

# TGO 2014

BuildMoNa Module 2014-T04  
From Molecules to Materials

## Transparent Conductive Oxides – Fundamentals and Applications

Monday, 29 September to Thursday, 2 October 2014  
Universität Leipzig, 04103 Leipzig, Linnéstr. 5,  
Lecture Hall for Theoretical Physics

### Agenda

#### Monday, 29 September 2014

- 13:30 Prof. Dr. Marius Grundmann  
Universität Leipzig  
*Opening*
- 14:00 Prof. Dr. Christian Elsässer\*  
Fraunhofer IWM, Freiburg, Germany  
*Electronic-structure theory of amorphous transparent (semi-)conducting oxides*
- 14:45 Jörg Haeberle  
Brandenburgische TU Cottbus, Germany  
*The electronic structure of amorphous SnO<sub>x</sub> and SnO<sub>2</sub> single crystals*
- 15:00 Prof. Dr. Friedhelm Bechstedt\*  
Friedrich-Schiller-Universität Jena, Germany  
*Transparent conducting oxides: Electronic states and band line-ups from first principles*
- 15:30 *Coffee break (Aula)*
- 16:00 Dr. Keith T. Butler\*  
University of Bath, UK  
*Beyond the bulk: Modelling surfaces and interfaces of transparent conducting oxides*

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\* invited talk



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- 16:45 Prof. Dr. Werner Mader  
-- Universität Bonn, Germany  
17:15 *Layered oxide compounds as transparent electronics*  
  
19:00 Welcome reception and Dinner (Ratskeller)

**Tuesday, 30 September 2014**

- 9:00 Prof. Dr. Axel Hoffmann\*  
TU Berlin, Germany  
*Optical Properties in transparent conductive semiconductors*
- 9:45 Patrick Vogt  
Paul-Drude-Institut Berlin, Germany  
*Epitaxial relation and growth-kinetics study of  $In_2O_3$  and  $\beta-Ga_2O_3$  ( $\bar{2}01$ ) on rhombohedral  $Al_2O_3$  (0001)*
- 10:15 Prof. Dr. Michael Lorenz  
Universität Leipzig, Germany  
*Performance and limitations of pulsed laser deposition of transparent conducting thin films*
- 10:45 *Coffee break (Aula)*
- 11:15 Dr. Zbigniew Galazka\*  
Institut für Kristallzüchtung, Berlin, Germany  
*Czochralski growth, characterization and properties of  $\beta-Ga_2O_3$  single crystals*
- 12:00 Dr. Heiko Frenzel  
Universität Leipzig, Germany  
*Long-throw magnetron sputtering of amorphous Zn-Sn-O thin films*
- 12:15 Dr. Günter Wagner  
Institut für Kristallzüchtung Berlin, Germany  
 *$Ga_2O_3$  and  $(Ga_{1-x}In_x)_2O_3$  layers on  $\beta-Ga_2O_3(100)$  grown by metal organic vapor phase epitaxy*
- 12:45 *Lunch (Aula)*
- 14:15 Dr. Stephan Lany\*  
NREL, USA  
*Computational design of wide gap materials*
- 15:00 Nicole Karpensky  
Helmholtz-Zentrum Berlin, Germany  
*Optical investigation of localized defects in zinc oxide*



- 15:15 Christian Kranert  
Universität Leipzig, Germany  
*Phonon modes and structural properties of  $(\text{In,Ga})_2\text{O}_3$  thin films*
- 15:30 *Coffee break (Aula)*
- 16:00 Prof. Leonard J. Brillson\*  
Ohio State University, USA  
*Native point defect energies, densities, and electrostatic repulsion across MgZnO alloys*
- 16:45 PD Dr. Eduard V. Lavrov\*  
TU Dresden, Germany  
*Hydrogen in ZnO and rutile  $\text{TiO}_2$*
- 17:15 Dr. Marc A. Gluba  
Helmholtz-Zentrum Berlin, Germany  
*Self-diffusion on polar and non-polar zinc oxide surfaces*
- 17:45 Group photo shooting (in front of main building)
- 18:00 Poster Session (TA307)

**Wednesday, 1 October 2014**

- 9:30 Prof. Dr. John F. Wager\*  
Oregon State University, USA  
*Flat-panel display backplanes: LTPS or IGZO for AMLCDs or AMOLEDs?*
- 10:15 *Coffee break (Aula)*
- 11:00 Dr. Silma Alberton Corrêa  
Brandenburgische TU Cottbus, Germany  
*Evaluation of the band gap of  $\text{HfO}_2$  thin films deposited by atomic layer deposition*
- 11:15 Dr. Louis Piper\*  
Binghamton University, USA  
*Electrical conductivity without sacrificing optical transparency in a-IGZO*
- 12:00 Peter Schlupp  
Universität Leipzig, Germany  
*All amorphous bipolar heterodiodes consisting of n-type zinc-tin oxide and p-type zinc-cobalt oxide*
- 12:30 *Lunch (Aula)*



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- 14:00 Prof. Dr. Kee Hoon Kim\*  
Seoul National University, Republic of Korea  
*Physical properties of doped BaSnO<sub>3</sub> semiconductors with high electrical mobility and optical transparency at room temperature*
- 14:45 Robert Karsthof  
Universität Leipzig, Germany  
*Doped nickel oxides as p-type TCO*
- 15:00 Christian Koppka  
TU Ilmenau, Germany  
*MOCVD-growth and characterization of AZO-contacts for p-doped GaAs nanowire structures*
- 15:15 Alexander Shkurmanov  
Universität Leipzig, Germany  
*Low temperature PLD-growth of ZnO nanowires*
- 15:30 *Coffee break (Aula)*
- 16:00 Prof. Dr. Bernd Szyszka\*  
TU Berlin, Germany  
*Multi component TCO films by hollow cathode gas flow sputtering*
- 16:45 Friedrich-L. Schein  
Universität Leipzig, Germany  
*Transparent p-CuI/n-ZnO heterjunction diodes*
- 17:15 Prof. Dr. Bruno K. Meyer\*  
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Justus Liebig Universität Gießen, Germany
- 18:00 *Copper oxides: Materials properties and photovoltaic devices*
- 20:00 Prize Ceremony and Conference Banquet (Bayrischer Bahnhof)

**Thursday, 2 October 2014**

- 9:00 Dr. André Bikowski\*  
Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany  
*The influence of Mg on the structural and electrical properties of magnetron sputtered Zn<sub>1-x</sub>Mg<sub>x</sub>O:Al thin films*
- 9:45 Abdurashid Mavlonov  
Universität Leipzig, Germany  
*Investigation of dopant limitations in Mg<sub>x</sub>Zn<sub>1-x</sub>O:Al, Ga (0 ≤ x ≤ 0.1)*
- 10:00 Jakob Nixdorf  
Otto-von-Guericke-Universität Magdeburg, Germany  
*Carrier density dependent effective electron mass in cubic In<sub>2</sub>O<sub>3</sub>*



- 10:15      *Coffee break (Aula)*
- 11:00      Dr. David C. Look\*  
Wright State University, USA  
*Large-area, nondestructive mapping of thickness, mobility, concentration, dopant, and compensator in Ga-doped ZnO films*
- 11:45      Christian Lidig  
Otto-von-Guericke-Universität Magdeburg, Germany  
*Anisotropic dielectric function and effective electron masses of rutile SnO<sub>2</sub>*
- 12:00      Dr. Sergey Sadofev  
Humboldt-Universität Berlin, Germany  
*Free electron density and polarity inversion domains in plasmonic (Zn,Ga)O*
- 12:30      *Lunch (Aula)*
- 14:00      Prof. Dr. Martin Allen\*  
University of Canterbury, New Zealand  
*Unipolar devices based on ZnO (and related materials)*
- 14:45      Kevin A. Stewart  
Oregon State University, USA  
*Effect of ultrathin channel layers on the properties of amorphous Al-In-Sn-O TFTs*
- 15:00      Daniel Splith  
Universität Leipzig, Germany  
*Schottky contacts on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> thin films grown by pulsed laser deposition*
- 15:15      Zhipeng Zhang  
Universität Leipzig, Germany  
*Ultraviolet photodiodes based on (Mg,Zn)O and (Ga,In)<sub>2</sub>O<sub>3</sub> thin films*
- 15:30      *Coffee break (Aula)*
- 16:00      Prof. Dr. Elvira Fortunato\*  
University of Lisbon, Portugal  
*Transparent complementary electronics*
- 16:45      Prof. Dr. Marius Grundmann  
Universität Leipzig  
*Closing*
- 17:00      Prospective end