Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Coherent phonon oscillations from micelle-suspended single-walled carbon nanotubes E. HAROZ, J. SHAVER, J. KONO, R. HAUGE, R. SMALLEY, Rice Univerisity-USA, Y.S. LIM, Rice University-USA, Konkuk University-Korea, K.J. LEE, J.H. KIM, Chungnam National University-Korea, S. DOORN, Los Alamos National Laboratory-USA — Time-domain oscillations were generated via degenerate pump- probe spectroscopy from individual single-walled carbon nanotubes (SWNTs) dispersed in aqueous media using ultrafast excitation pulses from a Ti:sapphire laser over the range of 710- 860 nm. Fast Fourier transform of such oscillations reveals the observation of coherent phonons (CP) corresponding to the radial breathing mode (RBMs) of 16 distinct (n,m) SWNTs. Comparison to Resonance Raman scattering (RRS) experiments indicates excellent agreement with observed RBMs, with significantly narrower linewidths seen for CP. Additionally, different RBM intensity behavior is observed within 2n+m families compared to RRS. Finally, we have directly observed two-peak maxima, separated by tens of meV, in the excitation profile for a given RBM. A possible origin of this two-peak structure is discussed. This technique represents a novel method for (n,m) characterization as well as electronic structure probing.

Jonah Shaver
Rice University-USA

Date submitted: 30 Nov 2005 Electronic form version 1.4