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Towards strongly correlated 2D gases of ultracold dipolar NaCs molecules[1] CLAIRE WARNER, NICCOLO' BIGAGLI, ADEN LAM, IAN STEVENSON, SEBASTIAN WILL, Columbia University — Ultracold dipolar ground state molecules open up new avenues to study many-body quantum systems with long-range dipole-dipole interactions and promise to become a novel platform for quantum simulation. In this project, we aim to use ultracold molecules of sodium-cesium (NaCs) to study strongly correlated quantum phases. Sodium-cesium molecules feature chemical stability in the ground state and an electric dipole moment of 4.6 Debye. We plan to create these molecules from ultracold mixtures of sodium and cesium and will report on progress towards simultaneous cooling of the two atomic species to quantum degeneracy, as well as preliminary studies of interactions in this new atomic mixture. We will trap the mixture in two dimensions using an accordion lattice potential, explore intra- and interspecies Feshbach resonances, study the impact of reduced dimensionality on molecule formation, and identify a pathway towards the molecular ground state of NaCs.

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