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Second generation measurement of the electric dipole moment of the electron using trapped ThF^+ ions KIA BOON NG, YAN ZHOU, DANIEL GRESH, WILLIAM CAIRNCROSS, MATTHEW GRAU, YIQI NI, JUN YE, ERIC CORNELL, JILA, NIST and University of Colorado, and Department of Physics, University of Colorado, Boulder CO 80309-0440, USA — ThF^+ has been chosen as the candidate for a second generation measurement of the electric dipole moment of the electron (eEDM). Compared to the current HfF^+ eEDM experiment, ThF^+ has several advantages: (i) the eEDM–sensitive state ($^3\Delta_1$) is the ground state, which facilitates a long coherence time[1]; (ii) its effective electric field (38 GV/cm) is 50% larger than that of HfF^+, which promises a direct increase of the eEDM sensitivity[2]; and (iii) the ionization energy of neutral ThF is lower than its dissociation energy, which introduces greater flexibility in rotational state–selective photoionization via core–nonpenetrating Rydberg states[3]. Here, we present progress of our experimental setup, preliminary spectroscopic data of multi–photon ionization, and discussions of new features in ion trapping, state preparation and population readout.

[1]D. N. Gresh, K. C. Cossel, Y. Zhou, J. Ye, E. A. Cornell, Journal of Molecular Spectroscopy, 319 (2016), 1-9
[2]T. Fleig, M. K. Nayak, Physical Review A 88 (2013) 032514
[3]Z. J. Jakubek, R. W. Field, Journal of Molecular Spectroscopy 205 (2001) 197220.

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