

Abstract Submitted
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A Precise Compton Polarimeter for Hall C at Jefferson Lab¹

WOUTER DECONINCK, Massachusetts Institute of Technology, Q-WEAK COLLABORATION — The Q_{weak} experiment, scheduled to run in 2010–2012 in Hall C at Jefferson Lab, will measure the parity-violating asymmetry in elastic electron-proton scattering at 1.1 GeV to determine the weak mixing angle $\sin^2 \theta_W$. The dominant experimental systematic uncertainty will be knowledge of the electron beam polarization. Following the accelerator upgrade to provide an 11 GeV electron beam to Hall C by 2014, parity-violating deep-inelastic scattering experiments will require a high-precision, continuous beam polarization measurement. With a new Compton polarimeter we aim to measure the beam polarization with a statistical precision better than 1% in one hour and a systematic uncertainty of 1% for an incident electron beam energy between 1.1 GeV and 11 GeV. A low-gain Fabry–Pérot cavity laser system provides the circularly polarized photons. The scattered electrons are detected in radiation-hard diamond strip detectors, and read-out using FPGA logic boards. The photon detector uses a fast, undoped CsI crystal with sampling and integrating read-out. Coincident events are used to calibrate the detectors. The design and installation of the Compton polarimeter subsystems will be discussed.

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