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The Amazing Electron and it Moments: Most Precise Tests of the Standard Model and Proposed Fixes

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The Standard Model of particle physics is the great triumph and great frustration of modern physics. It predicts the value of the electron magnetic moment – the most precisely measured property of an elementary particle – to better than a part per trillion. Yet, it cannot explain why a universe made of matter survived the big bang, nor can it yet explain dark matter or dark energy. A number of adjustments to the Standard Model have been proposed. To test these our ACME collaboration recently completed a 12 times more sensitive measurement of the electron's electric dipole moment. The Standard Model predicts a moment too small to measure, while proposed adjustments (e.g. supersymmetric models) generally cannot avoid predicting an electric dipole moment that could be within range of this new measurement sensitivity.