

Abstract Submitted
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Spatially correlated fluctuations and coherence dynamics in photosynthesis¹ Z. G. YU, M. A. BERDING, SRI International, HAOBIN WANG, New Mexico State University — Recent multicolor photon-echo experiments revealed a long-lasting quantum coherence between excitations on donor and acceptor in photosynthetic systems. Identifying the origin of the quantum coherence is essential to fully understand photosynthesis. Here we present a generic model in which a strong intermolecular steric restoring force in densely packed pigment-protein complexes results in a spatial correlation in conformational (static) variations of chromophores, which in turn induces an effective coupling between high-frequency (dynamic) fluctuations in donor and acceptor. The spatially correlated static and dynamic fluctuations provide a favorable environment to maintain quantum coherence, which can consistently explain the photon-echo measurements [1]. [1] Z. G. Yu, M. A. Berding, and Haobin Wang, Phys. Rev. E **78**, 050902 (Rapid Communications) (2008).

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