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First Determination of the Proton's Weak Charge

Monday 16 June 2014 14:15 (30 minutes)

The Qweak collaboration has reported first results of a program of precision measurements of parity violating electron-proton scattering at small momentum transfer at Jefferson Laboratory[1]. Together with earlier measurements at higher momentum transfer, which are used to constrain hadronic corrections, this initial Qweak data set has provided the first experimental determination of the proton's weak charge. Results are in good agreement with the Standard Model and set new limits on the neutral weak quark couplings C1u and C1d. Approximately 25x more data are currently undergoing analysis, with the aim of providing a stringent experimental test of the running of sin2(θW) when completed. As part of its ancillary measurement program to constrain and characterize systematic errors, Qweak has also obtained precision measurements of transverse polarization asymmetries, inelastic asymmetries, and parity violating scattering on aluminum. An overview of the Qweak experiment and the status of Qweak physics results will be presented.

[1.] D. Androic et al., Physical Review Letters 111, 141803 (2013)

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