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**Josephson Parametric Amplifer Based on a Cavity-Embedded Cooper Pair Transistor**[1] JULIANG LI, A. J. RIMBERG, Dartmouth College — In this experiment a cavity-embedded Cooper-pair transistor (cCPT) is used as a Josephson parametric amplifier. The cCPT consists of a Cooper pair transistor placed at the voltage antinode of a 5.7 GHz shorted quarter-wave resonator so that the CPT provides a galvanic connection between the cavity's central conductor and ground plane, which forms a SQUID loop. Both the flux threading the loop as well as the gate charge can be modulated, and each can provide the parametric pumping. The reflected signal from the cCPT is further amplified by both SLUG[1] and HEMT amplifiers for characterizing the parametric amplification. A first application of the parametric amplification is to improve the charge sensitivity of a single electron charge detector. This can be done either by pumping on a side band or by shifting the charge state of the cCPT near a bifurcation point. Stimulated emission has been also observed when the cCPT is pumped at twice the resonant frequency in the absence of an input signal. This could allow investigation of the dynamic Casimir effect as well as generation of non-classical photon states. 1. Hover, et al, Appl. Phys. Lett. 100, 063503 (2012)

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