LA-UR- 09-07497

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Title: Sensitivity reach of the neutron EDM experiment: The Electric Field Strength

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Intended for: Abstract for oral participation at the VIII Latin American Symposium on Nuclear Physics and Applications.

Los Alamos
NATIONAL LABORATORY
EST. 1943

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Form 836 (7/06)

Abstract for the
VIII Latin American Symposium on Nuclear Physics and Applications

Sensitivity reach of the neutron EDM experiment: The Electric Field Strength. RAUL HENNINGS-YEOMANS, MARK F. MAKELA, SCOTT A. CURRIE, JOHN C. RAMSEY, TODD L. WOMACK, Los Alamos National Laboratory, JOSHUA C. LONG, Indiana University, SHIRVEL STANISLAUS, Valparaiso University, SHIGEYUKI TAJIMA, Duke University, NEDM COLLABORATION — The search for an electric dipole moment of the neutron tests physics beyond the Standard Model such as new sources of CP-violation and Supersymmetry. The nEDM experiment aims to improve the sensitivity on the current limit of the electric dipole moment of the neutron to $<10^{-27}$ e·cm. The experiment will use a flux of Ultra Cold Neutrons (UCNs) produced and stored in a bath of superfluid He-II. A change in precession frequency is expected for a non-zero EDM when an electric field is applied parallel and antiparallel to a magnetic field across the neutron storage cell. A dominant parameter in terms of reducing the statistical uncertainty of this measurement is the strength of the applied electric field. An experiment to measure if superfluid He-II can sustain up to 50 kV/cm for a volume and electrode spacings comparable to the nEDM experiment has been constructed at Los Alamos National Laboratory. It consists in a large-area parallel plate capacitor immersed in a 200 liter central volume inside a suitable cryostat that in turn is connected to a dilution refrigerator unit. I will present a description of the design, test runs and the status of the experiment.

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