Abstract Submitted
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Spin Mass Interaction Limiting Experiment (SMILE) JUNYI LEE, MICHAEL ROMALIS, Princeton University — We present preliminary results of an upcoming experiment to limit possible anomalous spin mass interactions. Such interactions arise naturally if light pseudoscalar bosons like the axion exist and a bound on such interactions places constraints on the couplings of the axion, which is of particular interest both as a solution to the strong CP problem in QCD and as a dark matter candidate. In this experiment, we measure the couplings of the axion using a ^{3}He-K co-magnetometer by modulating the positions of two 200kg source masses that produces an energy shift in the atoms proportional to the axion's coupling constants. Astroyphysical observations[1] currently exceed the best laboratory limits[2] of light axions' couplings to nucleons by two order of magnitudes but we expect, for the first time in a laboratory experiment, to surpass those astrophysical bounds. Construction of the experiment has been completed and we present here some preliminary results and discuss possible systematic effects. Supported by NSF PHY-1404325.

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