Physikalisches Kolloquium

Universität Konstanz

Di 24.01.17
15:15 Uhr
14:45 Uhr, Kaffee/Tee
R 513

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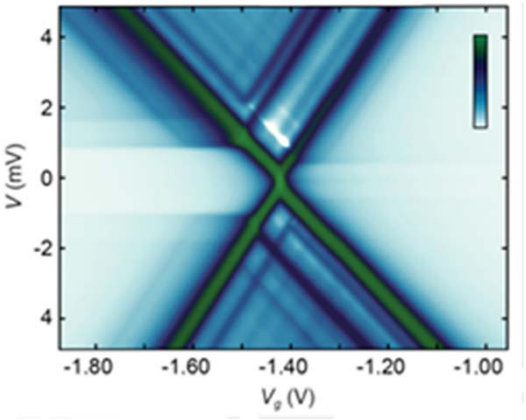
Transport characteristics of individual magnetic molecules



We have developed several techniques to fabricate three-terminal single-molecule devices [1], such as gated mechanical controlled break junctions, junctions made with a self-breaking electromigration technique and room-temperature stable molecular transistors formed by electroburning single or few-layer graphene. Spin properties are of special interest and we study a wide variety of magnetic molecules including radicals, bi-and tri-radicals, single-molecule magnets and spin-crossover compounds. In this talk I will discuss how an electric field by introducing dipoles on the molecule or mechanical stretching can be used to trigger the low-spin to high-spin transition in spin-crossover compounds [2]. All-organic radicals are studied as model systems for spin-1/2 (Kondo) physics and spin-spin interactions [3]. Recent developments include the use of superconducting electrodes to study Shiba states in molecules [4] and the demonstration of detailed spectroscopy studies including non-equilibrium, co-tunnelling assisted single-electron tunnelling [5].

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1. M.L. Perrin, E. Burzurí and H.S.J. van der Zant, Chem. Soc. Rev. 44 (2015) 902-919.
2. G.D. Harzmann et al., Angewandte Chemie International Edition 54 (2015) 13425-13430; R. Frisenda et al., Nano Letters 16 (2016) 4733-4737.
3. R. Frisenda et al., Nano Letters 15 (2015) 3109-3114; R. Gaudenzi et al., Nano Letters 16 (2016) 2066-2071.
4. J.O. Island et al., Proximity-induced Shiba states in a molecular junction, arXiv:1609.08316.
5. R. Gaudenzi et al., Transport mirages in single-molecule devices, arXiv:1611.01481.