

Abstract Submitted
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Investigation of Evaporative Removal of ^3He from Liquid ^4He for the nEDM Experiment¹ F. DUBOSE, D.G. HAASE, P.R. HUFFMAN, NC State University — The discovery of a nonzero electric dipole moment for the neutron (nEDM) would have a fundamental impact upon the current understanding of the weak and strong nuclear interactions. A non-zero value at the order expected in the proposed experiment (10^{-28} e cm) would indicate new sources of T and CP violation, thereby either extending or disproving aspects of the Standard Model. In the nEDM experiment, neutrons are trapped in liquid helium, doped with trace amounts of polarized ^3He , in parallel magnetic and electric fields, causing them to precess. The effect of the electric field upon the precession frequency of the neutron can then be used to characterize the neutron charge distribution. As the ^3He depolarizes, it must be removed before repeating the doping process. We are developing an evaporative purification technique that can facilitate this removal, thereby lowering the concentration of ^3He in ^4He from approximately 10^{-10} to 10^{-12} , at an operating temperature between 250 mK and 500 mK.

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