

Abstract Submitted  
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**Search for exotic short-range interactions using paramagnetic insulators**<sup>1</sup> EVAN WEISMAN, Indiana University and IU Center for Exploration of Energy and Matter, PINGHAN CHU, Los Alamos National Laboratory, CHEN-YU LIU, JOSH LONG, Indiana University and IU Center for Exploration of Energy and Matter — We describe a proposed experimental search for exotic spin-coupled interactions using a solid-state paramagnetic insulator. The experiment is sensitive to the net magnetization induced by the exotic interaction between the unpaired insulator electrons with a dense, nonmagnetic mass in close proximity. An existing experiment has been used to set limits on the electric dipole moment of the electron by probing the magnetization induced in a cryogenic gadolinium gallium garnet sample on application of a strong electric field. With suitable additions, including a movable source mass, this experiment can be used to explore “monopole-dipole” forces on polarized electrons with unique or unprecedented sensitivity. The solid-state, nonmagnetic construction, combined with the low-noise conditions and extremely sensitive magnetometry available at cryogenic temperatures could lead to a sensitivity over 10 orders of magnitude greater than exiting limits in the range below 1 mm.

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