Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

The Measurement of a Lepton-Lepton Electroweak Reaction (MOLLER) Experiment[1] JULIETTE MAMMEI, University of Manitoba, MOLLER COLLABORATION — The MOLLER experiment will measure the parity-violating asymmetry A_{PV} in polarized electron-electron (Møller) scattering which arises due to the interference between the Standard Model electromagnetic and weak neutral current amplitudes. The experiment will run in Hall A of Jefferson Lab. The 11 GeV polarized electron beam with a current of 75 μA will be incident on a 1.5 m liquid hydrogen target. A two-toroid spectrometer system will focus scattered electrons ($5 < \theta_{lab} < 19$ mrads) onto an array of 224 quartz Cherenkov detectors 28 m downstream of the target center. A_{PV} at our kinematics ($Q^2 = 0.0056$ GeV^2) is predicted to be ≈ 35 parts per billion (ppb) and the statistical uncertainty of the measurement will be 0.7 ppb, resulting in a measurement of the weak charge of the electron of 2.4% and a precision of ± 0.00024(stat)± 0.00013(sys) of the weak mixing angle. This precision matches that of the single best determinations from high energy colliders, and is sensitive to physics beyond the Standard Model, such as multi-TeV-scale vector bosons, supersymmetry and light dark bosons among others. A summary of recent progress in the design of the apparatus and related R&D efforts will be presented.

[1]Work supported by the Natural Sciences and Engineering Research Council of Canada and the National Research Council of Canada.

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Date submitted: 30 Jun 2014 Electronic form version 1.4