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Terahertz Detection as a Probe of Luttinger-Liquid Behavior in an Individual Single-Walled Carbon Nanotube JOEL D. CHUDOW, CHRIS B. MCKITTERICK, DANIEL E. PROBER, Depts. of Applied Physics and Physics, Yale University, DANIEL F. SANTAVICCA, Dept. of Physics, University of North Florida, PHILIP KIM, Dept. of Physics, Columbia University — Carbon nanotubes (CNTs) serve as an experimental system for verification of physical models of one-dimensional (1-D) conduction, in particular the Luttinger-liquid theory. We describe measurements of terahertz (THz) absorption in individual single-walled carbon nanotubes and distinguish between two response mechanisms: bolometric detection due to heating a CNT with a temperature-dependent resistance and the response due to non-thermal electrical contact nonlinearities. The effect of the contact nonlinearity is not significantly decreased at THz frequencies, allowing for analysis of the parallel contact capacitance to an individual CNT.[1] We study high-frequency charge excitations in a CNT as a probe of the strength of the electron-electron interactions due to the lack of screening in this 1-D system. This is achieved by exciting terahertz standing wave resonances along the length of a CNT, observed using the nonlinear detection mechanism. We exploit this experimental technique to test predictions of the Luttinger-liquid model. \\[4pt] [1] J.D. Chudow, D.F. Santavicca, C.B. McKitterick, D.E. Prober and P. Kim, *Appl. Phys. Lett.* **100**, 163503 (2012).

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