

Abstract Submitted  
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**TREX: A Proposed Search for T violation in Polarized Neutron Optics** WILLIAM SNOW, Indiana University, TREX COLLABORATION — A discovery of time reversal violation in any hadronic system, no matter how complicated, is clearly of fundamental importance. It has been known for decades that certain heavy nuclei possess neutron p-wave resonances where parity-odd amplitudes from the hadronic weak interaction are amplified by several orders of magnitude. The same amplification mechanism works also for P-odd T-odd neutron-nucleus forward-scattering amplitudes. A transmission experiment to search for a P-odd and T-odd term in the forward neutron-nucleus scattering amplitude using polarized neutrons and polarized nuclear targets shares with electric dipole moments the property of being a null test for time reversal invariance. Continuing advances in the ability to produce eV neutron beams of high polarization using polarized  $^3\text{He}$  and in the ability to polarize macroscopic amounts of the relevant nuclei ( $^{139}\text{La}$ ,  $^{131}\text{Xe}$ ,  $^{81}\text{Br}$ ) coupled with the appearance of bright pulsed spallation neutron sources make it timely to reconsider the scientific reach and potential of this approach. We present a conceptual design for such a measurement [1] along with an estimate of the scientific reach for an experiment done at the 0.7 eV resonance in  $^{139}\text{La}$ .

[1] J. D. Bowman and V. Gudkov, arXiv:1407.7004

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