Abstract Submitted
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Vibrationally-resolved structure in O_2^+ dissociation by intense ultrashort laser pulses[1] M. ZOHRABI, J. MCKENNA, B. GAIRE, NORA G. JOHNSON, K.D. CARNES, I. BEN-ITZHAK, J.R. Macdonald Laboratory, Department of Physics, Kansas State University — Laser induced dissociation of O_2^+ is studied in the strong-field limit using a crossed laser–ion beam coincidence 3D momentum imaging method (790 and 395 nm, 40 fs, $\sim 10^{15}$ W/cm^2). The measured kinetic energy release spectra from dissociation of O_2^+ reveal vibrational structure never observed before in multielectron molecules, which persists over a wide range of laser intensities. By evaluation of the potential energy curves, we assign the spectral energy peaks to dissociation via a one photon pathway $|a^4\Pi_u > \rightarrow |f^4\Pi_g - 1\omega >$ — a bond softening mechanism similar to the one observed in H_2^+. Careful inspection unveils an apparent suppression in the dissociation of particular vibrational peaks which is a manifestation of the well-known Cooper minima effect.

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