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Strong-field dissociation of CS^{2+} via a pump/dump-like mechanism[1] T. SEVERT, M. ZOHRABI, K.J. BETSCH, U. ABLIKIM, BETHANY JOCHIM, K.D. CARNES, S. ZENG, B.D. ESRY, I. BEN-ITZHAK, J.R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS 66506, USA, T. UHLÍKOVÁ, Department of Analytical Chemistry, Institute of Chemical Technology, Prague Technická, Czech Republic — Laser-induced dissociation of the quasi-bound electronic ground state of CS^{2+} is investigated in intense laser pulses (<55 fs, $<10^{16}$ W/cm^2). Photodissociation is observed to be the dominant dissociation pathway; however, a more curious feature in the kinetic energy release spectrum suggests no significant energy gain from the initial states. We propose a pump/dump-like mechanism to explain this observed feature. Contrary to the conventional pump/dump control scheme, this process occurs within a single laser pulse, where the time delay is caused by the molecular structure. The process begins when the vibrational wavepacket in the electronic ground state of CS^{2+} is pumped into the electronic first excited state's continuum by a single photon. After a period of stretching at an energy above the potential barrier, the emission of a second photon is stimulated by the same laser pulse, most likely at the Condon point.

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