

Abstract Submitted
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Association of single ultracold molecules in optical tweezers¹

YICHAO YU, Harvard Univ — Ultracold polar molecules have long-range, anisotropic, tunable interactions that could be used to study a wide variety of phenomena in quantum many-body physics, quantum information, and quantum simulations. We present a scheme to create fully-controlled ultracold molecules with single-site resolution from the ground up, starting with individually-controlled atoms. We use optical tweezers to extract and trap single Na and Cs atoms from magneto-optical traps. Both atoms are cooled to their motional ground state in the tweezers using Raman sideband cooling with greater than 92% probability in order to improve the fidelity of molecule formation. We present details of our approach, as well as our observation of the association of NaCs molecules in the optical tweezers.

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Yichao Yu
Harvard Univ

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