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Experimental study of transmon type qubits coupled to a fast tunable transmission line resonator. MARTIN SANDBERG, CHRIS WILSON, FREDRIK PERSSON, IO-CHUN HOI, PER DELSING, Chalmers University of Technology — We experimental study a high quality factor (Q-value) transmission line resonator terminated in a superconducting quantum interference device (SQUID). Using an on-chip fast flux bias line we show that we can tune the frequency of such a resonator by hundreds of line widths on a time scale faster the photon lifetime of the resonator. Such a resonator could then be used for dynamic coupling of superconducting quantum bits (qubits). We present preliminary data of two transmon type of qubits coupled to a fast tunable resonator. We show spectroscopy and Rabi oscillations of the qubits far detuned from the resonator. Data showing a relaxation time of 1μs and a Rabi time of 200 ns have so far been obtained.

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