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Opportunities for P-wave Resonance Spectroscopy for Studies of Parity and Time Reversal Violation on POL

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The NOPTREX collaboration performs neutron spectroscopy measurements on p-wave resonances to quantify P-odd/T-odd measurement sensitivity. Beam-port adaptations to POLI would enable one of the highest fluxes of polarized eV neutrons in the world aided by the new 3He polarizer and analyzer. The 139La 0.7 eV p-wave resonance amplifies both parity-odd (P) and time-reversal odd (T) effects from mixing of s-wave and p-wave resonances [1], and a sensitive null test of T is possible for this observable [2]. Examples of correlations that can be measured on POLI for NOPTREX include (1) the P-odd correlation term A from k ·I in the forward scattering amplitude, where k is the neutron momentum and I is the nuclear polarization, (2) the pseudomagnetic precession term B from σ ·I, where σ is the neutron polarization. POLI can improve the precision of the only 139 La A measurement of A = 0.31 ± 0.09 [3] by 10x. The pseudomagnetic precession term σ ·I has never been measured on the 0.7 eV 139La resonance and would provide important information on systematics in the null test of T. POLI can enable these measurements others on p-wave resonances in 131Xe and 81Br for example. Proposals for the two experiments on 139 mentioned above will be detailed. This work is supported by NSF grant PHY-1913789.
[1] V. P. Gudkov, Physics Reports **212** 77 (1992).
[2] J. D. Bowman and V. P. Gudkov, Phys. Rev. C **90** 065503 (2014).
[3] V. P. Alfimenkov et al, Phys. Atm. Nucl. **59**, 1861 (1996).

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