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Spin-qubit inspired architectures for superconducting quantum computing YUN-PIL SHIM, CHARLES TAHAN, Laboratory for Physical Sciences — In recent years, the superconducting qubit community has achieved single and two-qubit benchmarked gate fidelities approaching 99.9%, fast readout with novel superconducting amplifiers, distributed entanglement, and other milestones on the road to fault-tolerant quantum information processing. Obviously, this is a field that could use some help from the semiconductor qubit community! Here we present theoretical work on superconducting qubit systems inspired by our experience with semiconductor qubits. We discuss initialization, single- and two-qubit gate operations, and measurement schemes for an encoded qubit in a two-dimensional architecture. Our results motivate new ways of designing or operating superconducting quantum information processors.

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