Quasiparticle dynamics in Andreev quantum dots

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An Andreev quantum dot (Aqd) is a phase-biased superconducting weak link in which discrete quasiparticle states, called Andreev states, develop within the superconducting gap. In particular, a single-channel Aqd accommodates one Andreev state that can be occupied by either zero, one or two quasiparticles. In a recent experiment we demonstrated the coherent manipulation of the two-level system formed by the even states [1]. Moreover, as a common feature to other superconducting devices, the single-occupied state of the Aqd was also observed. In this talk, I will present experiments on Andreev quantum dots obtained from one-atom contacts between aluminum electrodes, in which we probe quasiparticle dynamics using circuit-Quantum Electrodynamics like techniques [1]. I will focus in particular on the role of the odd state in the relaxation of the Aqd and on the effect of the cavity on the dynamics.*In collaboration with: L. Tosi, H. Pothier and C. Urbina

References