

# New Technologies for Discovery III: The 2017 CPAD Instrumentation Frontier Workshop

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## nEDM with Liquid Helium

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A new experiment search for the neutron electric dipole moment with a sensitivity of  $\delta d_n \sim 3E-28$  e-cm, two orders of magnitude improvement over the current limit, is being developed to be mounted at the Spallation Neutron Source at Oak Ridge National Laboratory. This new experiment, based on the idea put forward by Golub and Lamoreaux, will be performed in superfluid helium at 0.4 K. Ultracold neutrons will be produced in situ from cold neutron beam using the superthermal process. Spin polarized  $^3\text{He}$  atoms will be used as comagnetometer.

The neutron precession frequency will be determined using liquid helium scintillation produced by the products of  $n(^3\text{He},^3\text{H})p$  reaction. In this talk, after a brief introduction to the principle of the experiment, I will present the current status of selected R&D efforts, including: 1) generation of high voltage in liquid helium, 2) application of large electric field in liquid helium, 3) study of liquid helium scintillation, and 4) detection of liquid helium scintillation.

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