

Abstract Submitted
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Parity-Violating Inelastic $\bar{e}p$ Asymmetry and Its Relation to γZ Box Radiative Corrections¹ JAMES DOWD, College of William and Mary, QWEAK COLLABORATION — The Qweak Experiment at Jefferson Lab will make the first direct measurement of the proton's weak charge, Q_W^p , via a measurement of the parity-violating asymmetry in elastic electron-proton scattering with low four-momentum transfer. To reach the precision goal of Qweak, energy dependent radiative corrections in the parity-violating asymmetry must be accounted for. The most significant of these is the γZ box diagram. The asymmetry arising from this diagram depends on the γZ interference structure functions, $F_{1,3}^{\gamma Z}$, for which there is almost no experimental data. Using the Qweak apparatus, with modifications, an ancillary measurement was taken at a higher beam energy of 3.35 GeV. The chosen kinematics accesses inelastic scattering, where the asymmetry depends on these structure functions, allowing tests of their theoretical description. Additions to the Qweak apparatus include a lead wall in front of one of the eight Cerenkov detectors to isolate the pion background in the asymmetry measurement, as well as a dedicated lead glass pion detector. Analysis of this data will lead to an improved determination of the γZ box contribution to the proton's weak charge, thereby validating the theoretical models used to predict this contribution.

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