Kondo effect in double quantum dots with magnetic field-tuned coupling

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We study the variation with magnetic field of the Kondo effect in a double quantum dot system which is coupled via an open conducting region. The transport measurements [1] indicate a competiton between Kondo singlet formation and magnetic alignment via the Ruderman-Kittel-Kasuya-Yosida (RKKY) interaction. This competition has been in the focus of interest in heavy electron systems during the past decade. Tuning the coupling by a magnetic field provides insight into the relative importance of the different interactions (excluded volume, RKKY, etc) between Kondo impurities. Novel features originate from the chirality of the coupling in finite magnetic fields. Theoretically we model the double quantum dot system by two Anderson impurities. The latter are both coupled to individual fermionic baths representing the leads as well as to a central fermionic reservoir representing the common source. We calculate equilibrium and transport properties of this model using a variational ansatz for the ground state and discuss the validity of simplified effective coupling models.

[1]Daniel Tutuc et al., arXiv:1010.5692