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Molecular $^{85}{\rm Rb_2}$ Formation in a 1-D 10.6 $\mu{\rm m}$ Optical Lattice R. CAROLLO, University of Connecticut, H.K. PECHKIS¹, NIST/JQI University of Maryland, D. RAHMLOW, M. BELLOS, J. BANERJEE, E.E. EYKER, P.L. GOULD, W.C. STWALLEY, University of Connecticut — We present results on the formation of ultracold $^{85}{\rm Rb_2}$ molecules in an optical lattice formed by a simple retro-reflected CO₂ laser. Atoms are loaded to the lattice from an ordinary MOT at a temperature of ${\sim}20~\mu{\rm K}$ after a transient cooling stage. They are then illuminated by a photoassociation laser from a single-mode Ti:Sapphire to briefly form excited-state molecules that decay to the singlet ground state. Utilizing resonance-enhanced two-photon ionization, we detect these molecules and measure their decay lifetimes. State-selective detection allows us to monitor the population of individual vibrational levels to measure collisional relaxation rates separately. This work is supported by the NSF and AFOSR.

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