MONTAN UNIVERSITÄT LEOBEN

Institut für Physik

Montanuniversität Leoben

A-8700 LEOBEN, Franz Josef Straße 18, Austria
Tel: +43 3842 402-4601, Fax:+43 3842 402-4602
e-mail: physics@unileoben.ac.at

INSTITUTE OF PHYSICS
PHYSIK.UNILEOBEN.AC.AT

S E M I N A R
aus
Halbleiterphysik und Nanotechnologie

Mo, 18.5.2020, 11:15 Uhr, (als Webinar)

"Complementary Scanning Thermal Microscopy and Time-domain Thermoreflectance characterization of thin film systems for improved thermal management"

Dr. Verena Leitgeb

Materials Center Leoben Forschung GmbH, Roseggerstrasse 12, 8700 Leoben, Austria

High-resolution images of thermal conductivity λ and temperature are obtained by Scanning Thermal Microscopy (SThM), a variant of Scanning Probe Microscopy (SPM) [1] [2].
A spatial resolution of tens of nanometers enables thermal characterization in micro- to nanoscale systems and thus provides input to improve heat management in modern small-scale electronic applications.
In the presented work a thin film system consisting of materials relevant in modern wafer technologies was characterized by SThM, complemented with Time Domain Thermoreflectance (TDTR) measurements [3] [4]. All SThM measurements were done inside a Scanning Electron Microscope at $<10^{-6}$ mbar. To (i) improve the spatial and thermal resolution of SThM images and (ii) reduce SThM artefacts due to surface roughness, the influence of the heating parameters of a thermoresistive SThM probe on the thermal image were systematically studied.

Research has been performed in collaboration with K. Fladischer, L. Mitterhuber, and S. Defregger.

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[2] Y. Zhang et al., Adv. Funct. Mater., 1900892 (2019).
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