

Abstract Submitted
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Development of a Rotating Test Mass System for Exotic Spin-Dependent Force Searches¹ JUAN BOHORQUEZ, Univ of Miami, W.M. SNOW, ERICK SMITH, BEN BRIGGS, ASIYAH DIN, Indiana University — Theories of Physics beyond the Standard Model predict the possibility of a spin-dependent macroscopic force between spin polarized masses and unpolarized masses proportional to $\hat{S} \cdot \hat{r}$ [1]. Previous experiments which bring a non-polarized mass near a polarized mass, and search for NMR frequency shifts have set the best limits on monopole-dipole interactions with matter at distances of one hundred hundred microns to 1 cm. We plan to improve the constraints on these interactions using a spinning test mass near an ensemble of rotating polarized spins produced in a newly-developed spin exchange optical pumping technique [2]. The frequency and phase of the spinning test mass will be chosen to resonantly couple energy into the spin system if there is a monopole-dipole interaction. I will present the designs of the mechanical system that will hold the test mass and the control system that will rotate it at the required rate.

[1] J. Moody and F. Wilczek, Phys. Rev. D (1984).

[2] A. Korver et al, arXiv:1506.08797 (2015)

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