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Suppressing decoherence of superconducting qubits by trapping non-equilibrium quasiparticles YVONNE GAO , CHEN WANG , I.M. POP, U. VOOL, C. AXLINE, T. BRECHT, R.W. HEERES, L. FRUNZIO , M.H. DEVORET, Yale University , G. CATELANI, Peter Grunberg Institute, L.I. GLAZMAN, R.J. SCHOELKOPF, Yale University — We report a counter-intuitive observation that vortices can improve the coherence of superconducting qubits by suppressing non-equilibrium quasiparticles. This effect is systematically studied by measuring the magnetic-field dependence of qubit coherence times and quasiparticle lifetimes in transmons with different geometries in a 3D cQED architecture. Varying quasiparticle dynamics by vortices allows separation of dissipation mechanisms and measurement of the stray generation rate of quasiparticles in our devices. More details are described in Ref [1]. Our results indicate that quasiparticles contribute significantly to qubit decoherence. Hence suppression of quasiparticle density in the device is essential for further improvement of coherence times of superconducting qubits and we will present recent results aimed at alleviating decoherence due to quasiparticles. [1] C.Wang, Y.Y.Gao et al arXiv:1406.7300

Yvonne Gao
Yale University

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