

INTERNATIONAL SCHOOL ON TERAHERTZ PHOTONICS AND ELECTRONICS

SALA AZZURRA, SCUOLA NORMALE SUPERIORE
MAY 9TH – 13TH 2022

Sunday May 8th

19.00 p.m. Welcome reception and welcome dinner
Top Terrace "Grand Hotel Duomo"

Monday May 9th

9:00 – 9:30: Registration

9:30 – 9:45 Opening remarks

SESSION I

Chair: M.S. Vitiello (CNR and Scuola Normale Superiore)

09:45 – 10:45: **Michael Feiginov** (Technical University of Wien, Austria)

"Resonant-tunnelling diodes and THz oscillators"

10:45 – 11:45: **Mikhail A. Belkin** (University of Munich, Germany)

"Terahertz quantum cascade laser sources based on difference frequency mixing"

11:45 – 12:00 *Coffee Break*

12:00 – 12:15 D. Cimbri (University of Glasgow)

"High-Power InP Double-Barrier Resonant Tunnelling Diodes for Terahertz Applications"

12:15 – 12:30 Z. Yehn (Technical University of Wien, Austria)

"Fabrication of Traveling Wave RTD Oscillators"

12:30 – 14:30 Lunch Break and Discussion Time

SESSION II

Chair: M. Feiginov (Technical University of Wien, Austria)

14:30 – 15:30 **Safumi Suzuki** (Tokyo Institute of technology)

"Recent developments of RTD THz oscillators in Japan"

15:30 – 16:00 *coffee break*

16:00 – 17:00 **Edward Wasige** (University of Glasgow, UK)

"Terahertz wireless communications with resonant tunnelling diodes"

17:00 – 17:15 M. Villani (Universitat Autònoma de Barcelona, Spain)

"Novel phenomena in the THz current of Resonant Tunnelling Diodes with coherent electron-photon interaction"

17:15 – 17.30 P. Ourednik (Technical University of Wien, Austria)

"Double-Resonant-Tunneling-Diode Chip-Size Patch-Antenna Oscillator"

Tuesday May 10th

SESSION III

Chair: C. Sirtori (Ecole Normale Supérieure, Paris)

09:00 – 10:00: **Jerome Faist** (ETH, Zurich)
"Quantum optics in the THz domain: investigating the vacuum"
14:30 – 15:30 **Sven Hoefling** (University of Wuerzburg, Germany)
"Semiconductor quantum technology devices"

11:00 – 11:30 *Coffee Break*

11:30 – 11:45 M. Franckie (ETH, Zurich)
"Gain Solitons in THz Semiconductor Lasers"
11:45 – 12:00 A. Sorigi (CNR, INO Florence)
"Fourier Transform Analysis Of Comb Emission"
12:00 – 12:15 C. Song (LPN, Ecole Normale Superieure, Paris France)
"Efficient ultrabroad terahertz emission from nanometer-thick spintronic heterostructures"
12:15 – 12:30 S. Kumaran (University of Cambridge, UK)
"Terahertz External Cavity Quantum Cascade Laser by Dielectric Antireflection Metasurfaces"

12:30 – 14:30 Lunch Break and Discussion Time

SESSION IV

Chair: O. Mitrofanov (UCL, UK)

14:30 – 15:30: **Dmitry Turchinovich** (Universität Bielefeld, Germany)
"Terahertz physics of graphene, possibly the most nonlinear material we know"

15:30 – 16:00 *coffee break*

16:00 – 16:15 C. Preuss (University of Duisburg-Essen)
"Flip-Chip Technology for Combining High Frequency Performance of InP Based Devices with CMOS/BiCMOS Technology to Gain Functionality"
16:15 – 16:30 E. Riccardi (CNR-NANO, Pisa)
"Terahertz quantum cascade laser Frequency combs"
16.30 – 16:45 E. Jochl (ETH Zurich)
"An Ultra-strongly Coupled Single Terahertz Meta-Atom"
16:45 – 17:00 K. Mueller (University of Duisburg-Essen, Germany)
"TCAD Simulation of an InP DHBT"

Wednesday May 11th

SESSION V

Chair: A. Tredicucci (University of Pisa)

09:00 – 10:00: **Frank Hegmann** (University of Alberta, Canada)
"Terahertz scanning tunneling microscopy: Exploring ultrafast dynamics in materials down to the atomic scale"
10:00 – 11:00 **Oleg Mitrofanov** (University College of London, UK)
"Microscopy with THz waves"

11:00 – 11:30 *Coffee Break*

11:30 – 11:45 T.S.Nowack (University of Glasgow)
"Advanced Terahertz imaging systems based on tailored metasurface optics"
11:45 – 12:00 F.Schiegl (University of Regensburg)
"Resolving an Exciton Mott Transition in Twisted Bilayer WSe₂ With Ultrafast Nanoscopy"
12:00 – 12:15 V. Pistori (CNR-NANO Pisa)
"THz hyperspectral detectorless near-field nanoscopy"
12:30 – 14:30 Lunch Break and Discussion Time

SESSION VI

Chair: F.Hegmann (University of Alberta, Canada)

14:30 – 15:30 **Paolo De Natale** (CNR-INO, Florence)
"The THz spectral range: a window of opportunities"

15:30 – 16:00 *coffee break*

16:00 – 16:15 S.M Abouzar Sarfraz (University of Bari)
"Electrically tunable graphene based THz modulators"

16:15 – 16:30 T. Sanders (University of Wollongong, Australia)
"Characterizing the Low Frequency Absorption of Polyethylene Over a Wide Temperature Range; 6–300K"

16:30 – 16:45 M. Asgari (Scuola Normale Superiore, Pisa)
"Large area CVD graphene-based transistors as room temperature and ultra-fast thermoelectric THz photodetector"

16:45 – 17:00 S. Gerbert (University of Montpellier, France)

19.30 p.m. Social Dinner "Restaurant La Clessidra"

Thursday May 12th

SESSION VII

Chair: J. Faist (ETH, Zurich)

09:00 – 10:00: **Carlo Sirtori** (Ecole Normale Supérieure, France)
"Free space optics data transmission with unipolar optoelectronics"

10:00 – 11:00 **Wojciech Knap** (University of Montpellier II, France and CENTERA, Poland)
"Graphene and GaN for THz amplification"

11:00 – 11:30 *Coffee Break*

11:30 – 11:45 M. Zhang (University of Duisburg-Essen, Germany)
"Phase Shifter Reduced Active Beam Steering Array in the 300 GHz Band"

11:45 – 12:00 R. Kress (University of Duisburg-Essen, Germany)

"Lens integrated InP DB-RTD oscillator for THz applications"

12:00 – 12:15 R. Scmidth (Keysight Technologies, Belgium)

"Accurate On-Wafer S-parameters Measurements at Sub-THz Frequencies"

12:15 – 12:30 S. Clochiatti (University of Duisburg-Essen, Germany)

"Monolithic n-InGaAs Thin Film Resistor from DC up to 0.5 THz"

12:30 – 14:30 Lunch Break and Discussion Time

SESSION VIII

Chair: W. Knap (Centera, Poland)

14:30 – 15:30 **Alvydas Lisauskas** (University of Vilnius, Lithuania)
"Principles of detection in the THz frequency range"

15:30 – 16:00 *coffee break*

16:00 – 16:15 T. O. Buchmann (Technical University of Denmark)
"Novel Detector Class for the 'THz-Gap'"

16:15 – 16:30 A. Rehman (CENTERA Lab, Poland)

"Temperature Dependent Current Responsivity in Sub-THz Regime of AlGaIn/GaN based FINFET Devices"

16:30 – 16:45 S. Alomari (University of Lisbon, Portugal)

"Resonant Tunneling Diode Based Photodetectors"

16:45 – 17:00 B. Yavas-Aydin (University of Würzburg, Germany)

"Optical Analysis of InGaAs based Resonant Tunneling Diode Photodetectors"

Friday May 13th

SESSION IX

Chair: M.S. Vitiello (CNR and Scuola Normale Superiore)

09:00 – 10:00 **Elliot Brown** (Wright State University, Dayton, OH, USA)

"Photoconductive THz Sources"

10:00 – 11:00 **Alessandro Tredicucci** (University of Pisa, Italy)

"Physics and technologies of Terahertz quantum cascade lasers"

11:00 – 11:30 *Coffee Break*

11:30 – 12:00 **Manfred Helm** (University of Dresden, Germany)

"Germanium Ultrabroadband THz photoconductive antenna"

12:00 – 12:15 J. Allen (University of Wollongong, Australia)

"Anomalous Temperature Dependence of Resonant and Non-Resonant Polarised THz Spectral Features in Atacamite"

12:15 – 12:30 M. Cito (University of Glasgow, UK)

"PL and PLE characterization of high current density resonant tunnelling diodes for THz applications"

12:30 – 12:45 P. Sai (CENTERA Laboratories, Institute of High Pressure Physics, Poland)

"THz spectroscopy of 2D plasma waves in large surface AlGaIn/GaN grating-gate structures"

12:45 – 13:00 Closing remarks

13.00 – 14:30 Lunch