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Magnetometry for next generation neutron EDM experiments

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Experiments searching for the electric dipole moment (EDM) of the neutron require a stable and homogeneous magnetic field. Statistical and systematic uncertainties in such experiments depend on magnetic field gradients and fluctuations of those gradients and the field itself. In order to monitor the different aspects of the magnetic field we developed a variety of special magnetometer systems based on optically-pumped Cs, ^{199}Hg , or ^3He . The used magnetometer techniques included variometers, multibeam vector readout [1], accurate all-optical field readings [2], and the readout of precessing ^3He spins with Cs OPM [3]. We will present an overview of magnetometer systems in our current neutron EDM experiment as well as plans for a next-generation upgrade (n2EDM). The n2EDM experiment at PSI requires a large number of Cs sensors similar to arrays previously designed for bio- magnetometry [4].

References

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