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Spin Relaxation and Geometric Frequency Shifts in the SNS nEDM Experiment[1] CHRISTOPHER SWANK, Caltech, NEDM COLLABORATION — The search for the neutron electric dipole moment (nEDM) is a promising search for physics beyond the Standard Model. The nEDM violates time reversal (T), and the size of T violation predicted by the Standard Model is incompatible with present ideas concerning the creation of the observed baryon-antibaryon asymmetry. A measurement of a nEDM requires the detection of a shift in the Larmor precession in proportion to an applied electric field. The most recent measurement of the nEDM is limited by a systematic effect termed the geometric phase [C. A. Baker, et al. Improved Experimental Limit on the Electric Dipole Moment of the Neutron. *Physical Review Letters*, 97(13):131801(4), 2006.], a frequency shift linear in the applied electric field. The nEDM planned for the Spallation Neutron Source(SNS) at Oak Ridge National Laboratory will use polarized ^{3}He as a co-magnetometer and detector, it is also subject to the geometric phase. I will present recent work aimed at understanding and mitigating this effect. This discussion will emphasize the trajectory correlation functions of the neutron and ^{3}He modeled by continuous time random walks with arbitrary scattering times. The same tools for predicting the geometric phase can also be used to predict polarization decay.

[1]nEDM Collaboration

Christopher Swank
Caltech

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