

Development of a simulation for measuring neutron electric dipole moment

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The neutron electric dipole moment (nEDM) is sensitive to new physics beyond the standard model, and could provide a new source of CP violation. Several experiments are being planned around the world for its high precision measurement. In the measurement of the nEDM, the systematic uncertainties are due to the motion of the ultracold neutrons (UCNs), the geometry of measurement systems, and the distortions in the magnetic field. Therefore, it is essential to qualitatively understand these effects so that they can be reduced. However, so far there does not exist a simulation framework for UCNs which properly take these effects into account. In this presentation, using the newly developed simulation framework adapted to work with Geant4-UCN, which properly simulate the motion of the UCNs taking into account their spin, we report on the result of optimizing the measurement systems.

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