

Abstract Submitted
for the CAL10 Meeting of
The American Physical Society

Progress toward a search for anomalous spin-mass couplings with a dual-isotope rubidium magnetometer¹ JULIAN VALDEZ, IAN LACEY, RODRIGO PEREGRINARAMIREZ, DELYANA DELCHEVA, L.R. JACOME, DEREK KIMBALL, California State University - East Bay — A coupling between spin and mass can arise from new spin-0 or spin-1 force-mediating particles or in non-standard gravity with scalar or vector components in addition to the usual tensor interaction. We report on progress toward a search for anomalous couplings between the mass of the earth and Rb spins. In the experiment, a natural isotopic mixture of Rb atoms is contained in an antirelaxation-coated cell. The atomic spins are polarized via laser optical pumping and spin precession is measured in both isotopes using optical rotation. The experiment is particularly sensitive to spin-mass interactions of the proton. We discuss the sensitivity of our experimental scheme and strategies for control of several important systematic effects such as differential light shifts, collisional frequency shifts, and frequency shifts due to the rotation of the earth.

¹Supported by NSF grants PHY-0652824 and PHY-0969666.

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Date submitted: 30 Sep 2010

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