Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Van Der Waals Interaction between Two Parallel Radially Deformed Single Wall Carbon Nanotubes[1] ADRIAN POPESCU, LILIA WOODS, University of South Florida, IGOR BONDAREV, North Carolina Central University — The van der Waals potential energy is calculated between two parallel infinitely long radially deformed single walled carbon nanotubes within the pairwise Lennard-Jones approximation for extended systems. The nanotubes will undergo different geometrical radial shape transitions if an external hydrostatic pressure with an increasing strength is applied. We describe these shapes with analytically in order to facilitate the calculations. The most preferred mutual orientations are determined in all considered cases in terms of their potential well depths, equilibrium distances, and geometrical parameters. We find that the interaction evolves in such a way as to keep the distance between the interacting surfaces comparable to the graphene-graphene distance in graphite. In addition, the universal graphitic potential concept is extended to radially deformed carbon nanotubes. These results can be used as a guide for future experiments to investigate interactions between deformed carbon nanotubes.

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

Adrian Popescu
University of South Florida

Date submitted: 02 Dec 2007 Electronic form version 1.4