Abstract Submitted for the APR15 Meeting of The American Physical Society

Progress on Tests of Electric Breakdown of Superfluid Liquid Helium-4 in High Electric Field for the SNS nEDM Experiment WANCHUN WEI, Los Alamos National Laboratory, DOUGLAS BECK, University Of Illinois, VINCE CIANCIOLO, Oak Ridge National Laboratory, STEVEN CLAYTON, Los Alamos National Laboratory, CHRISTOPHER CRAWFORD, University Of Kentucky, SCOTT CURRIE, WILLIAM GRIFFITH, TAKEYASU RAMSEY, AMY ROBERTS, Los Alamos National Laboratory, ITO, JOHN RICHARDO SCHMID, California Institute Of Technology, GEORGE SEI-DEL, Brown University, DANIEL WAGNER, University Of Kentucky, STEVEN WILLIAMSON, University Of Illinois, WEIJUN YAO, Oak Ridge National Laboratory, SNS NEDM COLLABORATION — The SNS nEDM experiment is a collaborative project under development, which aims to search for the neutron electric dipole moment (EDM) with ultracold neutrons (UCNs) stored in superfluid liquid helium-4 at the Spallation Neutron Source (SNS) in Oak Ridge National Laboratory. In general, the ultimate sensitivity of the EDM searches linearly depends on the strength of the applied electric field across the volume of superfluid liquid helium-4 in the UCN storage space. Our goal is to achieve an electric field with strength of 75 kV/cm. However, the phenomenon of electric breakdown in liquid helium-4 is poorly understood in the available literatures. We, therefore, have developed an apparatus to study it at temperatures as low as 0.4 K and pressures between saturated vapor pressure (SVP) of liquid helium and 1 atm. In this talk, we will present the latest progress on the tests of the electric breakdown of superfluid liquid helium-4 and its implications of findings that affect the design of the SNS nEDM experiment.

> Wanchun Wei Los Alamos National Laboratory

Date submitted: 09 Jan 2015

Electronic form version 1.4