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Coupling a SQUID array resonator with a semiconductor charge qubit ANNA STOCKKLAUSER, PASQUALE SCARLINO, JONNE KOSKI, SIMONE GASPARINETTI, ANTON POTOCNIK, CHRISTIAN REICHL, WERNER WEGSCHEIDER, THOMAS IHN, KLAUS ENSSLIN, ANDREAS WALLRAFF, ETH Zurich — Strong coupling between superconducting artificial atoms and coplanar waveguide resonators is routinely achieved in circuit QED. Coupling rates to gate defined semiconductor quantum dots are so far limited to about 50 MHz [1], due to their smaller dipole moment. By increasing the characteristic impedance of the resonator, it is possible to enhance the zero point voltage fluctuations, thus improving the electric dipole coupling to qubits. We aim to couple a semiconductor double quantum dot with a high impedance superconducting resonator realized using a SQUID array resonator of 1.5 kΩ impedance and an internal quality factor of up to 10^4. Considering a charge qubit decoherence rate of roughly 250 MHz, reported in [2], the coupling achievable with this kind of resonators is expected to be sufficient to reach the strong coupling regime.
[1] T. Frey *et al.*, Phys. Rev. Lett. **108**, 046807 (2012).
[2] A. Stockklauser *et al.*, Phys. Rev. Lett. **115**, 046802 (2015).

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