Abstract Submitted
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Experimental Quantum Error Correction KRISTEN PUDENZ, DANIEL LIDAR, University of Southern California — We demonstrate an experimentally implemented quantum error correcting code (QECC) in an adiabatic quantum computation (AQC) setting. In AQC, the computation proceeds by slowly changing the controls of the system to move from an initial Hamiltonian with an easily prepared ground state to a final Hamiltonian whose ground state embodies the solution to the problem. Our QECC is a repetition code in the computational basis, and encodes the final Hamiltonian of the computation. In this way, we provide an energy penalty for excursions outside the codespace which increases as the AQC progresses. We supplement this with classical decoding of the results at the end of the computation, so that the computation may finish in a state other than the ground state and still solve the problem, as long as it stays within the low-lying spectrum of decodable states. We will show experimental results demonstrating that AQCs encoded with our QECC exhibit better success rates than both unencoded and classically encoded versions.

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