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Coherence of Interacting Qubits in a Common Environment JUAN PABLO SPEER, RYOICHI KAWAI, University of Alabama at Birmingham — The standard theory of thermodynamics states that a quantum system in contact with a thermal environment relaxes to the equilibrium state known as the Gibbs state. This interaction causes decoherence of the system. However, if a system consists of coupled parts, interaction with a thermal environment does not necessarily lead to decoherence for all energy states. Here we considered a system of two interacting qubits, both independently interacting with the same bosonic environment and numerically simulated the dynamics of the system using the hierarchical equation of motion. We show that if the interaction between each qubit and the environment is symmetric, a decoherence-free state (DFS) exists. We explore the stability of the DFS by varying the strength and type of coupling between the qubits and the thermal bath.

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