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Information Flow in the Readout of a Superconducting Quantum Bit I. SIDDIQI, R. VIJAY, M. METCALFE, E. BOAKNIN, C. RIGETTI, L. FRUNZIO, R. SHOELKOPF, M.H. DEVORET, Yale University — Quantum computation requires efficient and well controlled coupling between qubits. Superconducting qubits can be strongly coupled using passive electrical circuit elements, but one of the major remaining challenges is to eliminate uncontrolled coupling to parasitic degrees of freedom. I will present experimental results on charge qubits integrated with a novel readout device – the Josephson bifurcation amplifier (JBA). New experiments using the improved readout fidelity and speed of the JBA quantify parasitic losses and shed light on their mechanism.

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