

Abstract Submitted
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Time- and Frequency-Dependent Imaging of Nuclear Dynamics in Laser-Excited Noble-Gas Dimers M. MAGRAKVELIDZE, KSU, A. KRAMER, Drake University, K. BARTSCHAT, Drake University, U. THUMM, KSU — We study the nuclear dynamics of noble-gas dimer ions resolved in time using intense ultrashort pump in combination with delayed probe laser pulses. We compare our time-dependent numerical results with those from a complementary description of the same basic dynamics in the frequency domain. This alternative analysis is based on the Fourier transformation of the time- and internuclear-separation-dependent wavefunction probability density or, equivalently, the Fourier transformation of the delay-dependent kinetic-energy-release spectra [1]. Specifically, for pump-laser excited diatomic molecules, it allows for the characterization of their nuclear motion in terms of coherently superimposed stationary vibrational states and the mapping of the laser-dressed nuclear potential curves, thereby supplementing the time-domain formulation [2], as we will demonstrate for the sequence He_2^+ to Xe_2^+ of dimer cations.

[1] M. Magrakvelidze et al., Phys. Rev. A 79, 033410 (2009); Phys. Rev. A 86, 023402 (2012); Phys. Rev. A 88, 013413 (2013);

[2] U. Thumm et al., Phys. Rev. A 77, 063401 (2008). This work was supported by the NSF and DOE.

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