Quasiparticle dynamics in Andreev quantum dots

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In contrast with a bulk superconductor, a single-channel phase-biased superconducting weak link hosts a discrete subgap quasiparticle state, called 'Andreev state'. As such, it can be seen as a sort of quantum dot in which zero, one or two quasiparticles can be trapped, not due to electrostatic barriers, but to the phase drop. This 'Andreev quantum dot' constitutes a very simple playground to explore the foundations of mesoscopic superconductivity.
I will present experiments on Andreev quantum dots obtained at one-atom contacts between aluminum electrodes, in which we probe the dynamics of quasiparticles trapping and un-trapping.