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Observation of the squeezed state of microwave photon by resolving the even-number Fock states in circuit QED[1] KYUNGSUN MOON, Dept. of Physics, Yonsei Univ. — We theoretically propose an elegant way to detect the microwave parametric down conversion in the circuit QED system. The qubit energy splitting E_{01} is tuned to be quite close to the fundamental frequency ω_1 of the microwave photon and the frequency of the pump beam is chosen to be ω_2. We place the qubit at the two-thirds away from the center of the central resonator, which will make the capacitive coupling to the third harmonic mode to be negligible. Since the qubit acts as an optical coupler in our system, one may expect that the following process $a_2^+ a_1^+ a_3$ may appear and compete with the squeezing process $a_1^+ a_1^+ a_2$, which will seriously degrade the quality of squeezing by mixing into the channel. Since the coupling to the third harmonic mode is negligible for our system, we expect instead to observe the clear squeezing of the microwave photon with frequency ω_1. We calculate the absorption spectrum of the qubit, which is experimentally measurable and will clearly reveal the squeezed states as the coherent superposition of the even-number Fock states.

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