

**PHYSIKALISCHES KOLLOQUIUM  
EINLADUNG**

**10.1.2012/Wh**

---

Am Montag, dem 16.1.2012, 16.15 Uhr in W2-1-148

spricht

Dr. Thomas Unold

Helmholtz Zentrum Berlin für Materialien und Energie

über

**“The Role of Defects in Chalcogenide Thin Film Solar Cells”**

Chalcogenide multinary materials are well suited for thin film solar cells, because they can be easily deposited on large areas and can be widely tuned in their optical and electronic properties. In order to achieve conversion efficiencies comparable to crystalline silicon solar cells, the control of defects and reduction of minority carrier recombination are critical issues. On the one hand intrinsic defects provide the doping necessary for device operation. On the other hand defects also may lead to recombination and negatively influence the transport of charge carriers. Although the formation and properties of defects in general depend sensitively on the material composition of these compounds, the chalcopyrite-type semiconductor  $\text{Cu(In,Ga)Se}_2$  has been found to be extremely tolerant to deviations from stoichiometry, with minority carrier lifetimes up to 300 ns for material compositions where structural defects in the percent range are expected. This can be explained with the formation of electronically benign secondary phases and the absence of deep levels in optimized material, leading to low recombination activities of point-defects, dislocations and grain boundaries in this material.

Einladender: Der Direktor