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**Optimizing filtering for fast measurements in circuit QED**

JAY GAMBETTA, OLIVER DIAL, ANDREW CROSS, DOUGLAS MCCLURE, JERRY CHOW, MATTHIAS STEFFEN, IBM T.J. Watson Research Center — Quantum error correction schemes, for example the popular surface code, involve running interleaved gate operations and measurements on a set of physical qubits. For this reason it is important to have fast measurements. In a fast measurement most of the information will be in the transients of the signal. In this talk we present a filtering technique to extract optimal qubit state information from the transient response of the resonator. I will also discuss techniques for rapidly driving the read-out resonator to its ground state independent of the qubit state. We acknowledge support from IARPA under contract W911NF-10-1-0324.

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