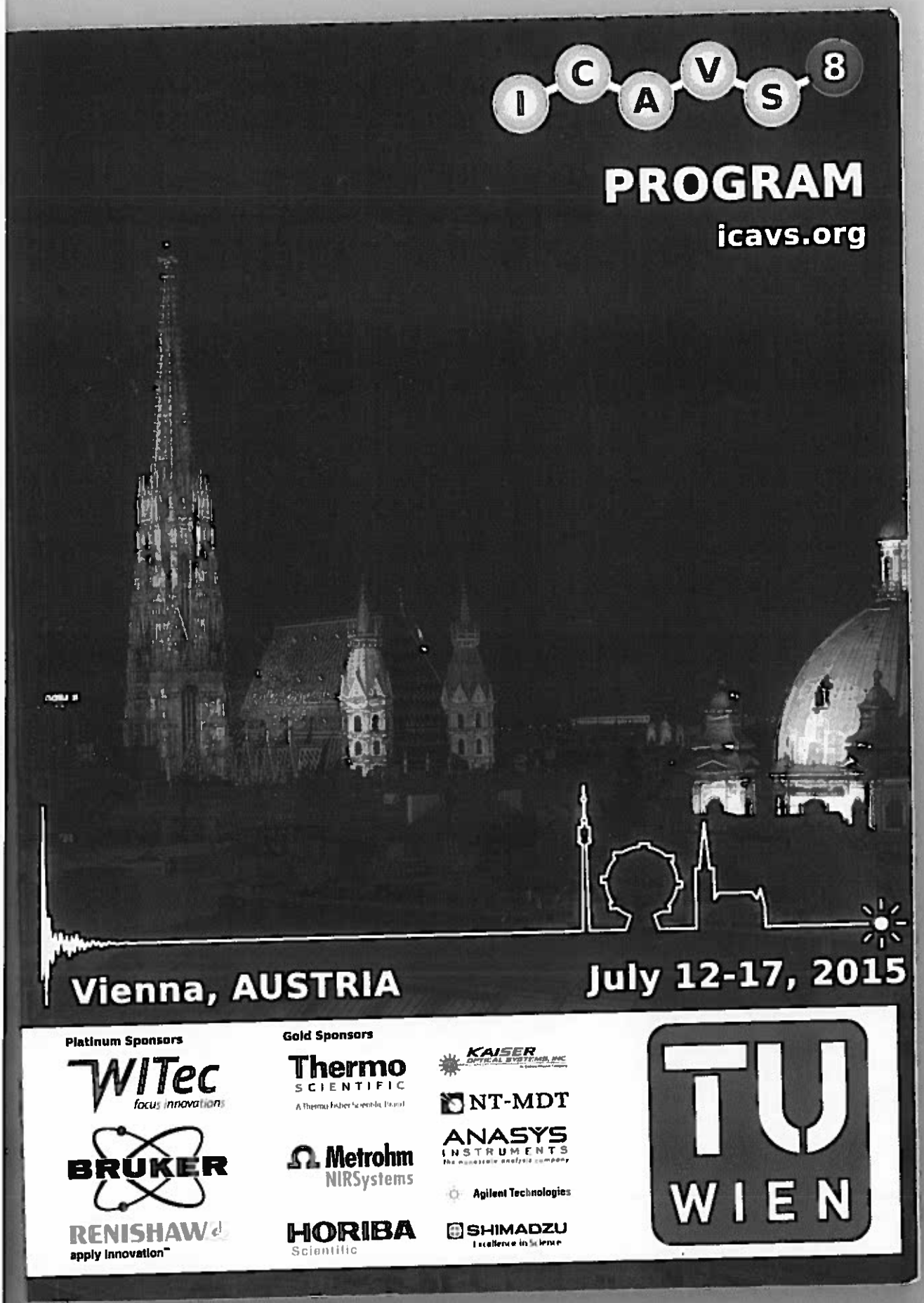

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QCL Source Development

Tuesday, 10:40 - 12:00 **HS8**
Chair: Natalie Picqué

10:40 TU801-inv
Recent Advances in EC-QCL Technology and Its Use in Spectroscopic Sensing
Joachim Wagner, Ralf Ostendorf, Jan Grahmann, Andre Merten, Stefan Hugger, Lorenz Butschek, Frank Fuchs, Dusan Boskovic, Harald Schenk

Widely tunable quantum cascade lasers (QCL) are well suited for spectroscopic sensing exploiting characteristic finger print absorption of molecules in the mid-infrared (MIR). This includes on- and in-line MIR spectroscopic sensing which requires analytical data to be taken at high sampling rates. We report on recent advances in broadband-tunable MIR EC-QCL technology as well as their use in spectroscopic analysis. Results are presented on rapid scan EC-QCL, employing a custom-made MEMS scanning grating in Littrow-configuration as wavelength-selective optical feedback element.

11:00 TU802
Monolithic Tunable MIR-Lasers from mirSense
Mathieu Carras, Gregory Maisons, Clement Gilles, Mickael Brun

mirSense develops monolithic solutions for tunable MIR-laser sources using the quantum cascade laser technologies, coupled with photonics integrated circuit (PIC) in the mid-infrared. We show the results and performances of different approaches, with either InP or silicon as a substrate for the PIC.

11:15 TU803
Ring Quantum Cascade Lasers for Infrared Spectroscopy
Rolf Szedlak, Martin Holzbauer, Donald MacFarland, Tobias Zederbauer, Hermann Detz, Aaron Maxwell Andrews, Werner Schrenk, Gottfried Strasser

Quantum cascade lasers have proven to be powerful and compact devices for infrared spectroscopy. Compared with conventional ridge lasers, ring QCLs provide strongly collimated emission beams. Depending on the grating, the beam can have an intensity minimum or maximum in the center. We show how this light beam can be additionally focused with a gradient index based metamaterial. In addition, we propose a novel laser array design, which makes beam combining optics obsolete.

11:30 TU804
Recent Results on Performance Optimization of QCLs for Spectral Coverage, Heat Dissipation, and Output Power
Antoine Müller, Alfredo Bismuto, Stéphane Blaser, Tobias Gresch, Olivier Landry, Richard Maulini, Romain Terazzi

In this presentation the results of recent optimization efforts performed at Alpes Lasers SA will be presented. For applications such as hand held battery powered apparatus, devices with total dissipation lower than one Watt are presented. Focus will also be put on applications related to extended tuning devices, showcasing DFB devices with up 10 cm^{-1} of tuning. Finally watt level output power in the 4 to 5 micron region will be presented.

11:45 TU805
QCL Frequency Comb Technology for Mid-Infrared Sensing
Markus Mangold, Andreas Hugi, Markus Geiser, Gustavo Villares, Jérôme Faist, Lukas Emmenegger

At IRsweep, we develop a spectroscopy platform for industrial applications based on semiconductor quantum cascade laser (QCL) frequency combs. The platform's key features will be an unmatched combination of optical bandwidth up to 100 wavenumbers, spectral resolution down to 100 kHz, and acquisition speed of ten to hundreds of µs. The robust platform opens doors to beforehand unreachable applications.