

Abstract Submitted
for the SES14 Meeting of
The American Physical Society

Parity-Violating and Parity-Conserving Asymmetries in $\vec{e}p$ and $\vec{e}N$ Scattering in the Qweak Experiment¹ WOUTER DECONINCK, College of William & Mary, QWEAK COLLABORATION — The Qweak experiment at Jefferson Lab has made the first determination of the weak charge of the proton in elastic scattering of longitudinally polarized electrons from unpolarized protons at a momentum transfer Q^2 of 0.025 (GeV/c)². To achieve the required precision to measure the small parity-violating asymmetry of -279 parts per billion, we directed a 180 μ A 85%-polarized electron beam on a 35 cm long liquid hydrogen target and integrated scattered events in eight azimuthally symmetric fused silica Cerenkov detectors. Based on 4% of the total data collected by the experiment, we find a value for the weak charge of proton in agreement with predictions of the Standard Model. To correct for the contributions from background processes, we conducted several additional parity-violating and parity-conserving asymmetry measurements with different kinematics (elastic and $N \rightarrow \Delta$), electron polarization (longitudinal and transverse), and targets (protons, electrons, aluminum, and carbon). In many cases, these ancillary results are first or high-precision measurements as well. I will discuss the analysis and results of the main experiment with a focus on several of the ancillary results.

¹This work was supported in part by the National Science Foundation under Grant No. PHY-1405857.

Wouter Deconinck
College of William & Mary

Date submitted: 02 Oct 2014

Electronic form version 1.4