Characterization of Molecular Dynamics in Ultrashort Laser Fields\textsuperscript{1} B. FEUERSTEIN, T. ERGLER, A. RUĐENKO, R. MOSHAMMER, J. ULLRICH, T. NIEDERHAUSEN, U. THUMM, HD TEAM\textsuperscript{2}, KS TEAM\textsuperscript{3} — Reaction Microscope-based, complete, and time-resolved Coulomb explosion imaging of vibrating and dissociating $D_2^+$ molecules with femtosecond time-resolution allowed us to perform an internuclear distance (R-)dependent Fourier analysis of the corresponding wave packets. Our wave packet propagation calculations demonstrate that the obtained two-dimensional R-dependent frequency spectra enable the complete characterization of the wave packet dynamics and directly visualize the field-modified molecular potential curves in intense, ultrashort laser pulses, cf., Phys. Rev. Lett. \textbf{99} 153002 (2007).

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