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Characterization and Suppression of Systematic Errors in the ACME II Measurement of the Electron Electric Dipole Moment COLE MEISENHELDER, DANIEL G. ANG, Harvard University, DAVID DEMILLE, Yale University, JOHN M. DOYLE, Harvard University, GERALD GABRIELSE, Northwestern University, JONATHAN HAEFNER, Harvard University, NICHOLAS R. HUTZLER, California Institute of Technology, ZACK LASNER, BRENDON R. O'LEARY, Yale University, CRISTIAN D. PANDA, Harvard University, ADAM D. WEST, Yale University, ELIZABETH P. WEST, XING WU, Harvard University, ACME COLLABORATION — Measurement of the electron electric dipole moment (eEDM) provides a powerful probe for physics beyond the Standard Model. Currently, ACME II is working towards improving by an order of magnitude upon the 2014 limit on the eEDM of $|d_e| < 0.9 \times 10^{-28}\ e \cdot cm$. As part of the current experimental generation we have worked to characterize and suppress both the leading sources of systematic error from ACME I and systematics found at our new level of sensitivity. We describe in detail how eEDM mimicking effects can arise from both the coupling of non-reversing electric fields to magnetic field gradients, and the imperfect alignment of laser polarizations. To search for systematic effects we have exaggerated over forty experiment parameters and observed no evidence of a shift in the eEDM measurement. We discuss the techniques that allowed for the suppression of these effects below our current level of statistical uncertainty.

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