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Upgrading the ACME electron EDM search with a molecular lens[1] XING WU, Yale University, DANIEL G. ANG, Harvard University, JAMES CHOW, DAVID DEMILLE, Yale University, JOHN M. DOYLE, Harvard University, GERALD GABRIELSE, Northwestern University, ZHEN HAN, Yale University, BINGJIE HAO, Northwestern University, PEIRAN HU, Yale University, NICHOLAS HUTZLER, California Institute of Technology, DANIEL LASCAR, SIYUAN LIU, Northwestern University, COLE MEISENHELDER, Harvard University, TAKAHIKO MASUDA, Okayama University, CRISTIAN D. PANDA, University of California, Berkeley, NOBORU SASAO, SATOSHI UETAKE, KOJI YOSHIMURA, Okayama University, ACME COLLABORATION — Measurements of the electron electric dipole moment (EDM) using cold molecules set very powerful constraints on T-violating new physics beyond the Standard Model. The best upper limit on the electron EDM was recently set by the ACME collaboration: |de|<1.1E-29 e•cm [Nature 562, 355 (2018)], using thorium monoxide (ThO). A major upgrade in statistics for next generation of ACME is now underway, using a molecular lens to focus molecule flux into the EDM measurement region. Here, we report the first measurements [arXiv:1911.03015] of relevant properties of the Q state, which appears ideal for molecular lensing. Also, we demonstrate a double-STIRAP procedure that transfers population into and out of the Q state with 90% efficiency. These combined with trajectory simulations on an electrostatic hexapole allow us to project a signal rate improvement by over an order of magnitude relative to an unfocused molecular beam.

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