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Simultaneous electrical transport and STM of carbon nanotubes
B.J. LEROY, Department of Physics, University of Arizona, I. HELLER, C. DEKKER, S.G. LEMAY, Kavli Institute of Nanoscience, Delft University of Technology — We have developed a technique to perform simultaneous electrical transport and scanning tunneling spectroscopy measurements on carbon nanotubes. The combination of these techniques allows the charge states involved in transport through the nanotube to be directly probed. The spectroscopy measurements show peaks due to Coulomb blockade, which split and change energy as a function of the source-drain voltage across the nanotube. These splitting peaks track the Fermi level of the source and drain electrodes. With our combined measurement technique, we are able to show that these peaks in the spectroscopy are correlated with changes in the source-drain current. This demonstrates that the states identified by the spectroscopy measurement are the same delocalized states involved in transport through the nanotube. Unexpectedly, the strength of these spectroscopy peaks depends on position along the nanotube.

Brian LeRoy
Department of Physics, University of Arizona

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