

Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Parity-Violating and Parity-Conserving Asymmetries in $\vec{e}p$, $\vec{e}e$, and $\vec{e}N$ Scattering¹ DAMON SPAYDE, Hendrix College, QWEAK COLLABORATION — The primary goal of the Qweak experiment at Jefferson Lab is to measure the parity-violating asymmetry A_{PV} in elastic scattering of longitudinally polarized electrons from unpolarized protons at a Q^2 of $0.025 \text{ (GeV}/c)^2$. The proton's weak charge and the electroweak mixing angle can be extracted from A_{PV} . An intense ($180 \mu\text{A}$) beam of highly polarized (85%) electrons was made incident on a 35 cm long liquid hydrogen target. A toroidal spectrometer magnet focused scattered electrons onto an azimuthally symmetric array of eight quartz Cerenkov bars. A_{PV} can be determined from detector yields recorded by integrating electronics as the beam polarization was flipped. Experimental systematics were constrained via a series of additional parity-violating and parity-conserving asymmetry measurements performed with different kinematics (elastic and $N \rightarrow \Delta$), electron polarization (longitudinal and transverse), and targets (protons, electrons, aluminum, and carbon). These ancillary results contain interesting physics of their own and in many cases constitute first or highest-precision-to-date measurements. This talk will offer an overview of the various ancillary measurements, the underlying physics, and the expected precision of the final results.

¹This work was supported in part by NSF Award PHY-1068032.

Damon Spayde
Hendrix College

Date submitted: 30 Jun 2014

Electronic form version 1.4