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The ^{199}Hg Co-magnetometer System for the n2EDM Experiment

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The n2EDM experiment at the Paul Scherrer Institute searches for the electric dipole moment (EDM) of the neutron with a baseline sensitivity of approximately $1 \times 10^{-27} \text{ e} \cdot \text{cm}$. Precise monitoring of the average magnetic field experienced by the neutrons is essential to prevent systematic shifts in the EDM measurement that cannot be otherwise mitigated. This magnetic field monitoring is achieved using optically pumped ^{199}Hg co-magnetometers, which operate in the same storage volumes as the neutrons. The improved neutron statistical sensitivity requires the co-magnetometers to measure the magnetic field with an uncertainty of 25 fT.

This poster presents the design, implementation, and performance of the mercury co-magnetometer system.

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