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Evaporation of Ultracold Polar Molecules in an Optical Lattice WILLIAM TOBIAS, LUIGI DE MARCO, GIACOMO VALTOLINA, KYLE MATSUDA, JACOB COVEY, JUN YE, University of Colorado/JILA — Ultracold polar molecules interact via long-range, anisotropic dipole-dipole potentials, allowing the realization of novel many-body quantum phases. Proposed areas of study for polar molecule lattice systems include spin-orbit coupling, topological phases, and exotic superfluidity. Having recently produced a bulk gas of greater than 40,000 ground state potassium rubidium molecules on a redesigned apparatus, we present progress towards evaporation of molecules in a one-dimensional optical lattice. To manipulate molecular rotational states and control interactions, the apparatus contains in-vacuum electrodes for generating large (30 kV/cm) homogeneous fields and field gradients as well as microwave fields. Future experiments will include preparation of low-entropy optical lattice samples and microscopy of dipolar spin Hamiltonians.

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