

Abstract Submitted
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Measurement Cell and Light Collection Simulations for the nEDM@SNS Experiment¹ DEVON LOOMIS, Western Kentucky University, NEDM@SNS COLLABORATION — A new experiment, nEDM@SNS, will search for the neutron electric dipole moment (nEDM) at the Spallation Neutron Source at Oak Ridge National Laboratory with a factor of 100 improvement in sensitivity from recent measurements. The existence of a non-zero permanent nEDM is forbidden by both Parity and Time-reversal invariance and, by the CPT theorem, a violation of CP symmetry. In the Standard Model, CP violation is handled through a complex phase in the CKM matrix. In general, extensions to the Standard Model introduce new CP violating mechanisms and predict larger nEDMs, many of which are within reach of nEDM@SNS. Thus, this probe of the CP violating sector can provide meaningful constraints on these beyond the Standard Model theories. A measured non-zero nEDM at nEDM@SNS would be a clear indication of physics beyond the Standard Model and, per Sakharov's criteria, could account for the matter-antimatter asymmetry of the universe. In this work, GEANT4 and MCNP simulations were performed to validate the design of two experiment subsystems, the light collection system and the measurement cells. We will discuss the results from these simulations that indicate a promising path towards their successful implementation in the experiment.

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