

Abstract Submitted
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Laser Assisted Electric Field Monitoring in a Cryogenic Environment¹ MARK BROERING, JOSH ABNEY, University of Kentucky, CHRISTOPHER SWANK, BRAD FILIPPONE, California Institute of Technology, WEIJUN YAO, Oak Ridge National Lab, WOLFGANG KORSCH, University of Kentucky, SNS-NEDM COLLABORATION — The neutron EDM collaboration at the Spallation Neutron Source(ORNL) is using ultra-cold neutrons in liquid helium to improve the nEDM limit by two orders of magnitude. These neutrons will be stored in target cells located in a strong, stable electric field. Local radiation will generate charged particles which build up on the target cell walls reducing field strength and stability. The field fluctuations need to be kept below 1%, making it necessary to study this cell charging behavior, determine its effect on the experiment and find ways to mitigate this. A more compact test setup was designed to study this effect using smaller electrodes and cell. Charged particles are generated by ionizing the helium with a ^{137}Cs source and the electric field is monitored via the electro-optic Kerr effect. Linearly polarized light is passed through the helium. The Kerr effect then introduces an ellipticity to the polarization that is proportional to the electric field squared. This allows an effective means of field monitoring. Nitrogen has a much stronger response to electric fields. This makes liquid nitrogen an ideal candidate for first tests. First results on the liquid nitrogen tests will be presented.

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