

Abstract Submitted  
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**Photon Emission from a Self-oscillating Cavity-Embedded-Cooper Pair Transistor**<sup>1</sup> FEI CHEN, JOEL STETTENHEIM, JULIANG LI, 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 strongly non-linear superconducting device consisting of a Cooper pair transistor embedded in a dc voltage biased microwave cavity is investigated. The cavity-embedded-Cooper pair transistor (CECPT) is driven via the ac Josephson effect by an applied dc bias and exhibits self-oscillation without an external ac drive. Tunneling Cooper pairs can both emit photons into and absorb photons from microwave cavity modes. Photons emitted into the cavity are directly probed and are in good agreement with dc measurements. Photon emission arising from both sequential tunneling and cotunnelling processes has been observed. The CECPT offers an interesting system for studying nonlinear quantum dynamics and the quantum-to-classical transition. Recent experimental results will be discussed.

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