



Vortragsankündigung:

Am Mittwoch, 03.12.2008 findet um 17:00 Uhr im Wolfgang-Eychmüller-Hörsaal H 45.2 der Universität Ulm (Bereich Uni West) im Rahmen des Elektrotechnischen Kolloquiums folgender Vortrag statt:

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Chem/Biosensing with Quantum Cascade Lasers: Toward On-Chip Mid-Infrared Sensor Technology

Optical chemical sensor technology in the mid-infrared (MIR) spectral range (3-20 μm) is gaining importance in process monitoring, environmental analysis, security/surveillance applications, and the biomedical field, due to the increasing demand for robust sensor technology with inherent molecular specificity [1]. Interfacing IR-transducers with continuous measurement situations in the gas and liquid phase becomes increasingly feasible with the advent of appropriate waveguide technology (e.g., MIR transparent optical fibers and planar waveguides), protective or chemically responsive surface coatings (e.g., diamond-like carbon, sol-gels, polymers, etc.) [2,3], and the availability of advanced light sources such as room-temperature operated broadly tunable quantum cascade lasers (QCLs) enabling miniaturized IR diagnostics [4,5].

Selected examples will highlight recent advances in IR sensor technologies for application in aqueous environments, which are particularly challenging due to the pronounced absorption features of the water matrix. Therefore, sensing schemes taking advantage of the evanescent field enable trace molecular analysis in otherwise opaque media. With the advent of thin film MIR waveguide technology such as e.g., planar silver halide slabs [6] or - more recently - MBE and MOCVD grown GaAs/AlGaAs structures [7], on-chip planar MIR waveguide technology has emerged enabling superior control on the optical conditions (e.g., via resonant optical structures), and facilitating reproducible surface modification. Liquid phase analytical applications of QCLs combined with onchip waveguide technology are beneficial to device platforms operating in extreme environments (e.g., deep sea monitoring) [8], for biomedical analysis (e.g., in-vivo surgical monitoring) [9], and for next-generation multi-functional analytical platforms (e.g., combination with atomic force microscopy) for cell physiological studies [10].

References

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Zu diesem Vortrag laden wir herzlich ein und bitten um Bekanntgabe in Ihrem Bereich.

Ulm, den 3. Dezember 2008

Prof. Dr.-Ing. Klaus Dietmayer

- Prodekan -