Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Aspect Ratio Dependant Buckling Mode Transition in Single-Walled Carbon Nanotubes under Compression[1] CHUN TANG, JEREMY FELICIANO, CHANGFENG CHEN, Department of Physics and Astronomy and High Pressure Science and Engineering Center, University of Nevada, Las Vegas, NV 89154 — We have conducted molecular dynamics simulations on compressing behaviors of single-walled carbon nanotubes (SWCNTs) with a large variaty of aspect ratios. It is found that SWCNTs with large aspect ratios experience column buckling behavior at low strain levels, in contrast to commonly observed shell buckling of short SWCNTs. Further compression leads to a transition to a shell buckling mode, which is distinct from those of short SWCNTs under compression. It originates from the column buckling induced bending loadings. We extract the scaling law with respect to the aspect ratio of SWCNTs based on an analytical model of bending buckling.

[1]Work supported by DOE Grant: DE-FC52-06NA26274.

Chun Tang
Department of Physics and Astronomy and High Pressure Science and Engineering Center, University of Nevada, Las Vegas, NV 89154

Date submitted: 18 Nov 2010 Electronic form version 1.4