

Abstract Submitted  
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**Carbon nanotubes coupled to superconducting impedance matching circuits**<sup>1</sup> SCHONENBERGER CHRISTIAN, MINKYUNG JUNG, VISHAL RANJAN, Department of Physics, Univ. of Basel, GABRIEL PUEBLA-HELLMANN, Department of Physics, ETH-Zurich, THOMAS HASLER, ANDREAS NUNNENKAMP, Department of Physics, Univ. of Basel, MATTHIAS MUOTH, CHRISTOFER HIEROLD, Micro- and Nanosystems, ETH-Zurich, ANDREAS WALLRAFF, Department of Physics, ETH-Zurich, RF-HYBRID-COLLABORATION COLLABORATION — Coupling carbon nanotube devices to microwave circuits offers a significant increase in bandwidth and signal-to-noise ratio. These facilitate fast non-invasive readouts important for quantum optics, shot noise and correlation measurements. Here, we successfully couple a carbon nanotube (CNT) double quantum dot to a GHz superconducting matching circuit using a mechanical transfer technique. The device shows a tunable bipolar double dot behavior, reaching the few-electron/hole regime. The resonance response reflected by the matching circuit is a sensitive probe of the charge state of the device, allowing a determination of the absolute charge number. The resonance response at the interdot charge transitions enables quantitative parameter extraction. Presented results open the path for novel studies of microwave photons interacting with electrons in carbon nanotubes.

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