Dissociation dynamics of Ar\(_2^+\) in two-color intense laser fields\(^1\)

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— We demonstrate that the dissociation of singly ionized argon dimers can be controlled with two laser pulses of different wavelength. We used 790 nm pump and 1400 nm probe pulses with intensities of 10\(^{14}\) W/cm\(^2\) to study the dissociation dynamics by analyzing kinetic-energy release spectra as a function of the pump-probe delay. The kinetic energy-release spectra are recorded using a COLTRIMS \([1-2]\) setup and compared with model calculations based on the numerical propagations of the time-dependent Schrödinger equation \([2-3]\). We find that the measured spectra are best reproduced by the calculations that include the adiabatic electronic states \(I(1/2)_u\) and \(II(1/2)_g\) of Ar\(_2^+\). The comparison of the measured and calculated spectra allows us to identify striking frustrated dissociation mechanism.


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