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Kondo effect in a quantum dot via orbital population switching¹

HYUN-WOO LEE, Pohang University of Science and Technology, SEJOONG KIM, Massachusetts Institute of Technology — Strong correlation effects in electron transport through a spinless quantum dot are considered. For general tunneling matrix elements between the quantum dot and leads, there exists a conserved pseudospin degree of freedom when two orbitals in the quantum dot are degenerate. The fluctuations of the pseudospin at the quantum dot give rise to the Kondo effect described by the anisotropic s - d model. Interestingly the Kondo effect generates a pair of asymmetric conductance peaks near the center of a Coulomb valley, in clear contrast to the conductance behavior due to the spin Kondo effect. This explains the origin of the so-called correlation-induced resonances reported recently [V. Meden and F. Marquardt, Phys. Rev. Lett. 96, 146801 (2006)]. An exact relation to the phenomenon of the population switching is provided and differences from the conventional Kondo effects are clarified.

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