Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Field Gradient Cancellation Technique for the LANL nEDM Experiment[1] PIYA PALAMURE FOR THE LANL NEDM COLLABORATION , Univ of Kentucky — The search for the permanent electric dipole moment of neutron (nEDM) has the goal of exploring sources of beyond standard model CP violating physics. The room temperature LANL nEDM experiment was proposed to push the upper limit of nEDM to 3×10^{-27} e·cm (68% confidence level). Achieving this substantially high sensitivity requires a highly uniform magnetic field which lowers the systematic uncertainty associated with the field non-uniformity below the precision goal of the experiment. The geometric phase false EDM effect is the primary consideration for the field uniformity requirement and it demands that the magnetic field gradients to be controlled below 0.3 nT·m^{-1} at the nominal B_0 field of 1 μT. I will describe the technique and the design of the proposed gradient coils to cancel first order and higher order magnetic field gradients to achieve the field uniformity requirements of the LANL nEDM experiment.

[1]This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics, under Award Number DE-SC0014622, the NSF under Award Number PHY-1828568, and by the LANL LDRD program.

Piya Palamure
Univ of Kentucky

Date submitted: 26 Jun 2020 Electronic form version 1.4