Interplay between the correlations and superconductivity in electron transport through the quantum dots

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We explore influence of the electron correlations on nonequilibrium charge transport through the quantum dots coupled between the metallic and superconducting leads. Such nanodevices are on one hand characterized by an induced superconducting order (i.e. proximity effect) which is responsible for mixing the particle and hole excitations. On the other hand, strong repulsion between the opposite spin electrons prevents from a double occupancy of the quantum dot levels. Coulomb interactions can eventually cause a screening of the quantum dot spin leading to formation of the Kondo resonance or, in the case of multidot structures, trigger quantum interference manifested by the Fano resonances. We analyze interplay between these phenomena especially with regard to the effective transport through the quantum dots, focusing on the low energy regime dominated by the Andreev scattering processes.

9.7 cm

13.4 cm

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