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Coupled superconducting qubits: A theoretical overview.

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In recent years we have witnessed great progress in quantum state engineering with superconducting qubits. Most experiments have been done with single qubits whereas several groups have reported multi-qubit manipulations. Having controllable coupling between the qubits is absolutely necessary for efficient quantum state engineering. I will overview various coupling schemes suggested in the literature. Among them are capacitive, inductive, nanomechanical, and cavity couplings. Special attention will be paid to the questions of accuracy to which the coupling can be switched off and of speed at which it can be manipulated.