Decay and generation of entanglement in coupled, driven systems with bipartite decoherence

J. Li and G. S. Paraoanu

Low Temperature Laboratory, Aalto University School of Science, P.O. Box 15100, FI-00076 AALTO, Finland

In a bipartite system subject to decoherence from two separate reservoirs, entanglement is typically destroyed faster than decoherence of each single qubit. This effect is known as entanglement sudden death (ESD).[1] We analyze a system of two coupled qubits with classical on-resonance driving embedded in two different environments. In the secular limit, we obtain exact analytical results for the evolution of the system for several classes of two-qubit mixed initial states.[2] In non-secular limit, surprisingly however, in a certain region of the parameter space the existence of separate reservoirs can also have a beneficial entangling effect: the system can end in a stationary state characterized by a finite degree of entanglement.[3]

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[2]J. Li and G. S. Paraoanu, Eur. Phys. J. D **56**, 255-264 (2010).
[3]J. Li and G. S. Paraoanu, New J. Phys. **11**, 113020 (2009).