

APR17-2016-020127

Abstract for an Invited Paper
for the APR17 Meeting of
the American Physical Society

Magnetometer Searches for Ultra Low Mass Fields

MICHAEL ROMALIS, Princeton University

New spin interactions arise in a variety of extensions to the Standard Model. Well-known spin-dependent effects, such as permanent electric dipole moments and violations of Lorentz and CPT symmetries, have been searched for in many experiments. The existence of low-mass axion-like particles would also generate spin-dependent effects that can be searched for in similar experiments, but often with unique signatures. Since particles with spin also have a magnetic moment, such experiments are automatically sensitive to ordinary magnetic fields and one of the challenges is to eliminate such effects, using for example, two different spin species in a co-magnetometer arrangement. I will describe several past and on-going experiments using co-magnetometers based on nuclear spin-polarized noble gases. These experiments are used to search for both axion-like dark matter and for axion-mediated forces that are independent of dark matter.