

Abstract Submitted  
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**The effect of excitonic interactions on singlet fission dynamics in crystalline tetracene**<sup>1</sup> CHUNFENG ZHANG, BO ZHANG, RUI WANG, Nanjing University, MIN XIAO, University of Arkansas — Singlet fission in organic semiconductors is interesting for its potential application in boosting the efficiency of solar conversion. Singlet-singlet annihilation induced by excitonic interaction has been regarded as a process that competes against singlet fission in high-density regime. In this work, we conduct a systematic transient optical study to investigate the density-dependent singlet fission dynamics in crystalline tetracene. Surprisingly, the transient absorption data indicate the rate of singlet fission is actually increased with increasing the excitation density [1], which is further supported by probing the quantum beating between the manifold states of triplet pairs following Burdett's approach. Our result suggests it is necessary to re-examine the role of excitonic interactions to uncover the physical mechanism underlying singlet fission in crystalline tetracene. [1] Zhang et al., J. Phys. Chem. Lett. 5, 3462 (2014). [2] Burdett & Bardeen, J. Am. Chem. Soc. 134, 8597(2012).

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