



TRR 80 Seminar

Am Dienstag, den 20. Januar um 16:00 Uhr

spricht

Dr. Dirk Fuchs

Institute for Solid State Physics, Karlsruhe Institute of Technology

über das Thema

Spin states and magnetic exchange in epitaxially strained cobaltate thin films

Cobaltates have recently received intense interest, both experimentally and theoretically. A large number of interactions in this mixed-valent family of compounds (like Hund's coupling, double exchange, correlation, and crystal field) competes on a similar energy scale and leads to a rich landscape of mutually competing phases, many with unusual macroscopic properties. In this respect, cobaltates are somewhat similar to manganites and also cuprates but do show their own unique flavor – like the fact that usually different spin states are possible in undoped LaCoO_3 and raising questions of the relevance of the double-exchange mechanism in hole-doped cobaltates. Despite the nonmagnetic low spin ($S = 0$) ground state of LaCoO_3 there have been many reports on either long- or short range ferromagnetic order. In the light of such highly conflicting results it is a challenging problem to identify the origin of ferromagnetism in LaCoO_3 . In contrast to polycrystalline LaCoO_3 films which did not show ferromagnetism down to $T \approx 5$ K, epitaxial films showed clear ferromagnetic order at $T_c \approx 85$ K. We show that tensile strain plausibly causes a decrease of the crystal-field-splitting favoring an occupation of higher spin states and a ferromagnetic exchange via t_{2g} -derived states. We likewise investigated the magnetic exchange in hole-doped $\text{La}_{0.7}\text{Sr}_{0.3}\text{CoO}_3$ films by studying the magnetic and electronic properties as a function of epitaxial strain. A strong-coupling double exchange between Co^{3+} and Co^{4+} high spin states via t_{2g} orbitals is found to be the driving force for the magnetism. This is in strong contrast to the situation for the manganites.

Gäste sind herzlich willkommen!

Der Vortrag findet im Seminarraum S-288 / Institut für Physik, Universität Augsburg statt.

Gastgeber: Prof. Dr. Thilo Kopp
www.trr80.de