

Abstract Submitted  
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**Parity-Violating Neutron Spin Rotation in n-<sup>4</sup>He**<sup>1</sup> MURAD SARSOUR, Georgia State University, NSR COLLABORATION — The neutron spin rotation (NSR) collaboration used parity-violating spin rotation of transversely polarized neutrons transmitted through a 0.5 m liquid helium target to constrain weak coupling constants between nucleons. While consistent with theoretical expectation, the upper limit set by this measurement on the rotation angle,  $d\phi/dz = [+1.7 \pm 9.1(\text{stat.}) \pm 1.4(\text{sys.})] \times 10^{-7}$  rad/m<sup>2</sup>, is limited by statistical uncertainties. The NSR collaboration is preparing a new measurement to improve this statistically-limited result by about an order of magnitude. In addition to using the new high-flux NG-C beam at the National Institute of Standards and Technology (NIST) Center for Neutron Research, the apparatus is being upgraded to take advantage of the larger-area and more divergent NG-C beam. In addition, significant improvements have been made to the cryogenic design and the <sup>3</sup>He ion chamber. Details of these improvements and readiness of the upgraded apparatus will be discussed and the current theoretical and experimental status of  $d\phi/dz$  in n-<sup>4</sup>He will be reviewed.

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<sup>2</sup>W. M. Snow et al., PRC **83**, 022501(R) (2011).

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