Robust quantum state recovery from amplitude damping within a mixed states framework SAEIDEH SHAHROKH ESFAHANI, ZEYANG LIAO, M. SUHAIL ZUBAIRY, Institute of Quantum Science and Engineering (IQSE) and Department of Physics and Astronomy, Texas AM University, College Station, TX — Due to the interaction with the environment, a quantum state is subjected to decoherence which becomes one of the biggest problems for practical quantum computation. Amplitude damping is one of the most important decoherence processes. We show that general two-qubit mixed states undergoing an amplitude damping can be almost completely restored using a reversal procedure. This reversal procedure, through CNOT and Hadamard gates, could also protect the entanglement of two-qubit mixed states, when it undergoes general amplitude damping. Moreover, in the presence of uncertainty in the underlying system, we propose a robust recovering method with optimal characteristics of the problem.

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