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An exactly solvable model for decoherence-assisted transport ADRIANA MARAIS, ILYA SINAYSKIY, FRANCESCO PETRUCCIONE, Quantum Research Group, School of Physics and National Institute for Theoretical Physics, University of KwaZulu-Natal, Durban, 4001, SA, ARTUR EKERT, Centre for Quantum Technology, National University of Singapore, 2 Science Drive 3, 117542, Singapore, QUANTUM RESEARCH GROUP, SCHOOL OF PHYSICS AND NATIONAL INSTITUTE FOR THEORETICAL PHYSICS, UNIVERSITY TEAM, CENTRE FOR QUANTUM TECHNOLOGY, NATIONAL UNIVERSITY OF SINGAPORE, 2 SCIENCE DRIVE 3, 117542, SINGAPOR TEAM — The processes of energy and information transfer in quantum networks play an important role for quantum communication and quantum computation. Unavoidable interaction of the quantum system with the environment leads to decoherence and dissipation, processes typically associated with a destruction of quantum coherence in the system. However, recently the signature of long-lasting quantum coherence has been identified in conjugate polymers and in photosynthetic light harvesting complexes. Here we present an exactly solvable model where interaction with a decoherent environment plays a crucial role in assisting the transport in a quantum subsystem. Based on exact solution, we study different regimes of the parameters of the system, and identify the role of the correlations between the environments for assisting of the transitions in the quantum subsystem.

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