

Abstract Submitted
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Molecular bond stabilization in the strong-field dissociation of O_2^+ ¹ PAUL M. ABANADOR, Kansas State University, THOMAS PAULY, Drake University, UWE THUMM, Kansas State University — Molecular bond stabilization is generally understood as a field-intensity-dependent effect, i.e., a decrease in the dissociation yield with respect to increasing laser field intensity [1,2]. In this study we revisit this effect in the strong-field dissociation of O_2^+ by numerically solving the time-dependent Schrödinger equation, within the Born-Oppenheimer approximation. Our results show that, for a fixed peak intensity, the total angle-integrated dissociation yields do not monotonically increase as the infrared-pulse duration is increased. This molecular stabilization effect is consistent with the transient population trapping in light-induced (bond-hardening) potential energy surfaces. In addition, we provide further evidence for the underlying bond-hardening mechanism by examining the power spectra of the evolving partial nuclear densities associated with two relevant cationic states of O_2^+ , $a^4\Pi_u$ and $f^4\Pi_g$. [1] E. E. Aubanel, A. Conjusteau, and A. D. Bandrauk, Phys. Rev. A 48, R4011 (1993). [2] A. Giusti-Suzor, F. H. Mies, L. F. DiMauro, E. Charron, and B. Yang, J. Phys. B 28, 309 (1995). [3] P. M. Abanador, T. Pauly, and U. Thumm, Phys. Rev. A (submitted).

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