Abstract Submitted
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Analysis of the Kinematics in the Qweak Experiment[1] VALERIE GRAY, William & Mary College — The Qweak experiment at Jefferson Lab aims to determine the weak charge of the proton to a high precision by parity-violating elastic electron scattering on protons in a liquid hydrogen target. After two years of data-taking, the experiment is in its analysis phase and the first results from the experiment's commissioning period have been published. The weak charge of the proton is directly related to the measured asymmetry, which is proportional to the squared four-momentum transfer Q^2 of the scattered electron. The uncertainty in Q^2 contributes directly to the precision of the measurement of the weak charge. Using two independent sets of drift chambers we can reconstruct the electron trajectory and its momentum. Horizontal drift chambers are located just after the target while vertical drift chambers are located after a magnetic field just before the final Cerenkov detectors. With a Geant4 Monte Carlo simulation we deduce the scattering vertex kinematics from the observed scattered energy and momentum. I will present the work on determining the Q^2 of the Qweak experiment from data and using the Geant4 simulation. I will discuss the sources that contribute to the uncertainty in the momentum transfer, and our progress towards a precision of 0.5% on Q^2.

[1]For the Qweak Collaboration

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