

SFB 608

Einladung zum Kolloquium

- Ort:** Universität zu Köln
II. Physikalisches Institut, Seminarraum 201
- Zeit:** 14. Februar 2007, 14:30 Uhr
- Sprecher:** F. Rodriguez,
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- Thema:** Interplay between Jahn-Teller effect and spin states in Mn^{3+} , Ni^{3+} and Co^{3+} systems under pressure.

This contribution deals with structural correlation studies in Jahn-Teller (JT) systems of Mn^{3+} , Ni^{3+} and Co^{3+} in connection with the spin state in perovskites AMX_3 and BMX_4 (M: Mn, Ni, Co; X: F, O). We aim to explore the influence of the JT distortion on the materials structure and related properties as well as its variation with pressure. The emphasis is paid on the influence of the JT effect on the stabilization of the ground-state spin in both pure and doped materials containing Mn^{3+} , Ni^{3+} and Co^{3+} . Based on appropriate crystal-field models, we analyze how the JT effect favors high-spin (HS), low-spin (LS) or intermediate-spin (IS) configuration.

Several pressure studies carried out in layered perovskites AMnF_4 will be presented, aiming to elucidate whether pressure reduces the JT distortion or induces octahedron tilts, and how this structural behavior affects the spin state. The results will be compared to structural studies carried out in A_2CuCl_4 . This knowledge is important to understand and eventually predict magnetic, electrical and optical properties and in particular HS-LS phenomena. Besides we show that high-pressure spectroscopy is a suitable technique to establish correlations between the optical spectra and the local structure around the JT ion. In addition, it also provides information on the electron-ion coupling, the JT energy and tilting phenomena.

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Gez. Prof. M. Abd-Elmeguid