Abstract Submitted
for the DNP08 Meeting of
The American Physical Society

^{3}He Relaxation Time Measurement at ∼400mK for the neutron electric dipole moment (nEDM) experiment[1] QIANG YE, Duke University, FRANKLIN DUBOSE, NCSU, DIPANGKAR DUTTA, Mississippi State University, HAIYAN GAO, Duke University, ROBERT GOLUB, PAUL HUFFMAN, NCSU, NEDM COLLABORATION — In the new neutron electric dipole moment (nEDM) experiment which is planned to be carried out at the SNS, the neutron storage cell will be made of dTPB-dPS (a wavelength shifting material) coated acrylic and filled with superfluid ^{4}He. The experiment will use the nuclear magnetic resonance technique to measure the neutron precession frequency by comparing with that of the polarized ^{3}He using spin dependence of the nuclear absorption process: $\vec{n} + {}^3\vec{H}e \rightarrow p + t + 764$ keV. The polarized ^{3}He will be used as a co-magnetometer to monitor the magnetic field *in situ* during the experiment. Understanding the relaxation mechanism of polarized ^{3}He in the storage cell under the experimental conditions and maintaining ^{3}He polarization is crucial. Following our earlier study of the ^{3}He relaxation time in a dTPB-dPS coated cylindrical acrylic cell at a temperature of 1.9K in the presence of superfluid ^{4}He at a magnetic holding field of 21 gauss, similar measurements at ∼400mK (the proposed nEDM experimental temperature) have been carried out using a dilution refrigerator at TUNL with the magnetic holding field of ∼7 gauss. Preliminary results will be presented.

[1]This work is supported in part by the U.S. Department of Energy under contract number DE-FG02-03ER41231.

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Date submitted: 23 Jun 2008 Electronic form version 1.4