

Abstract Submitted
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Neutron Spin Rotation Measurements¹ MURAD SARSOOR, 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, $d\phi/dz = [+1.7 \pm 9.1(\text{stat.}) \pm 1.4(\text{sys.})] \times 10^{-7} \text{ rad/m}^2$, was limited by statistical uncertainties. The NSR collaboration is preparing a new measurement to improve this statistically-limited result by about an order of magnitude. We are designing the new apparatus to operate on the new high flux NGC beam with increased phase-space at the National Institute of Standards and Technology (NIST) Center for Neutron Research. The upgraded apparatus with a room-temperature target will be tested at LANSCE in a measurement that will search for parity-conserving rotations from possible exotic neutron interactions. The design and readiness of the upgraded apparatus will be discussed in relation to its application in both measurements, and the current theoretical and experimental status of $d\phi/dz$ in n - ^4He will be reviewed.

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

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