Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Backaction of Microwave Photon Detection by a Strongly Coupled Josephson Junction[1] EMILY PRITCHETT, Saarland University, LUKE GOVIA, University of Waterloo, SETH MERKEL, IBM T. J. Watson Research Center, FRANK WILHELM, Saarland University — We analyze the functionality of on-chip Josephson junctions as single microwave photon detectors, as has been demonstrated recently in Chen, *et al.*, arXiv:1011.4329. The Josephson junction device, which we refer to as a Josephson Photomultiplier (JPM), acts as a nearly perfect binary detectors of microwave photons by undergoing an observable switching event when there are one or more photons in an incident cavity. We analyze the backaction of this switching event on the state of incident light, including the energy dissipation and dephasing affecting an imperfect JPM. This analysis improves the efficiency and fidelity with which a JPM reconstructs the state of light in an incident transmission line 'cavity', which are commonly used to store and transfer quantum states in implementations of circuit-QED.

[1]This work was supported by DARPA-QuEST.

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Date submitted: 11 Nov 2011 Electronic form version 1.4