Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Electrical properties of 0.4 cm long single walled nanotubes ZHEN YU, CHRISTOPHER RUTHERGLEN, SHENGDONG LI, PETER BURKE, U.C. Irvine — Centimeter scale aligned carbon nanotube arrays are grown from nanoparticle/metal catalyst pads[1]. We find the nanotubes grow both with and "against the wind." A metal underlayer provides in-situ electrical contact to these long nanotubes with no post growth processing needed. Using the electrically contacted nanotubes, we study electrical transport of 0.4 cm long nanotubes[2]. Using this data, we are able to determine the resistance of a nanotube as a function of length quantitatively, since the contact resistance is negligible in these long nanotubes. The source drain I-V curves are quantitatively described by a classical, diffusive model. Our measurements show that the outstanding transport properties of nanotubes can be extended to the cm scale and open the door to large scale integrated nanotube circuits with macroscopic dimensions. These are the longest electrically contacted single walled nanotubes measured to date. [1] Zhen Yu, Shengdong Li, Peter J. Burke, "Synthesis of Aligned Arrays of Millimeter Long, Straight Single-Walled Carbon Nanotubes," Chemistry of Materials, 16(18), 3414-3416 (2004). [2] Shengdong Li, Zhen Yu, Christopher Rutherglen, Peter J. Burke, "Electrical properties of 0.4 cm long single-walled carbon nanotubes" Nano Letters, 4(10), 2003-2007 (2004).

Zhen Yu
U.C. Irvine

Date submitted: 06 Jan 2005 Electronic form version 1.4