

Abstract Submitted
for the APR09 Meeting of
The American Physical Society

An Apparatus to Study Ultra-Cold Neutron Production in Solid Oxygen DANIEL SALVAT, CHEN-YU LIU¹, CHRISTOPHER LAVELLE, PATRICK MCCHESENEY, GREGORY MANUS, YU FENG, Indiana University, YUNCHANG SHIN, University of Kentucky, ALBERT YOUNG, GUILHEM RIBEILL, ADAM HOLLEY, North Carolina State University, CHRIS MORRIS, MARK MAKELA, ANDY SAUNDERS, Los Alamos National Laboratory — Ultra-Cold Neutrons (UCN) provide sensitive measurements of the neutron's properties, such as the neutron lifetime, electric dipole moment, and angular correlations in beta-decay. Solid deuterium offers a super-thermal phonon down-scattering mechanism to produce UCN; however, the lifetime of UCN in solid deuterium is limited by the material's absorption and incoherent scattering cross-sections. Solid oxygen possesses zero incoherent cross-section and magnon, as well as phonon, down-scattering modes. These suggest potentially larger effective production volume and higher UCN yield than deuterium. We present an apparatus to investigate temperature and magnetic field dependent UCN production. The instrument is benchmarked using 97 percent ortho-deuterium from 5 to 18 Kelvin. Results for oxygen will be presented in the following talk.

¹Primary Investigator

Daniel Salvat
Indiana University

Date submitted: 09 Jan 2009

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