

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



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The measurement of the nEDM requires a magnetic field that is homogeneous in space and stable in time.

This presentation will focus on how to provide and maintain such a field.

Assuming a stable current source and a rigid coil, it is still necessary to have a stable temperature such that the mu-metal keeps its magnetisation.

Furthermore, careful relaxation (about once per day) of the mu-metal is necessary after each change of the orientation of the B-field.

Trim-coils are used to obtain a homogeneous field. Off-line mapping is done to find their optimal setting and to measure residual inhomogeneities in order to correct for systematic effects.

Before entering the mu-metal the neutrons need to be polarized, and then guided with a relatively strong magnetic field in order to keep the polarization. The transition into the weak field in the storage chamber is particularly difficult.

Around the mu-metal shield a surrounding field compensation system consisting of 6 large coils and 30 Flux-gate sensors is installed and suppresses external magnetic fluctuations.

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