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A study of liquid helium scintillation in the presence of an electric field for the nEDM experiment TAKEYASU ITO, S. CLAYTON, J. RAMSEY, Los Alamos National Laboratory, M. KARCZ, C.-Y. LIU, J. LONG, H.-O. MEYER, G. REDDY, Indiana University, NEDM COLLABORATION — The nEDM experiment, currently being developed to be constructed at the Fundamental Neutron Physics Beamline at Oak Ridge National Laboratory, will search for the neutron electric dipole moment (EDM) with a sensitivity roughly two orders of magnitude better than the current limit. In neutron EDM searches, the signature of an EDM appears as a shift in the neutron spin precession frequency upon an application of an electric field for neutrons precessing in a weak magnetic field. In the nEDM experiment, the neutron precession will be measured with respect to that of polarized ^{3}He atoms, which will occupy the same volume as the neutrons and act as a co-magnetometer. Liquid helium (LHe) scintillation from the spin dependent ^{3}He(n,p)t reaction will be used to determine the n-^{3}He precession frequency difference. The existing data on LHe scintillation in an electric field do not cover the expected electric field and operating temperature of the nEDM experiment. We measured the LHe scintillation yield dependence on the electric field strength up to $\sim$45 kV/cm in the temperature range of 0.2-1.1K at the saturated vapor pressure. In this talk, the results of the measurements will be presented, along with their implication for the nEDM experiment.

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