

Abstract Submitted
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Production of Ultracold Strontium Dimers in Optical Lattices for Precision Measurements and Metrology CHRISTOPHER OSBORN, GAEL REINAUDI, TANYA ZELEVINSKY, Columbia University — Ultracold diatomic molecules offer exciting possibilities for studies of novel states of matter, quantum information, and precision measurements. We present recent results on the photoassociation of ultracold strontium dimers in optical lattices of various dimensions, including the coherent two-photon production of stable ground state molecules. We discuss features of this two-photon transfer, including the frequencies and strengths of the relevant transitions, and the associated Autler-Townes splitting. Further, we present results on the molecular lifetime, and its dependence on the dimensionality of the lattice. In addition, we highlight further work toward the development of deeply bound (10's of THz) molecules for use in a molecular clock.

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