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^{3}He Relaxation Study at Low Temperature for the Neutron Electric Dipole Moment Experiment[1] QIANG YE, Duke University/TUNL — The search for the existence of a nonzero neutron electric dipole moment (EDM) is a direct search of time reversal symmetry violation and has the potential to reveal new sources of CP violation beyond the Standard Model and may have a significant impact on our understanding of baryogenesis. A new experiment has been proposed to provide a new way to measure the neutron EDM with unprecedented sensitivity. The experiment requires that the ^{3}He polarization to have little or negligible loss during each measurement period. Therefore, understanding the relaxation mechanism of polarized ^{3}He and maintaining its polarization at the unique nEDM experimental conditions is essential. We have studied the longitudinal relaxation time of ^{3}He vapor for the first time from a deuterated tetraphenyl butadiene (d-TPB) coated acrylic cell in a diluted mixture of ^{3}He-^{4}He at a temperature of 1.9K and first set of results will be reported. A d-TPB coated acrylic cells will be used in the neutron EDM experiment. It is important to extend our current work down to $\sim$500mK and to a ^{3}He concentration closer to that of the nEDM experiment. Such measurements are being planned with the use of a dilution refrigerator and a SQUID setup for the monitoring of the ^{3}He polarization.

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