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Characterization and Suppression of Systematic Errors in the ACME Electron Electric Dipole Moment Search[1] BRENDON O'LEARY, Yale University, JACOB BARON, Harvard University, DAVID DEMILLE, Yale University, JOHN DOYLE, GERALD GABRIELSE, PAUL HESS, NICK HUTZLER, ELIZABETH PETRIK, BEN SPAUN, Harvard University, ACME COLLABORATION — In the search for the electron's electric dipole moment (eEDM) in the H $^3\Delta_1$ state of ThO, the ACME collaboration has characterized and suppressed a number of systematic errors on the order of the experiment's statistical sensitivity $\delta d_e \approx 10^{-28} e \cdot cm/\sqrt{T/days}$, where T is experiment duration. Through intentional experimental parameter variation we have explored the impact of imperfect field reversals, laser polarization gradients, changes in field magnitudes, and other potential sources of systematic error on the measured value of the eEDM. In particular, we report on the details of an eEDM mimicking effect caused by the coupling of an imperfect electric field reversal to a laser detuning dependent molecule phase obtained during optical pumping. We discuss ways in which this effect was suppressed to a level below the experiment's statistical error by technical means.

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