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Suppression in dissociation probability of H_2^+ by ultrashort laser pulses in a high resolution experiment[1] FATIMA ANIS, J. MCKENNA, B. GAIRE, NORA G. JOHNSON, M. ZOHRABI, A.M. SAYLER, K.D. CARNES, I. BEN-ITZHAK, B.D. ESRY, J. R. Macdonald Laboratory, Department of Physics, Kansas State University — We will present theoretical and experimental results for the kinetic energy spectrum of H_2^+ dissociation in short laser pulses. For Ti:Sapphire laser pulses, a surprising suppression of the dissociation probability for the 12th vibrational state of H_2^+ has been reported in many studies. This suppression always occurs for the same vibrational state with varying strengths over a range of laser intensities. By changing the wavelength, however, a different vibrational state shows suppression. In some past studies, this suppression has been interpreted as stabilization due to vibrational trapping. We will argue, however, that this behavior is due to the energy dependence of the bound-free vibrational dipole matrix elements. The suppression can thus be predicted with perturbation theory, and we will present experimental evidence supporting these findings.

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