

Abstract Submitted  
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**A new apparatus for manipulating polar KRb molecules in an optical lattice.** JACOB COVEY, MATTHEW MIECNIKOWSKI, STEVEN MOSES, ZHENGKUN FU, DEBORAH JIN, JUN YE, JILA/Univ of Colorado — Ultracold polar molecules provide new opportunities for investigation of strongly correlated many-body spin systems such as many-body localization and quantum magnetism. Previously, we observed many-body spin dynamics between molecules pinned in an optical lattice, despite a filling fraction of only 5%. We also performed a thorough investigation of the molecule creation process in an optical lattice and improved our filling fraction to 30% by preparing overlapped Mott and band insulators of the initial atomic gases. Now, we have developed a second generation KRb apparatus that will allow application of large, stable electric fields as well as high-resolution addressing and detection of polar molecules. We plan to use these capabilities to study non-equilibrium spin dynamics in an optical lattice with nearly single site resolution. We present the status and direction of the second generation apparatus.

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