

Modeling Electric Fields in Support of a Measurement of the Neutron Electric Dipole Moment

Author: Samuel Schaub

Affiliation: Physics Department

This research focuses on calculating electric fields in support of a proposed experiment to measure the electric dipole moment (EDM) of the neutron at Los Alamos National Laboratory. The experiment will employ a very strong electric field to exert a torque on the neutrons EDM, if any exists. Field Precision software is used to calculate the theoretical electric fields in and around the central detector region of the proposed experimental setup. This research has two goals. The first is to seek out areas of high electric field in the apparatus that will cause arcing and disrupt the experiment. When these areas are found, the shapes of parts are changed to eliminate the problem. The second goal is to map the electric field in the central detector region where measurements are to be made. It is desirable to know the strength, direction, and uniformity of the electric field in this region. The results of this research will be crucial to the design and execution of the proposed experiment to measure the neutrons EDM, which will, in turn, have far reaching implications in theoretical particle physics.

Information about the Authors:

Samuel Schaub graduated from Valparaiso University this past spring with a bachelors degree in Physics and Chemistry. This fall, he will be attending Massachusetts Institute of Technology in pursuit of a Ph.D. in Physics.

Faculty Sponsor: Dr. T. D. Shirvel Stanislaus

Student Contact: sam.schaub@valpo.edu