

Challenges of the world-wide experimental search for the electric dipole moment of the neutron



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Systematic effect measurements related to ^{199}Hg in the nEDM experiment

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The nEDM experiment benefits from two atomic magnetometers to characterize the magnetic field environment.

The ^{199}Hg co-magnetometer allows to correct the neutron frequency for magnetic field drift at the sub-ppm level but does not provide any magnetic field homogeneity informations.

Consequently, a dedicated array of 16 Cesium magnetometers (CsM) has been built in the last 3 years allowing a control of vertical magnetic gradients at the 10pT/cm level, which is a critical point for systematic uncertainties estimation in the nEDM experiment.

Since 2012, important results have been obtained combining both ^{199}Hg and Cs magnetometers.

I will present the last one: a false electric dipole moment of ^{199}Hg atoms correlated to an electric field.

In addition, in the context of the neutron to Hg magnetic moment ratio estimation, we put for the first time in the nEDM experiment, a limit on the systematic light shift effect related to the interaction of the probe light UV photons with the ^{199}Hg atoms gas.

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