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Variable Coupling of Two Flux Qubits[1] T. HIME, University of California, Berkeley, P.A. REICHARDT, B.L.T. PLOURDE, Syracuse University, T.L. ROBERTSON, University of California, Berkeley, C.-E. WU, A.V. USTINOV, University of Erlangen-Nuremberg, JOHN CLARKE, University of California, Berkeley — We report observations of variable coupling of two flux qubits. The qubits are coupled inductively to each other and to a readout Superconducting QUantum Interference Device (SQUID). By applying microwave radiation to the device, we observed resonant absorption in each of the qubits when the level splitting in the qubit matched the energy of the microwave photons. Using the two on-chip flux bias lines we adjusted the bias of each qubit so that the energy levels of the two qubits were equal; we then observed a splitting of the resulting absorption peak characteristic of coupling between the qubits. We varied the coupling between the qubits by changing the current bias in the SQUID in the zero voltage state, thereby changing its dynamic inductance and thus modifying the effective mutual inductance between the qubits. We compare the resulting changes in splitting with our predictions. This controllable coupling should be extendable to many qubits.

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