

Abstract Submitted
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Bounds on New Spin Dependent Forces Between Neutrons Using a $^3\text{He} / ^{129}\text{Xe}$ Zeeman Maser ALEX GLENDAY, CLAIRE CRAMER, DAVID F. PHILLIPS, RONALD L. WALSWORTH, Harvard-Smithsonian CfA — Searches for new spin dependent macroscopic forces place bounds on physics beyond the Standard Model, such as Lorentz symmetry violation and existence of new particles like the axion. We report the first experimental limits on new spin dependent macroscopic forces between neutron spins. We measure the nuclear Zeeman frequencies of a $^3\text{He} / ^{129}\text{Xe}$ maser while we modulate the nuclear spin polarization of ^3He in a separate glass cell. We place limits on the coupling strength of dipole potentials mediated by axion-like particles ($g_p g_p$) at the 5.5×10^{-6} level for interactions at ranges longer than 40 cm.

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