SFB/TRR 21 - Colloquium

17. December 2010, Tübingen

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Molecular Nanomagnets: A Challenge for Quantum Many-body Physics in Mesoscopic Spin Systems

The molecular nanomagnets establish a new class of magnetic materials providing a fascinating view on the magnetism of small, nanosized objects. These molecules typically consist of tens of magnetic metal ions, which are linked by organic ligands, such as to form well defined geometrical structures. The magnetic exchange couplings between the metal ions within a molecule are frequently of antiferromagnetic nature, which gives rises to a competition between the quantum correlations injected by the antiferromagnetic paths and the constraints due to the topology of the lattice of metal ions. Spin frustration is a prominent example, but other complex many-body wave functions can emerge, yielding unprecedented magnetic behavior. In this talk the molecular nanomagnets will be regarded from the perspective of many-body physics in ßmall"quantum systems. Several examples of our work will be presented, which shall demonstrate the challenges in understanding the structure of the emerging many-body wave functions and their associate quantum magnetism in small spin systems.

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