

Abstract Submitted
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Scaling of Resistance with Channel Length in Single Walled Carbon Nanotubes. MENINDER PUREWAL, Columbia University, Department of Applied Physics and Applied Mathematics, BYUNG HEE HONG, ANIRUDDH RAVI, Columbia University, Department of Physics, BHUPESH CHANDRA, JAMES HONE, Columbia University, Department of Mechanical Engineering, PHILIP KIM, Columbia University — We report on the scaling of resistance with channel length in single walled carbon nanotubes (SWNTs) with multiple Pd Ohmic contacts. The channel lengths range from 100nm to 400um. The intrinsic 1-D resistivity of individual SWNTs are measured from the slope of the linear dependence of resistance and length. The temperature dependent electron mean free length can be obtained from these data. While the mean free length ranges 100-500 nm at room temperature, the low temperature saturated value shows values as high as $\sim 10\mu\text{m}$. In addition, we will discuss possible mechanisms for the deviation from linear scaling behavior, as seen in long length scales ($>100\mu\text{m}$). Finally, we will report unusual strong suppression of conductance outside of the band gap regions of several SWNTs deviating from typical small and large band gap semiconducting SWNTs.

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