

DF 19: Invited Talk - Elke Beyreuther

Time: Thursday 9:30–10:15

Location: GER 37

Invited Talk

DF 19.1 Thu 9:30 GER 37

Analyzing electronic defect states at perovskite oxide interfaces by surface photovoltage spectroscopy — •ELKE BEYREUTHER and LUKAS ENG — Institut für Angewandte Photo-physik, Technische Universität Dresden, D-01062 Dresden, Germany

Surface photovoltage (SPV) spectroscopy, being a versatile method to analyze the energetic distribution of electronic defect states at surfaces and interfaces of wide-bandgap semiconductor (hetero-)structures, is discussed as an alternative approach for studying perovskite oxide surfaces and interfaces [1]. In particular, the method is applied to comparatively investigate prototypical heterostructures made of 5-unit-cell-thick LaAlO₃ films grown on either TiO₂- or SrO-terminated SrTiO₃. As shown by a number of experimental and theoretical investigations

in the past, these two systems exhibit dramatically different interface properties with the first establishing a conducting interface and the second being insulating. The present SPV investigation reveals clearly distinguishable interface defect state distributions for both configurations within the framework of a classical semiconductor band scheme. Furthermore, bare SrTiO₃ crystals with TiO₂ or mixed SrO/TiO₂ terminations show similar SPV spectra and transients as the LaAlO₃ covered samples with the respective termination of the SrTiO₃ substrate [2]. This is in accordance with a number of recent works, which stress the decisive role of the SrTiO₃ and the minor role of the LaAlO₃ for the electronic properties of the interface.

[1] E. Beyreuther et al., *Surf. Sci.* 612, 1–9 (2013).

[2] E. Beyreuther et al., arXiv:1311.0491 [cond-mat.mtrl-sci] (2013).