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Probing new physics using trapped molecular ions: JILA's electron EDM search[1] TANYA S. ROUSSY, WILLIAM B. CAIRNCROSS, DANIEL N. GRESH, KIA BOON NG, JEFFREY MEYERS, KEVIN BOYCE, YAN ZHOU, YUVAL SHAGAM, JUN YE, ERIC A. CORNELL, JILA, NIST, and University of Colorado, and Department of Physics, University of Colorado — Precision measurement of fundamental asymmetries, such as the electron's electric dipole moment (eEDM), can help to probe physics beyond the standard model and explore mysteries such as dark matter or the baryon asymmetry. Trapped molecular ions can be remarkably sensitive to small effects such as an electron EDM while offering robust rejection of systematics. Our approach at JILA takes advantage of the large internal electric fields in a molecule, and the long coherence times possible with trapped ions. In this talk, I will provide an overview of our second-generation EDM measurement, focusing on current demonstrations and future plans to improve our sensitivity by an order of magnitude.

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