Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Observation of unusual structure in the low-temperature conductance of carbon nanotubes JEFFREY D. STEPHENS, JEROME C. LICINI, Lehigh University, A.T. CHARLIE JOHNSON, DOUGLAS R. STRACHAN, SAM KHAMIS, DANVERS E. JOHNSTON, University of Pennsylvania — Carbon nanotubes grown by chemical vapor deposition on a oxidized silicon substrate were contacted to form a gated sample consisting of a pair of tubes in parallel. The sample was tested at low temperature and high magnetic field using a dilution refrigerator and superconducting magnet. The current versus bias voltage graph shows a general trend consistent with the linear relationship except at low voltage. Further investigation is done by computing the differential conductance (dI/dV) and investigating how it varies with bias voltage. Here we see some intriguing behavior including a substantial increase in conductivity near zero voltage and a pronounced asymmetry with bias voltage. The temperature dependence of the zero field peak and asymmetry show that they appear at low temperatures and receding quickly by 3.0K. However, the magnetic field dependence is less intuitive. There are apparent shifts and possible splits that seem to develop but they are not followed in a manner consistent with simple theory.

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Date submitted: 20 Nov 2006 Electronic form version 1.4