TRR 80 Sonderseminar

Am Dienstag, den 23. September um 13:00 Uhr

spricht

Prof. Dr. Clemens Ulrich

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über das Thema

Multiferroic $TbMn^{16/18}O_3$, RMn_2O_5 (R = Y, Tb, Ho) single crystals and $BiFeO_3$ thin films investigated by Raman light scattering and neutron scattering

Multiferroic materials demonstrate excellent potential for next-generation multifunctional devices, as they exhibit coexisting ferroelectric and magnetic orders. At present, the underlying physics of the magnetoelectric coupling is not fully understood, and competing theories exist with partly conflicting predictions. Therefore, we have investigated isotopically substituted $TbMn^{16/18}O_3$ and RMn_2O_5 (R = magnetic Tb, Ho and non-magnetic Y) by Raman light scattering and neutron diffraction to elucidate the spin-phonon coupling and crystallographic as well as magnetic phase diagrams in order to shine light on the multiferroic coupling mechanism in both compounds.
Depth-sensitive magnetic, structural, and chemical characterization is important in the understanding and optimization of novel physical phenomena emerging at interfaces of transition metal oxide heterostructures. In a simultaneous approach we have used polarized neutron and element specific resonant X-ray reflectometry to determine the magnetic depth profile across atomically sharp inter faces of ferromagnetic $La_{0.67}Sr_{0.33}MnO_3$ / multiferroic $BiFeO_3$ bi-layers with sub-nanometer resolution [1]. Our measurements indicate a magnetically diluted interface layer within the $La_{0.67}Sr_{0.33}MnO_3$, in contrast to previous observations on inversely deposited layers [2]. Additional resonant X-ray reflection measurements indicate a region of an altered Mn- and O-content at the interface, with a thickness matching that of the magnetic diluted layer, as origin of the reduction of the magnetic moment. Therefore, our result underlines the importance of the precise knowledge of the chemical composition, i.e. the concentration of oxygen vacancies, at the interface.

[1] J. Bertinshaw *et al.*, Phys. Rev. B. **90**, 041113(R) (2014).
[2] P. Yu *et al.*, Phys. Rev. Lett. **105**, 027201 (2010).

Gäste sind herzlich willkommen.
Der Vortrag findet im Seminarraum R-242 / Institut für Physik, Universität Augsburg statt.

Gastgeber: Prof. Dr. Joachim Deisenhofer
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