

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Electronic excitations and deexcitations in narrow-gap carbon nanotubes¹ C. W. CHIU, Y. H. HO, M. F. LIN, Department of Physics, National Cheng Kung University, F. L. SHYU, Department of Physics, Chinese Military Academy — Temperature could induce some free carriers in narrow-gap carbon nanotubes. Such carriers exhibit rich intraband single- particle excitations and collective excitations. Only the low- frequency e-h excitations are the effective de-excitation channels in the carrier decay. The Coulomb decay rates are dominated by the screened loss function and the carrier distribution function. They are very sensitive to the changes in nanotube radius and temperature, but not wave vector. Narrow- gap carbon nanotubes quite differ from moderate-gap and metallic carbon nanotubes in electronic excitations and carrier relaxation.

¹NSC 93-2112-M-006-002; NSC 93-2112-M-145-001

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Date submitted: 30 Nov 2005

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