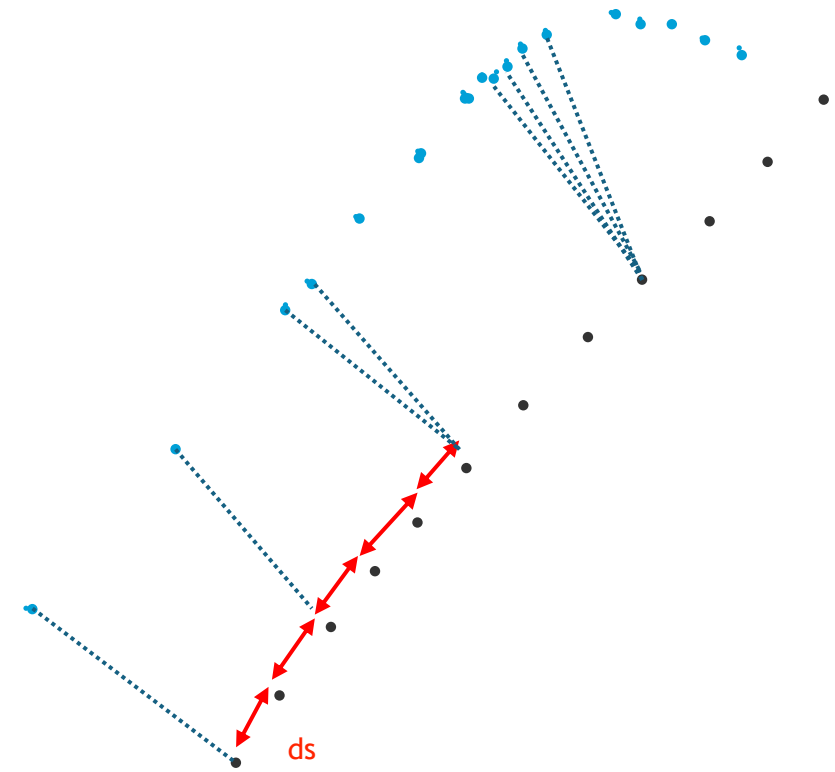
dqdx for track along collection plane (2)





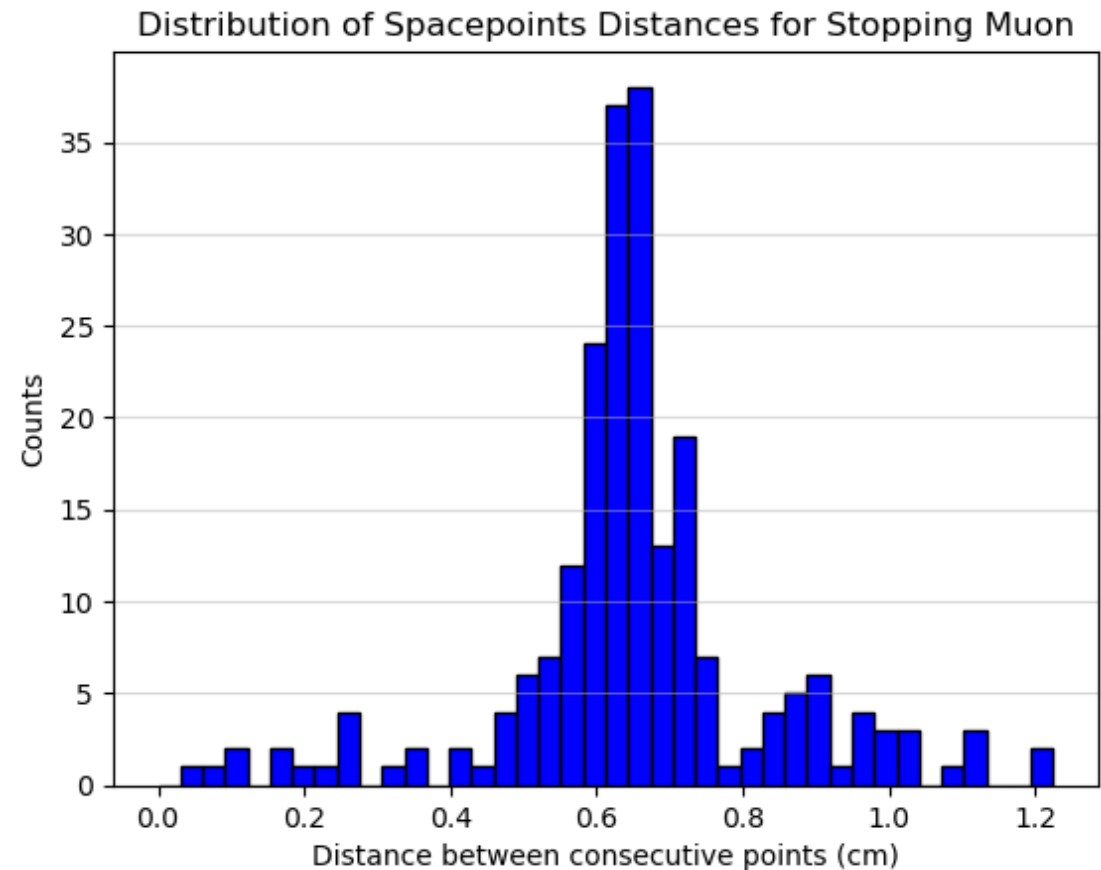
Point clustering/resampling

- Looking at dqdx profile, it would be good to calculate my own 'dqdx' for comparison
- Are some points clustering? These over/underdensities could be why these look off
- Individual points fluctuate as well, skewing things like linearity and trunc mean charge calculation
- Defining a “standard step length” would be better for evaluation



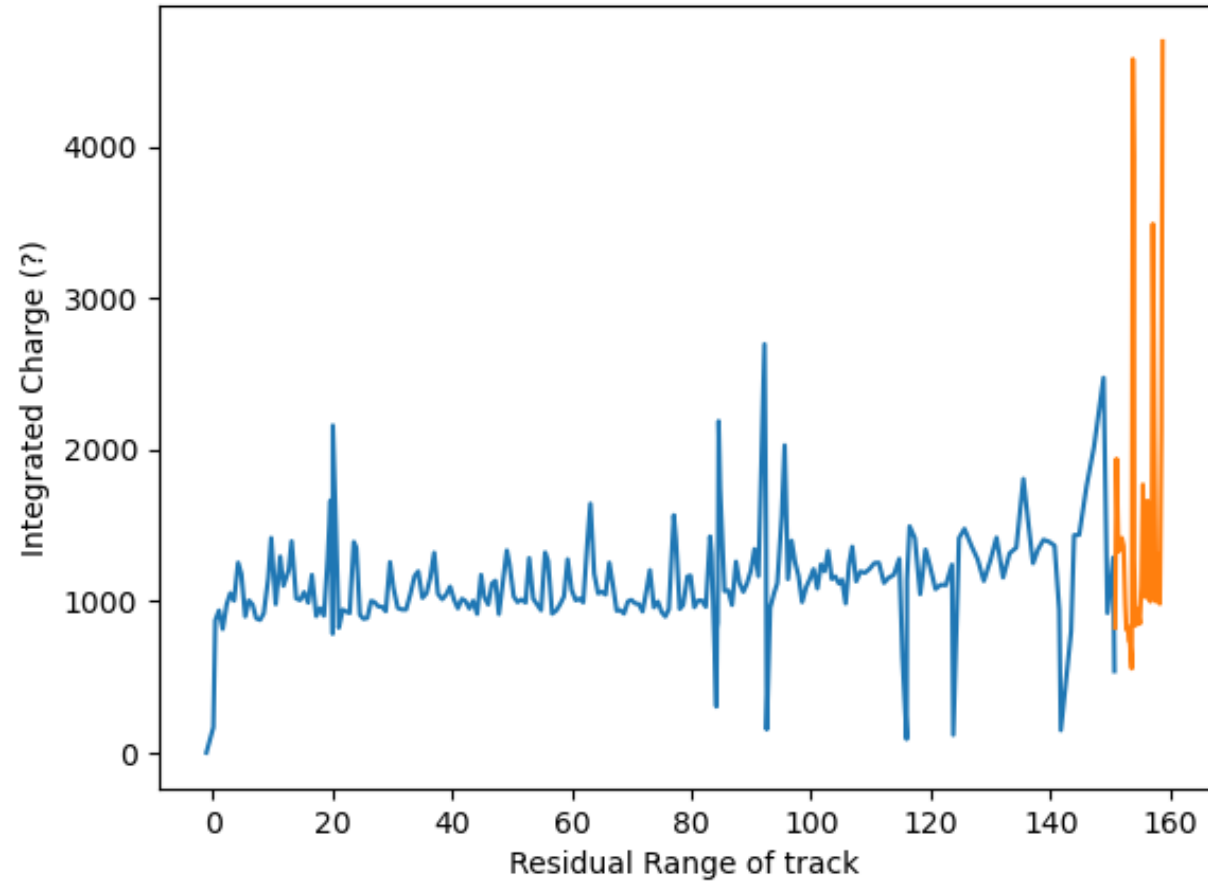
What's a good spacing size?

Peak around 0.67 cm

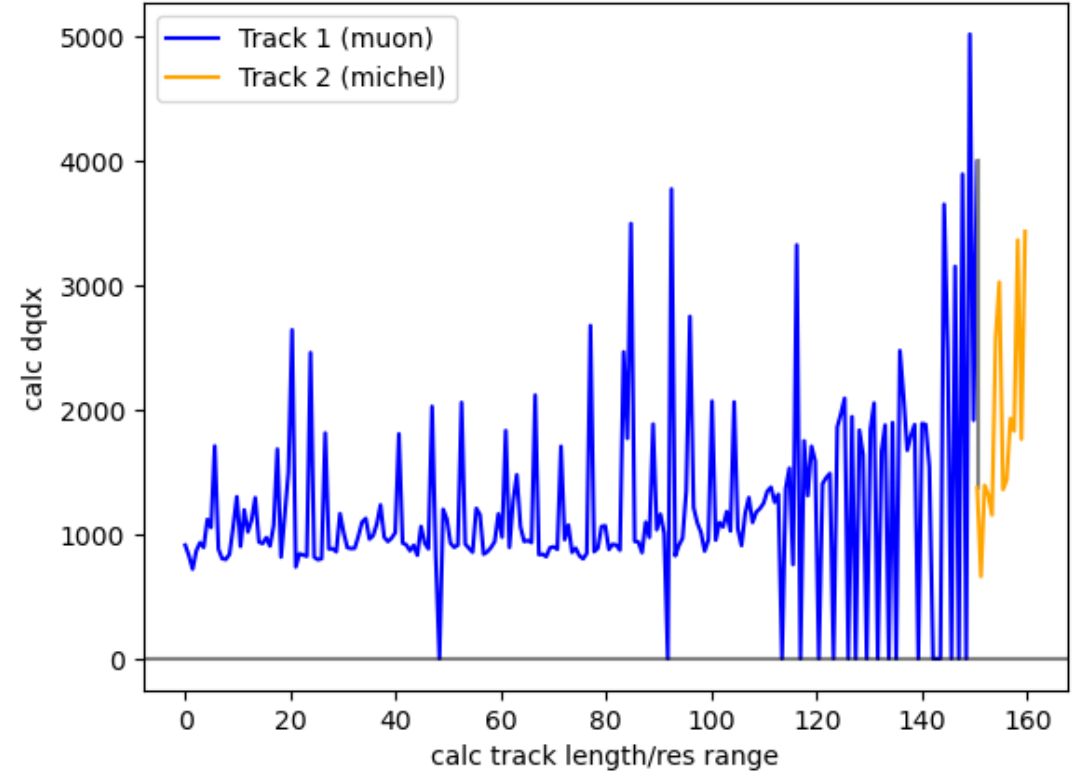


Noisy!

dqdx for track along collection plane (2)

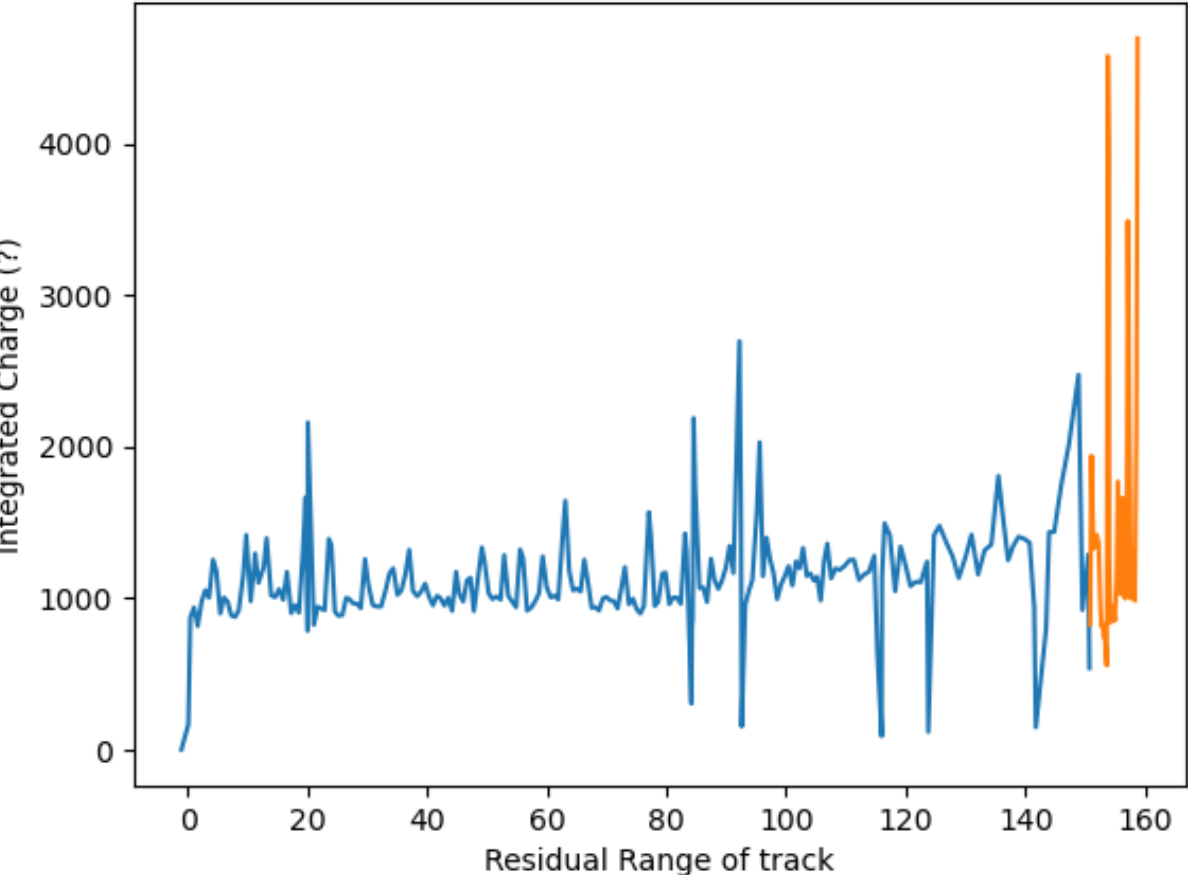


Calculated dqdx along track plane 2, using my own 'path length' thing

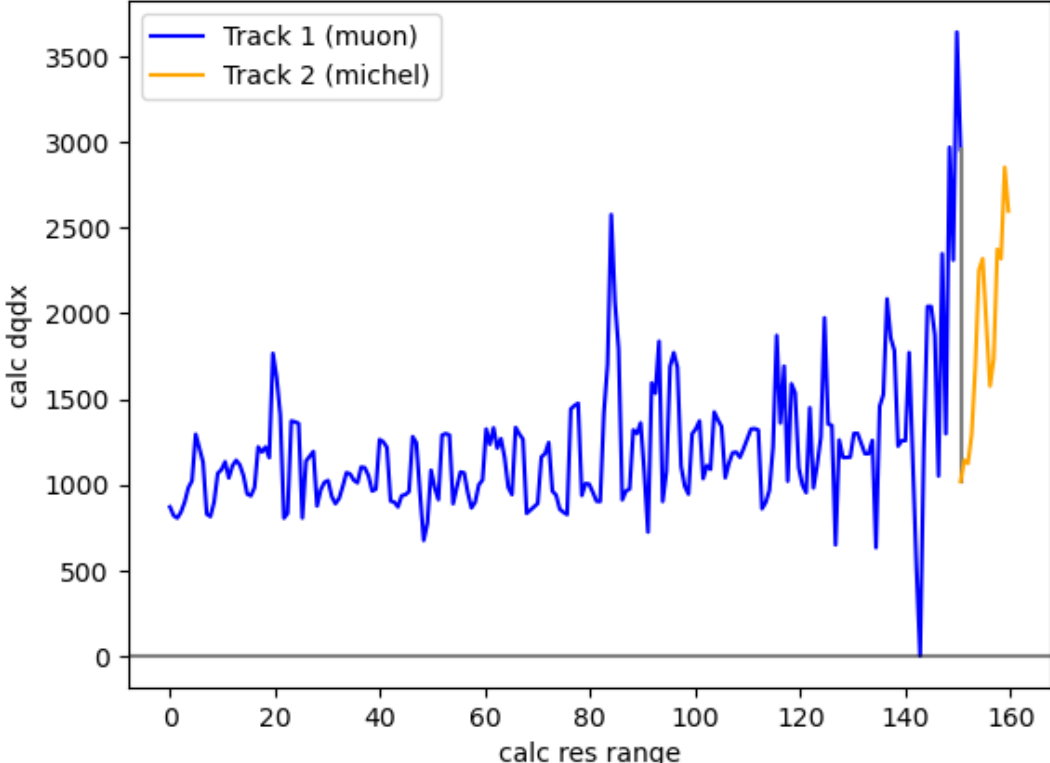


Adding a sliding window to smooth out charges (2 cm)

dqdx for track along collection plane (2)

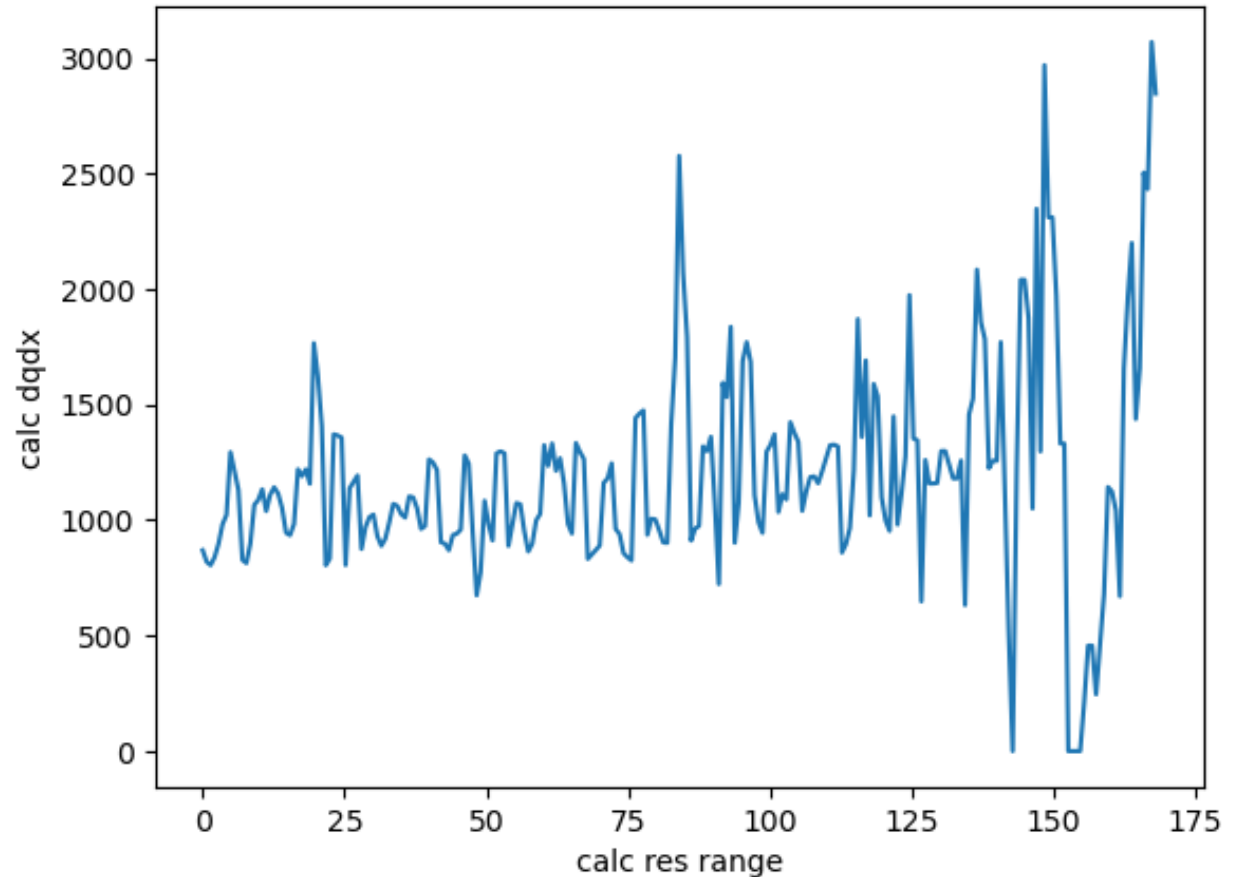


Calculated dqdx along track plane 2, using my own 'path length' thing

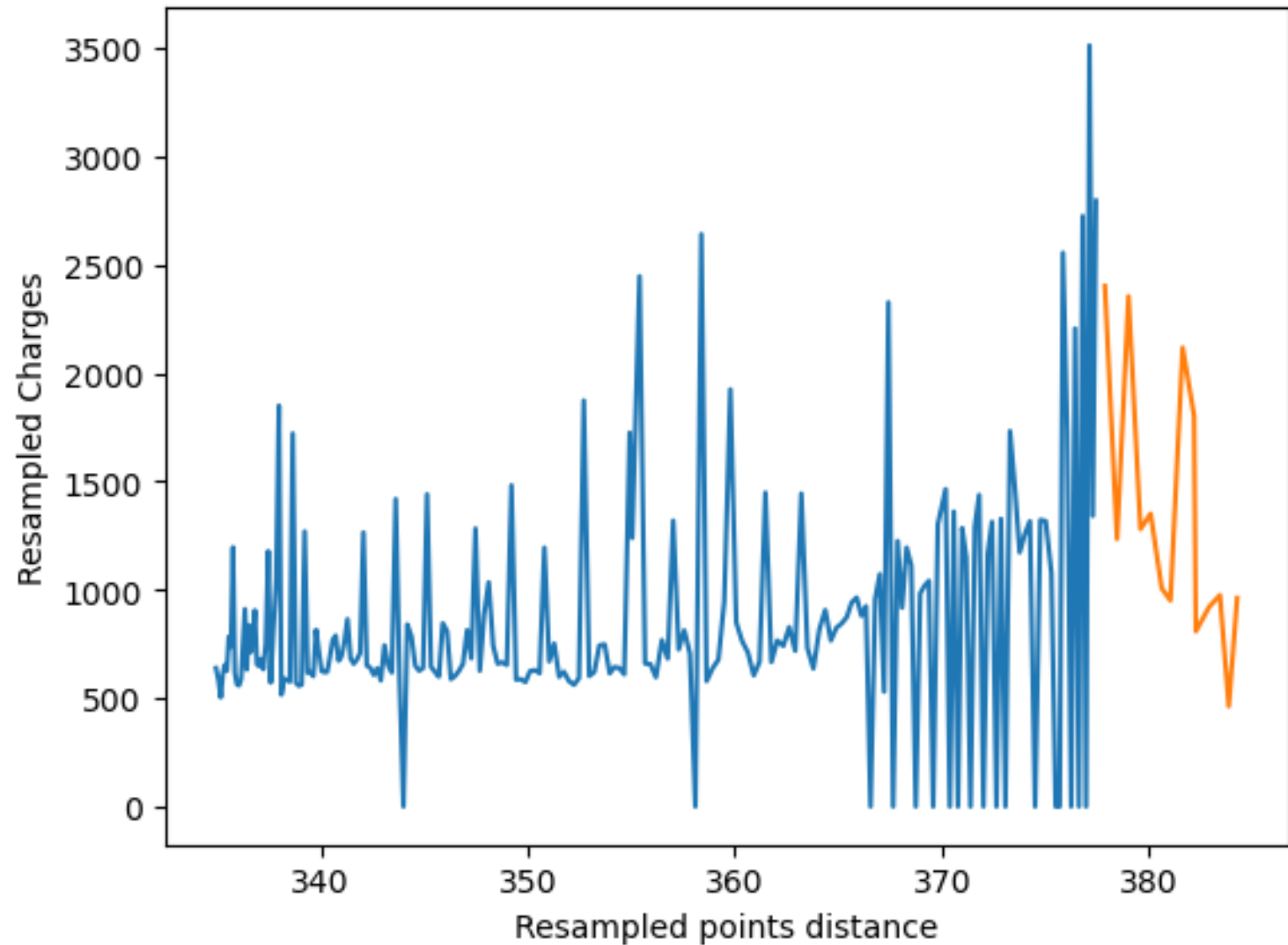


- Combining the two tracks... sudden jump in $dqdx$ after muon stops?
 - Charge seems to bunch up, likely due to the kink
 - Looks like it makes sense to resample points then concatenate after?

Calculated $dqdx$ along track plane 2, using my own 'path length' thing



Looking strictly at resampled points vs charge



Extra

