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Dipolar Effects in an Ultracold Gas of LiCs Molecules[1]

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Recently, there has been important progress in the investigation of ultracold polar molecules in the absolute ground state, thus opening intriguing perspectives for strongly correlated quantum systems under the influence of long-range dipolar forces. We have studied the formation of LiCs molecules via photoassociation (PA) in a double-species magneto-optical trap. The LiCs dimer is a particularly promising candidate for observing dipolar effects, as it possesses the largest dipole moment of all alkali dimers (5.5 Debye in the ground state). Ultracold LiCs molecules in the absolute rovibrational ground state are formed by a single photo-association step. The dipole moment of ground state levels is determined by Stark spectroscopy and was found to be in excellent agreement with the theoretical predictions. Vibrational redistribution due to spontaneous emission and blackbody radiation is observed and compared a rate-equation model.

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