

Abstract Submitted
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South Pole Lorentz Invariance Test MORGAN HEDGES, MARC SMICIKLAS, MICHAEL ROMALIS, Princeton University — Searches for Lorentz and CPT violation play an important role in testing current theories of space-time. To test one of the consequences of local Lorentz invariance we have performed a precision test of spatial isotropy at the Amundsen-Scott station near the geographic South Pole. This location provides the most isotropic environment available on Earth. The experiment is a rotating atomic-spin co-magnetometer which compares energy levels of ^{21}Ne and Rubidium atoms as a function of direction. The experimental sensitivity obtained is more than an order of magnitude better than in previous such measurements, known as Hughes-Drever experiments. By operating the experiment at the Pole we are able to eliminate background signals due to the gyroscopic interactions of spins with Earth's rotation as well as diurnal environmental effects. Here we will present final results from the experiment's 2-year data collection period. This is the first precision atomic physics experiment performed at the Pole, and we will discuss the potential for future such measurements.

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