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Proposed measurement of the neutron spin-rotation through solid ortho-deuterium. A. KOMIVES, De Pauw Univ., D.M. MARKOFF, B.J. CROWE, NC Central Univ. — In recent review papers [1,2] a program to study parity-violating (PV) nucleon-nucleon (NN) interaction observables including spin-rotation in the \vec{n} - α and \vec{n} - p systems has been proposed to characterize the weak NN interaction. The rotation of the transverse neutron polarization vector as the long-wavelength neutron traverses the medium, results from the PV weak forward scattering amplitude. We propose that the spin-rotation observable in the \vec{n} - d system would greatly contribute to this experimental and theoretical effort. Neutron depolarization from a relative large scattering cross section of a few barns in the deuterium could greatly dilute the small rotation signal on the order of 10^{-7} radians. Recent measurements were performed at the FUNSPIN beam line at the Paul Scherrer Institute of the depolarization of neutrons transmitted through liquid and solid ortho-deuterium as a function of neutron energy [3]. Results indicate that the observed depolarization of cold neutrons through solid ortho-deuterium is low enough for a measurement of the neutron spin-rotation to be feasible. We present here a proposed apparatus and program to measure the neutron spin-rotation in the \vec{n} - d system.

[1] B. R. Holstein, *Nucl. Phys.* **A737**:85-92 (2004).

[2] S.G. Page and M. Ramsey-Musolf, *Ann. Rev. Nucl. Part. Sci.* **56** (2006).

[3] A. Komives, *Bull. Am. Phys. Soc.* **51**, No. 6, HC.00008 (2006).

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