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**The Liquid Helium Target for the Neutron Spin-Rotation Experiment**[1] C.D. BASS, J.M. DAWKINS, T.D. FINDLEY, J.C. HORTON, C.R. HUFFER, D. LUO, A.M. MICHERDZINSKA, M.G. SARSOUR, W.M. SNOW, Indiana Univ / IUCF, V. ZHUMABEKOVA, Al-Farabi Khazakh National Univ, K. GAN, A.K. OPPER, The George Washington Univ, B.E. CRAWFORD, Gettysburg College, E.I. SHARAPOV, Joint Institute for Nuclear Research, Dubna, H.P. MUMM, J.S. NICO, NIST, D.M. MARKOFF, North Carolina Central Univ, P.R. HUFFMAN, North Carolina State Univ / TUNL, B.R. HECKEL, H.E. SWANSON, Univ of Washington — We are performing a new precision measurement of the parity-violating neutron spin-rotation of polarized neutrons that propagate through liquid helium with a sensitivity goal of $3 \times 10^{-7}$ rad / m at the NCNR. We describe the design, operation, and evaluation of systematic effects of a new liquid helium target that consists of a pair of target chambers located upstream and downstream of a vertically-aligned spin-precession coil. A system for changing target states by moving liquid helium between the front and back chambers allows one to isolate the parity-violating spin-rotation signal from much larger parity-conserving rotations that are primarily due to background magnetic fields. The targets are further split into left and right chambers, where the transfer of liquid helium between the front and back targets occurs in the opposite sense for left and right sides, thus allowing simultaneous measurements of opposite target states.

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