

# EINLADUNG

zum Vortrag  
von

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**Surface Science of Oxide Semiconductors**

am

**Dienstag, 12. Juni 2012, um 16:00**

Technische Universität Wien, Institut für Angewandte Physik  
Seminarraum 134A, Turm B (gelbe Leitfarbe), 5. OG  
1040 Wien, Wiedner Hauptstraße 8-10

## Abstract:

Oxide semiconductors have become of great interest lately with enormous opportunities for new uses that will potentially improve existing materials and device applications. The fact that some of these materials, such as indium tin oxide (ITO), have been around for some time and, in a relatively low quality form, have seen significant industrial use as transparent conductors, has perhaps contributed to the belated recognition of the possibilities as semiconductors in their own right. Here, the surface and bulk electronic properties of epitaxially grown high-quality oxide semiconductors ( $\text{In}_2\text{O}_3$ ,  $\text{CdO}$ , and  $\text{ZnO}$ ) will be discussed and the effects of modifying these surfaces by adsorption and surface treatment. Optical, electronic and structural properties of these semiconducting oxide films will be presented.

The valence band density of states and the surface electronic properties of these oxide semiconductors have been studied using high-resolution angle-resolved photoemission spectroscopy (ARPES) and compared with theoretical band structure calculations. A common property of these oxide semiconductors is found to be the presence of a surface electron accumulation layer, in marked contrast to the electron depletion generally observed at the surfaces of conventional semiconductor materials. Additionally, hydrogen is found to be a donor and any native defects have a propensity to be donors in already *n*-type material. The origins of this phenomenon will be discussed in terms of the band structure and intrinsic properties of these materials.

### FWF SFB F45 „Functional Oxide Surfaces and Interfaces (FOXSI)“

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