

Abstract Submitted
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Local Density of States in Nanoscale Systems Measured by Electrostatic Force Microscopy¹ CRISTIAN STAI, Materials Science and Engineering, Drexel University, DOUGLAS R. STRACHAN, Physics and Astronomy, University of Pennsylvania, DAWN A. BONNELL, Materials Science and Engineering, University of Pennsylvania, ALAN T. JOHNSON, Physics and Astronomy, University of Pennsylvania, JONATHAN E. SPANIER, Materials Science and Engineering, Drexel University, DREXEL TEAM, PENN TEAM — We use Electrostatic Force Microscopy (EFM) to measure the local density of states (LDOS) in carbon nanotubes and semiconducting nanowires. A voltage biased EFM cantilever, driven at its resonant frequency is used to perturb the local charge density in these systems. The recorded change in the oscillation phase is proportional to the LDOS of the sample. We monitor the phase change as a function of both the tip voltage and cantilever oscillation amplitude for a fixed cantilever position above the sample. We also show that this is a general electrostatic method that can be used to measure the band gap and LDOS of both conducting and insulating nanoscale systems with no need for electrical contacts.

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