

Abstract Submitted
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Progress towards a measurement of the electron electric dipole moment with trapped molecular ions WILL CAIRNCROSS, KEVIN COSSEL, MATT GRAU, DAN GRESH, JUN YE, ERIC CORNELL, JILA/University of Colorado Boulder — Trapped molecular ions are well suited to searches for the electric dipole moment of the electron (eEDM) due to the long coherence times possible. The current experiment at JILA focuses on the metastable $^3\Delta_1$ level of HfF^+ in a Paul trap with additional rotating electric and magnetic bias fields. We have demonstrated the ability to state-selectively transfer population to the desired $^3\Delta_1$ $J = 1$ state in the ion trap and to efficiently read-out the population in single spin states using photodissociation. Using these techniques, we performed Stark spectroscopy of the eEDM measurement states and made an absolute determination of the magnetic g-factors of the $m_F = \pm 3/2$ Zeeman sub-levels. Finally, we have demonstrated eEDM-sensitive Ramsey spectroscopy in a rotating bias field with 100 ms coherence time and four detected ion counts on average per experimental cycle.

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