

Abstract Submitted
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Tunneling spectroscopy using carbon nanotubes quantum dots¹

YANJING LI, NADYA MASON, University of Illinois — Tunneling spectroscopy is an important measurement technique, encompassing, for example, planar tunneling, scanning tunneling microscopy and superconducting tunnel probes. Here, we demonstrate that carbon nanotube quantum dots (QDs) can be used as tunneling probes. The sharp features in the density of states of the QDs in the Coulomb blockade regime can map out the density of states and the energy distribution function of the system to be studied. We present preliminary data showing tunneling from a carbon nanotube quantum dot into mesoscopic metal wires that have been driven out of equilibrium by a bias voltage. Previous measurements of these systems using superconducting probes [1-2] showed that the electron energy distribution functions and electron interactions can be determined. With the present measurements, the use of a QD instead of a superconductor allows us to probe at significantly higher temperatures and biases.

[1] H. Pothier, S. Gueron, Norman O. Birge, D. Esteve, and M. H. Devoret, Phys Rev Lett 79, 3490 (1997)

[2] Yung-fu Chen, Travis Dirks, Gassem Al-Zoubi, Norman O. Birge, and Nadya Mason, Phys Rev Lett 102, 036804 (2009)

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