Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Oscillatory Behavior of a Double Wall Carbon Nanotube Near an Infinite Surface[1] ADRIAN POPESCU, LILIA WOODS, University of South Florida, IGOR BONDAREV, North Carolina Central University — Theoretical calculations of a double wall carbon nanotube oscillator with its axial direction perpendicular to an infinite surface are presented. The model for this work is based on the continuum approach of the pair-wise Lennard-Jones type of interaction in the double wall nanotube and between the nanotube and the surface. We investigate the oscillation frequency as a function of the distance between the nanotube and the surface, the length of the nanotube, and the magnitude of the initial extrusion. Our calculations show that the oscillatory behavior is in the GHz region and it can be changed significantly by these factors. Based on these results, we suggest that the carbon nanotube oscillator can be used as a scanning device for surfaces in a similar manner as an atomic force microscope tip.

[1]Supported by DOE (DE-FG02-06ER46297).

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Date submitted: 02 Dec 2007 Electronic form version 1.4