Abstract Submitted
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Quasi-particle population of superconducting islands probed by quantum jumps of a fluxonium qubit[1] I.M. POP, U. VOOL, K. SLIWA, B. ABDO, T. BRECHT, R.J. SCHOELKOPF, M. MIRRAHIMI, L. GLAZMAN, M.H. DEVORET, Department of Applied Physics, Yale University — The origin and the dynamics of nonequlibrium quasiparticles in superconducting circuits remain an open problem. One of the most sensitive systems that could be used to measure quasiparticles is the fluxonium qubit. Recently, this artificial atom has demonstrated relaxation times on the order of 1 ms, limited by quasiparticle dissipation. Moreover, the sensitivity to quasiparticle loss can be tuned in situ by applying a magnetic flux. By using a quantum limited amplifier (a Josephson Parametric Converter) we can observe quantum jumps between the 0 and 1 states of a fluxonium qubit in thermal equilibrium with the environment. The distribution of the times in-between the quantum jumps reveals quantitative information about the population and dynamics of quasiparticles. Our data is entirely consistent with the hypothesis that our system is sensitive to single quasiparticle excitations.

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