Kondo effect in a quantum dot doped with a $Mn^{2+}$ ion

EDSON VERNEK, Universidade Federal de Uberlandia - Brazil, FANYAO QU, Universidade de Brasilia - Brazil, FABRICIO F.M. SOUZA, ENRIQUE V. ANDA, Pontificia Universidade Catolica do Rio de Janeiro, J. CARLOS EGUES, Instituto de Física de São Carlos, Universidade de São Paulo - Brazil — We present a study of a quantum dot (QD) with a single $Mn^{2+}$ ion implanted and coupled to normal metallic leads [1]. As a result of the coupling to the leads, single QD is known to exhibit the well known Kondo effect, which emerges at temperatures below the so called Kondo temperature ($T_K$). In the present work we investigate the interplay between the Kondo effect and the ferromagnetic (FM) coupling ($J$) between a spin of the electrons in the QD and the spin of the Mn ion. We show that depending of the ratio $J/T_K$ the ground state of the system is a local FM (non-Kondo) state or a Kondo state of the QD, in which case the $Mn^{2+}$ decouples from the rest of the system.