Using gm2ringsim in the Cornell Fast Rotation Fourier analysis… Part III

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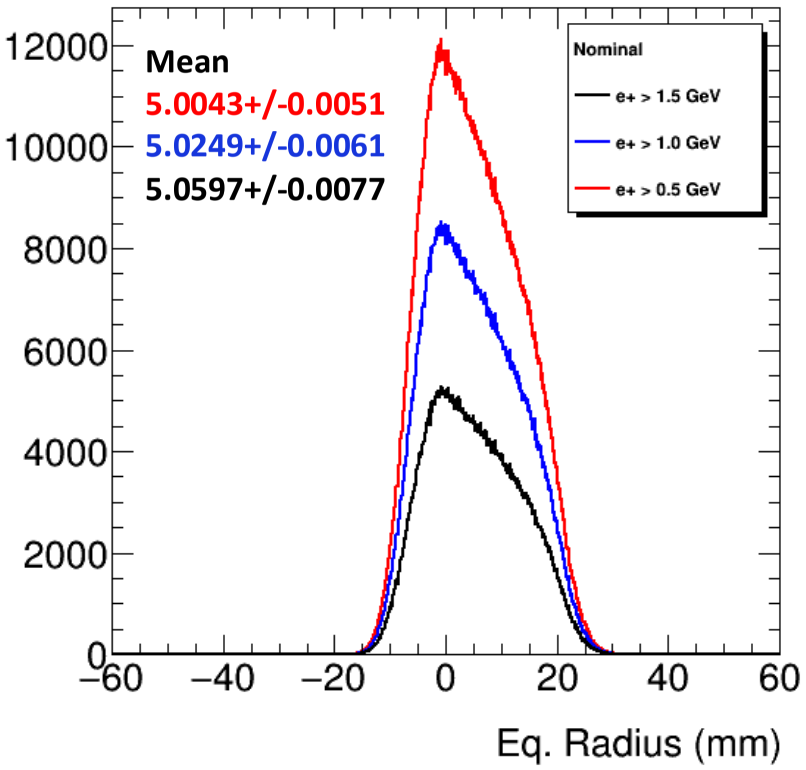
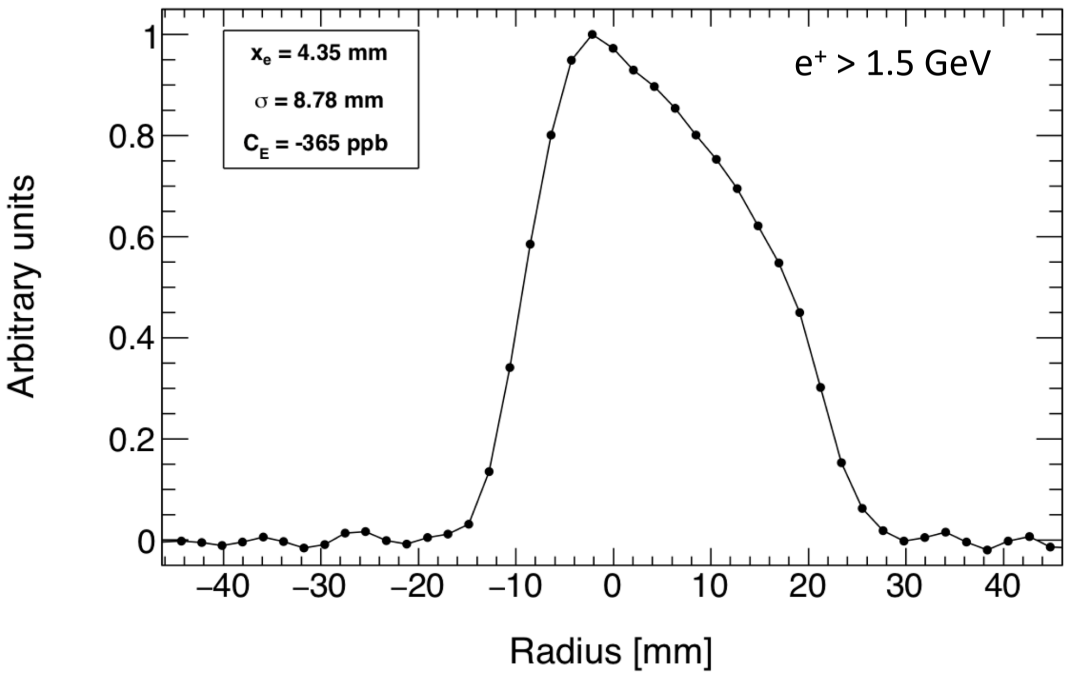
Previously: Eq. Radius from Tracking planes at t > 30 **μ**s did not match the fast rotation reconstruction.



Means are different 5.060 → 4.35. but shape comparison looks quite good.

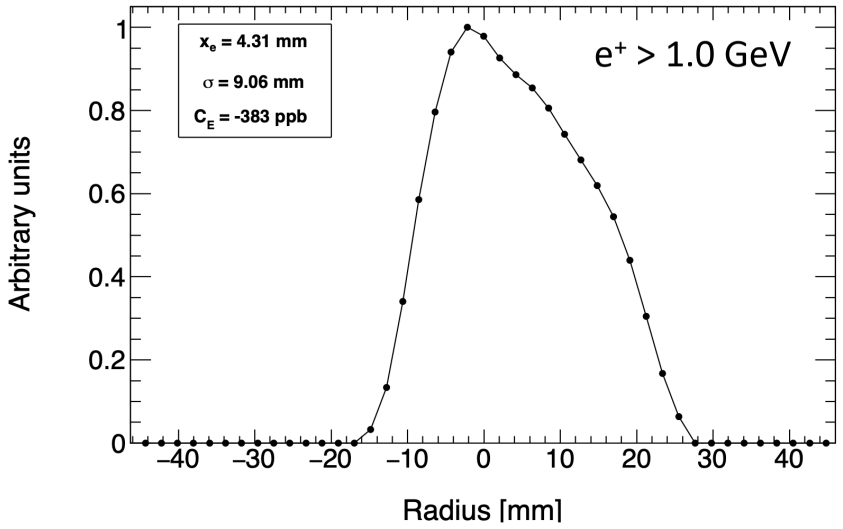


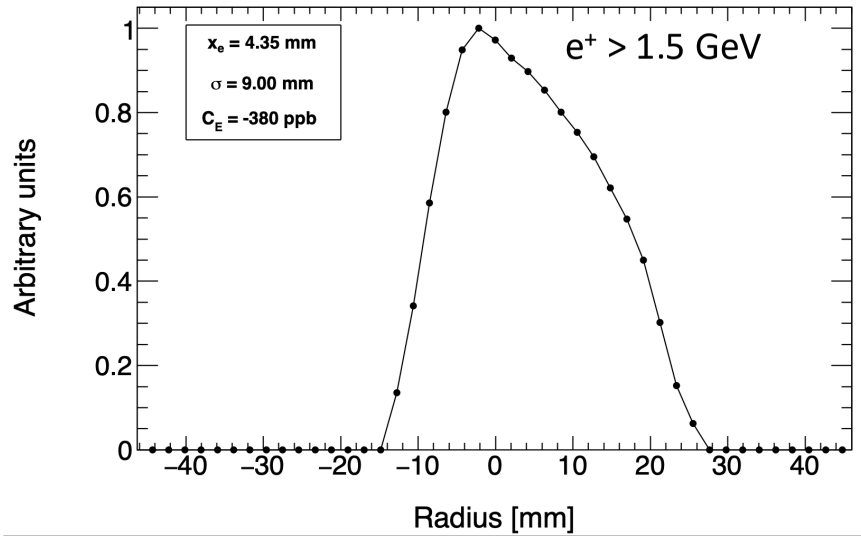
Suggestions

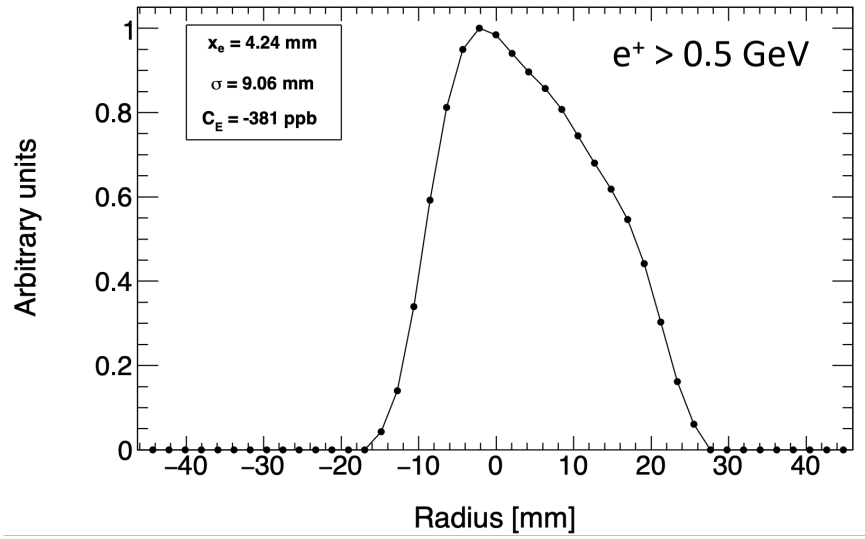
1. Implement Background Subtraction
2. What does n-independent, average R, look like?
3. Compare frequency spectrums
4. Extract tune from same dataset to see if n = 0.108 is correct

Background Subtraction

threshold	No BG Sub	BG Subtracted
0.5	4.26	4.24
1.0	4.20	4.31
1.5	4.35	4.35







Suggestions

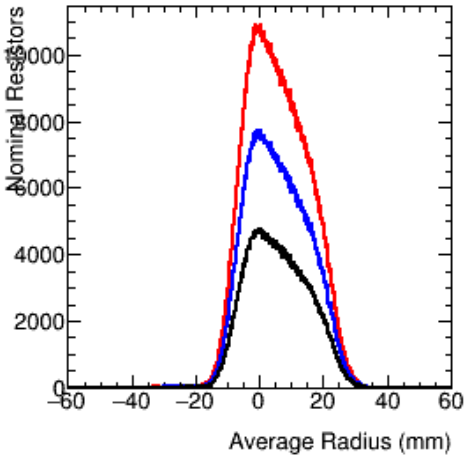
✓Implement Background Subtraction

Background subtracted spectra look very similar to those without BG subtraction. Systematic shift to smaller χ_e persists.

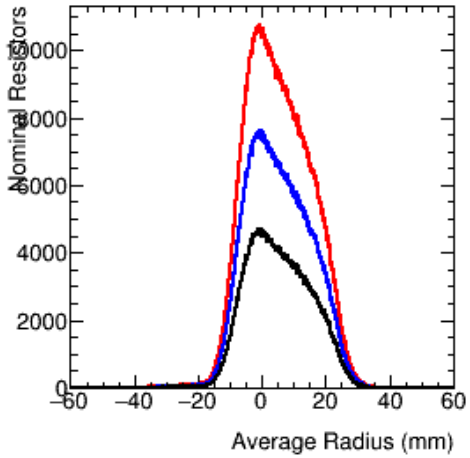
1. What does n-independent, average R, look like?
2. Compare frequency spectrums
3. Extract tune from same dataset to see if n = 0.108 is correct

Average Radius (no n dependence) from Tracking planes at t > 30 μs

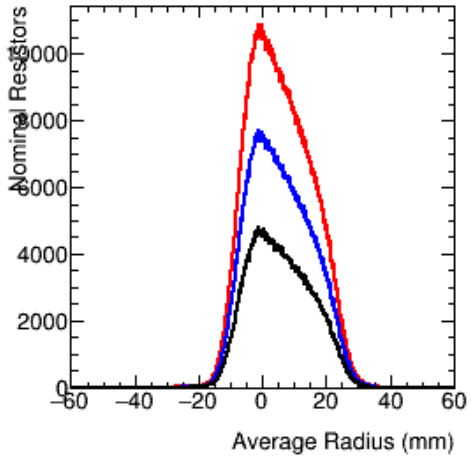
Plane 0 Mean
5.73 +/- 0.0057
5.76 +/- 0.0068
5.80 +/- 0.0086



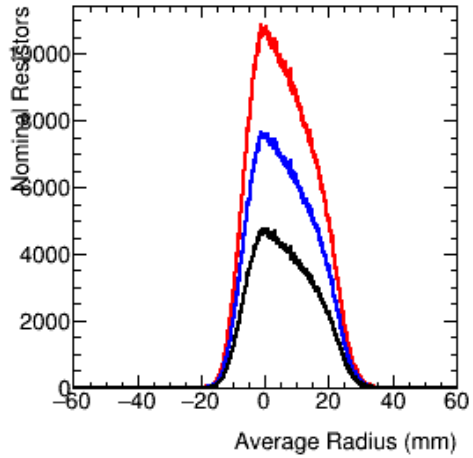
Plane 1 Mean
5.25+/-0.0059
5.29+/-0.0070
5.34+/-0.0089



Plane 2 Mean
5.57 +/- 0.0058
5.59 +/- 0.0069
5.62 +/- 0.0088



Plane 3 Mean
6.039 +/- 0.0057
6.049 +/- 0.0067
6.071 +/- 0.0085



Suggestions

✓Implement Background Subtraction

Background subtracted spectra look very similar to those without BG subtraction. Systematic shift to smaller χ_e persists.

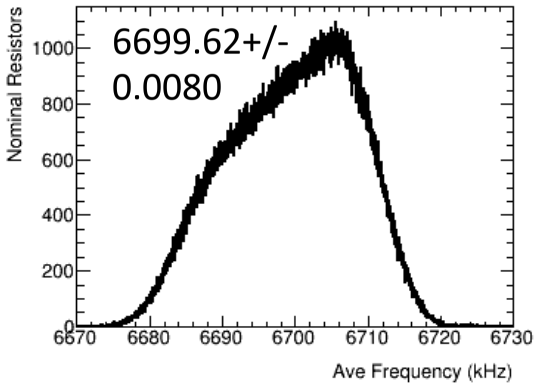
✓What does n-independent, average R, look like?

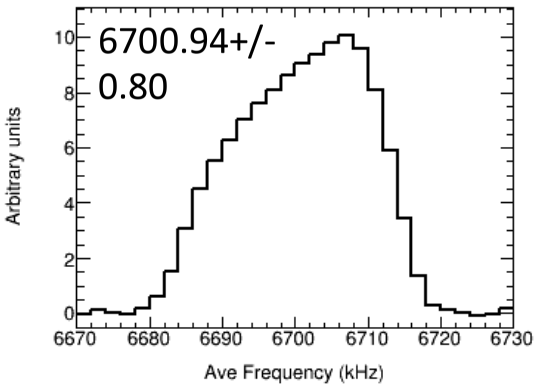
Averaged over all planes <R> ~ 5.6 mm

1. Compare frequency spectrums
2. Extract tune from same dataset to see if n = 0.108 is correct

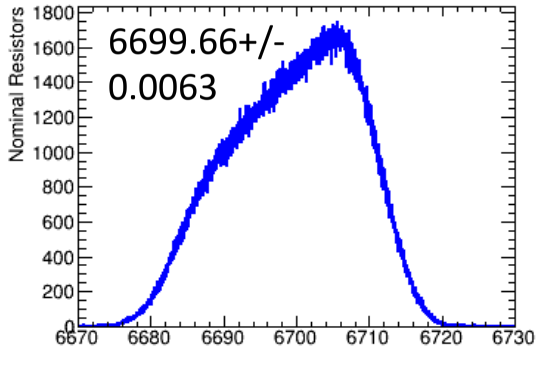
Compare Frequency Spectrum

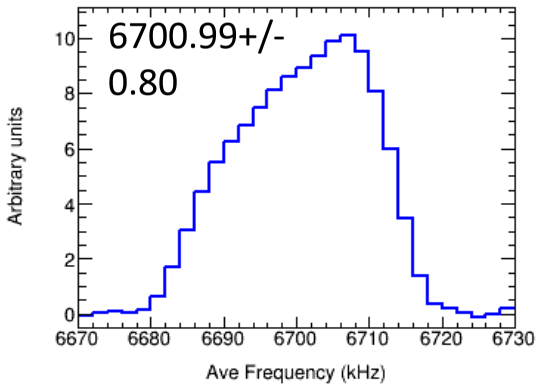
$e^+ > 1.5$ GeV



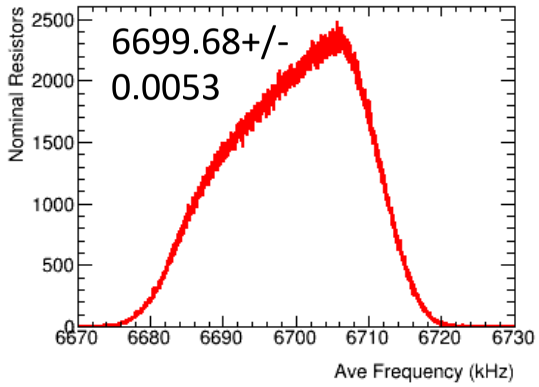


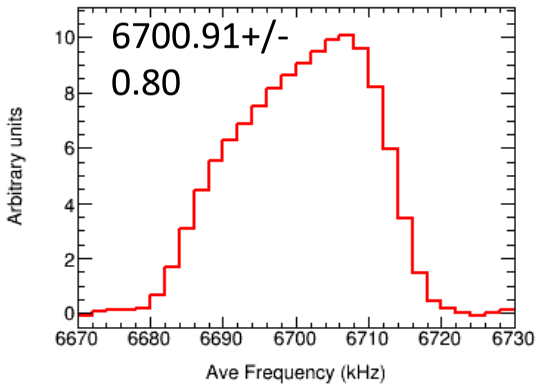
$e^+ > 1.0$ GeV





$e^+ > 0.5$ GeV





Tracking Plane 0 (all look the same)

Fast Rotation Extraction

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✓Implement Background Subtraction

Background subtracted spectra look very similar to those without BG subtraction. Systematic shift to smaller χ_e persists.

✓What does n-independent, average R, look like?

Averaged over all planes <R> ~ 5.6 mm

✓Compare frequency spectrums

Spectra match extremely well. Tracking planes show very small but systematically lower mean than FR extraction.

1. Extract tune from same dataset to see if n = 0.108 is correct

This still needs to be done. But it cannot be the problem as n would have to be negative to account for the difference seen in the eq. radius.

$$\chi_e = R_{magic}\frac{\Delta p}{p_{magic}(1-n)}$$