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Studies on Magnetometry and Samples used for an Experimental Search on the Electric Dipole Moment of the Electron using Solid-State Techniques YOUNG JIN KIM, CRAIG HUFFER, Indiana University, Bloomington, MACIEJ KARCZ, CHEN-YU LIU, GOVERDHAN REDDY, Indiana University, Bloomington — A discovery of a permanent electric dipole moment of the electron (eEDM) at the current sensitivity level will imply new sources of CP violation beyond the standard model of particle physics. We are attempting to improve the experimental limit of the eEDM using a new technique employing solid-state systems at low temperatures. The experiment requires a system with a large magnetic response and the application of sensitive SQUID magnetometry. In this talk, I will present results in characterizing the magnetic properties of our solid-state sample, polycrystalline Gadolinium Gallium Garnet (GGG), and discuss preliminary results of systematic studies on our SQUID detectors. In our current setup, SQUID sensors record a non-zero change in magnetic flux with no GGG samples. This non-zero signals indicate sources of systematic effects which mimic EDM signals. We identified that several sources are responsible for producing systematic errors: the eddy current and the transient current. The dominant effect due to the eddy current can be reduced by using electrode material with a high resistivity, such as graphite..

Young Jin Kim
Indiana University, Bloomington

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