

Abstract Submitted
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Superconducting SET backaction on the Cooper-pair box BENJAMIN TUREK, Yale University, JOHANNES MAJER, Yale University, AASHISH CLERK, McGill University, STEVEN GIRVIN, Yale University, ROBERT SCHOELKOPF, Yale University, KEVIN BLADH, Chalmers Institute of Technology, DAVID GUNNARSSON, Chalmers Institute of Technology, PER DELSING, Chalmers Institute of Technology — We report on measurements of the backaction of a superconducting single electron transistor (SSET) measuring a Cooper-pair box qubit. During the weak, continuous measurement made by the SSET, the qubit can be relaxed, dephased, and even excited by noise capacitively coupled from the island of the SSET. This backaction is calculated to depend on the operating point of the SSET. We operate the SSET near the double Josephson quasiparticle (DJQP) feature, where the backaction of the SSET is well understood (A. Clerk, et al., Phys. Rev. Lett. **89**, 176804 (2002)), and where there are no quasiparticle poisoning effects. Measurements of the variation in steady-state polarization and relaxation time of the Cooper-pair box vary as expected with SSET operating point and confirm this model of SSET backaction.

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