Abstract Submitted
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Dissociation of CO^+ molecular ions by strong laser fields[1] U. ABLIKIM, M. ZOHRABI, B. GAIRE, NORA G. KLING, K.J. BETSCH, BETHANY JOCHIM, K.D. CARNES, I. BEN-ITZHAK, J.R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS 66506 USA — We study the strong-field laser-induced dissociation of a CO^+ ion beam employing a coincidence 3D momentum imaging technique. Kinetic energy release(KER) features, fragment angular distributions, and available potential energy curves help us determine the possible fragmentation pathways. At low laser intensity (30fs FWHM pulses centered near 800 nm), the CO^+ dissociates into C^++O, meanwhile the C+O^+ channel appears at higher intensities. The fact that C^++O channel is observed at laser intensities as low as 5×10^{12} W/cm^2 indicates that the initial target is in the metastable $a^4\Sigma^+$ quartet state, rather than the vibrationally "cold" doublet ground state $X^2\Sigma^+$, as the latter requires at least six photons to dissociate. The angular distribution of the low KER dissociation suggests that a combination of parallel and perpendicular transitions play a role and that their relative importance varies with increasing intensity. Moreover, multiphoton dissociation of the CO^+ electronic ground state also contributes to the signal as the laser intensity increases. We will discuss other pathways and their dependence on the laser pulse parameters.

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