

Nonequilibrium transport theory of the singlet-triplet transition: Perturbative approach

Wed, 2010-10-06 11:02 - [Ingo Kamleitner](#) [1] **Date:** 2010-10-28

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Reference:

Phys. Rev. B 82, 165129 (2010)

URL:

<http://link.aps.org/doi/10.1103/PhysRevB.82.165129> [2]

We use a simple iterative perturbation theory to study the singlet-triplet (ST) transition in lateral and vertical quantum dots, modeled by the nonequilibrium two-level Anderson model. To a great surprise, the region of stable perturbation theory extends to relatively strong interactions, and this simple approach is able to reproduce all experimentally observed features of the ST transition, including the formation of a dip in the differential conductance of a lateral dot indicative of the two-stage Kondo effect, or the maximum in the linear conductance around the transition point. Choosing the right starting point to the perturbation theory is, however, crucial to obtain reliable and meaningful results.

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