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Controlled Interactions of Polar Molecules in Two Dimensions WILLIAM TOBIAS, KYLE MATSUDA, LUIGI DE MARCO, GIACOMO VALTOLINA, JUN-RU LI, JUN YE, JILA University of Colorado, Boulder — Degenerate polar molecules, which interact via long-range, anisotropic potentials, allow access to rich many-body physics. One challenge for realizing many-body interacting systems is the short molecular lifetime relative to the interaction energy, which is limited by chemical reactions and photo-induced loss of collision complexes. By confining potassium-rubidium molecules to two dimensions and applying an electric field to polarize the dipoles perpendicular to the plane of motion, we demonstrate strong suppression of inelastic loss and a corresponding enhancement of elastic collisions. We present preliminary results of direct evaporation of molecules, as well as progress towards single-site microwave addressing of molecules in an optical lattice and measurement of the dipolar interaction shift.

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