Lecture 6:

Quantum Josephson effect

(Cooper pair box, Superconducting qubit)

DC SQUID

VOLUME 55, NUMBER 18 PHYSICAL REVIEW LETTERS 28 OCTOBER 1985

Measurements of Macroscopic Quantum Tunneling out of the Zero-Voltage State of a Current-Biased Josephson Junction

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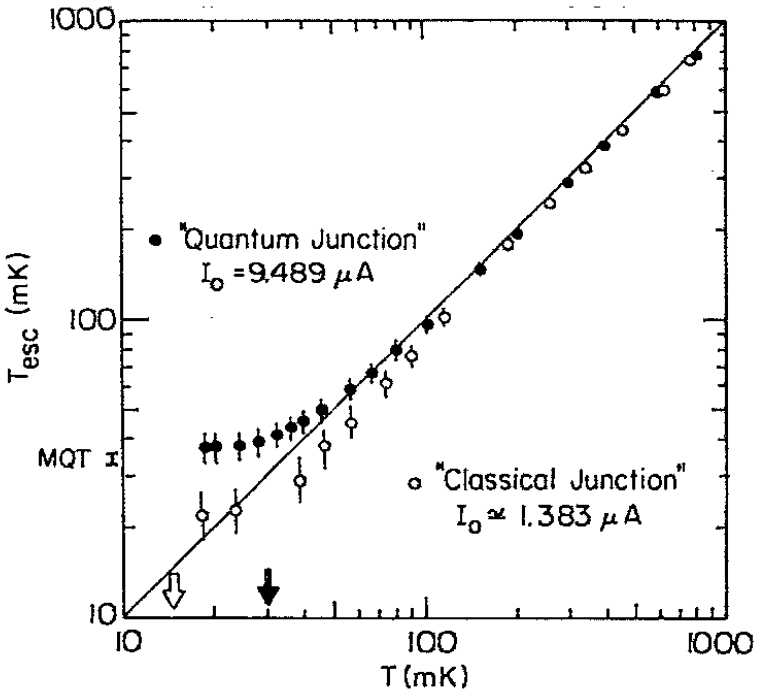
(Received 26 July 1985)



Cooper pair box

Coherent control of macroscopic quantum states in a single-Cooper-pair box

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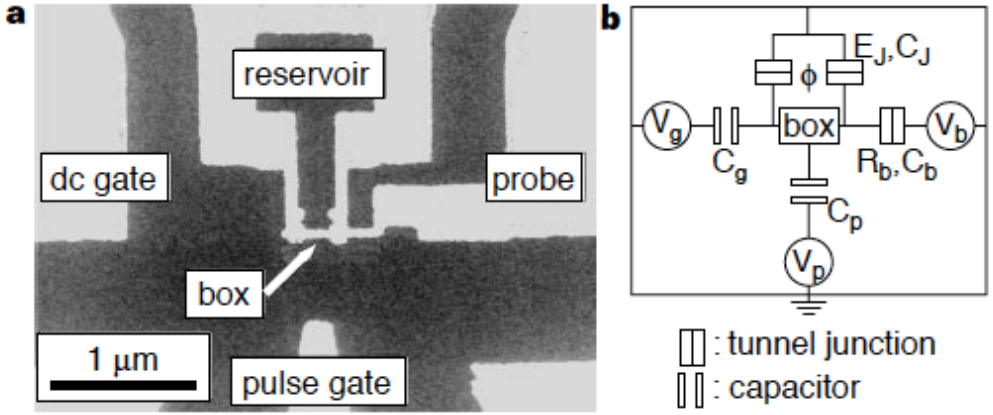
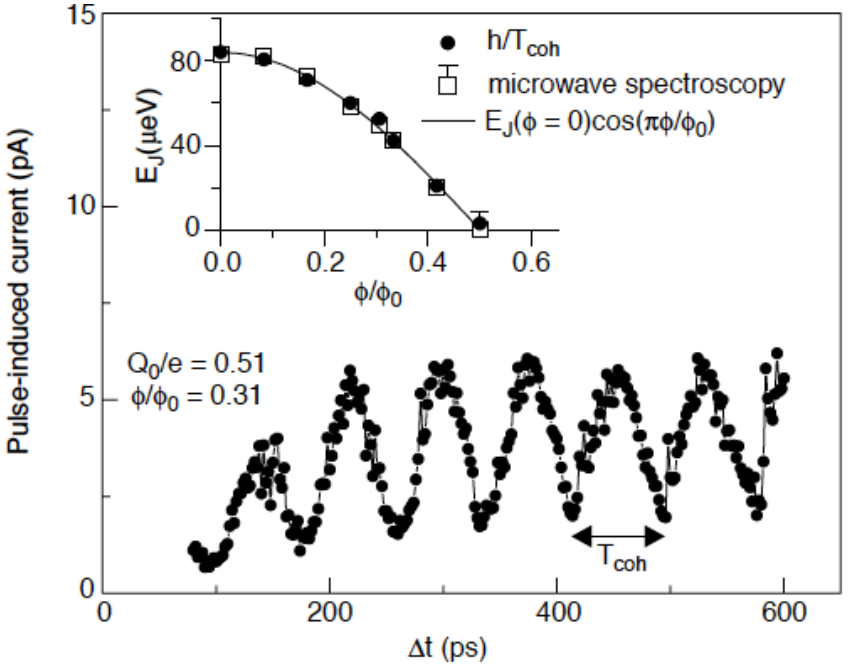
Nature 398, 786 (1999)





circuit QED

Strong coupling of a single photon to a superconducting qubit using circuit quantum electrodynamics

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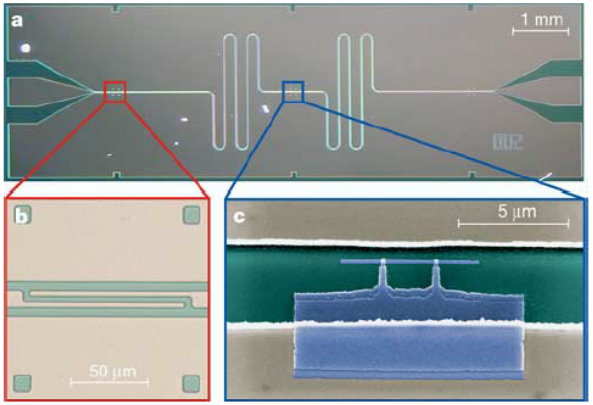
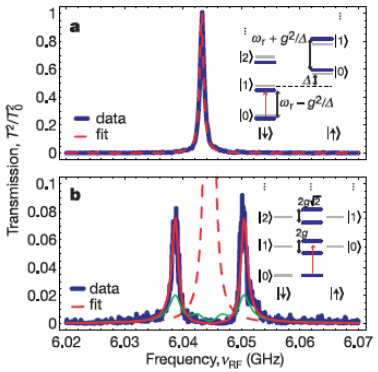
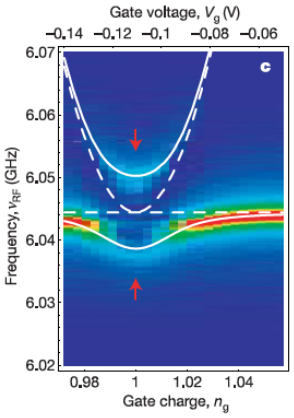
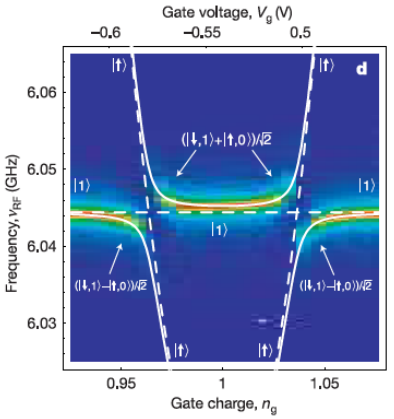
Nature 431, 162 (4004)









poisoning detected with SC qubit

PRL 113, 247001 (2014) PHYSICAL REVIEW LETTERS week ending 12 DECEMBER 2014

Non-Poissonian Quantum Jumps of a Fluxonium Qubit due to Quasiparticle Excitations

U. Vool,[1,*] I. M. Pop,[1] K. Sliwa,[1] B. Abdo,[1,†] C. Wang,[1] T. Brecht,[1] Y. Y. Gao,[1] S. Shankar,[1] M. Hatridge,[1] G. Catelani,[2] M. Mirrahimi,[1,3] L. Frunzio,[1] R. J. Schoelkopf,[1] L. I. Glazman,[1] and M. H. Devoret[1]

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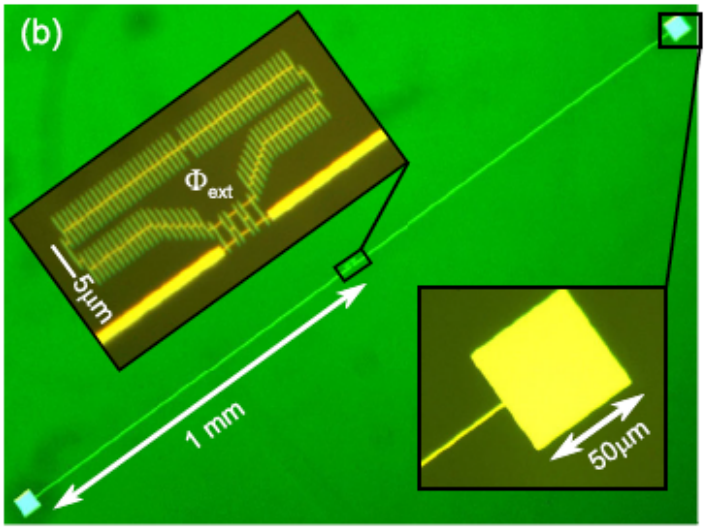
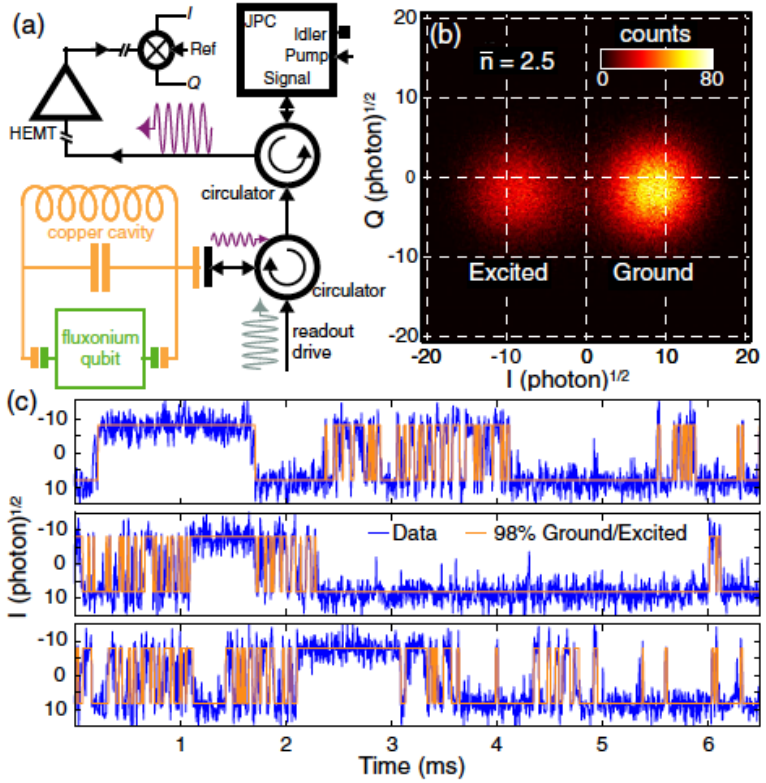


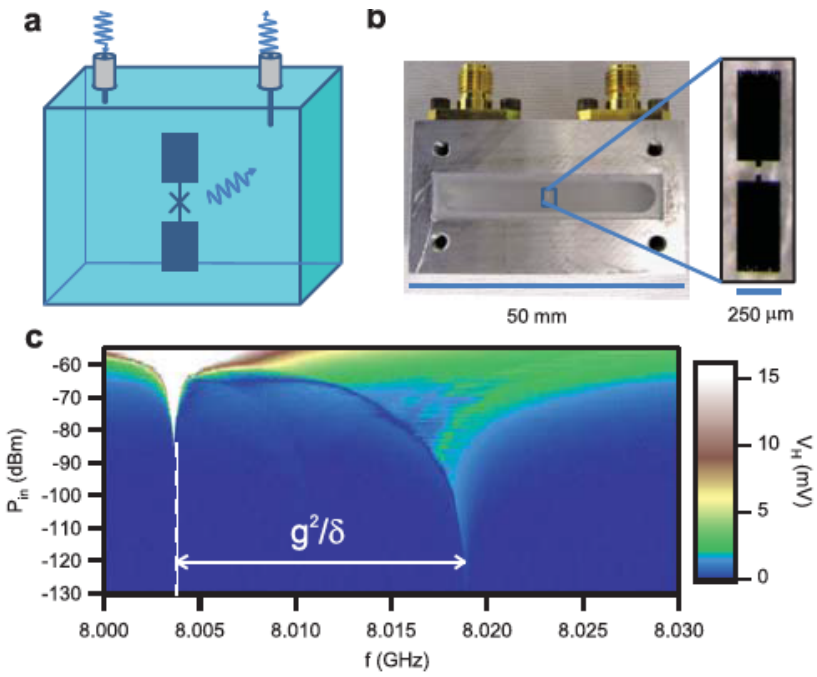


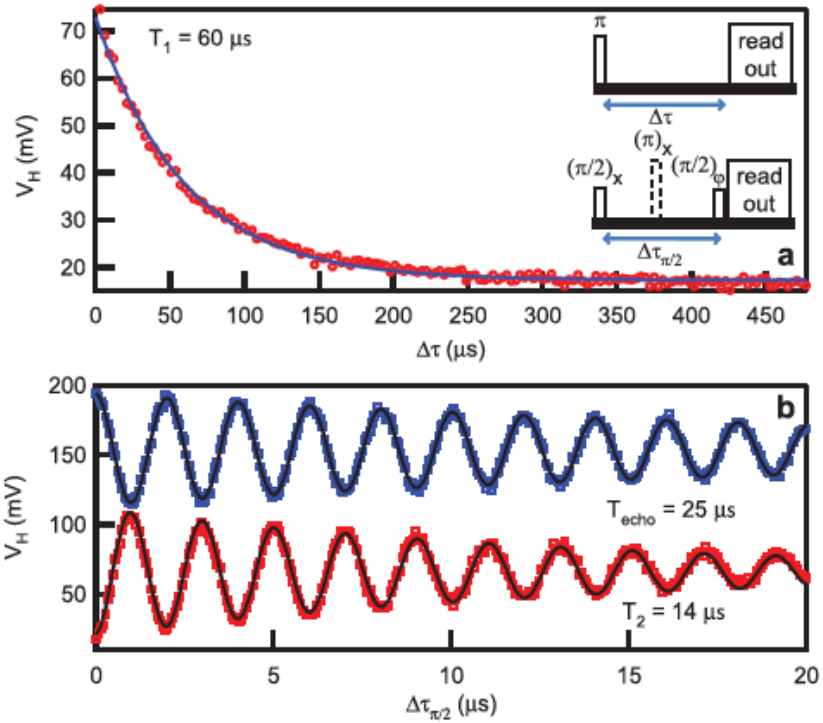
Transmon

PRL 107, 240501 (2011) Selected for a Viewpoint in *Physics* PHYSICAL REVIEW LETTERS week ending 9 DECEMBER 2011

Observation of High Coherence in Josephson Junction Qubits Measured in a Three-Dimensional Circuit QED Architecture

Hanhee Paik,[1] D. I. Schuster,[1,2] Lev S. Bishop,[1,3] G. Kirchmair,[1] G. Catelani,[1] A. P. Sears,[1] B. R. Johnson,[1,4] M. J. Reagor,[1] L. Frunzio,[1] L. I. Glazman,[1] S. M. Girvin,[1] M. H. Devoret,[1] and R. J. Schoelkopf[1]





Superconducting quantum circuits at the surface code threshold for fault tolerance

R. Barends[1]*, J. Kelly[1]*, A. Megrant[1], A. Veitia[2], D. Sank[1], E. Jeffrey[1], T. C. White[1], J. Mutus[1], A. G. Fowler[1,3], B. Campbell[1], Y. Chen[1], Z. Chen[1], B. Chiaro[1], A. Dunsworth[1], C. Neill[1], P. O'Malley[1], P. Roushan[1], A. Vainsencher[1], J. Wenner[1], A. N. Korotkov[2], A. N. Cleland[1] & John M. Martinis[1]

Nature 508, 500 (2014)