

# Hardware challenges to a large-scale quantum computer based on superconducting qubits

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A paramount goal across the quantum information field is to build a quantum computer with a large number of high-fidelity qubits. Superconducting qubits, which are operated in a cryogenic environment ( $\approx 20$  mK) and controlled with microwave electronics, are an interesting platform for this research. We briefly review a few candidate architectures for building a quantum computer with superconducting qubits, and discuss similarities between the physical implementations of each in the Google Quantum-AI lab. We consider what hardware is currently used to build these systems and examine the limits of brute-force scaling. The road to a large-scale quantum computer will include the development of a number of new technologies.