Spin and orbital Kondo effect in electrostatically coupled quantum dots

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The coherent spin dependent transport through a set of two capacitively coupled quantum dots (DQD) is considered within the equation of motion method in the limit of infinite coulomb interactions. The Kondo effect in DQD has two possible sources: the spin and the "orbital" degeneracies [1]. For the vanishing magnetic field and equal site energies of the dots, currents flowing through each of the four channels are equal and the linear conductance reaches the unitary limit at zero temperature. For finite field, apart from the Kondo peak, also the many-body satellite peaks are found in the densities of states in the positions determined by the field. We analyze the linear conductance for the general case of different site energies and nonvanishing magnetic field. For special values of the field and site energies the degeneracy can be restored what results in the occurrence of the Kondo effect. For the case, when the dots are specified by different g- factors or if they are placed in different magnetic fields the Kondo effect can be used for spin filtering.

[1] T. Pohjola, H. Schoeller, G. Schon, Europhys. Lett. **54** (2001) 241.

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