TRR 80 Seminar

Am Dienstag, den 7. Juni um 16:00 Uhr

spricht

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über das Thema

Spin polaronic states in lightly doped $LaCoO_3$

A unique aspect of cobalt oxides is the occurrence of different (low, intermediate, high) spin states of Co3+ and Co4+ ions. The richness of the spin states combined with orbital and charge degrees of freedoms yields extremely complex and fascinating physics of these materials. A prominent example is LaCoO3 which is nonmagnetic at low temperatures and shows a temperature activated magnetism due to a change of the Co3+ spin state. Surprisingly, a very small hole doping (< 0.5 %) via Sr2+ or Ca2+ substitution for La3+ yields a strong magnetization already at low temperatures amounting to a very high value of ~ 15μ_B per one hole. To uncover the nature of this unexpected effect we have investigated samples of LaCoO3 lightly doped with Sr, Ca or Y by means of high-field frequency-tunable electron spin resonance spectroscopy (HF-ESR). In case of the Sr2+ or Ca2+ substitution the low temperature HF-ESR experiments reveal multiple resonance excitations suggesting the occurrence of extended clusters (spin polarons) with a high spin value and a substantial orbital contribution to the magnetism. We have found out that the crucial role in the formation of the spin polaron is played by the introduced hole.
In this talk the principles and realization of HF-ESR spectroscopy will be shortly introduced, followed with the presentation and discussion of the ESR data and supporting nuclear magnetic resonance and inelastic neutron scattering measurements. Finally a qualitative model of the formation of spin polarons in LaCoO3 will be discussed.

Gäste sind herzlich willkommen!
Der Vortrag findet im Seminarraum S-288/ Physikgebäude Süd, Universität Augsburg statt.

Gastgeber: PD Dr. Hans-Albrecht Krug von Nidda

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