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Universal quantum degeneracy point for solid-state qubits¹ L. TIAN, Department of Applied Physics and E. L. Ginzton Laboratory, Stanford University, Stanford, CA 94305 — When operated at the quantum degeneracy point, the so called “sweet spot”, solid-state qubits can be protected from the first order decoherence of low-frequency noise in the off-diagonal coupling. Here, we show that a quantum degeneracy point can also be found for low-frequency noise in the diagonal coupling in an encoded- qubit scheme. We also study the protocols for implementing one and two bit quantum logic gates and the effects of circuit imperfection on this scheme. A practical system to realize this scheme with superconducting qubits is then presented.

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