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Role of defects in optical phonon decay, softening and 1/f noise resonance in carbon nanotubes MOONSUB SHIM, University of Illinois — Scattering and relaxation of optical phonons are especially important processes in carbon nanotubes. Strong phonon softening near the Dirac point in metallic nanotubes occurs by coupling of carrier excitation to optical phonon transitions. Current saturation and negative differential conductance in the high bias regime in nanotube devices are attributed optical phonon absorption and emission. Cooling of hot carriers occurs mostly via optical phonons which eventually decay anharmonically into acoustic phonons. Whether intentional or unavoidable, defects will strongly influence these fundamentally important processes. In this talk, how defects affect optical phonon scattering will be discussed. In particular, defect-dependent optical phonon lifetime and resonant 1/f noise associated with phonon softening via the Kohn anomaly will be discussed.

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