Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Measuring the High Frequency Response of Individual Carbon Nanotubes ANTHONY ANNUNZIATA, BETH PARKS, Colgate University, SAMI ROSENBLATT, PAUL MCEUEN, Cornell University — Carbon nanotubes are nanometer diameter hollow tubes of carbon that are ideal one-dimensional conductors. They are being developed as elements in molecular electronics. Extensive studies up to this time have focused on DC properties of nanotubes. I report progress toward measurements of the dynamic conductance of individual carbon nanotubes at GHz to THz frequencies using terahertz time-domain spectroscopy. In this method, individual single-wall carbon nanotubes are incorporated into microfabricated antennas and used as receivers of broadband THz radiation. A variable time delay between two incident pulses is used to gain information about the frequency dependence of the antenna response. If the nanotube has the predicted length-dependent resonance [Burke, P. J., IEEE Transactions on Nanotechnology V. 1, p. 129 (2002)], then this should be clear in the antenna response. Knowledge of the spectral response of carbon nanotubes is important for applications in electronic interconnects as well as a confirmation of certain aspects of Luttinger liquid theory.

Anthony Annunziata
Colgate University

Date submitted: 30 Nov 2004 Electronic form version 1.4