

Abstract Submitted
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Scanning Probe Characterization of Electronic Scattering by Carbon Nanotube Defects ELLIOT FULLER, STEVEN HUNT, BRAD CORSO, PHILIP COLLINS, Dept. of Physics and Astronomy, Univ. of California Irvine, Irvine, CA 92697 — Single-walled carbon nanotubes (SWCNTs) are quasi-ballistic, one-dimensional conductors with unique electronic properties. The controlled addition of a single covalent, sidewall defect interrupts this conduction pathway and produces a disproportionate change in the device properties. Here, we investigate the electronic effects in the immediate vicinity of a defect site using Kelvin force microscopy (KFM) and scanning gate spectroscopy (SGS). KFM images the local electrostatic surface potential along a SWCNT and thus can directly measure the potential drop at defects and other electronic surface features. Using KFM, we clearly observe the bias dependence of resistance at the site of defects and/or chemical attachments. The SGS technique provides complementary information by mapping their gate dependence. Combined, these two scanning probe techniques resolve the full energy dependence of scattering by a defect site and allow the determination of effective barrier widths and heights for different types.

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