

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



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Cs magnetometer array in the nEDM experiment

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The nEDM experiment located at the ultracold neutron source at Paul Scherrer Institut searches for a permanent electric dipole moment of the neutron (EDM) by looking for a difference of the neutron precession frequencies in parallel and antiparallel magnetic and electric fields. Changes of the magnetic field and its gradients that are correlated with the electric field reversal may mimic an EDM. Sixteen vacuum-compatible Cs magnetometers arranged in a three-layer gradiometer around the neutron precession chamber monitor temporal and spatial magnetic field changes. The sensors are driven by individual laser beams derived from a single beam produced by a frequency-stabilized diode laser. The magnetometers are routinely operated in a continuous mode and can be switched to a free induction decay mode for improving readout accuracy. I will present details of the magnetometer operation and array arrangement.

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