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Qubit readout with Josephson Photomultipliers GUILHEM RIBEILL, IVAN PECHENEZHSKI, TED THORBECK, University of Wisconsin, Madison, CALEB HOWINGTON, MATTHEW HUTCHINGS, Syracuse University, LUKE GOVIA, FRANK WILHELM, Saarland University, B.L.T. PLOURDE , Syracuse University, ROBERT MCDERMOTT, University of Wisconsin, Madison — Continued progress in superconducting qubits will require the development of scalable quantum-limited measurement tools. We have recently introduced a scalable superconducting qubit measurement protocol involving the state-selective ringup of a readout cavity followed by photodetection with the Josephson photomultiplier (JPM), a current-biased Josephson junction. Here we describe the experimental realization of this protocol. We discuss JPM optimization for high quantum efficiency, and describe integration of the JPM with a transmon qubit for high-fidelity dispersive readout. In addition, we discuss prospects for JPM readout of larger multi-qubit circuits.

Guilhem Ribeill
University of Wisconsin, Madison

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