

Abstract Submitted
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Cooper Pair Transistor Embedded in a dc-Biased High-Q Microwave Cavity JULIANG LI, FEI CHEN, JOEL STETTENHEIM, Dartmouth College, A.J. SIROIS, University of Colorado, Boulder, R.W. SIMMONDS, National Institute of Standards and Technology, Boulder, M.P. BLENCOWE, A.J. RIMBERG, Dartmouth College — A Cooper pair transistor (CPT) is directly coupled to a high-Q microwave cavity, which allows introduction of a dc bias to the CPT without significantly degrading the cavity Q. In the subgap region of the CPT, the dc bias generates a tunable oscillating current through the CPT via the ac Josephson effect. Evidence of such self-oscillations has been observed as current peaks in our dc measurements, which are in good agreement with calculated cavity modes, and indicate the strong coupling between the CPT and the cavity. Tunneling Cooper pairs can both emit photons into and absorb photons from microwave cavity modes. Photons emitted into the cavity are also directly probed and are in good agreement with dc measurements. Recent experimental results including the importance of careful filtering of the DC bias lines will be discussed. This work is supported by the NSF, AFOSR and DARPA.

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