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Phonon thermal conductivities of single-walled carbon nanotubes and the graphene limit L. LINDSAY, D.A. BROIDO, Department of Physics, Boston College, N. MINGO, CEA-Grenoble — We employ a recently developed Boltzmann transport approach to calculate the intrinsic lattice thermal conductivity of a wide range of chiral and large-diameter single-walled carbon nanotubes. This approach uses a Tersoff empirical interatomic potential [1] and exploits symmetry based selection rules for anharmonic phonon-phonon scattering [2]. We also use this Boltzmann transport approach to calculate the thermal conductivity of graphene where we find an additional selection rule that strongly limits the anharmonic phonon-phonon scattering of out-of-plane modes. The phonon dispersion curves and thermal conductivities of successively larger diameter nanotubes approach that of two-dimensional graphene. [1] J. Tersoff, Phys. Rev. Lett. 61, 2879 1988 [2] L. Lindsay, D. A. Broido, and N. Mingo, Phys. Rev. B 80, 125407 (2009).

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