TECHNISCHE FAKULTÄT DER
CHRISTIAN-ALBRECHTS-UNIVERSITÄT
ZU KIEL

Christian-Albrechts-Universität zu Kiel

Kolloquium der TF am 06.01.2014

Sehr geehrte Damen und Herren,

wir laden Sie herzlich zum Kolloquium der TF am **06.01.2014 um 17:15 Uhr** ein. Auf Einladung von *Herrn Prof. Dr. E. Quandt* hält

Herr Prof. Dr. Jens Kreisel
Scientific Director, Depart. Science & Analysis of Materials
Centre de Recherche Public Gabriel Lippmann
Luxembourg

einen Vortrag mit dem Titel:

"Intriguing phases and phase transitions in Bi-based ABO3-type multiferroics"

The understanding of transition-metal ABO3 perovskite-type oxides remains one of the most challenging topics at the interface between solid state physics and solid state chemistry. Perovskites display a large variety of structural and physical properties, which can be tuned by chemical composition, or external parameters such as temperature, pressure, strain, electric or magnetic fields. Much of the current interest in perovskites focuses on so-called multiferroics, which possess several ferroic properties such as ferromagnetism, ferroelectricity, and/or ferroelasticity. The interaction of coexisting structural instabilities in multiferroic materials gives rise to intriguing coupling phenomena and extraordinarily rich phase diagrams, both in bulk materials and strained thin films.
After a short presentation of perovskites and their structural instabilities, we will introduce the family of bismuth-based BiMO3 perovskites which display a remarkable diversity of structures namely related to their 6s2 'lone pair' electrons1, 2. We will then discuss in more detail our recent results on the model multiferroics BiFeO3 3-5 and BiMnO3 6 which stand out for their multiple and intriguing interacting mechanisms: electric polarity, octahedra rotations, magnetism and cooperative Jahn-Teller distortion.
For the investigation and tuning of the different instabilities, we have chosen the external parameter pressure, which allows modifying the interatomic distances and, thus the interactions, to a much larger extent than any other parameter. Our complementary use of Raman scattering and synchrotron X-ray diffraction (XRD) has led to four main observations: (i) a succession of multiple phase transitions/instabilities with intriguingly large unit cells, (ii) the reduction of the Jahn-Teller distortion through a different process than the model system LaMnO3, (iii) a high-pressure phase with an unprecedented giant distortion and polarity for a perovskite under high-pressure and (iv) an insulator-to-metal (IM) phase transition at very high-pressure.

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5 S. Gomez-Salces, F. Aguado, F. Rodriguez, R. Valiente, J. Gonzales, R. Haumont, J. Kreisel, Phys. Rev. B 85, 144109 (2012).
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Veranstaltungsort ist wie immer der Vortragsraum der Technischen Fakultät („Aquarium") im Gebäude D, Kaiserstraße 2, 24143 Kiel. Wir erwarten eine interessante Veranstaltung und freuen uns über Ihr Erscheinen.

Mit freundlichen Grüßen
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