

Abstract Submitted
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New Search for Mirror Neutrons at HFIR¹ JOSHUA BARROW, YURI KAMYSHKOV, BEN RYBOLT, The University of Tennessee, LEAH BROUSSARD, Oak Ridge National Laboratory, NEUTRON OSCILLATION GROUP TEAM² — The theory of mirror matter (MM) acts as an extension to the Standard Model (SM), and predicts a hidden sector made up of a copy of SM particles and interactions but with opposite parity. MM would seldom interact with our own matter, except via gravity, making it a dark matter candidate. Mixing interactions between MM and ordinary matter would provide experimentally accessible implications in the form of neutral particle oscillations. Direct searches for neutron oscillations into mirror-neutrons in a controlled magnetic field have previously been performed using ultracold neutrons in storage/disappearance measurements, with some inconclusive results for oscillation times of $\tau \sim 10$ s. A proposal for future disappearance and regeneration experiments in which the neutron oscillates to and from a mirror-neutron state is forthcoming. An experiment performed using the existing General Purpose-Small Angle Neutron Scattering instrument at the High Flux Isotope Reactor at Oak Ridge National Laboratory could have the sensitivity to exclude up to $\tau < 15$ s, with short beamtime and at low cost.

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