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Dispersive microwave readout of a double quantum dot charge qubit in silicon EDWARD HENRY, ANDREW SCHMIDT, QNL, UC Berkeley, MATHEW HOUSE, UCLA, OFER NAAMAN, H. PAN, MING XIAO, HONG-WEN JIANG, UCLA, IRFAN SIDDIQI, QNL, UC Berkeley, QNL, UC BERKELEY TEAM, JIANG GROUP, UCLA TEAM — Microwave resonators coupled to quantum systems have been used for fast dispersive measurement in many different architectures in solid state and atomic physics. The electronic states of a semiconductor quantum dot represent a promising candidate for quantum information processing. Our work is geared toward developing a fast, non-demolition readout of semiconductor qubit by coupling to a superconducting resonant circuit. We report on microwave measurements of a lateral quantum dot, realized using a silicon MOSFET structure, where the charge degree of freedom is capacitively coupled to a shorted quarter wave 6 GHz resonator. We characterize the sensitivity of this charge detection scheme and its implications for qubit readout fidelity.

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