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TU Wien, Institut für Angewandte Physik, E134
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Yellow Tower „B“, 5th floor, SEM.R. DB gelb 05 B



On-Chip and Remote Sensing with Quantum Cascade Laser and Detector Systems

Optical sensors for mid-infrared spectroscopy are widely used in industrial and environmental monitoring as well as medical and biochemical diagnostics. A sensor concept, based on a bi-functional quantum cascade heterostructure, for which the differentiation between laser and detector is eliminated, enables mutual commutation of laser and detector, simplifies remote sensing setups and facilitates a crucial miniaturization of sensing devices.

Liquid sensing utilizing bi-functional quantum cascade lasers/detectors (QCLDs) can be realized on a single chip. A QCL active region design with an additional detection capability at the laser emission wavelength allows a straightforward integration, where different parts of the chip are used for lasers and others for detectors. Typical analyte interaction lengths for gas sensing are in the range of tens of centimeters or more and exceed the common semiconductor chip sizes. Our gas sensing approach incorporates surface-active lasers and detectors. Latest results on material design, performance and remote sensing concepts will be presented.

Gottfried Strasser received his Ph.D. degree in Physics from the University of Innsbruck in 1991. In 2001 he became associate professor at the TU Vienna, Austria. 2007 G. Strasser became full professor at the State University of New York in Buffalo, in 2009 full professor at the TU Vienna. He is heading the QCL research group at the TU Vienna, established molecular beam epitaxy (MBE) at the institute, and is head of the Center of Micro- and Nanostructures. He is author and co-author of more than 700 publications.

All interested colleagues are welcome to this seminar lecture (45 min. presentation followed by discussion)

Friedrich Aumayr
(LVA-Leiter)

Gerhard Schütz
(Seminar Chair)