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A Search for Possible Weakly-Coupled Z' Bosons to the Neutron Using Slow Neutron Spin Rotation[1] KRYSTYNA LOPEZ, Indiana University, Bloomington, NSR COLLABORATION — An exotic axial vector interaction with a mm to μm range that couples weakly to the neutron through exchange of a Z' boson can appear in some extensions of the Standard Model [1]. We present the current status and systematic uncertainty analysis for an experiment to search for an interaction of the form $V_5 = \frac{g_A^2}{4\pi m}\frac{e^{-m_0 r}}{r}(\frac{1}{r} + \frac{1}{\lambda_c})\vec{\sigma}\cdot(\vec{v}\times\hat{r})$. We plan to employ slow neutron polarimetry [2] to look for a spin rotation of transversely polarized slow neutrons which pass through a series of open parallel slots bounded by flat rectangular plates of tungsten, copper, and glass [3]. The goal of our experiment is to improve the sensitivity of $\varphi' = [2.8 \pm 4.6(stat.) \pm 4.0(sys.)] \times 10^{-5}$ rad/m achieved in [4] by at least two orders of magnitude at the NIST NG-C beamline. We will discuss our work using pT-sensitivity B-field maps of the plate surfaces to bound the main source of systematic uncertainty arising from residual magnetic fields.

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[3] C. Haddock et al., Nucl. Inst. Meth. A 885 (2018)
[4] C. Haddock et al., Phys. Lett. B 783 (2018)

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