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Low kinetic energy release in the strong-field dissociation of H_3^+[1]

B. GAIRE, J. MCKENNA, M. ZOHRABI, K.D. CARNES, B.D. ESRY, I. BEN-ITZHAK, J.R. Macdonald Laboratory, Physics Department, Kansas State University — The triatomic hydrogen molecular ion is a fundamentally important system for the understanding of the laser-driven dynamics of polyatomic molecules. Recently, Alexander *et al.* [J. Phys. B, **42**, 141004, (2009)] reported the laser-induced dissociation of D_3^+ as a function of the time the D_3^+ was stored in an electrostatic ion trap, using 30 fs, 800 nm pulses. They ascribed the detected low kinetic energy release neutral fragments to the D_2^++D dissociation channel even though the neutral fragments D and D_2 could not be clearly distinguished in their measurement. Using coincidence 3D momentum imaging we clearly separate and distinguish between all fragments and measure kinetic energy release down to 0 eV. Our results suggest that the low kinetic energy release is associated with the H^++H_2 dissociation channel of H_3^+.

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