Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Scanning gate microscopy of electronic inhomogeneities in single-walled carbon nanotube (SWCNT) devices STEVEN R. HUNT, PHILIP G. COLLINS, Department of Physics and Astronomy, Univ. of California Irvine, Irvine, CA 92697-4576 — The electronic properties of SWCNT devices are primarily determined by the contact metal and the SWCNT bandstructure. However, inhomogeneities such as substrate imperfections, sidewall defects, and mobile contaminants also contribute. In extreme cases, metallic SWCNTs have transistor-like behaviors due to these inhomogeneities. We investigate methods of identifying and distinguishing these different scattering mechanisms using scanning gate microscopy. For example, we can readily identify a sidewall defect in the presence of substrate charge traps, because the two types of disorder respond differently to gate electric fields. We present methods of optimizing the imaging conditions to make such distinctions. This research has been partly supported by the NSF (DMR-0801271 and ECCS-0802077).

Steven R. Hunt
Department of Physics and Astronomy,
Univ. of California Irvine, Irvine, CA 92697-4576

Date submitted: 02 Dec 2008 Electronic form version 1.4