Abstract Submitted
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Magnetometry in the Munich Neutron Electric Dipole Moment (nEDM) Experiment SKYLER DEGENKOLB[1], University of Michigan — Neutron EDM measurements rely on sensitive magnetometry to decouple signal from systematic errors. State-of-the-art co-magnetometers use hyperpolarized diamagnetic atoms, chosen for small spin-flip cross-sections and long coherence times. In particular, the 254nm ^{199}Hg line is used to polarize and detect via Hg lamps or lasers. We present a comprehensive scheme of Hg co-magnetometers, external magnetometers and gradiometers inside passive and active shields. Hg gas is pumped and probed by a diode laser with two doubling stages whose UV output is locked to the 254nm line at the point of vanishing light shift; adjacent cells containing Hg and/or other species are used to extract systematics correlated with material properties of Hg (e.g., center-of-mass displacements or georotational shifts). Vapor cell magnetometers of Hg or Cs are used for comparison, and to guide apparatus installation. The vibration-isolated experiment takes place within passive mu-metal and aluminum shields, inside a non-magnetic experimental hall. A magnetically shielded room, monitored by 180 fluxgate magnetometers which generate error signals for 24 independent external compensation coils, contains the passive shield. Design and performance of the composite system will be discussed.

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