

Abstract Submitted
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Measuring the Parity-Violating Neutron Spin Rotation in Helium: The Neutron Spin Rotation Experiment C.D. BASS, T.D. BASS, B.E. CRAWFORD, J.M. DAWKINS, K. GAN, B.R. HECKEL, J.C. HORTON, C.R. HUFFER, D. LUO, D.M. MARKOFF, A.M. MICHERDZINSKA, H.P. MUMM, J.S. NICO, A.K. OPPER, M.G. SARSOUR, E. SHARAPOV, W.M. SNOW, H.E. SWANSON, S.C. WALBRIDGE, V. ZHUMABEKOVA — We have performed a precision measurement of the parity-violating neutron spin rotation in helium due to the nucleon-nucleon weak interaction at the NIST Center for Neutron Research. The measurement employed a beam of low energy neutrons passing through a liquid helium target system located between a neutron polarizer-analyzer pair. The parity-violating spin rotation magnitude was determined from measured count asymmetries in the analyzer. The expected parity-violating spin rotation of order 10^{-6} rad placed severe constraints on the apparatus design. In particular, isolation of the parity-odd component of the spin rotation from the much larger Larmor precession required use of a nonmagnetic target system that allowed movement of the target helium upstream or downstream of a vertical precession coil, which enabled us to take asymmetry differences to subtract background rotations. We describe the design and performance of the apparatus used for this experiment.

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