Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

First Principle Study of Electronic Transport in Carbon Nanotubes and Copper Nanowires for Interconnect Applications YU ZHOU, YIMING ZHANG, SUBBALAKSHMI SREEKALA, PULICKEL AJAYAN, SAROJ NAYAK, DEPARTMENT OF PHYSICS, RPI TEAM — We will present our recent first principles calculation modeling work on carbon nanotubes (CNT) and copper wires for Interconnect applications. In particular we have calculated the ballistic transport properties of nanotubes based on their density of states and band structures, and compared with that of copper wires of similar dimension. By using Ohm's law and Landauer Formalism, we computed the resistance of them in mesoscopic sizes. The effect of correlation in the transport properties are discussed in detail. We will present our work on the nanowires and nanotubes packing and their impact on the resistance, while taking into account the surface scattering based on Fuchs-Sondheimer model. The performance of CNT for both local and global Interconnects will be discussed in detail. Our results show that nanotube bundles can outperform copper wires for long intermediate and global interconnects.

Yu Zhou

Date submitted: 20 Nov 2006 Electronic form version 1.4