Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Low-temperature electronic transport in ferromagnetic cluster embedded carbon nanotubes CATERINA SOLDANO, Department of Physics, Applied Physics and Astronomy, Rensselaer Polytechnic Institute, SWASTIK KAR, Department of Materials Science and Engineering, Rensselaer Polytechnic Institute, ROBERT VAJTAI, Rensselaer Nanotechnology Center, Rensselaer Polytechnic Institute, SAIKAT TALAPATRA, Department of Physics, University of Southern Illinois at Carbondale, SAROJ NAYAK, Department of Physics, Applied Physics and Astronomy, Rensselaer Polytechnic Institute, PULICKEL AJAYAN, Department of Materials Science and Engineering, Rensselaer Polytechnic Institute —
We present the electronic transport properties of ferromagnetic material embedded alumina template grown carbon nanotubes. Zero-field temperature dependence of the conductance in ferromagnetic cluster-embedded tubes (FM-MWNT) reveals a Lüttinger liquid type of behavior in the higher temperature region. Differential conductance measurements for discrete applied magnetic field show the appearance of field-dependent oscillations at low temperatures. The properties of the FM-MWNT were found to change permanently under the application of a magnetic field, indicating that the charge transport is sensitive to the relative magnetic orientations (random or aligned) of the nanoclusters. Those measurements suggest differences between charge transport in a Lüttinger liquid under the influence of "random" and "ferromagnetically aligned" impurities.

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Date submitted: 27 Dec 2007 Electronic form version 1.4