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Coupled Radial Breathing Modes in Double-Walled Carbon Nanotubes KAIHUI LIU, XIAOPING HONG, Phys. Dept., UC Berkeley, WENLONG WANG, Institute of Physics, CAS, China, ENGE WANG, Institute of Physics, CAS, and School of Phys., PKU, China, FENG WANG, Phys. Dept., UC Berkeley — Radial breathing modes (RBM) phonon vibrations of chirality-resolved, individual double-walled nanotubes (DWNT) were studied by combined electron diffraction and Raman scattering techniques. The chiral-indices of both the inner- and outer-wall nanotubes are determined directly by TEM diffraction. We found that the RBM phonons of each shell in DWNTs, compared to the isolated SWNTs with the same (n, m) , were modified by the intershell interactions. The RBM vibration frequency shift varies significantly with specific DWNT shell atomic structures. We will compare the results to a continuously model for two coupled nanomechanical oscillators.

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