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Progress in the search for the electron EDM using trapped molecular ions LAURA SINCLAIR, JOHN BOHN, AARON LEANHARDT, PATRICK MALETINSKY, EDMUND MEYER, RUSSELL STUTZ, ERIC CORNELL, Dept. of Physics, University of Colorado, Boulder CO — The current limit on the electron electric dipole moment ($d_e < 1.6 * 10^{-27}$ e*cm) was set using an atomic beam of Tl [1]. We have proposed the use of molecular ions trapped in a RF quadrupole trap and cooled to cryogenic temperatures with a helium buffer gas to lower this limit. This experiment should benefit from the large effective electric fields experienced by an electron in polar molecules and the long spin coherence times of trapped ions. The use of triplet delta ground state hydrides, such as HfH^+ [2], should allow us to achieve both a highly polarized sample of ions in a relatively weak (100's of V/cm) rotating electric field and a competitive EDM enhancement factor. We will outline our proposed experimental procedure and present preliminary results of helium buffer gas cooling and mass spectrometry of heavy atomic ions as a precursor to studying molecular species.

[1]B.C. Regan et. al., Phys. Rev. Lett. 88, 718051 (2002).
[2]G. Ohanessian et. al., J. Am. Chem. Soc. 112, 7179 (1990).

Laura Sinclair
Dept. of Physics, University of Colorado, Boulder CO

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