

Abstract Submitted
for the DNP11 Meeting of
The American Physical Society

Simulation of an Apparatus to Measure the Parity-Violating Neutron Spin Rotation in ^4He R.C. MALONE, B.E. CRAWFORD, Gettysburg College, NSR COLLABORATION — In order to better understand the nucleon-nucleon weak interaction, the Neutron Spin Rotation (NSR) collaboration performed an experiment at NIST that measured a parity-violating neutron spin rotation per unit length in liquid helium of $\sim[1.7\pm 9.1(\text{stat.})\pm 1.4(\text{sys.})] \times 10^{-7}$ rad/m [1]. A second experiment is planned using a more intense neutron beam to reduce the statistical uncertainty, which was the limiting source of uncertainty in the measurement. This project focused on analysis of systematic effects in the experiment using a Monte Carlo computer simulation which traces neutrons down the beamline, calculating scattering from target materials, reflections from neutron waveguides, and rotations due to magnetic fields. Systematic effects resulting from small angle scattering coupled with different target locations and beam geometries were studied.

[1] W.M. Snow, *et al.*, Phys. Rev. C **83**, 022501 (2011).

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Date submitted: 28 Jul 2011

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