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Theory of electronic transport properties in multiterminal carbon nanostructures

V. Meunier[1], J. Bernholc[1,2], M. Buongiorno Nardelli[1,2], J.-C.Charlier[3]

[1]Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831
[2]North Carolina State University, Raleigh, North Carolina 27695
[3] Université Catholique de Louvain, B-1348 Louvain-La-Neuve, Belgium

The electron transport properties of two-, three-, and four- terminal carbon-nanotube junctions are investigated within the Landauer theory of quantum conductance, using a realistic tight-binding Hamiltonian. We demonstrate that the experimentally observed rectifying behavior in multi-terminal junctions is not an intrinsic property of the junctions, but rather of the contact geometry. When semiconducting nanotubes are connected to metallic leads, non-transmitting states are induced at the nanotube-metal interface, leading to asymmetric transmission curves and potentially rectifying behavior of the nanodevice.

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