

SFB 608

Einladung zum Kolloquium

- Ort:** Universität zu Köln
II. Physikalisches Institut, Seminarraum 201
- Zeit:** Mittwoch, 26.01.05, 15 Uhr c.t.
- Sprecher:** Dr. Dimitri N. Argyriou, HMI
- Thema:** Magnetism and Ferroelectricity in the Manganite TbMnO_3 .

The prototypical manganite LaMnO_3 exhibits orbital ordering at high temperatures (700K) and spin ordering at $T_N=150\text{K}$ of the A-type. It has recently been found that for undoped manganite perovskites where the A site cation is small enough, type-A antiferromagnetism is suppressed to lower temperatures and eventually replaced by an incommensurate magnetic structure at $T_N\sim 45\text{K}$. For $A=\text{Tb}$ or Dy the lock in of the incommensurate magnetic propagation vector coincides with a peak in the dielectric constant indicating the onset of ferroelectricity. The application of magnetic field below T_{lock} has shown that the polarization can be switched from $P//c$ to $P//a$ with $H>10\text{T}$. We have recently performed single crystal neutron and X-ray diffraction experiments and have found that the magnetic structure of TbMnO_3 to be very complex and best described within the soliton model of Paar and Bak. Indeed we find that the high field phase of TbMnO_3 corresponds to a $q=1/4$ structure as predicted by Paar and Bak. Associated with the incommensurate magnetic structure and the higher field transitions, we also find evidence for a structural modulation associated with the ferroelectric transitions and the ferroelectric flop transition with field. We present a structural and magnetic model of the high field phases on the basis of our measurements.

Gez. Prof. M. Braden