FEE Rate Analysis

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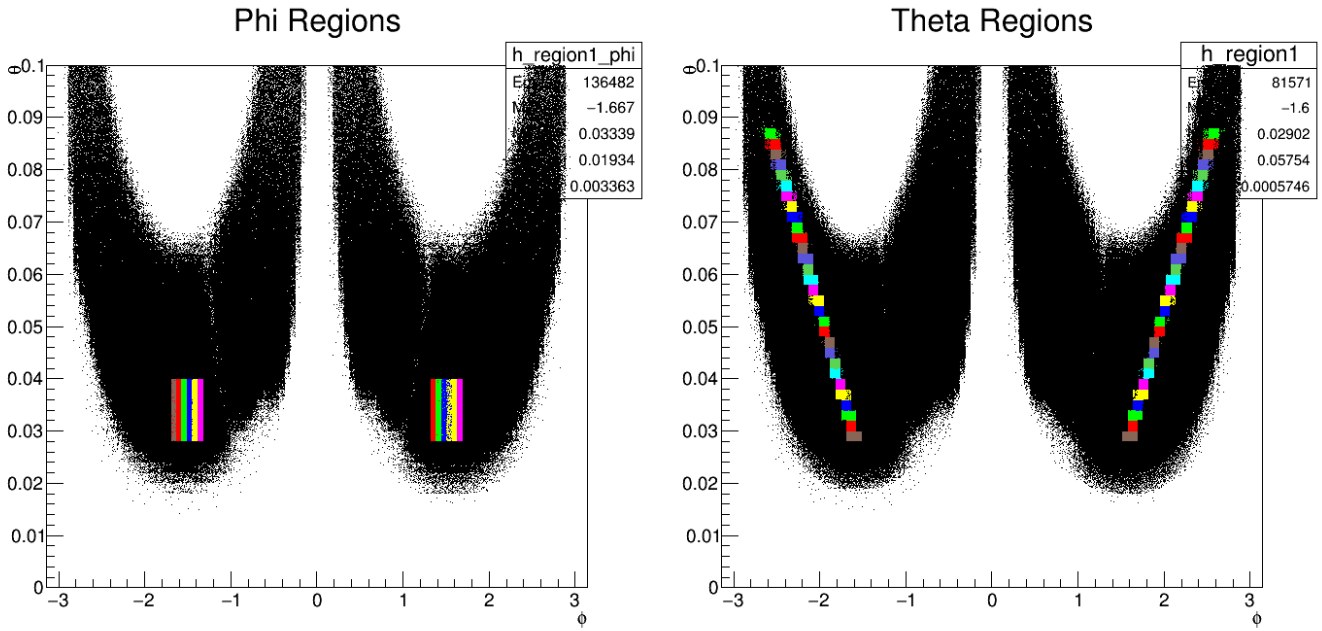
Introduction

- Pass2, V2 Detector, Singles1 Trigger
- FEE cuts - 10 ns timing window, 0.6-1.2 GeV energy cut, greater than 2 cluster size cut. All rates are matched
- FEE rates in different spherical (ϕ and θ) regions of detector. Comparison of data (tunsten and carbon targets) and MC.
- Data - 5771, 5772, and 5779 (Carbon); MC - 3.4.0

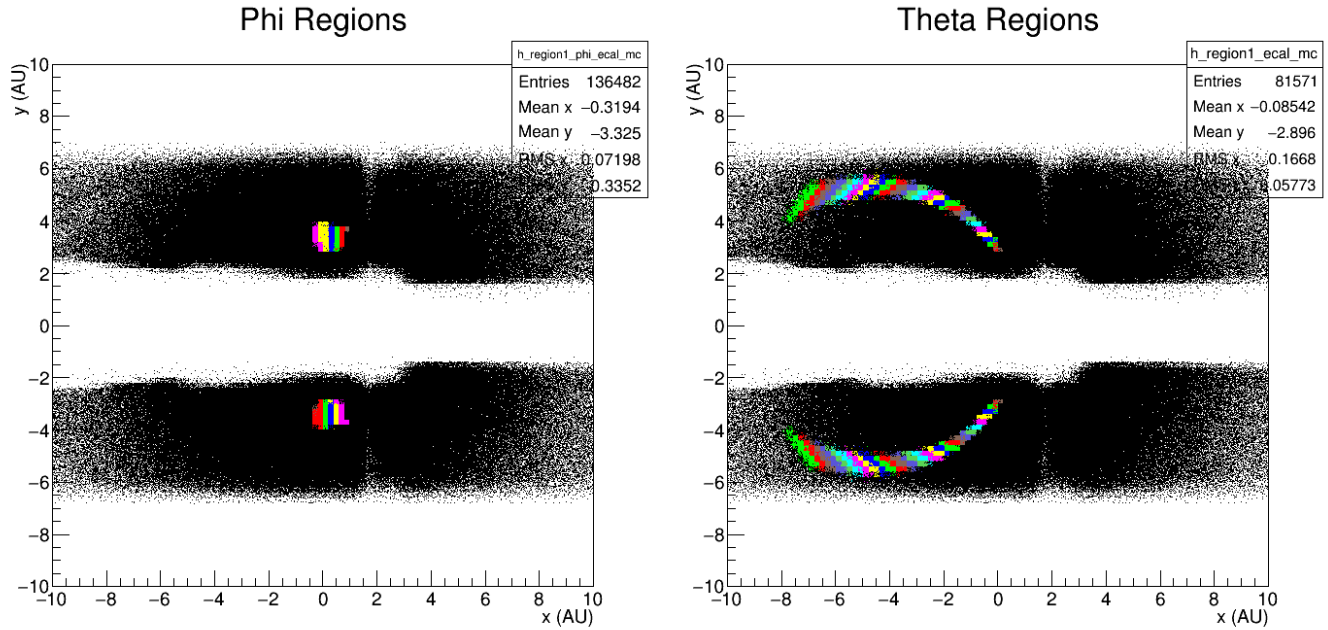
Region Definitions

- Definition of regions shown in the different colors. Black is not a part of any region
- ϕ regions (left): $\Delta\phi = 0.0666$, $0.028 < \theta < 0.040$
- θ regions (right): $\Delta\phi = 0.2$, $\Delta\theta = 0.02$



Region Definitions (Cont.)

- Definition of regions shown from previous slide in x-y coordinates
- ϕ regions (left) and θ regions (right)



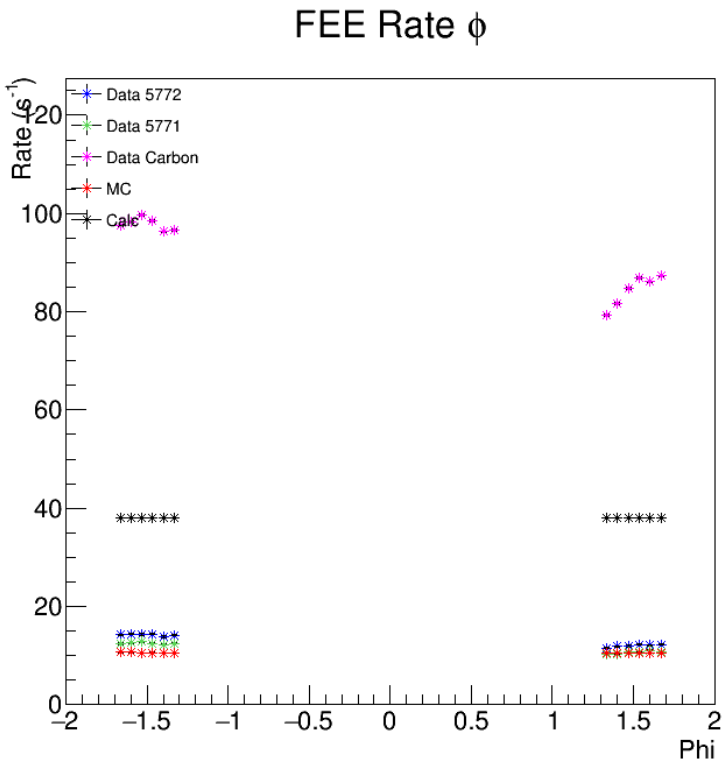
Normalization and Total Rates

- Data normalized based on time (7200 s), current (50 nA), blind (0.1), and deadtime (0.85)
- Carbon run normalized based on (1800 s), current (30 nA), blind (0.1), deadtime (0.85), and material properties
  - Was the carbon run pre-scaled? I had to prescale to put it on the same scale as the others...
- MC normalized based on time (calculated from file size), current (50 nA), and prescale (2^{11})

	Rates (per second)			
Region	Data 5771	Data 5772	Data 5779	MC
Total	874.5	993.8	7804.7	1144.9
Phi Regions	138.7	157.1	1093.1	126.6
Theta Regions (Top)	60.5	68.5	530.3	67.1
Theta Regions (Bottom)	54.3	60.9	493.3	66.1

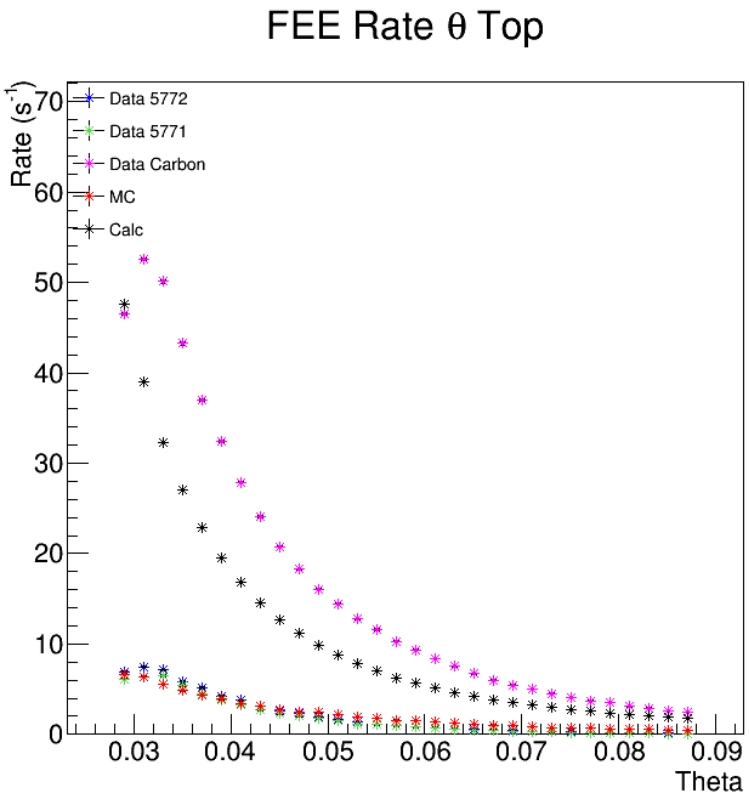
FEE Rate of ϕ Regions

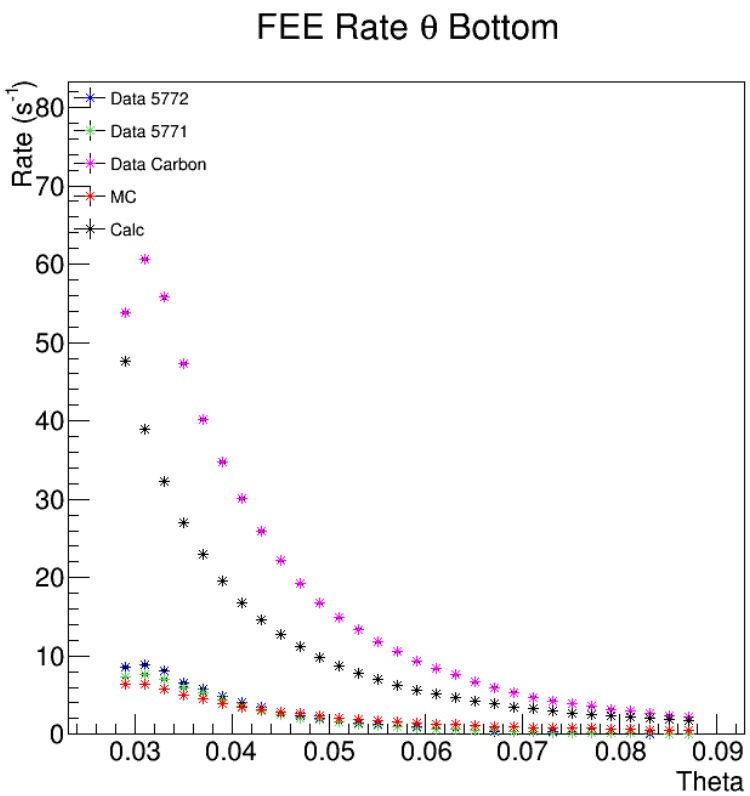
- Carbon run has significantly higher rates
- Runs 5771 and 5772 are similar



FEE Rate of θ Regions

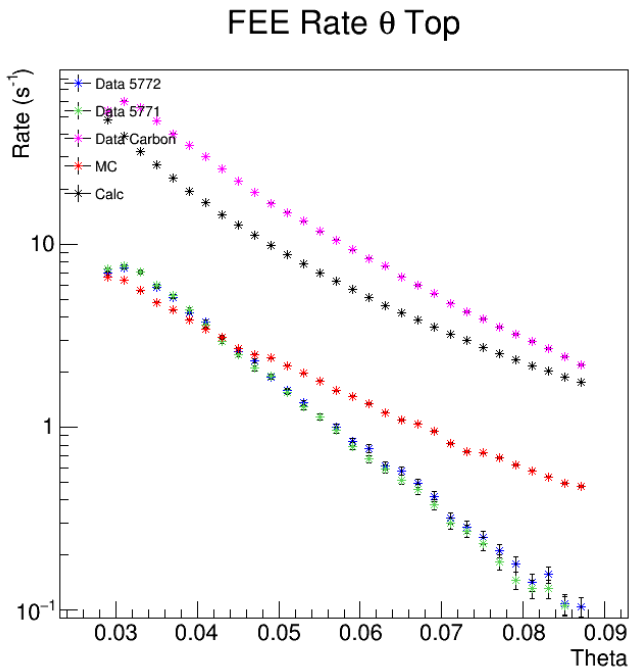
- Similar results as we saw last time for tunsten runs
- Carbon runs match the shape of MC/calculations more so than tungsten runs. See next slide...

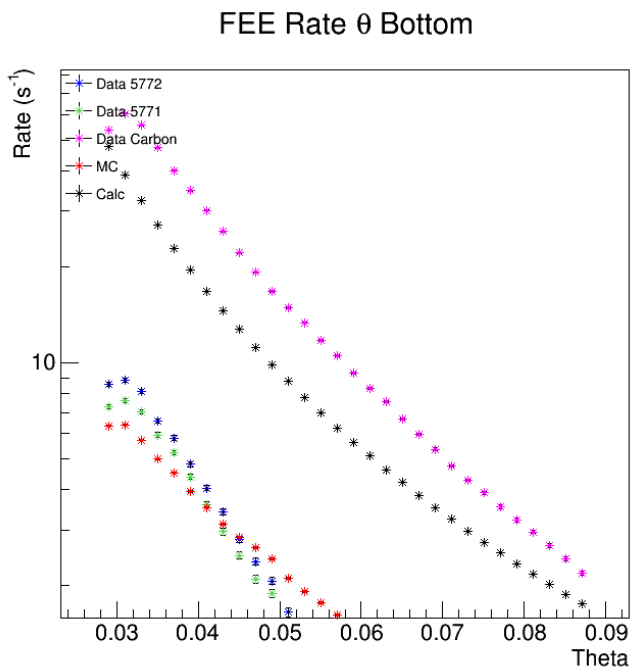




FEE Rates of Calculation Compared to Data or MC in θ

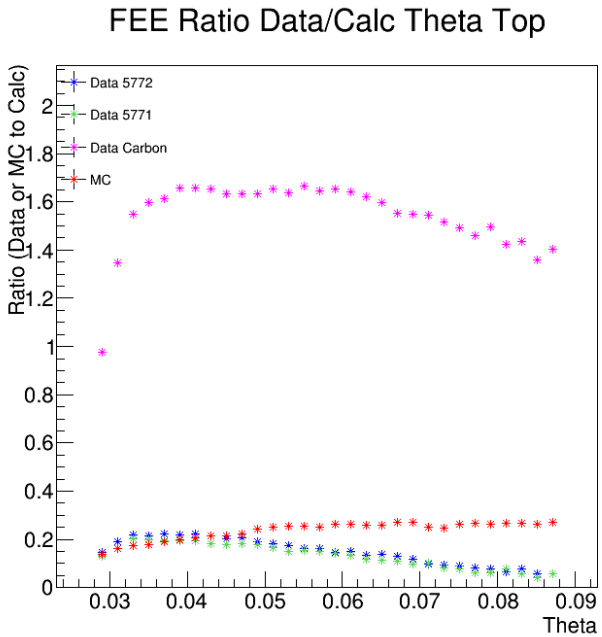
- Comparison of Calculation (Mott Scattering) Rates to Data and MC log scale
- MC and calcs have the similar slope and carbon run appears to match as well. Both tunsten runs have a different trend
- Note: Calculation are off by an arbitrary factor

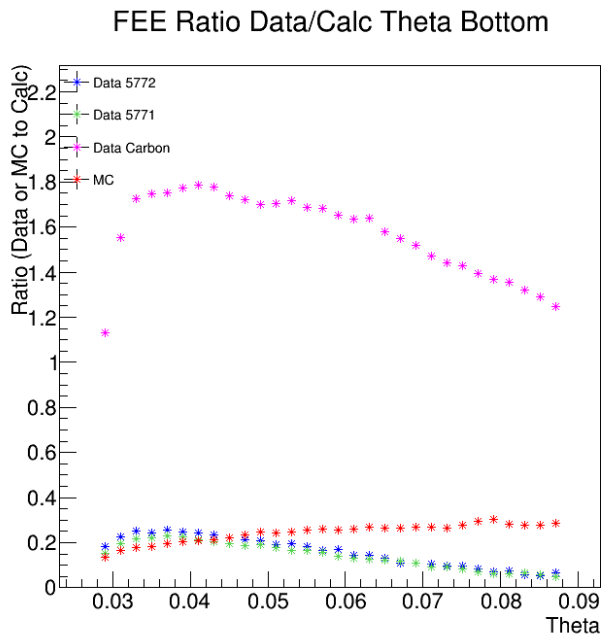




FEE Ratio of Calculation to Data or MC in θ

- Comparison of the ratios of Data and MC to Calculation (Mott Scattering): $\frac{\text{MC or Data Rate}}{\text{Calc Rate}}$
- Approximately constant ratio for MC (and for carbon run, Why?). Ratio for tungsten data decreases drastically with θ
- Note: Calculation are off by an arbitrary factor





Conclusions

- Not much difference between Pass1 and Pass2 Data. Pass2 MC coming soon
- Data 5771 and 5772 (tunsten runs) show similar results
- Data 5779 (carbon run) shows different results more consistent with MC and calculations.