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Thermal Conductivity of Single-Wall and Multi-Wall Carbon Nanotubes NIHAR PRADHAN, Physics Departmnet, WPI, MA, USA, HUANAN DUAN, JIANYU LIANG, Mechanical Engineering Department, WPI, MA, USA, GERMANO IANNACCHIONE, Physics Department, WPI, MA, USA — One-dimensional materials, such as nanotubes, and their composites attract interest due to their potential use in applications as well as model systems for understanding low-dimensional physics. There is a need for detailed measurements of the specific heat (c_p) and thermal conductivity (κ) in order to guide theoretical efforts. This talk presents c_p and κ using an ac-calorimetric technique for single-wall (SW) and multi-wall (MW) carbon nanotubes (CNT) in a composite sample+cell arrangement. From 300 to 400 K, c_p exhibits a linear behavior for both nanotubes. However, κ for MWCNT and SWCNT with the heat flow perpendicular to the nanotube long-axis is bulk-like in behavior until $\approx$ 370 K, thereafter decreasing with increasing temperature, indicating the onset of phonon-phonon scattering. For samples where the heat flow is parallel to the nanotube long-axis, κ for the MWCNT sample is consistent with ballistic phonon transport.

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