

Abstract Submitted
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First Determination of the Proton's Weak Charge from the Qweak Experiment SCOTT MACEWAN, University of Manitoba, QWEAK COLLABORATION — The Qweak experiment at Jefferson Lab uses parity-violating electron scattering (PVES) to make a precision measurement of the proton's weak charge Q_W^p . The experiment has recently reported a measurement of the asymmetry in elastic $\vec{e} - p$ scattering at low $Q^2 = 0.0250 \text{ (GeV/c)}^2$ with a beam energy of 1.16 GeV based on approximately 1/25 of the overall data collected in the experiment (D. Androic, et al. [Qweak Collaboration], Phys. Rev. Lett. 111, 141803 (2013)). Several technical challenges were overcome to successfully measure the small asymmetry requiring a high power liquid hydrogen target, radiation hard Cerenkov detectors, and precision electron beam polarimetry. The small Q^2 of the measurement has made possible the first determination of the weak charge of the proton, Q_W^p , by incorporating earlier PVES data at higher Q^2 to obtain hadronic corrections. The value of Q_W^p obtained this way is $Q_W^p = 0.064 \pm 0.012$. An overview of the experimental apparatus and technical challenges will be presented alongside the details of the analysis required to extract Q_W^p and its error from the measured asymmetry.

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