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Quantitative Comparison of H_2^+ Laser-Induced Dissociation in an Intense Ultrashort Pulse¹ J.V. HERNÁNDEZ, F. ANIS, A.M. SAYLER, J. MCKENNA, B. GAIRE, M. ZOHRABI, N.G. JOHNSON, K.D. CARNES, B.D. ESRY, I. BEN-ITZHAK, J. R. Macdonald Laboratory, Kansas State University — We present a quantitative comparison between experimental measurements and theoretical calculations for laser-induced dissociation of H_2^+ in an intense ultrashort pulse. The 3D momentum distribution was measured for the dissociating fragments of an H_2^+ beam that has been exposed to a 10 fs, 790 nm pulse at intensities of 10^{12} and 10^{13} W/cm². We have solved the TDSE within the Born-Oppenheimer representation, including all degrees of freedom, but ionization. In order to produce a theoretical momentum distribution that can be directly compared to experimental measurements, the observables are averaged over the initial vibrational and thermal distributions as well as the intensity distribution of the laser within the focus. The experimental resolution in both energy and angle are also incorporated, which can finally be fit to the experimental data taking the effective source temperature to be a free parameter. Whether this parameter alone is sufficient to produce agreement will be discussed.

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Jesus Hernandez J. R. Macdonald Laboratory, Kansas State University

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