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Out of Equilibrium Charge dynamics in a cQED Architecture JEREMIE VIENNOT, MATTHIEU DELBECQ, MATTHIEU DARTIAILH, AUDREY COTTET, TAKIS KONTOS, CNRS/ENS, HQC TEAM — In the context of circuit quantum electrodynamics, recent developments made it possible to build hybrid circuits [1], including many types of quantum dots. The versatility of these systems allows us to explore several directions, from quantum information engineering to many-body physics, all in a circuit QED architecture. I will present some of the experiments of our group where a carbon nanotube-based double quantum dot is coupled to a microwave cavity. We demonstrate an efficient electron confinement in this carbon nanotube, allowing us to bring the system at resonance with the cavity and used it as a charge Qbit. We characterise the response of this circuit out of equilibrium, either at finite bias or large microwave power [2]. We are also able to perform microwave spectroscopy of the device. Combined with ferromagnet interface exchange Zeeman fields, such a control should enable us to go towards spin-photon coupling and spin qubit experiments for circuit QED [3]. References : [1] M.R. Delbecq et al. Nature Comm., 4, 1400 (2013). [2] J.J. Viennot et al., arXiv:1310.4363 [3] A. Cottet et al., Phys. Rev. Lett. 105, 160502 (2010).

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