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Progress towards an improved search for a permanent EDM of Hg atoms W. C. GRIFFITH, M. D. SWALLOWS, B. R. HECKEL, E. N. FORTSON, University of Washington, M. V. ROMALIS, Princeton University — The measurement of a finite permanent electric dipole moment (EDM) on any atom or particle would reveal a new source of CP violation outside of the Standard Model. At present, the tightest bound on any EDM comes from our measurement with ^{199}Hg atoms, which set an upper limit of $|d| < 2.1 \times 10^{-28}\, e\,\mathrm{cm}$ [1]. In that work, a comparison was made of the spin precession frequencies in two ^{199}Hg vapor cells placed in a common magnetic field and oppositely directed electric fields. The signature of an EDM would be a frequency shift correlated with the electric field direction. The present version of the experiment uses a stack of four vapor cells. The two additional cells are at zero electric field and are used as magnetometers to help reduce magnetic field gradient noise and to help diagnose magnetic systematic effects. Initial data taken with the four cell apparatus would often show electric field correlated magnetic field shifts. These effects were possibly due to HV discharges orienting trace ferromagnetic impurities, and the replacement of some materials near the vapor cells and an improved cleaning procedure have greatly reduced their occurrence. We expect to report data with at least a factor of two improvement in statistical sensitivity over our previous result. [1] M.V. Romalis, W.C. Griffith, J.P. Jacobs, and E.N. Fortson, Phys. Rev. Lett. **86**, 2505 (2001).

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