



# Seminarankündigung

**Dienstag, 13. Januar 2015  
15:00 Uhr**

**WSI, Seminarraum S 101**

## **“X-ray standing wave excited photoelectron spectroscopy of transition metal oxides”**

Transition metal oxides (TMOs) with perovskite structure exhibit a rich variety of phases such as colossal magneto resistant, multi-ferroic and superconducting. Their electronic characteristics are largely determined by the narrow band of highly correlated *d*-electrons of the transition metal. The different possible oxidation states of the metal ion give rise to defect structures accompanied by complex electronic properties. Lately, in particular TMO interfaces attract considerable attention following the discovery of a two dimensional sheet of high mobility carriers at the interface between a few units cells of the wide band gap insulators  $\text{LaAlO}_3$  and the band insulator  $\text{SrTiO}_3$  (STO).

Hard X-ray photoelectron spectroscopy (HAXPES), using third generation synchrotron sources, is a powerful means of investigating the chemistry and electronic properties of TMO materials and their interfaces. Using an X-ray standing Wave instead of a transient X-ray wave allows PES studies with structural resolution. I will report what is learnt in this way (a) about the valence band of STO and the 90 K superconductor  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  (b) about how this orthorhombic material with 13 atoms in the unit cell starts to grow on the ternary cubic oxide STO (c) about structural distortions in epitaxial LAO on STO, likely reducing the polar electric field in the LAO, which is thought to be responsible for the 2D electron gas and (d) about the 2D electron gas at the STO/LAO interface.

**Dr. Jörg Zegenhagen  
Diamond Light Source Ltd  
Harwell Science and Innovation Campus  
Oxfordshire, United Kingdom**