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Theoretical and Experimental Studies of Circuit QED Systems (Part II)[1] FRANK DEPPE, MATTEO MARIANTONI, Walther-Meissner-Institute, TU of Munich, Germany, SHIRO SAITO, NTT BRL, NTT Corp., Japan, TAKAYOSHI MENO, NTT AT, NTT Corp., Japan, KOUICHI SEMBA, NTT BRL, NTT Corp., Japan, HIDEAKI TAKAYANAGI, Tokyo Univ. of Science, Japan, RUDOLF GROSS, Walther-Meissner-Institute, TU of Munich, Germany — In recent years, the interaction between superconducting qubits and on-chip microwave resonators has been investigated in theory and in experiment. We performed microwave spectroscopy on a system composed of a superconducting flux qubit and the single mode of an LC circuit resonator. The latter is formed by the shunting capacitance and its associated line inductance of the dc SQUID used to read-out the qubit state. Our implementation provides a counterpart to experiments in which the state of the microwave field is detected. The data shows clear evidence of the coupled system (coupling constant: few tens of MHz). Simulations of a dissipationless driven Jaynes-Cummings-like model allow us to estimate the effective number of photons present in the resonator. One possible interesting application would be the generation of microwave single photons.

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