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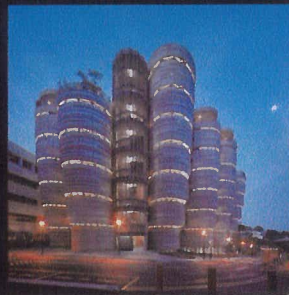
ITQW 2017

10 – 15 Sep, Singapore

14th International Conference on
Intersubband Transitions in Quantum Wells

Sands Expo and
Convention Center
Singapore

CONFERENCE PROGRAM



Conference Program

Sunday 10 September 2017

- 16:00 – 18:00 Registration
- 18:30 – 21:00 Welcome Cocktail Reception (at Clarke)

Monday 11 September 2017

09:00 – 09:15 Welcome and Opening Remarks

Session 1 Intersubband Material and Fabrications-Chair: Mikhail A. Belkin

09:15 – 09:45 Gottfried Strasser (Technische Universität Wien) - Invited talk

QCL materials and fabrications

09:45 – 10:00 Jean-Michel Chauveau (CNRS-CRHEA)

Intersubband Transitions and Polarons in (Zn,Mg)O/ZnO Quantum Wells

10:00 – 10:15 Martin A. Kainz (Technische Universität Wien)

Compensation of asymmetries for high-performance InGaAs/InAlAs terahertz quantum cascade lasers

10:15 – 10:30 Zeineb Loghmari (Université de Montpellier)

Continuous wave operation of InAs-based quantum cascade lasers above 20 μm

10:30 – 11:00 Tea break

Session 2 2D Material Opto-electronics-Chair: Carlo Sirtori

11:00 – 11:45 Andrea C. Ferrari (University of Cambridge) - Plenary talk
Graphene photonics and optoelectronics

11:45 – 12:00 Long Xiao (University of Cambridge)

High Responsivity Detection of Terahertz Quantum Cascade Lasers with

Graphene-Loaded Plasmonic Antenna Arrays

12:00 – 12:15 Xuechao Yu (Nanyang Technological University)

Mid-infrared photodetectors based on novel two-dimensional materials

12:15 – 14:00 Lunch

Session 3 Mid-IR Frequency Comb and Lasers-Chair: Qijie Wang

14:00 – 14:30 Jerome Faist (ETH Zurich) - Invited talk

Frequency comb

14:30 – 14:45 Dmitry Kazakov (Harvard University)

Harmonic frequency comb initiated by population pulsations in a quantum cascade laser

14:45 – 15:00 Pierre Jouy (ETH Zurich)

1 Watt Quantum Cascade Laser Frequency Comb emitting at $\lambda=8.13 \mu\text{m}$

15:00 – 15:15 Yves Bidaux (ETH Zurich)

Waveguide engineering for low dispersion mid-infrared Quantum Cascade Lasers frequency combs

15:15 – 15:30 Mikhail A. Belkin (The University of Texas at Austin)

Ultrafast terahertz detectors based on 3D meta-atoms

15:30 – 16:00 Tea break

Transfer-printing of quantum cascade lasers to silicon-based substrates

15:30 – 16:00 Tea break

Session 4 Intersubband Quantum Devices-Chair: Gottfried Strasser

16:00 – 16:15 Giacomo Scalari (ETH Zurich)

Ultra strong THz light-matter coupling with Landau levels: transport measurements and nanocavities

16:15 – 16:30 Angela Vasanelli (Université Paris Diderot)

Quantum model of optical properties and thermal emission of superradiant electronic excitations

16:30 – 16:45 Francesca Carosella (Université Paris Diderot)

Band mixing in THz cascade structures

16:45 – 17:00 Martin Franckie (ETH Zurich)

Phonon-Polariton Intersubband Gain

17:00 – 17:15 Daniele Palaferri (University Paris Diderot- Paris 7)

Room temperature quantum well mid-infrared photodetector embedded into a patch-antennae array

17:15 – 17:30 Martin Franckie (ETH Zurich)

Theory of 2-well GaAs/Al_{0.25}Ga_{0.75}As THz Quantum Cascade Lasers

17:30 – 17:45 Asaf Albo (Massachusetts Institute of Technology)

Direct-phonon terahertz light-emitting intersubband lasers

17:45 End of day one

18:30 Banquet diner near Dome flower (Majestic Bay)

Tuesday 12 September 2017

Session 5 Mid-IR Sensing and Spectroscopy-Chair: Jerome Faist

09:00 – 09:30 Boris Mizaikoff (Ulm University) - Invited talk

mid-IR QCLs for sensing and spectroscopy

09:30 – 09:45 Filippos Kapsalidis (ETH Zurich)

Dual-wavelength DFB Quantum Cascade Lasers for Trace Gas Spectroscopy

09:45 – 10:00 Lorenz Butschek (Fraunhofer Institute for Applied Solid State Physics)

MOEMS-based External Cavity QCLs for Real-time Spectroscopy

10:00 – 10:30 Bernhard Lendl (Technische Universität Wien) - Invited talk

Introducing New approaches in QCL based gas sensing. Photothermal

Interferometry and Heterodyne Phase Sensitive Dispersion Spectroscopy

10:30 – 11:00 Tea break

Session 6 THz detection and generation-Chair: Boris Mizaikoff

11:00 – 11:45 Junichiro Kono (Rice University) - Plenary talk

THz detection and spectroscopy

11:45 – 12:15 Yanko Todorov (Université Paris Diderot) - Invited talk

THz detection using metamaterial resonators and microcavities

12:15 – 12:30 Stefano Pirotta (Universite Paris Sud and CNRS)

Ultrafast terahertz detectors based on 3D meta-atoms

Quantum Cascade Material Systems: Growth and Processing

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Abstract

Over the last 23 years quantum cascade lasers (QCLs) have become powerful, reliable, versatile and desirable light sources, providing tailorable emission in a wide range from the mid-infrared to the terahertz spectral region. Therefore, such lasers are suitable for many applications in science, medicine and industry. In spite of the developments during the last 20 years in this lively field there is still room for further improvement in terms of materials, material combinations, and growth. In addition, various cavity concepts have been developed, partly exploited, and might open broader applications and novel markets. This talk covers recent material and growth related advancements as well as the development of innovative cavity concepts enabling unique sensor concepts.

From a growth perspective symmetric quantum cascade laser active regions can be used to study material and growth related effects on the device performance. GaAs, InAs and InGaAs-based heterostructures will be discussed in terms of material induced imperfections like monolayer fluctuations (InAs THz QCLs), roughness scattering (e.g. InGaAs/GaAsSb), or dopant diffusion during epitaxial growth (GaAs/AlGaAs). Novel, more exotic material combinations for QC devices will be addressed.

Apart from QCLs the field around QC devices also includes quantum cascade detectors (QCDs) and the combination of QC lasers and detectors. Combined laser/detector single chip systems are asking for additional design rules and processing recipes. Various cavity concepts like facet emitting, surface emitting, and substrate emitting lasers and their detector counterparts will gain importance in the future.