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Electron temperature dependence of the electron-phonon coupling strength in double-wall carbon nanotubes[1] IOANNIS CHATZAKIS, University of Southern California — We apply Time-Resolved Two-Photon Photoemission spectroscopy to probe the electron-phonon (e-ph) coupling strength in double-wall carbon nanotubes. The e-ph energy transfer rate $G(T_e, T_l)$ from the electronic system to the lattice depends linearly on the electron (T_e) and lattice (T_l) temperatures for $T_e > \Theta_{Debye}$. Moreover, we numerically solved the Two-Temperature Model. We found: (i) a T_e decay with a 3.5 ps time constant and no significant change in T_l; (ii) an e-ph coupling factor of 2×10^{16} W/m^3; (iii) a mass-enhancement parameter, λ, of $(5.4 \pm 0.9) \times 10^{-4}$; and (iv) a decay time of the electron energy density to the lattice of 1.34×0.85 ps.

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