

Abstract Submitted
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Spin Propagation Simulation for the NSR Apparatus¹ PETER YERGEAU, Gettysburg Coll, NEUTRON SPIN ROTATION COLLABORATION — The Neutron Spin Rotation (NSR) Collaboration investigates the hadronic weak interaction and, in a recent experiment, possible spin-dependent fifth forces. One such interaction between a neutron and nearby material acts as a pseudo-magnetic force causing the neutron spin to precess, as first investigated experimentally by Piegsa and Pignol[1]. The NSR apparatus functions as a cold-neutron polarimeter that is sensitive enough to measure rotations in the 10^{-7} rad range. In the 5th-force experiment neutrons pass near a slab of material. Since the effect falls off exponentially and we want to take advantage of the large 10cmx10cm beam at LANSCE, the target has many slabs of different densities with several mm gaps between them through which the neutrons propagate. Due the sensitivity of the apparatus, it is vital to investigate and reduce the effects of stray magnetic fields, as they can cause large rotations as the neutrons pass through the target region. My work has been modifying a neutron transport simulation to include the precession of spins about realistic magnetic fields in the low-field regions of the NSR apparatus. Results will be presented. [1] F. M. Piegsa and G. Pignol Limits on the Axial Coupling Constant of the New Light Bosons Phys. Rev. Lett. 108, 181801 (2012)

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