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Computer Simulation and Systematic Effects for Neutron Spin Rotation in Liquid Helium KANGFEI GAN, A.M. MICHERDZINSKA, A.K. OPPER, The George Washington University, C.D. BASS, H.P. MUMM, J.S. NICO, National Institute of Standards and Technology, T.D. BASS, J.M. DAWKINS, J.C. HORTON, D. LUO, W.M. SNOW, Indiana University, B.E. CRAWFORD, Gettysburg College, B.R. HECKEL, H.E. SWANSON, University of Washington, C.R. HUFFER, P.R. HUFFMAN, North Carolina State University, D.M. MARKOFF, North Carolina Central University, M.G. SARSOUR, Georgia State University, E.I. SHARAPOV, Joint Institute for Nuclear Reserach, V. ZHUMABEKOVA, Al-Farabi Kazakh National University, SPIN ROTATION COLLABORATION — A high precision measurement of the parity-violating spin rotation $\phi_{PV}(\vec{n},^4 He)$ for transversely polarized neutrons passing through liquid ^{4}He has taken place at the NIST Center for Neutron Research. To investigate and quantify systematic effects, a computer simulation of the experiment which takes into account neutron optical effects and scattering from liquid helium has been written for neutron transport through the polarimeter and target. Scattering in the 4K helium target is modeled using neutron and light scattering data and theoretical constraints. Limits on systematic effects based on the simulation and measurements have been determined for internal magnetic fields, magnetic field gradients, and possible phase space non-uniformities of the beam and polarization analyzer.

Kangfei Gan
The George Washington University

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