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Optical studies of finite length effects in short DNA-wrapped carbon nanotubes SHIN GRACE CHOU, Chemistry, MIT, H. SON, EECS, MIT, EDUARDO BARROS, EECS/Physics, UFC, Brazil/MIT, GEORGII G. SAMSONIDZE, EECS, MIT, MING ZHENG, Experimental Station, Dupont Central Research and Development, RIICHIRO SAITO, Department of Physics, Tohoku University and CREST JST, Japan, GENE DRESSELHAUS, Francis Bitter Magnet Laboratory, MIT, MILDRED DRESSELHAUS, EECS/Physics, MIT — In this study, a systematic resonance Raman study was carried out on samples of DNA-wrapped SWNTs with average lengths between 50 and 100nm using multiple laser excitation energies. The different Raman features have been studied in detail as a function of nanotube length and laser excitation energies. The ratio of the D-band to G-band intensities has been found to increase with decreasing average SWNT length and decreasing laser excitation energy. As the nanotubes becomes much shorter than 1/4 wavelength of light, distinct finite length effects are also observed in overtone and intermediate frequency modes between 400 and 1500cm^{-1}. The MIT authors acknowledge supports under the Dupont-MIT Alliance, and NSF Grant DMR 04-05538.

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