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**Dissociation of  $H_2^+$  in intense femtosecond laser fields probed at different pulse durations**<sup>1</sup> PENGQIAN WANG, A.M. SAYLER, K.D. CARNES, J.F. XIA, M.A. SMITH, B.D. ESRY, I. BENITZHAK, J.R. Macdonald Laboratory, Physics Department, Kansas State University — Laser-induced dissociation of  $H_2^+$  has been experimentally studied using long (135 fs) and short (45 fs) laser pulses at 790 nm in the intensity range of  $10^{13}$ - $10^{15}$  W/cm<sup>2</sup>. The  $H^+$  and H fragments from a vibrationally excited  $H_2^+$  beam are measured in coincidence by a 3-dimensional momentum imaging system. The results are dramatically different for the long and short pulses, in contrast to the reported trend for longer pulses. At similar peak intensities, bond-softening is found to be the main feature in long pulses, while in short pulses it is a minor process having a low kinetic energy release and a very narrow angular distribution. Above threshold dissociation is dominant in short pulses whose durations are approaching the vibrational period of the molecule. The comparisons are made at specific intensity ranges using an intensity-difference spectrum method.

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Prefer Oral Session

Prefer Poster Session

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