

Abstract Submitted  
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**Efficient Qubit Readout Using Josephson Photomultipliers** L.C.G.

GOVIA, Univ des Saarlandes, E.J. PRITCHETT, HRL Laboratories, C. XU, M.G. VAVILOV, University of Wisconsin-Madison, B.L.T. PLOURDE, Syracuse University, R. MCDERMOTT, University of Wisconsin-Madison, F.K. WILHELM, Univ des Saarlandes — A Josephson photomultiplier (JPM) can absorb and detect weak microwave signals with high sensitivity (PRL 107, 217401 (2011)). When strongly coupled to a microwave cavity, the JPM can detect single microwave photons with large bandwidth and with near unit efficiency (PRB 86, 174506 (2012)). The switching of a JPM into its measured state acts on the adjacent cavity via the back action of photon subtraction (PRA 86, 032311 (2012)). While a destructive measurement of the microwave cavity, this switching can perform a binary non-demolition measurement of a quantum system coupled to the cavity. We present a protocol by which the presence and subsequent detection of a cavity photon by a JPM conveys information about the state of a qubit coupled to the cavity without destroying it, thus performing a quantum non-demolition measurement of the qubit's state. Multi-qubit generalizations of this protocol are discussed.

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