

Abstract Submitted
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Precision neutron polarimetry for a measurement of the n-³He incoherent scattering length of ³He THOMAS GENTILE, M. ARIF, W.C. CHEN, D.S. HUSSEY, D.A. PUSHIN, L. YANG, NIST, M.G. HUBER, F.E. WITTFELDT, Tulane Univ., T.C. BLACK, Univ. of North Carolina at Wilmington — In a recent experiment, we performed a precision measurement of the incoherent scattering length for neutrons in ³He at the Neutron Interferometry and Optics Facility (NIOF) at the National Institute of Standards and Technology (NIST). As part of this experiment, the neutron polarization produced by a supermirror in a monochromatic neutron beam and the efficiency of a precession coil spin flipper were measured to better than 0.1% relative standard uncertainty using polarized ³He spin filter analyzers. Two related, but not identical, approaches were employed: the asymmetry method, in which we determined the asymmetry in the transmission of neutrons through the ³He, and the “normalized transmission” method, in which we determined the transmission asymmetry for polarized vs. unpolarized neutrons. (The latter is often referred to as the shim method in neutron scattering, in which a ferromagnetic shim is typically employed to depolarize the beam.) In both cases we employed reproducible translation of the supermirror so as to permit determination of the ³He analyzing power via neutron transmission measurements, and adiabatic fast passage nuclear magnetic resonance to invert the ³He polarization. Results from the two methods will be discussed.

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