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Resurrection of Schrödinger Cat JAE-SEUNG LEE, ANATOLY KHITRIN, Department of Chemistry, Kent State University, Kent, Ohio 44242-0001
— The most striking difference between quantum and classical systems is the ability of quantum objects to be in a superposition state. A system in a superposition of macroscopically distinct states (*alive* and *dead* states of the "Schrödinger cat") would demonstrate highly unusual behavior. Cat states are the central elements in recent proposals on high-precision spectroscopy, amplified quantum detection and measurement. Quantum decoherence is the major obstacle in building practical devices which could revolutionize high-precision measurements or information processing. Here we experimentally demonstrate that quantum state of a system can be recovered after the state is destroyed by uncontrollable natural decoherence. The physical system used in this experiment is a cluster of seven dipolar-coupled nuclear spins of single-labeled ^{13}C-benzene oriented in liquid crystal. After decoherence of the cat state, superposition of states with all spins up (*alive*) and all spins down (*dead*), information stored in a single ancillary spin (^{13}C) is used to bring the protons subsystem into the *alive* state, while the excess entropy produced by decoherence is transferred to the ancillary spin.

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