

Abstract Submitted
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Internuclear separation resolved asymmetric dissociation of I₂ in a two-color laser field VINCENT TAGLIAMONTI, HUI CHEN, GEORGE GIBSON, University of Connecticut — We have designed a pump-probe experiment to excite I₂ to the *B* state and subsequently ionize the molecule with a two-color (800 and 400 nm) probe pulse. By varying the relative phase of the two colors we are able to probe the asymmetric dissociation of I₂²⁺ → I²⁺ + I and we observe spatial asymmetries in the ion yield of this (2,0) channel. Because the durations (35 fs) of the pump and probe pulses are much shorter than the vibrational period of the *B* state (700 fs) we can fully resolve the dynamics as a function of internuclear separation *R*. We find that the amplitude of the spatial asymmetry increases as a function of *R* and that the relative phase of the two colors that produces the maximum asymmetry is independent of *R*. Both of these observations are consistent with ionization of I₂ directly into the field-dressed potential curves of I₂²⁺, which we model with a two-electron 1-D double-well potential in an external field. Interestingly, we find a spatial asymmetry for dissociation channels with a charge difference $\Delta q = 2$, ((2,0) and (3,1)), but not for $\Delta q = 1$, ((1,0), (2,1), (3,2)). Finally, substructure in the time-of-flight data shows two distinct states leading to the (2,0) dissociation limit.

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