Abstract Submitted
for the APR21 Meeting of
The American Physical Society

A First Measurement of the Spin-Dependent Neutron-Nucleus Forward Scattering Amplitudes in Polarized Neutron-Polarized ^{131}Xe and ^{129}Xe Nuclei Using Pseudomagnetic Precession[1] HAO LU, Indiana Univ - Bloomington, NOPTREX COLLABORATION — Spin-dependent amplitudes in polarized neutron-polarized nucleus forward scattering can cause systematic errors in NOPTREX. We performed the first measurement of neutron pseudomagnetic precession[2] in neutron transmission through polarized ^{131}Xe and ^{129}Xe with the J-NSE Neutron Spin Echo spectrometer at FRM II reactor facility in Germany[3]. The Xenon nuclei were polarized using an in-situ Spin Exchange Optical Pumping system. We extracted pseudomagnetic precession angles from phase-sensitive NSE signals and then calculated the corresponding incoherent scattering lengths. We will present the experimental setup of the polarized Xenon pseudomagnetic precession measurement, the data analysis procedure, the result and its implication.

[1]Supported by US National Science Foundation grants PHY-1614545 and PHY-1914405 and the Indiana University Center for Spacetime Symmetries
[2]Zimmer, O., Ehlers, G., Farago, B. et al. A precise measurement of the spin-dependent neutron scattering length of 3He. EPJ direct 4, 128 (2002). https://doi.org/10.1007/s1010502a0001
[3]Heinz Maier-Leibnitz Zentrum. (2015). J-NSE: Neutron spin echo(NSE) spectrometer.
Journal of large-scale research facilities, 1, A11. http://dx.doi.org/10.17815/jlsrf-1-34

Hao Lu
Indiana Univ - Bloomington

Date submitted: 08 Jan 2021 Electronic form version 1.4