Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

From quantum jumps to quasiparticle population[1] U. VOOL, I.M. POP, K. SLIWA, B. ABDO, C. WANG, Y.Y. GAO, A. KOU, W.C. SMITH, T. BRECHT, S. SHANKAR, M. HATRIDGE, Department of Applied Physics, Yale University, G. CATELANI, Peter Grünberg Institut (PGI-2), Forschungszentrum Jülich, L. FRUNZIO, R.J. SCHOELKOPF, L. GLAZMAN, Department of Applied Physics, Yale University, M. MIRRAHIMI, Department of Applied Physics, Yale University and INRIA Paris Rocquencourt, M.H. DEVORET, Department of Applied Physics, Yale University — Superconducting quasiparticles (QP) play a dominant role in the relaxation of the fluxonium qubit in the vicinity of the half-flux-quantum bias point. Recent experiments integrating the fluxonium with a quantum-limited amplifier have measured quantum jump trajectories between the ground state and the first excited state. These trajectories show a change in the characteristic lifetime of the fluxonium qubit as a function of time, arising from a change in the number of QP's in the sample [1]. Using a simple model of QP dynamics and their effect on the fluxonium qubit, we can access the QP population with temporal resolution better than a 100 microsecond. Such rapid monitoring of QP dynamics is essential for understanding the sources of QP's and ultimately suppressing them.

[1] "Non-Poissonian quantum jumps of a fluxonium qubit due to quasiparticle excitations," U. Vool, I.M. Pop et al. to be published in PRL 2014.

[1]Work supported by: IARPA, ARO, and ONR.

Uri Vool
Yale Univ

Date submitted: 13 Nov 2014 Electronic form version 1.4