Abstract Submitted
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Exploring trends in strong-field dissociation of small polyatomic molecules[1] BETHANY JOCHIM, M. ZOHRABI, U. ABLIKIM, B. BERRY, T. SEVERT, K.D. CARNES, I. BEN-ITZHAK, J. R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS 66506 USA — Using a 3-D coincidence momentum imaging technique, we examine trends in intense ultrafast laser-induced two-body dissociation and dissociative ionization of an N_2O^+ ion beam. As an example, it is observed that in both dissociation and dissociative ionization, the N-N bond is more likely to break than the N-O bond for typical laser pulses (Fourier transform-limited, 800 nm, $\sim$30 fs, $\sim 10^{15}$ W/cm^2). This finding is perhaps counterintuitive in light of the stronger bond between the two N atoms in the ground state of N_2O^+. Utilizing our measured kinetic energy release and angular distribution spectra and the molecule's published electronic structure, we explain this and other trends in bond cleavage and charge localization preference. We also draw comparisons to other triatomic molecular ions, such as $CO_2{}^+$, and attempt to gain insight into the relative importance of chemical bond strength and the spacing of the relevant potential energy surfaces.

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