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Decoherence and Disentanglement of Two Intereacting Qubits in the Presence of Random Telegraphic Noise[1] AMRIT DE, ALEX LANG, ROBERT JOYNT, Department of Physics, University of Wisconsin- Madison, WI-53706 — We have studied the dissipative dynamics of a pair of quits coupled via the exchange interaction in the presence of random telegraphic noise. We use a recently developed transfer-matrix formalism that is suitable for computing the temporal evolution of a quantum system affected by a classical stochastic process. For bi-partite systems, the concurrence provides a measure of the entanglement between two qubits. We have calculated the concurrence as a function of the qubit working point, noise coupling strength, fluctuator rates and exchange interaction strengths. Sudden death of entanglement and its revival are seen to depend on various factors. We show that for certain cases, the exchange interaction between the qubits can be used to significantly slow down the decoherence process and maintain entanglement over much longer periods of time. This could be particularly promising for quantum computing applications.

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Amrit De
Department of Physics, University of Wisconsin- Madison, WI-53706

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