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Rotating Co-Magnetometer for Tests of Fundamental Symmetries S.J. SMULLIN, T.W. KORNACK, G. VASILAKIS, M.V. ROMALIS, Princeton University — Recent interest in tests of Lorentz and CPT symmetries have resulted in several new limits on spin coupling to a preferred direction in space. We are developing a rotating K-^{3}He co-magnetometer to improve such limits. The co-magnetometer is based on a high sensitivity K magnetometer operating in spin-exchange relaxation free regime; in this case, the K is interacting with nuclear spin-polarized ^{3}He buffer gas. When properly tuned, the coupling between the two atomic species makes the system insensitive to magnetic fields and sensitive to anomalous fields that indicate the presence of new physics. The compact co-magnetometer incorporates a number of novel features, such as a ferrite magnetic shield with much lower magnetic noise level than mu-metal and in-vacuum operation of all optical elements to reduce air convection noise and improve thermal stability. Periodic rotation of the apparatus allows much faster modulation of the expected signal. In this talk, I will discuss the performance of the apparatus and present initial results.

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