Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Electron EDM measurement in a beam of ThO: Demonstrated and planned upgrades ZACK LASNER, Yale University, VITALY ANDREEV, DANIEL ANG, JACOB BARON, Harvard University, DAVID DEMILLE, Yale University, JOHN DOYLE, GERALD GABRIELSE, NICHOLAS HUTZLER, Harvard University, BRENDON O'LEARY, Yale University, CRISTIAN PANDA, ELIZABETH PETRIK, Harvard University, CHRISTIAN WEBER, ADAM WEST, Yale University, GREY WILBURN, Harvard University, ACME COLLABORATION —
The permanent electric dipole moment (EDM) d of a particle with spin S is characterized by a linear interaction $H \propto d\,\vec{S}\cdot\vec{E}$ with an electric field $\vec{E}$. This Hamiltonian is inherently P- and T-odd, making it a powerful probe of fundamental physics. To date, no EDM of a fundamental particle has been observed, but limits placed for several particles have significantly constrained theories beyond the Standard Model in the TeV range. In 2014, the ACME collaboration set a new upper limit on the electron EDM (eEDM) of $|d| < 1 \times 10^{-28}\,e{\cdot}$cm by means of a spin-precession measurement in a beam of thorium monoxide (ThO) [1]. We present our measurement scheme and demonstrated apparatus upgrades designed to suppress known systematic errors and achieve an order of magnitude greater statistical sensitivity in a next-generation measurement of the eEDM. In addition, we describe upgrades currently in development to improve our statistical sensitivity beyond next-generation levels. [1] Baron *et al.*, Science **343** (2014), 269-272

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Date submitted: 29 Jan 2016 Electronic form version 1.4