SFB 608

Einladung zum Kolloquium

Ort: Universität zu Köln
II. Physikalisches Institut
Seminarraum 201

Zeit: Mittwoch, den 22. Mai 2002, 15 Uhr c.t.

Sprecher: Dr. G. Khaliullin Max-Planck-Institut FKF, Stuttgart

Thema: Quantum behaviour of orbitals in titanates and vanadates

We discuss a collective behaviour of orbital angular momentum in Mott insulators with t_{2g} orbital degeneracy. The frustrated nature of the super exchange interactions leads to an infinite degeneracy of classical states. Quantum effects select a particular orbital state depending on spin configuration:

i) In spin one-half antiferromagnetic $LaTiO_3$, orbitals remain quantum disordered down to low temperature
ii) In ferromagnetic $YTiO_3$, a weak orbital order is stabilized by order-from-disorder mechanism;
iii) In large spin (e.g. S=1) systems like cubic vanadates orbitals may form fluctuating quasi one-dimensional structures.

Experimental consequences of orbital fluctuations will be discussed, which might help to identify orbital states, and to detect elementary orbital excitations.

gez. Kataev