Abstract Submitted
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Strong coupling of a single electron in silicon to a microwave photon[1] XIAO MI, JEFFREY CADY, DAVID ZAJAC, JASON PETTA, Princeton University — We demonstrate a hybrid circuit quantum electrodynamics (cQED) architecture in which a single electron in a Si/SiGe double quantum dot is dipole-coupled to the electric field of microwave photons in a superconducting cavity. Vacuum Rabi splitting is observed in the cavity transmission when the transition energy of the single-electron charge qubit matches that of a cavity photon, demonstrating that our device is in the strong coupling regime. The achievement of strong coupling is largely facilitated by an exceptionally low charge decoherence rate of 5 MHz and paves the way toward a wide range of cQED experiments with quantum dots, such as non-local qubit interactions [2], strong spin-cavity coupling [3] and single photon generation [4].

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[2]J. Majer *et al.*, *Nature* **449**, 443 (2007).
[3]J. J. Viennot *et al.*, *Science* **349**, 408 (2015).
[4]A. A. Houck *et al.*, *Nature* **449**, 328 (2007).

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