Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Diameter-dependent conductance oscillations in carbon nanotubes upon torsion. NAGAPRIYA K.S., Weizmann Institute of Science, Rehovot, Israel, TZAHI COHEN-KARNI, LIOR SEGEV, ONIT SRUR-LAVI, SIDNEY COHEN, ERNESTO JOSELEVICH, Weizmann Institute of Science, Rehovot, Israel — Torsion-induced conductance oscillations have been recently observed in multi-wall carbon nanotubes[1,2]. These oscillations have been interpreted as metal-semiconductor periodic transitions, while an alternative interpretation attributed the phenomenon to changes in registry between the walls. Here we show[3] that the period of the oscillations is inversely proportional to the squared diameter of the nanotube ($\delta\phi \sim 1/d^2$). This dependence is theoretically predicted from the shifting of the corners of the first Brillouin zone of graphene across different subbands allowed in the nanotube, whereas a change in registry should give rise to a simple inverse dependence ($\delta\phi \sim 1/d$). Hence, the experimental results validate the interpretation of Fermi level shift across subbands *vs.* that of registry change, as a source of torsion-induced conductance oscillations in carbon nanotubes.

[1] T. Cohen-Karni *et al*, Nature Nanotech. **1**, 36 (2006).
[2] E. Joselevich, ChemPhysChem **7**, 1405 (2006).
[3] K. S. Nagapriya *et al*, *in preparation.*

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Date submitted: 28 Nov 2007 Electronic form version 1.4