Abstract Submitted
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The Sidereal Time Variations of the Lorentz Force and Maximum Attainable Speed of Electrons.[1] GABRIEL NOWAK, Oregon State University, BOGDAN WOJTSEKHOWSKI, YVES ROBLIN, Jefferson Lab, BARAK SCHMOOKLER, MIT — The Continuous Electron Beam Accelerator Facility (CEBAF) at Jefferson Lab produces electrons that orbit through a known magnetic system. The electron beam's momentum can be determined through the radius of the beam's orbit. This project compares the beam orbit's radius while travelling in a transverse magnetic field with theoretical predictions from special relativity, which predict a constant beam orbit radius. Variations in the beam orbit's radius are found by comparing the beam's momentum entering and exiting a magnetic arc. Beam position monitors (BPMs) provide the information needed to calculate the beam momentum. Multiple BPM's are included in the analysis and fitted using the method of least squares to decrease statistical uncertainty. Preliminary results from data collected over a 24 hour period show that the relative momentum change was less than 10^{-4}. Further study will be conducted including larger time spans and stricter cuts applied to the BPM data. The data from this analysis will be used in a larger experiment attempting to verify special relativity. While the project is not traditionally nuclear physics, it involves the same technology (the CEBAF accelerator) and the same methods (ROOT) as a nuclear physics experiment.

[1]DOE SULI Program

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