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Quantum Relaxation in Singlet Fission PAUL TEICHEN, JOEL EAVES, The University of Colorado at Boulder — Singlet fission is a multielectron process in organic chromophores, where an initially excited singlet state decays into two independent triplets. First observed in organic semiconductors almost 40 years ago, the phenomenon may be a promising route for increasing yields in next-generation photovoltaics. Early theories that ignored quantum coherence between excited states were capable of explaining the fission process on nanosecond timescales, but recent observations of fission on sub picosecond timescales call several tenants of those theories into question. We present a theory of optical dephasing and decoherence in singlet fission, drawing on ideas from quantum information theory to establish conditions for decoherence and disentanglement between the relevant quantum states on the picosecond timescale.

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