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Progress Toward a Ten-Times Better Measurement of the Electron's EDM with ThO BRENDON O'LEARY, Yale University, VITALY ANDREEV, DANIEL ANG, JACOB BARON, Harvard University, DAVID DEMILLE, Yale University, JOHN DOYLE, GERALD GABRIELSE, NICHOLAS HUTZLER, Harvard University, ZACK LASNER, Yale University, CRISTIAN PANDA, ELIZABETH PETRIK, Harvard University, CHRISTIAN WEBER, ADAM WEST, Yale University, GREY WILBURN, Harvard University, ACME COLLABORATION —
The ACME experiment recently improved the limit on the electron's electric dipole moment (EDM) by a factor of 10 by performing spin-precession measurements on a molecular beam of ThO (Science 343 (2014), 269-272). Since that measurement, we have implemented and demonstrated a series of improvements that will increase the statistical sensitivity to the EDM by another factor of 10, including methods to increase the efficiency of molecular state preparation and detection. Additional improvements are projected to suppress known systematic errors to a level below the new target statistical uncertainty. The largest systematic errors in our first measurement arose due to thermal stress-induced birefringence and an E1-M1 interference effect; we will describe our approach to dramatically reduce each of these effects.

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