

SES07-2007-000025

Abstract for an Invited Paper
for the SES07 Meeting of
the American Physical Society

A New Search for the Neutron Electric Dipole Moment at the Spallation Neutron Source

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A non-zero neutron electric dipole moment would provide the first evidence for the existence of Time-Reversal-Symmetry violation, equivalent to Charge-Conjugation-Parity (CP-) violation via the CPT theorem, in a stable system of light quarks. Such a discovery would be of fundamental importance, because additional sources of CP-violation are needed to explain the matter-antimatter asymmetry of the universe. Efforts spanning the past 50 years have increased the sensitivity to this miniscule quantity by eight orders of magnitude, culminating in the current upper limit of 3×10^{-26} e-cm. In this talk I will describe a new search by the nEDM Collaboration to be staged at the Spallation Neutron Source. This new experiment holds the potential for a two-orders-of-magnitude improvement in sensitivity, and is based on a magnetic resonance approach of comparing the neutron's spin precession frequency in parallel and anti-parallel electric and magnetic fields. Progress, plans, and challenges facing the experiment will be discussed.