

Abstract Submitted
for the DNP07 Meeting of
The American Physical Society

High Voltage Breakdown and SQUID Performance for the Neutron Electric Dipole Moment Experiment CRAIG HUFFER, CHEN-YU LIU, Indiana University , JOSH LONG, Indiana University Cyclotron Facility, MACIEJ KARZ, Indiana University, NEUTRON ELECTRIC DIPOLE MOMENT COLLABORATION COLLABORATION — A new search for a permanent electric dipole moment (EDM) of the neutron is underway at the Oak Ridge Spallation Neutron Source. A non-zero EDM would be a signal of time reversal symmetry violation and improve our understanding of the matter-antimatter asymmetry of the universe. The experiment will use a Superconducting Quantum Interference Device (SQUID) to infer the precession of ultracold neutrons held in a superfluid helium bath, in the presence of applied electric and magnetic fields. The experiment's sensitivity is proportional to the applied electric field. Neither the maximum practical size of the electric field nor the behavior of SQUIDS in proximity to this field are presently understood. Therefore we have constructed a small prototype (to decrease the cool-down time) to verify that SQUIDS can function in a high voltage environment and when exposed to RF interference. Another goal is to determine what characteristics allow us to maximize the electric field without breakdown. To do this we measure the breakdown voltage in both normal and superfluid helium at a variety of temperatures and (more uniquely) at different pressures, as well as test a variety of electrode materials.

Craig Huffer
Indiana University Cyclotron Facility

Date submitted: 01 Aug 2007

Electronic form version 1.4