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Demonstration of an Electron Electric Dipole Moment Experiment Using Electric-Field Quantization in a Cesium Cold Atom Fountain[1]
HARVEY GOULD, JASON M. AMINI[2], CHARLES T. MUNGER[3], LBNL — A Cs fountain electron electric dipole moment (EDM) experiment using electric-field quantization is demonstrated. With magnetic fields reduced to ≤ 200 pT, the electric field lifts the degeneracy between hyperfine $|m_F|$ levels and, along with the fountain geometry, suppresses systematics from motional magnetic fields. Transitions are induced and the atoms polarized and analyzed in field-free regions. Our results suggest that a fountain experiment can detect (or rule out) an electron EDM far smaller than the present experimental limits.

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