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**$Q_{weak}$: A Precision Measurement of the Proton's Weak Charge** JULIETTE MAMMEI, Virginia Polytechnic and State University, QWEAK COLLABORATION — The weak charge of the proton is a Standard Model-suppressed observable: $Q^p_{weak} \sim 1 - 4\sin^2\theta_w \approx 0.05$. The $Q_{weak}$ experiment proposes to measure this quantity to 4%. A measurement with this precision is sensitive to new physics at the TeV scale, such as lepto-quarks, $Z'$s, or R-parity violating SUSY. The parity violating asymmetry in elastic electron proton scattering arises from the interference between photon and $Z$ boson exhange, and at low momentum transfers is dominated by $Q^p_{weak}$. The experiment will utilize an 80% polarized, 180 $\mu$A, 1.165 GeV electron beam scattered from a 35 cm liquid hydrogen target for a production run time of 2200 hours. A resistive toroidal magnet with 8 fold symmetry around the beamline will focus elastically scattered electrons of $8 \pm 2^\circ$ onto a set of quartz bars. The $Q^2$ corresponding to these kinematics is 0.03 $(\mathrm{GeV/c})^2$, and the expected asymmetry is $A \sim$ -0.23 ppm. At these kinematics the contributions from nucleon structure are suppressed. Due to the high counting rate of ~800 MHz/octant, the experiment will be run in integrating mode. The $Q^2$ distribution will be measured in a low rate counting mode with a set of tracking detectors. An overview of the physics and experiment as well as a status report will be given.

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