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Quantum Calculations of Ultracold Molecule Formation by Nanosecond-Timescale Frequency-Chirped Pulses J.L. CARINI, C.E. ROGERS III, P.L. GOULD, Department of Physics, University of Connecticut, Storrs, CT 06269, USA, J.A. PECHKIS, Naval Research Laboratory, 4555 Overlook Avenue S.W., Washington, DC 20375, USA, S. KALLUSH, Department of Physics and Optical Engineering, ORT Braude, P.O. Box 78, Karmiel, Israel, R. KOSLOFF, Department of Physical Chemistry and the Fritz Haber Research Center for Molecular Dynamics, The Hebrew University, 91094, Jerusalem, Israel —
We report on the results of quantum calculations of $^{87}Rb_2$ formation from ultracold atoms by pulses of frequency-chirped light on the nanosecond timescale. This time-dependent photoassociation is modeled by following the dynamics of the collisional wave functions on both ground-state and excited-state potentials in the presence of the chirped light. Because of the relatively long time scales involved, spontaneous emission from the excited state must be accounted for. Results of the calculations are compared to recent measurements made with 40 ns FWHM Gaussian pulses and chirps that sweep 1 GHz in 100 ns. Dependencies on pulse intensity and chirp direction will be presented. This work is supported by DOE.

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