

Abstract Submitted
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The Q-weak Experiment: Implications from the First Determination of the Proton's Weak Charge¹ JOSHUA MAGEE, College of William and Mary, QWEAK COLLABORATION — Q_{weak} part 3: The Q_{weak} experiment recently completed data taking at Jefferson Laboratory with the aim of making the first experimental determination of the proton's weak charge, the neutral-weak analog of the electric charge. Results have been obtained from the first period of data-taking, which comprises 3 days of beam and 4% of the total data set. The experiment measured the small parity-violating asymmetry of elastic electron-proton scattering, which allows direct extraction of Q_W^p . Once extracted, the current results directly probe potential new parity-violating semi-leptonic physics beyond the Standard Model at the TeV scale. For the general 4-fermion contact interaction, the probed mass-limit is $1.1 TeV$ with 95% confidence. When combined with the world's parity-violating data, extraction of the neutron's neutral-weak charge, Q_n^p , and the individual quark weak vector couplings, C_{1u} and C_{1d} , are also possible. This talk will focus on the implications of the current Q_{weak} experimental results, including the extraction of the proton and neutron weak charges, the quark weak couplings, and also highlight the mass-limit reach of Standard Model extensions probed. Projections to the final Q_{weak} dataset will be provided.

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