Abstract Submitted
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Dissociation of H_2^+ in intense femtosecond laser fields probed at different pulse durations[1] PENGQIAN WANG, A.M. SAYLER, K.D. CARNES, J.F. XIA, M.A. SMITH, B.D. ESRY, I. BEN-ITZHAK, 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^2. 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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