CORRELATIONS IN ELECTRONIC TRANSPORT THROUGH NANOSTRUCTURES

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In devices of a nanoscale two phenomena play crucial role in electronic transport: coherent transmission and electronic correlations. Some recent results of coherent transport in a presence of strong electron correlations are presented. In particular we are interested in many-body effects, as the Kondo resonance. As an example a system with two quantum dots connected in series is considered, for which all many-electron correlation functions are determined for an arbitrary number of electrons. The studies predict a new feature in transport resulting from transmission through a triplet state, which can be activated for larger source-drain voltages. An analysis of the spin-spin correlation function allows an insight into formation of the total spin and its influence on transport. The quantum interference effect is also seen in the conductance through the double quantum dot. For a large quantum dot one can expect a discrete set of pointer states, which make conditions for the Fano resonance. Our theoretical results for the conductance are in good agreement with experimental measurements on semi-open quantum dots.

9.7 cm

13.4 cm

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2. Magnetic Films, Surfaces, Multilayers and Nanostructures

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