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### **Superconducting quantum bits**

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Superconducting qubits are solid state electrical circuits fabricated using techniques adapted from conventional integrated circuits. They are based on the Josephson tunnel junction, the only non-dissipative, strongly non-linear circuit element compatible with low temperature operation. In contrast to microscopic entities such as spins or atoms, these qubits tend to be well coupled to other circuits, an appealing feature for readout and 2-qubit gate implementation. Very recently, new circuit topologies have solved the problem of qubit isolation from unwanted extrinsic electromagnetic noise, yielding coherence quality factors in excess of 10,000. Current experiments are addressing the intrinsic decoherence mechanisms in tunnel junctions circuits and whether the Preskill criterion of 10,000 coherent 1- and 2-qubit gate operations can be met.