

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



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## A combined $^3\text{He}/\text{Cs}$ magnetometer for absolute measurements of magnetic fields

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The experimental search for a neutron electric dipole moment (nEDM) at PSI (Switzerland) calls for the precise measurement and control of the applied magnetic field.

Here, we report on a combined  $^3\text{He}$ -Cs magnetometer for the absolute measurement of a  $\mu\text{T}$  magnetic field. The measurement principle relies on detecting the free precession frequency of polarized  $^3\text{He}$  nuclei by a set of 8 optically pumped double-resonance  $M_x$ -cesium magnetometers.

A prototype has been built and its performance was investigated in the magnetically shielded BMSR2-room at PTB (Berlin).

We show that the combined magnetometer reaches a precision of better than  $10\text{E-}7$  in a 100s measurement time, its sensitivity for longer measurement periods being limited by the stability of the applied magnetic field.

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