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A photon capture approach to Josephson photomultiplier-based qubit measurement ALEXANDER OPREMCAK, IVAN PECHENEZHSKIY, Univ of Wisconsin, Madison, CALEB HOWINGTON, Syracuse University, CHRIS WILEN, MATTHEW BECK, EDWARD LEONARD JR., KONSTANTIN NESTEROV, MAXIM VAVILOV, Univ of Wisconsin, Madison, BRITTON PLOURDE, Syracuse University, ROBERT MCDERMOTT, Univ of Wisconsin, Madison — Scalable high-fidelity qubit measurement is essential to the realization of a fault tolerant quantum processor. Here we outline a new approach whereby microwave pointers states are transferred between a dispersively coupled qubit readout resonator and an auxiliary resonator that is probed by a Josephson photomultplier (JPM). We describe the design, fabrication, and characterization of the JPM chips and discuss experiments to benchmark qubit measurement fidelity. These efforts are an intermediate step towards interfacing superconducting qubit circuits with Single Flux Quantum (SFQ) digital logic in order to reduce room temperature hardware overhead and latency of classical post-processing.

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