

Abstract Submitted
for the HAW09 Meeting of
The American Physical Society

Target Density Fluctuation Studies for the Qweak Experiment

JOHN LEACOCK, Virginia Tech, QWEAK COLLABORATION — The Q_{weak} experiment will measure the proton's neutral weak charge using parity-violating electron scattering. Target density fluctuations are an important issue for liquid hydrogen targets in parity-violating electron scattering experiments because they contribute to the statistical error. A proposed technique for reducing their importance relative to counting statistics is to increase the data-taking frequency. To determine how this technique may benefit the Q_{weak} experiment, a study was done using a standard Jefferson Lab Hall C liquid hydrogen target. The purpose of the study was to determine how target density fluctuations depend on data-taking frequency. Čerenkov detectors mounted at small scattering angles were used to detect scattered electrons from carbon and liquid hydrogen targets at 30, 250, and 1000 Hz data-taking frequencies for beam currents in the 10 - 80 μ A range. The data on the carbon target was used to understand sources of random noise other than target density fluctuations. The study resulted in an empirical determination of the dependence of the target density fluctuation amplitude on data-taking frequency.

Mark Pitt
Virginia Tech

Date submitted: 30 Jun 2009

Electronic form version 1.4