

Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Construction and Testing of Data Acquisition Components for the Hall A Compton Polarimeter JOSHUA HILL¹, College of William and Mary, Thomas Jefferson National Accelerator Facility — Nuclear physics experiments require accurate knowledge of the spin polarization of the electron beam delivered to the experimental halls. Hall A is upgrading its Compton polarimeter in support of the lab's 12 GeV beam energy upgrade. This project centered around the data acquisition (DAQ) system for the scattered-photon detection component of the polarimeter. The goal was to test whether the DAQ software and hardware are capable of capturing, recording, and processing electron helicity-dependent scattering rate asymmetry data at high rates, while maintaining appropriate accuracy. We created the necessary circuits, and are able to reliably extract asymmetries of between 0.5% and 11.5% to 0.2%. We did this in a deadtime-free regime at rates between 100 KHz and 350 KHz. We currently are unable to measure the system deadtime after it becomes manifest at about 350 KHz. These tests support the use of a scaled version of this configuration.

¹DOE SULI Summer Student

Joshua Hill
College of William and Mary, Thomas Jefferson National Accelerator Facility

Date submitted: 20 Aug 2013

Electronic form version 1.4