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



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A combined ³He/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 3He-Cs magnetometer for the absolute measurement of a uT magnetic field. The measurement principle relies on detecting the free precession frequency of polarized 3He 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 10E-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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