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The fused-silica Cherenkov detector system for the Qweak experiment ROB MAHURIN, University of Manitoba and Jefferson Lab, QWEAK COLLABORATION — The Qweak experiment will measure the proton's weak charge via the parity-violating asymmetry in electron-proton scattering, measuring the asymmetry to a precision of 5 parts per billion. A continuous ~ 180 μA beam of polarized 1.1 GeV electrons interacts with a 35 cm liquid hydrogen target. Elastically scattered electrons with momentum transfer $Q^2 \approx 0.03$ GeV^2 are focused onto an array of eight fused silica detectors, each 2 m long. Cherenkov light emitted inside the silica is collected by photomultiplier tubes. The typical electron rate in each detector is $\sim$700 MHz; during production data-taking, the photocurrent is measured continuously by low-noise integrating electronics. The accelerator can also deliver the same beam at much lower currents ($\sim$ 100 pA); for these measurements, the phototubes can be connected to higher-gain fast electronics capable of resolving single-electron events. In this talk I will describe the construction, operation, and performance of these detectors.

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