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Correlated electron-nuclear kinetic energy distribution following strong-field ionization of H_2^+ C.B. MADSEN, Lundbeck Foundation Theoretical Center for Quantum System Research, Dept of Physics and Astronomy, Aarhus U. and J.R. Macdonald Lab., Kansas State U., F. ANIS*, J.R. Macdonald Laboratory, Kansas State University, L.B. MADSEN, Lundbeck Foundation Theoretical Center for Quantum System Research, Dept of Physics and Astronomy, Aarhus U., B.D. ESRY*, J.R. Macdonald Laboratory, Kansas State University — Being the simplest molecule, understanding the behavior of H_2^+ in a strong laser field helps to understand more complex molecules. Theoretically, however, it is challenging to account for both electronic and nuclear motion in the ionization of even this simple molecule. Accordingly, calculating correlated electron-nuclear physical observables — such as energy or momentum distributions — has rarely been accomplished. Such calculations are needed to interpret recent measurements of coincidence momentum distributions of electrons and ions following the ionization of molecules by short intense laser pulses. We study how the energy absorbed from an intense laser pulse (400–800 nm, $\sim 10^{14}$ W/cm², ≥ 10 cycles) is shared among the nuclei and the electron of H_2^+ by calculating the 2D electron-nuclei momentum distribution for a 1D model with soft-core Coulomb interactions. These 2D momentum plots reveal multiphoton structure with the energy shared between the nuclei and electron. This structure survives integrating out the nuclear energy, but not integrating out the electronic energy. *Supported by the Chemical Sciences, Geosciences, and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. DoE.

Brett Esry
Kansas State University

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