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Dissipation Assisted Quantum Memory with Coupled Spin Systems LIANG JIANG, Harvard University, FRANK VERSTRAETE, Universitaet Wien, IGNACIO CIRAC, Max-Planck Institut für Quantenoptik, MIKHAIL LUKIN, Harvard University — Dissipative dynamics often destroys quantum coherences. However, one can use dissipation to suppress decoherence. A well-known example is the so-called quantum Zeno effect, in which one can freeze the evolution using dissipative processes (e.g., frequently projecting the system to its initial state). Similarly, the undesired decoherence of quantum bits can also be suppressed using controlled dissipation. We propose and analyze the use of this generalization of quantum Zeno effect for protecting the quantum information encoded in the coupled spin systems. This new approach may potentially enhance the performance of quantum memories, in systems such as nitrogen-vacancy color-centers in diamond.

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