Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

A Proposed Search for Time Reversal Violation in Polarized Neutron Transmission Through Polarized ^{117}Sn JONATHAN CUROLE, Indiana Univ - Bloomington, NOPTREX COLLABORATION — We describe work towards an experimental search for a P-odd and T-odd term in the polarized neutron-polarized nucleus forward scattering amplitude [1] on the 1.33 eV p-wave resonance in ^{117}Sn, which exhibits a 10^5 amplification of P-odd amplitude.

$$\frac{\Delta\sigma_{PT}}{\Delta\sigma_P} = \kappa(J)\frac{W}{V}$$

This formula relates the P-odd T-odd over P-odd amplitude ratio W/V to the ratio $\frac{\sigma_{PT}}{\sigma_P}$ of the P-odd T-odd to P-odd cross sections, and a spectroscopic parameter $\kappa(J)$ involving the partial neutron resonance widths in the $J = I \pm 1/2$ channels. We present a reevaluation of ($\vec{n}$,γ) angular distribution from the resonance [2] which implies a large, nonzero value for κ that controls the T-odd sensitivity. The $I = 1/2$ ^{117}Sn nucleus can be polarized with a technique known as SABRE which we will describe. [3]

References

[1]V. P. Gudkov, Physics Reports 212, 77 (1992).

[2]Vo Van Tkhuan Yu. D. Mareev L.B. Pikelner I.M. Frank A.S. Khrykin V.P. Alfimenkov, S.B. Borzakov and E.I. Sharapov. PismaZh. Eksp. Teor. Fiz., 39(8):346348, 1984.

[3]A.M. Olaru, A. Burt, P.J. Rayner, S.J. Hart, A.C. Whitwood, G.G.R. Green, S.B. Duckett Chem. Commun. 52 14482 2016

Jonathan Curole
Indiana Univ - Bloomington

Date submitted: 26 Jun 2020 Electronic form version 1.4