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Monte Carlo Simulation of Spin Relaxation due to v $\times$ E effect in nEDM experiment RICCARDO SCHMID, BRAD PLASTER, BRADLEY FILIPPONE, Caltech, NEDM COLLABORATION — We have simulated the precession of spin-polarized Ultra Cold Neutrons and ^{3}He atoms in uniform and static B and E fields and calculated the spin relaxation. The spin relaxation times T_1 (longitudinal) and T_2 (transverse) of spin-polarized UCN and ^{3}He atoms are important considerations in the new measurements of neutron Electric Dipole Moment in the SNS nEDM experiment. The uniform E field creates a motional magnetic field due to the $\vec{v} \times \vec{E}$ effect which combines with collisions with the walls of the holding cell to produce constant variation of the total B field and result in the spin relaxation of the neutron and ^{3}He samples. Scattering of ^{3}He atoms in ^{4}He also results in spin relaxation and is highly temperature dependent. In the SNS nEDM experiment the B field has magnitude of 10 mGauss. The applied E field is parallel to the B field and has a magnitude of 50 kV/cm. We have found the relaxation times for the neutron due to the $\vec{v} \times \vec{E}$ effect to be long compared to holding times and neutron lifetime. On the other hand, the $\vec{v} \times \vec{E}$ effect could be important for ^{3}He relaxation times.

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