

Abstract Submitted
for the DNP06 Meeting of
The American Physical Society

Determination of the ortho/para ratio in the LH₂ target for the NPDGamma experiment¹ LIBERTAD BARRÓN-PALOS, Arizona State University, FOR THE NPDGAMMA COLLABORATION — In the NPDGamma experiment to measure the parity violating asymmetry A_γ in the distribution of the gamma rays emitted in the capture of polarized neutrons by protons ($\vec{n} + p \rightarrow d + \gamma$), an important issue is to ensure that the neutrons retain their polarization as they travel into the hydrogen target. For that purpose, a 16-liter LH₂ vessel, held at 17-18 K and 15 psi pressure, is used as the target. Under these conditions, the concentration of para-hydrogen is 99.97%, so that the effect of polarization loss by the incoherent scattering of neutrons in ortho-hydrogen is reduced. Due to the large difference in the scattering cross-section for low energy neutrons in both hydrogen species, changes in the ortho/para ratio can be monitored through the study of the transmitted neutron flux. In this work, we present a model for the transmission of neutrons through the apparatus and hydrogen target, as well as the effect of different ortho/para ratios in the data of the 2006 NPDGamma commissioning run.

¹This work is supported by U.S. National Science Foundation, the Department of Energy and NIST.

Libertad Barrón-Palos
Arizona State University

Date submitted: 06 Jul 2006

Electronic form version 1.4