

Abstract Submitted
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Far Infrared Optical Studies of Single and Double Walled Carbon Nanotubes SHIN GRACE CHOU, NIST, AHMED ZEESHAN, GEORGY SAMSONIDZE, JING KONG, MILDRED DRESSELHAUS, JEFFREY FAGAN, DAVID PLUSQUELLIC — Variable temperature far infrared absorption measurements were carried out for single walled and double walled carbon nanotubes samples (SWCNT and DWCNT) encased in a polymer matrix to investigate the effects of temperature and surface interaction on the low frequency phonons associated with the circumferential vibrations. At a temperature where kBT is significantly lower than the phonon energy, the broad absorption features as observed at room temperature become well resolved phonon transitions. For a DWCNT sample whose inner tubes have a similar diameter distribution as the SWCNT sample studied, a series of sharp features were observed at room temperature at similar positions as for the SWCNT samples studied. The narrow linewidth is attributed to the fact that the inner tubes are isolated from the polymer matrix and from the weak inter-tubule interactions. First principles calculations are carried out to understand the pertinent interactions and the temperature-dependent effects.

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