

MA 22: Invited Talk Schoeller

Time: Wednesday 14:00–14:30

Location: HSZ 04

Invited Talk MA 22.1 Wed 14:00 HSZ 04
Quantum Transport through Single Molecular Magnets —
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Quantum transport through single molecular magnets (SMM) is starting to become a new exciting field in molecular spintronics. Experiments have shown that magnetic excitations can be identified in transport measurements. Several theoretical suggestions are presented how to identify magnetic anisotropy, the spin excitations, and quantum tunneling of magnetization (QTM) in transport through SMM. NDC effects, complete current suppression, and unexpected resonance lines

are discussed for weak coupling to the leads. For strong coupling, it is shown that a pseudo spin-1/2 Kondo effect is induced by QTM, either from ground-state degeneracy in half-integer spin molecules or by Berry-phase induced degeneracies due to transverse magnetic fields. Estimations of the Kondo temperature are provided and selection rules depending on spin and symmetry of the SMM are derived for the Kondo effect to occur. The effect of longitudinal and transverse magnetic fields is shown together with the effect of spin-polarized leads. It is shown that SMMs give rise to new spin-valve effects which depend on the relative as well as the absolute orientations of the electrode polarizations due to the presence of the SMM magnetic easy axis. This additional degree of external control allows complex non-equilibrium spin states to be realized and identified in single-molecule transistors.