Abstract Submitted
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Parallel and perpendicular transitions in the dissociation of O_2^+ caused by an ultrashort intense laser pulse[1] A.M. SAYLER, P.Q. WANG, K.D. CARNES, B.D. ESRY, I. BEN-ITZHAK, J.R. Macdonald Laboratory, Department of Physics, Kansas State University — Laser-induced dissociation of O_2^+ has been experimentally studied using ultrashort ($\sim$50 fs) intense ($\sim 10^{14}$ W/cm^2) laser pulses at 790 nm. The O^+ and O fragments are measured in coincidence with a 3-dimensional momentum imaging system, which provides both angular and kinetic energy release (KER) distributions for dissociation. By analyzing the angular distribution of a specific range in the KER spectrum, the dissociation pathway may be deduced. In particular, a single photon parallel transition ($\Delta\Lambda$=0) is expected to have a $\cos^2\theta$ distribution, while a perpendicular one ($\Delta\Lambda$=1) leads to a $\sin^2\theta$ distribution. Therefore, a dissociation pathway requiring the exchange of n $\Delta\Lambda$=0 photons and m $\Delta\Lambda$=1 photons is expected to have a $\cos^{2n}\theta\sin^{2m}\theta$ distribution. Thus, knowing n and m along with the KER range allows a plausible identification of the dissociation pathway.

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