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Measurement of recombination and single-vortex trapping of quasiparticles in a superconducting qubit CHEN WANG, Y.Y. GAO, I.M. POP, U. VOOL, C. AXLINE, T. BRECHT, R.W. HEERES, L. FRUNZIO, Yale Univ, G. CATELANI, Peter Grunberg Institut (PGI-2), M.H. DEVORET, L.I. GLAZMAN, R.J. SCHOELKOPF, Yale Univ — We measure the dynamics of quasiparticle relaxation over multiple orders of magnitude in density in superconducting transmon qubits using a contactless injection technique by microwave pulses. We demonstrate the power-law decay characteristics for quasiparticle recombination and exponential decay for single quasiparticle loss due to trapping effects, and find both mechanisms play a significant role in quasiparticle relaxation depending on device geometry. We observe quantized changes in quasiparticle trapping rate due to individual vortices, and thus quantitatively measure the interaction between non-equilibrium quasiparticles and a single vortex in a superconducting aluminum film. These results are described in Ref. [1]. [1] C. Wang et al. arXiv:1406.7300 [quant-ph]

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