DIODE EFFECT IN TRANSPORT THROUGH A QUANTUM DOT COUPLED TO NON-COLLINEARLY POLARIZED FERROMAGNETIC LEADS

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9.7 cm

Electron tunneling through a spin-split discrete level of an interacting quantum dot coupled to two ferromagnetic electrodes with non-collinear magnetizations is investigated theoretically by means of the nonequilibrium Green-function approach. It is shown that the spin splitting of the dot level leads to a number of new effects. Asymmetry in the tunnel magnetoresistance (TMR) with respect to the bias reversal and non-monotonous angular variation of the spin-polarized current are found for symmetrical tunnel junctions. Numerical results also show that negative differential conductance and diode effect may occur in symmetrical junctions with non-collinear magnetizations and for large enough magnetic polarization of the leads. It is also found that in asymmetrical junctions with one electrode being half-metallic, the spin splitting gives rise to an enhancement of the diode-like behavior. The latter feature is accompanied by a splitting of the TMR peak in the bias range for which the sequential tunneling is exponentially suppressed.

13.4 cm

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