**Physics Seminar**

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*" The Qweak Experiment: Its Physics Significance and Legacy"*

**Abstract**

Over the past decade Jefferson Lab has maintained a vigorous parity-violating physics program using the signature of the weak interaction to probe both nuclear and nucleonic structure. Parity-violating experiments have developed a reputation for their increasingly rigorous demands on measurement precision and on electron beam quality. Many of those requirements have been met by the science and engineering teams at Jefferson Lab along with their partnering researchers from around the world. The parity program is now at the level of precision where it can test key predictions of the Standard Model. The most recent parity violating experiment at Jefferson Lab was the Qweak experiment which measured the world's smallest elastic electron-proton parity violating asymmetry to date to unprecedented precision. With an initial release of 4% of the full data set and the final publication of results only a few months away, this experiment provides the world's first determination of the weak charge of the proton and a test of the Standard Model prediction of the running of the weak mixing angle. Achievements, difficulties and surprises encountered during Qweak further provide technical insights that are key for future precision experiments scheduled at Jefferson Lab. I give an overview of the operation and physics case for the Qweak experiment with particular focus on its legacy for future experiments.

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