

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Phonon-mediated path-interference in electronic energy transfer HODA HOSSEIN-NEJAD, University of Toronto, ALEXANDRA OLAYA-CASTRO, University College London, GREGORY D. SCHOLES, University of Toronto — Motivated by the recent observations of quantum coherence in light-harvesting antennae, we present a formalism to quantify the contribution of path-interference in phonon-mediated electronic energy transfer. The transfer rate between two molecules is computed by considering the quantum mechanical amplitudes associated with pathways connecting the initial and final sites. This includes contributions from classical pathways, but also terms arising from their interference. By treating the vibrational modes of the molecules as a non-Markovian harmonic oscillator bath, we compute the first-order path-interference correction to the classical transfer rate. We show that the correction due to path-interference may have either a vibrational or an electronic character, and may exceed the contribution of the indirect classical pathways.

Hoda Hossein-Nejad
University of Toronto

Date submitted: 18 Nov 2010

Electronic form version 1.4