Abstract Submitted
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Thermalization and Sub-Poissonian Density Fluctuations in a Degenerate Fermi Gas of KRb Molecules KYLE MATSUDA, WILLIAM TOBIAS, GIACOMO VALTOLINA, LUIGI DE MARCO, JUN-RU LI, JUN YE, JILA/University of Colorado-Boulder — Quantum degenerate gases of polar molecules, which exhibit long-range, anisotropic, and tunable dipole-dipole interactions, open new possibilities for engineering strongly-correlated quantum matter. We study atom-molecule thermalization in the creation of a degenerate Fermi gas of potassium-rubidium molecules [1]. By measuring the atom-molecule interaction strength, we estimate that the molecules experience 6 elastic collisions during the magneto-association ramp, facilitating thermalization. We observe suppressed density fluctuations in the degenerate molecular gas, similar to atomic Fermi gases, which confirms the thermometry of the gas. We will also describe efforts to create a single 2D Fermi gas of molecules, where losses due to chemical reactions are suppressed and dipolar interactions can lead to the emergence of exotic many-body phases. In particular, we will present preliminary experimental data showing efficient evaporation of the molecules via dipolar collisions, demonstrating a clear pathway toward creating a 2D Fermi gas of molecules. [1] Tobias, et al., PRL 124, 033401 (2020).

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