Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

A new apparatus for the manipulation of polar KRb molecules JACOB COVEY, BO YAN, STEVEN MOSES, BRYCE GADWAY, DEBORAH JIN, JUN YE, JILA/University of Colorado-Boulder — Long-range dipolar interactions can facilitate understanding of strongly interacting many-body quantum systems with phenomena such as quantum magnetism. While we have used polar molecules pinned in a three-dimensional optical lattice to realize a spin-exchange model, the absence of an external electric field precluded the study of the full spin-1/2 Hamiltonian that includes the Ising interaction. Moreover, manipulation of dipolar properties of a bulk molecular gas is also desired. We report on progress towards the second generation of our KRb polar molecule apparatus that will allow for large electric fields with the flexibility to apply gradients of the field in arbitrary directions. The same electrodes that supply large DC electric fields can also provide AC fields for driving rotational transitions to encode spin, where the relative angle between the AC and DC fields can be tuned to control the polarization of the microwave field. Moreover, the geometry of the system is amenable to high resolution optical detection of the molecules. We plan to implement these tools to perform dipolar evaporative cooling of our spin-polarized fermionic molecular gas.

Jacob Covey
JILA/University of Colorado-Boulder

Date submitted: 30 Jan 2014 Electronic form version 1.4