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Coherent dimer dynamics in a dissipative environment maintained by an off-resonant single mode ELLIOTT LEVI, BRENDON LOVETT, University of St Andrews — The role of quantum coherence in efficient energy harvesting has recently been the subject of intense research. In this paper, we explore the extent to which quantum coherence can be induced in a previously incoherent two level system (TLS) by strongly coupling to a single, off-resonant, bosonic mode. The rest of the environment is assumed to comprise a Markovian bath of bosonic modes. The TLS could, for example, represent the position of the exciton in an energy transfer dimer system. The TLS-single mode coupling strength is varied for several different forms of bath spectral density in order to assess whether the coherent dynamics of the TLS are modified. We find a clear renormalisation of the site population oscillation frequency, which also causes an altered interaction with the bath. This new interaction can cause enhanced or reduced coherent behaviour of the TLS depending on the parameters. We will discuss the usefulness and pitfalls of exploiting such a dynamics-altering tool in a quantum device.

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