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Towards a Molecular Quantum Gas Microscope[1] LYSANDER CHRISTAKIS, JASON ROSENBERG, ELMER GUARDADO-SANCHEZ, WASEEM BAKR, Princeton University — Recent years have seen rapid progress in creating and studying ultracold gases of polar molecules. These molecules are attractive candidates for quantum simulation of many-body systems, such as the XXZ model of quantum magnetism, due to their long-range anisotropic interactions and rich internal structure. Here we present our progress towards the construction of a new apparatus to perform site-resolved quantum gas microscopy on strongly-interacting dipolar ^{23}Na^{87}Rb molecules confined within a 2D optical lattice. We will form the molecules by coherently assembling cold sodium and rubidium atoms from atomic Bose condensates. Our experiment features in-vacuum electrodes to tune the interactions between the molecules as well as a high-resolution objective for imaging. We plan to perform quantum gas microscopy by dissociating the molecules in a way sensitive to their rotational state, laser cooling the constituent atomic species, and detecting the scattered photons.

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