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Phonon thermal conductivities of multi-layered graphene LUCAS LINDSAY, Department of Physics, Computer Science, and Engineering, Christopher Newport University, Newport News, VA 23606, USA, DAVID BROIDO, Department of Physics, Boston College, Chestnut Hill, MA 02467, USA — Using an exact numerical solution of the phonon Boltzmann equation, we show that the intrinsic lattice thermal conductivities, κ, of N-layer graphene (N=1-5) are dominated by contributions from out-of-plane, flexural (ZA) phonon modes contrary to previous theories based on the relaxation time approximation, which assumed this contribution to be negligible [1, 2]. We find a reduction of κ with increasing N due to interlayer coupling, which: 1) lifts the degeneracy of the flexural acoustic mode frequencies, 2) makes the ZA phonon branch become linear near the zone-center, and 3) breaks a selection rule for anharmonic phonon-phonon scattering in two-dimensional systems.

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