Abstract Submitted
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Design and measurement of a silicon double quantum dot qubit with dispersive microwave readout[1] EDWARD HENRY, ANDREW SCHMIDT, UC Berkeley, QNL, MATHEW HOUSE, UCLA, YAO-TSENG WANG, CHEUK LO, UC Berkeley, HONG PAN, XIN XIAO, UCLA, HANHAN LI, LOREN GREENMAN, BIRGITTA WHALEY, UC Berkeley, HONGWEN JIANG, UCLA, ELI YABLONOVITCH, JEFFREY BOKOR, UC Berkeley, I. SIDDIQI, UC Berkeley, QNL — The electronic states of a semiconductor quantum dot are a promising candidate for quantum information processing. We describe a circuit QED qubit architecture in which a semiconductor qubit in silicon is capacitively coupled to a 6 GHz superconducting resonator. Silicon is an attractive material on account of the long electron spin lifetime. We discuss the design and operation of both the laterally defined double quantum dot qubit as well as the balanced coplanar stripline resonator. We focus in particular on the chip design and the specifics of the measurement setup, including both low and high frequency filtering. We also discuss the possibility of operating this device as a spin qubit by way of applying an inhomogeneous magnetic field.

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