

Abstract Submitted
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Measurement of Q-Weak Detector Sensitivities

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— The Q-Weak experiment at Jefferson Laboratory will provide a 4% measurement of the proton's weak charge (Q_w^p) using parity-violating electron scattering from a liquid Hydrogen target. The scattering rates into the detectors depend significantly on five electron beam parameters at the target: transverse position x and y , angle x' and y' , and incident energy, E . Small helicity-correlated variations in these parameters produce false asymmetries which are enhanced by various broken symmetries in the apparatus. While great care is being taken to suppress or eliminate helicity-correlated changes in beam parameters at the polarized source, we will measure the detector sensitivities (dA_f/dx_i ($i=1..5$)) for first order offline correction of beam false asymmetries. To directly measure the detector sensitivities, we will modulate the beam in (x,x',y,y') using pairs of electromagnets, and in E using an SRF cavity. We estimate a 10% measurement of the 5 beam sensitivities will be possible each day using only 1% of our total beam time. I will discuss simulations of predicted detector sensitivities, as well as our group's work on the design and implementation of a robust beam modulation system.

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