

Abstract Submitted
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Proposed search for T-odd, P-even interactions in spectra of chaotic atoms with frequency combs¹ MUIR MORRISON, ANDREI DEREVIANKO, University of Nevada, Reno, M.G. KOZLOV, Petersburg Nuclear Physics Institute — Violation of fundamental symmetries in atoms has been the subject of intense experimental and theoretical interest. P-odd, T-even transitions have been observed and are in excellent agreement with electroweak theory. Electron EDM searches have placed bounds on T-odd, P-odd interactions, constraining proposed extensions to the Standard Model. In this work we propose a search for T-odd, P-even (TOPE) interactions in atoms, which have thus far received little attention. We consider open-shell atoms (such as the rare earths) which have dense, chaotic excitation spectra with strong level repulsion. The strength of the level repulsion depends on the underlying symmetries of the atomic Hamiltonian. TOPE interactions lead to increased level repulsion. We will demonstrate how a statistical analysis of many chaotic spectra can determine the strength of level repulsion; in particular, the variance of the number of levels in an energy range has been shown to be a useful measure. We estimate that, using frequency comb spectroscopy, a sufficient number of chaotic levels could be measured to match or exceed the current experimental bounds on TOPE interactions.

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