

Abstract Submitted  
for the HAW14 Meeting of  
The American Physical Society

**Neutron Spin Rotation Measurements by the NSR Collaboration**<sup>1</sup> BRET CRAWFORD, Gettysburg College, NSR COLLABORATION — To constrain weak coupling constants between nucleons and place limits on the existence of possible long-range forces, the Neutron Spin Rotation (NSR) apparatus measures rotations of transversely-polarized neutrons passing through  $\sim 0.5$  m of target material [1,2]. A previous measurement on the NG6 beamline at the NCNR placed stringent limits on the size of parity-violating rotations of neutrons in liquid helium,  $d\phi/dz = [+1.7 \pm 9.1(stat.) \pm 1.4(sys.)] \times 10^{-7}$  rad/m [1]. A newly designed apparatus will accept the increased phase-space of the new high-flux NGC beam at NCNR to improve this statistically-limited measurement by about an order of magnitude. An experiment using the same apparatus with a room-temperature target is being proposed at LANSCE to place limits on parity-conserving rotations from possible fifth-force interactions to complement previous studies [3,4]. An overview of the experimental method, plans for upcoming measurements, and the status of upgrades will be presented.

[1] W. M. Snow et al., PRC **83**, 022501(R) (2011)

[2] H. Yan, W. M. Snow, PRL **110**, 082003 (2013)

[3] E. G. Adelberger, T.A. Wagner, PRD **88**, 031101(R) (2013)

[4] F. M. Piegsa, G. Pignol, PRL **108**, 181801 (2012)

<sup>1</sup>This work was supported in part by NSF PHY-0457219, NSF PHY-0758018, DE-AI02-93ER40784, and DE-FG02-95ER40901.

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Date submitted: 01 Jul 2014

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