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QUANTUM TRANSPORT THEORY IN CARBON NANOSTRUCTURES

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It has been shown both experimentally and theoretically that carbon nanotubes and nanotube based structures show a great potential for use in future nanoscale devices. However, since carbon nanostructures are found in various morphologies and dimensionalities, it is particularly important to acquire a precise understanding of the process governing the electronic transport in all these novel systems. In this framework, we have investigated the electronic and quantum transport properties of a number of carbon nanotube based structures, including deformed, tapered (telescopic) and highly defective nanotubes, coalesced nanopeapods, as well as complex intramolecular networks comprised of up to four carbon nanotubes. In addition, we will discuss the critical role played by the metallic contacts in driving the characteristics of the electronic transport in these nanoscale materials.

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