Abstract Submitted
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A Search for Possible Exotic Spin Dependent Interactions Using Neutron Spin Rotation[1] CHRIS HADDOCK, Indiana Univ - Bloomington, NEUTRON SPIN ROTATION COLLABORATION — Various theories beyond the Standard Model predict the existence of new particles with masses in the sub-eV range with very weak couplings to ordinary matter. A parity-even and time-reversal-even interaction between polarized nucleons and unpolarized matter proportional to ${g_A}^2\vec{\sigma}\cdot(\vec{p}\times\vec{r})$ is one such possibility, where $\vec{\sigma}$ and $\vec{p}$ are the spin and the momentum of the polarized nucleon, $\vec{r}$ is the separation between the polarized nucleon and a nucleon in unpolarized matter, and g_A is the axial vector coupling of an interaction induced by the exchange of a new light vector boson. I present recent results on behalf of the NSR (Neutron Spin Rotation) Collaboration from an experiment performed at the FP12 slow neutron beam line at LANSCE which utilizes a polarized neutron beam to test for the above mentioned possible spin-coupled force. By sending a beam of polarized cold neutrons near thin, flat sheets of non-magnetic, unpolarized matter which could induce a net rotation of the plane of polarization of the neutrons, we can place a limit on the strength of the new possible interaction, g_A^2, by measuring the change in neutron polarization downstream of the target.

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