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Anomalous Kondo transport in a single-electron transistor driven by microwave field ZHAN CAO, CHENG CHEN, FU-ZHOU CHEN, HONG-GANG LUO, School of Physical Science and Technology, Lanzhou University, Lanzhou 730000, China — The Kondo transport in a single-electron transistor continues to provide unexpected physics due to the interplay between magnetic field and microwave applied, as shown in a recent experiment(B. Hemingway et al., arXiv:1304.0037). For a given microwave frequency, the Kondo differential conductance shows an anomalous magnetic field dependence, and a very sharp peak is observed for certain field applied. Additionally, the microwave frequency is found to be larger of about one order than the corresponding Zeeman energy. These two features are not understood in the current theory. Here we propose a phenomenological mechanism to explain these observations. When both magnetic field and microwave are applied in the SET, if the frequency matches the (renormalized) Zeeman energy, it is assumed that the microwave is able to induce spin-ip in the single-electron transistor, which leads to two consequences. One is the dot level shifts down and the other is the renormalization of the Zeeman energy. This picture can not only explain qualitatively the main findings in the experiment but also further stimulate the related experimental study of the Kondo transport. Additional microwave modulation may provide a novel way to explore the functional of the SET in nanotechnology and quantum information processing.

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