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Spin-polarized conductance in double quantum dots with ferromagnetic contacts[1] IRENEUSZ WEYMANN, KRZYSZTOF WOJCIK, Adam Mickiewicz University, Faculty of Physics — We study the transport properties of double quantum dots in T-shape geometry strongly coupled to external ferromagnetic contacts. The analysis is performed with the aid of the numerical renormalization group method, which allows us to study the behavior of respective spectral functions and the linear conductance through the system in the full parameter space of the model. The considered device enables a unique possibility to explore the interplay of the Fano and Kondo effects with ferromagnetic-contact induced exchange field. We show that the presence of gate-tunable exchange field leads to strong dependence of the spin polarization of conductance on the position of the dot levels. By tuning the level of the decoupled dot, the conductance may become fully spin polarized. Moreover, when changing the dot level positions, one can also tune the sign of the spin polarization. The increased spin polarization of the conductance is a consequence of a subtle interplay between the interference effects, the Kondo effect and the exchange field. Double quantum dots with ferromagnetic contacts can be thus considered as efficient spin current sources, where the degree of spin polarization can be tuned by purely electrical means, without the necessity to apply external magnetic field.

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