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Strong-Field Double Ionization of H_2/D_2 : Wavelength Dependent Study IGOR LITVINYUK, Kansas State University, ALI ALNASER, American University of Sharjah, UAE, DANIEL COMTOIS, INRS-Énergie, Matériaux et Télécommunications, ASAD HASAN, American University of Sharjah, UAE, DAVID VILLENEUVE, National Research Council of Canada, JEAN-CLAUDE KIEFFER, INRS-Énergie, Matériaux et Télécommunications — We studied double-ionization of H_2 and D_2 by intense femtosecond laser pulses of different wavelengths (500, 600, 800, 1300, 2000 nm) and peak intensities. The kinetic energy release (KER) spectra measured in the Coulomb explosion of the molecules were used to identify the various mechanisms responsible for the dissociation and ionization of H_2/D_2 in the laser fields. In addition to fragments from well known bond softening and enhanced ionization channels, high energy protons/deuterons of KER around 11 eV were for the first time observed when using short wavelengths (500 and 600 nm) at high-peak intensities. This channel exhibited wavelength dependence, with KER decreasing for longer wavelengths. This observation implies that a multiphoton-ionization process is actively operating at short internuclear distances and must be accounted for to correctly understand the strong-field ionization of H_2/D_2 by short laser pulses.

Igor Litvinyuk
Kansas State University

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