Abstract Submitted
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Strong-field dissociation dynamics of NO^{2+}: A multiphoton electronic or vibrational excitation?[1] BETHANY JOCHIM, E. WELLS, Augustana College, M. ZOHRABI, B. GAIRE, U. ABULIKEMU, K.D. CARNES, B.D. ESRY, I. BEN-ITZHAK, Kansas State University — A 3-D momentum imaging technique is employed to study intense ultrafast laser-induced dissociation of a metastable NO^{2+} beam. We focus on $N^+ + O^+$ coincidences and explore possible dissociation pathways using estimates of the initial vibrational population and transition rates between the X $^2\Sigma^+$and A $^2\Pi$ states together with kinetic energy release and angular distribution spectra. Our analysis suggests that lower intensity pulses ($<10^{15}$ W/cm^2) drive perpendicular transitions between these states. Higher intensity pulses ($\sim 10^{16}$ W/cm^2), on the other hand, yield a prominent contribution from molecules breaking parallel to the polarization. While the results are preliminary, an intriguing possibility is that this feature is due to a direct 2-photon transition to the vibrational continuum of the X $^2\Sigma^+$ state, *i.e.*, a multiphoton vibrational excitation on the electronic ground state.

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