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Resonant Two-Qubit Gates and Mesoscopic Shelving Qubit Readout in Circuit QED¹

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We consider the implementation of universal sets of resonant one-qubit and two-qubit gates for superconducting qubits inside microwave resonators in Circuit QED, aiming at the speed-up of gate operations [1]. We study also the implementation of mesoscopic shelving readout of a superconducting qubit inside a microwave resonator, where a high-fidelity measurement may be achieved [2]. In both proposals we borrow from inspiring quantum-optical tools and concepts, exploiting the advantages of three-level physics and adapting electron-shelving readout in a novel manner in the context of multi-cavity physics [3], and in particular two-cavity Circuit QED [4].

REFERENCES:

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