Abstract Submitted
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The ACME Electron EDM Search[1] ADAM WEST, DAVID DEMILLE, ZACK LASNER, BRENDON O'LEARY, Yale University, JACOB BARON, JOHN DOYLE, GERALD GABRIELSE, NICHOLAS HUTZLER, CRISTIAN PANDA, ELIZABETH PETRIK, Harvard University, ACME COLLABORATION — We recently improved the limit on the electron electric dipole moment (eEDM), d_e, by an order of magnitude[2]. An eEDM-induced energy shift consistent with zero implied a limit $|d_e| < 9.6 \times 10^{-29}$ e·cm×($\mathcal{E}'_{\rm eff}/\mathcal{E}_{\rm eff}$) (90% c.l.). $\mathcal{E}_{\rm eff}$ ($\mathcal{E}'_{\rm eff}$) is the true (mean calculated = 78 GV/cm^3) value of the effective $\mathcal{E}$-field acting on d_e. We are implementing various upgrades to substantially enhance usable molecule flux. These include a new type of buffer gas beam source based on a high-yield thermochemical reaction, coherent state preparation via STIRAP, and electrostatic focusing of the molecular beam. Preliminary tests demonstrated significant improvement in molecule number and we anticipate an overall factor of 100 increase. This would enable a tenfold improvement in statistical sensitivity, which would probe interactions at scales up to 10 TeV. Modifications are also being made to suppress the largest systematic errors associated with our previous result to reduce these below our projected statistical sensitivity.

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[2]Science **343**, 269 (2014)
[3]J. Chem. Phys. **139** 221103 (2013), J. Mol. Spectrosc. **300**, 16 (2014)

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