

Coherent transmission through a one dimensional lattice

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Abstract

Based on the Keldysh nonequilibrium Green function (NGF) technique, a general formula for the current and transmission coefficient through a one dimensional lattice is derived without the consideration of electron-electron interactions. We obtain an analytical condition for perfect resonant transmission when the levels of sites are aligned, which depends on the parity of the number of sites. Localization-delocalization transition in a generic one dimensional disordered lattice is also analyzed, depending on the correlation among the hopping parameters and the strength of the coupling to reservoirs. The dependence of the number and lineshape of resonant transmission and linear conductance peaks on the structure parameters of the lattice is also given in several site cases.