Abstract Submitted
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Reducing Backgrounds in a High Precision Measurement of the Proton's Weak Charge at Jefferson Lab[1] K.E. MYERS, The George Washington University, Q_{WEAK} COLLABORATION — The Q_{weak} collaboration at Jefferson Lab is developing an experiment which will precisely measure the parity violating asymmetry in elastic electron-proton scattering. This asymmetry is proportional to the proton's weak charge – the basic property which determines the proton's response to the weak interaction. The Standard Model makes a firm prediction of the proton's weak charge, $Q_w^p = 1 - 4\sin^2\theta_W$, based on how the weak mixing angle $\sin^2\theta_W$ evolves from the Z^0 pole down to low energy scales. The ultimate goal of the experiment is to determine Q_w^p with 4% combined statistical and systematic uncertainties, which in turn leads to a 0.3% measurement of $\sin^2\theta_W$. Achieving this degree of precision requires an in-depth study of the backgrounds generated and methods to reduce them. Using a GEANT3 based simulation we have identified the acceptance defining collimator, the apertures of the shielding hut, and the beamline as sources of different types of backgrounds. Quantitative estimates of these backgrounds will be presented. The possible effects of these backgrounds on the goals of the experiment and methods to reduce them without producing new backgrounds will also be discussed.

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