Abstract Submitted
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Long lived dipolar molecules in optical lattices[1] STEVEN MOSES, BO YAN, BRIAN NEYENHUIS, JACOB COVEY, AMODSEN CHOTIA, DEBORAH JIN, JUN YE, JILA, NIST, and University of Colorado, Boulder — Ultracold polar molecules in the quantum degenerate regime allow for the realization of quantum systems with long-range, spatially anisotropic interactions. Ultracold fermionic ground-state KRb molecules are created in a three-dimensional optical lattice, where the molecules are shielded from chemically reactive collisions. Lifetimes of around 25 seconds are observed, limited by off-resonant light scattering from the lattice laser. With polar molecules confined in a 3D lattice, we can remove all remaining atoms using resonant light. By reversing the STIRAP process, we recreate Feshbach molecules in a purified 3D lattice, resulting in long lifetimes of up to 20 seconds for Feshbach molecules, limited also by only light scattering. In order to create a colder, denser molecular gas, we have recently implemented a species selective dipole trap that allows us to tune the relative size and position of the K and Rb clouds.

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