Project Title

Student name, Student name, Student name

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Introduction and Objectives

•Single-Walled Carbon Nanotubes(SWCNTs) have been reported to support current densities of up to 109 A/cm2 [1]. Their small dimension and ability to operate at high temperature well above 2000K [2

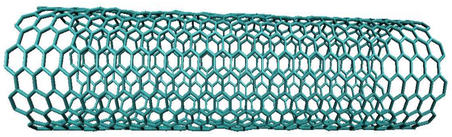
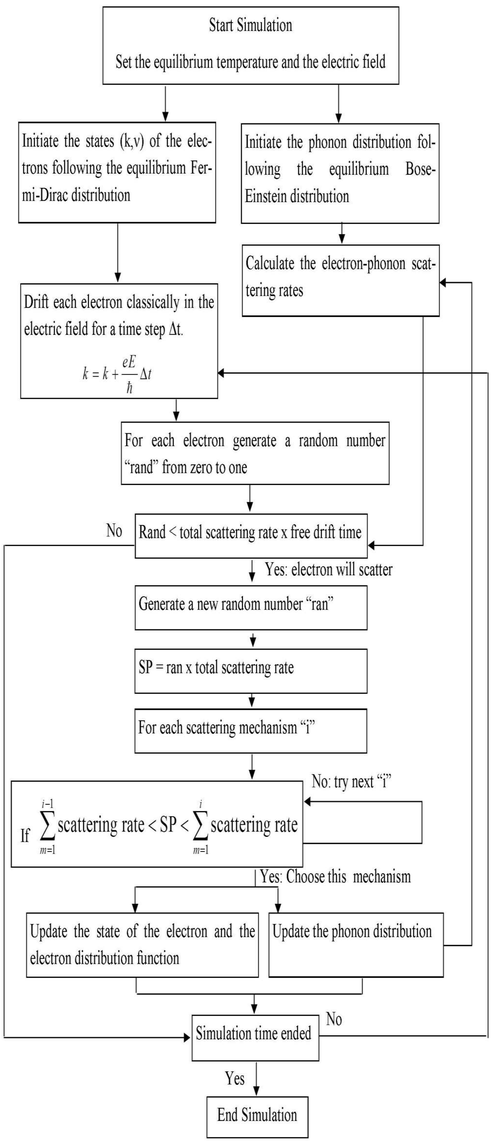


Figure 1 SWCNTS

Analysis and Design

In this study, the goal is to underline the hot phonon contribution to electron-phonon scattering rates in (10, 10) single-walled carbon nanotubes. inclusive way to calculate the scattering rates in carbon nanotubes.

Results and Outcomes



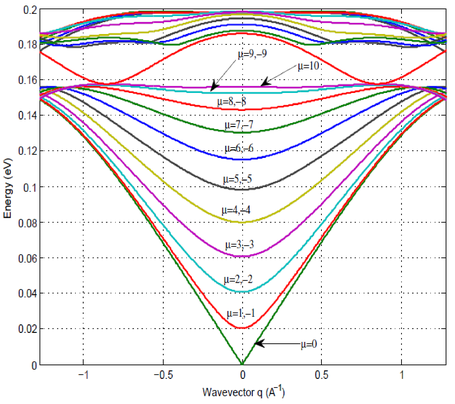


Figure 2 Energy dispersion relation of (10, 10)

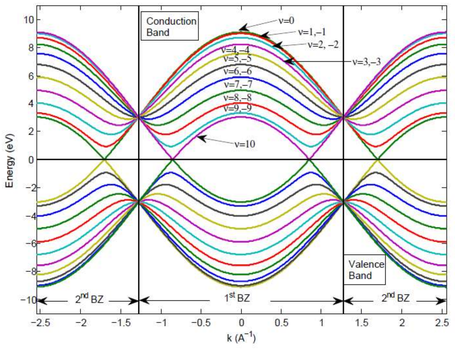


Figure 3 Phonon dispersion relation of (SWCNT for Longitudinal modes 10, 10)

Making use of the deformation potential approximation and Fermi's golden rule, the scattering rate S for Longitudinal Acoustic(LA) and Longitudinal Optical(LO) scattering mechanisms is given as [3]:

Summary and Recommendations

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References

[1] P. G. Collins et al., Physical Review Letters 86, 3128 (2001).

[2] W. Wei et al., Nano Lett 7, 64 (2007).