

Abstract Submitted
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A New Beam Modulation Strategy for Q_{weak}^p Experiment F.N.U.
NURUZZAMAN, Mississippi State University — A new, robust strategy is presented for beam modulation in the Q-weak experiment. The objective of the Q-weak experiment is to measure the weak charge of the proton by a measurement of the parity violating asymmetry ($< 1\text{ppm}$) in elastic e-p scattering to determine the proton's weak charge with $\approx 4\%$ combined statistical and systematic errors. The e-p scattering rate depends on the five beam parameters: horizontal position (X), angle (X), vertical position (Y), angle (Y) and energy (E). Small changes in these parameters will create a change in rate which results as false asymmetry. We measure the detector sensitivities to correct remaining false asymmetry by keeping these parameters as small as possible. For detector sensitivity measurement, we will modulate X, X, Y, Y using four pairs of coils in the Hall-C (3C) beamline and energy using an SRF cavity. Two pairs of coils will be pulsed at a time to produce relatively pure position and angle changes at the target, for virtually any tune of the 3C line. We have determined the optimal positions for the coils that will be used to modulate the beam. These results and some preliminary tests of the coils and the associated control instrumentation are discussed.

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