



Contribution ID: 43

Type: Oral

## Laser-initiated electron and heat transport in gold-skutterudite $\text{CoSb}_3$ bilayers resolved by pulsed x-ray scattering

Tuesday, 16 July 2024 17:10 (20 minutes)

Transport phenomena at interfaces include amongst others the transport of heat or charges, which are of eminent importance in electronic or energy harvesting devices [1]. By using pulsed x-ray scattering with 80 ps time resolution following laser excitation of thin films [2] we were able to resolve the calorific balance in layered structures of gold and a skutterudite,  $\text{CoSb}_3$ . From the dynamics of heat distribution we conclude on the importance of energy transport across the gold- $\text{CoSb}_3$  interface, which is to a large part carried not by phonons, but by the heated electron gas. Gold is known as a good source for injecting electrons in coupled subsystems due to its weak electron-phonon coupling. The amount of heat transfer across the interface suggests additional transport by ballistic electrons [3].

[1] H. Bracht, S. Eon, R. Frieling, A. Plech, D. Issenmann, D. Wolf, J. Lundsgaard Hansen, A. Nylandsted Larsen, J. W. Ager III, E. E. Haller, *New J. Phys.* 16, 015021 (2014)

[2] A. Plech, B. Krause, T. Baumbach, M. Zakharova, S. Eon, C. Girmen, G. Buth and H. Bracht, *nanomaterials* 9, 501 (2019).

[3] A. Plech, P. Gaal, D. Schmidt, M. Levantino, M. Daniel, S. Stankov, G. Buth and M. Albrecht, *New J. Phys.* (2024) submitted.

### Please select the related topic from the list below

Dynamics of surfaces, interfaces, and nanostructures

**Primary author:** PLECH, Anton (Karlsruhe Institute of Technology)

**Co-authors:** Mr SCHMIDT, Daniel (Txproducts); Dr BUTH, Gernot (Karlsruhe Institute of Technology); Prof. ALBRECHT, Manfred (Univ. Augsburg); Dr DANIEL, Marcus (Univ. Augsburg); Dr LEVANTINO, Matteo (ESRF); GAAL, Peter (Leibnitz-Institut für Kristallzüchtung); Dr STANKOV, Svetoslav (Karlsruhe Institute of Technology)

**Presenter:** PLECH, Anton (Karlsruhe Institute of Technology)

**Session Classification:** Dynamics of surfaces, interfaces, and nanostructures