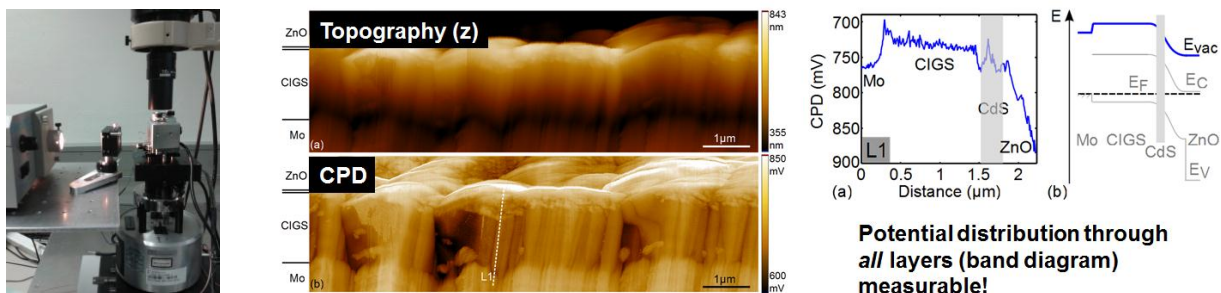


## Diplom- / Master Project in Thin-Film Photovoltaics

In thin-film photovoltaics, solar cells based on  $\text{Cu(In,Ga)Se}_2$  (CIGS) are among the most promising approaches. Indeed, our collaborator ZSW (Center for Solar Energy and Hydrogen Research Baden-Württemberg, Stuttgart) could recently demonstrate a world-record energy conversion efficiency of 20.3%. In order to further improve CIGS solar cells, an in-depth understanding of their performance-limiting structural and optical properties is of prime importance.



Within the offered Dipom- / Master project, Kelvin Probe Force Microscopy (KPFM) investigations of the surface of the CIGS absorber as well as the cleaved edge of the complete device structure shall be performed. KPFM is a special Atomic Force Microscopy (AFM) technique enabling the direct determination of the local electronic work function / potential distribution in the complete semiconductor structure, in particular at layer interfaces, grain boundaries of the polycrystalline material etc., with and without illumination. Building on recent investigations in air, comparative studies of structurally modified samples that prevent the environmentally problematic utilization of CdS shall be performed. Measurements in an inert gas atmosphere are planned to prevent oxidation of the solar cell materials.

The project will mainly be carried out at KIT Campus North in a collaboration between the Institute of Applied Physics (APH, PD Dr. Michael Hetterich / Prof. Heinz Kalt), the Light Technology Institute (LTI, Prof. M. Powalla) and ZSW. Depending on the personal background, supervision through the Faculties of Physics or Electrical Engineering, respectively, is possible.

### Contact:

- PD Dr. Michael Hetterich, Institute of Applied Physics  
e-mail: [michael.hetterich@kit.edu](mailto:michael.hetterich@kit.edu), phone: 0721 / 608 43402
- Dipl.-Ing. Zhenhao Zhang, Light Technology Institute  
e-mail: [zhenhao.zhang@kit.edu](mailto:zhenhao.zhang@kit.edu)

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