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Robust quantum state transfer using flying microwave qubits ERIC MLINAR, EYOB A. SETE, ALEXANDER N. KOROTKOV, University of California, Riverside — We analyze the transfer of a quantum state between two superconducting microwave resonators connected by a transmission line. Nearly perfect state-transfer efficiency can be achieved by using adjustable couplers to cancel the back-reflection from the receiving coupler with destructive interference. We show that the transfer protocol is robust to parameter variations affecting the transmission amplitudes of the couplers. We also show that the effects of Gaussian filtering, pulse-shape noise, and multiple reflections on the transfer efficiency are not significant for experimentally realistic parameters. However, the transfer protocol is very sensitive to a frequency mismatch between the two resonators. Moreover, the type of coupler we consider produces a time-dependent detuning, which requires active compensation with sufficient accuracy to yield high-efficiency state transfer.

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