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The Qweak Čerenkov Detector[1] PEIQING WANG, University of Manitoba, QWEAK COLLABORATION — The Qweak experiment at Jefferson Laboratory will make a determination of the proton's weak charge $Q_W^P = 1 - 4\sin^2\theta_W$ with approximately 4% combined statistical and systematic errors. This will enable us to extract the weak mixing angle $\sin^2\theta_W$ at $Q^2 = 0.03(\mathrm{GeV/c})^2$ to approximately 0.3% testing the Standard Model prediction. The key apparatus includes a liquid hydrogen target, a toroidal magnetic spectrometer and a set of eight Čerenkov detectors. The proton's weak charge is determined by measuring the parity violating e-p scattering asymmetry A_{PV}. The proposed experimental precision and statistical uncertainty demand a high performance Čerenkov detector system working in integration mode. These Čerenkov detectors are made of fused silica, allowing us to handle the high rate of 800 MHz per detector for a running time of 2500 hours without significant radiation damage. In this talk, I shall introduce the Monte Carlo simulation, the design, the construction of this detector system, as well as detector performance tests.

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