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Sensitivity Optimization of a Dual Isotope Rubidium Magnetometer[1] RODRIGO PEREGRINARAMIREZ, IAN LACEY, JULIAN VALDEZ, DELYANA DELCHEVA, L.R. JACOME, DEREK KIMBALL, California State University - East Bay — We report progress on optimization of a dual-isotope Rb magnetometer to be used in experiments searching for anomalous spin-dependent interactions of the proton with the earth's gravitational field. Rubidium atoms are contained in an antirelaxation-coated cell mounted inside a five-layer magnetic shield system. A system of six coils allows precise control of the magnetic environment experienced by the atoms, and atomic spin precession is measured using a pump-probe setup. The ratio of the difference and the sum of the spin precession frequencies of the two Rb isotopes is insensitive to magnetic field fluctuations but highly sensitive to anomalous interactions of the proton spin. We discuss optimization of the optical pumping and probing of the Rb spins and the projected sensitivity of the dual-isotope magnetometer.

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