The Kondo box in the presence of exchange interaction

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We study the problem of a quantum dot with finite level spacing which is coupled antiferromagnetically to a Kondo spin (“Kondo box”). In particular, we investigate the influence of a ferromagnetic exchange interaction among the dot electrons and the effect of an applied Zeeman field. This problem is addressed with the help of a numerical algorithm that allows for an exact diagonalization of the Hamiltonian in a good total spin basis [1] of the dot plus the Kondo spin. We discuss how the competition between the ferromagnetic exchange and the antiferromagnetic Kondo interaction affects the ground-state spin of the system.


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