

9th International Conference on Optical Terahertz Science and Technology (OTST 2022)

19-24 June 2022, Budapest



Programme Book

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International Union of Pure and Applied Physics



University of Pécs, Hungary

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National Research, Development and Innovation Office Hungary

PROGRAM
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Exhibitor



Sunday, 19 June

12:00 Start of registration

Session: **Tutorials I**

Session Chair: **Hou-Tong Chen**

13:30 Metasurfaces: Physics and applications
Lei Zhou TL-01

14:30 Terahertz emission spectroscopy: Insights into spintronic materials and applications
Tobias Kampfrath TL-02

15:30 Coffee break

Session: **Tutorials II**

Session Chair: **Tobias Kampfrath**

16:00 Terahertz spectroscopy of emerging materials for solar applications
Jens Neu TL-03

17:00 Terahertz cavity quantum electrodynamics in condensed matter
Junichiro Kono TL-04

18:30 Welcome reception

Monday, 20 June

09:00 Opening

Session: THz spectroscopy I

Session Chair: **Petr Kužel**

09:15 Terahertz observation of large polarons in lead halide perovskites
David Cooke KN-01

10:00 Ultrafast terahertz dynamics in 2D/3D lead-tin perovskites with enhanced emissivity and phase purity
Jake D. Hutchinson O-01

10:15 Coherent underdamped polaron oscillations in liquid alcohols
Poonam Singh O-02

10:30 Rigorous modeling of the THz emission spectrometer
Wentao Zhang O-03

10:45 Coffee break

Session: Metamaterials and plasmonics

Session Chair: **Igal Brener**

11:15 Control electromagnetic waves with space-time modulated metasurfaces
Abul K. Azad I-01

11:45 Experimental verification of plasmonic THz nonlinearities on graphene disks
Jeong Woo Han O-04

12:00 Magnetically reconfigurable terahertz superlattice metasurfaces
Dibakar Roy Chowdhury O-05

12:15 THz topological meta-devices for on-chip photonics
Ilya Shadrivov O-06

12:30 Towards ultrahigh modulation speed of THz optoelectronic devices based on metamaterial/graphene split-ring resonators
Abdullah M. Zaman O-07

12:45 Lunch break

Monday, 20 June

Session: **Optical THz generation and detection I – Currents**

Session Chair: **Clara Saraceno**

- 14:15 High-power gas-plasma based THz generation driven by a fiber-laser
Joachim Buldt O-08
- 14:30 Recovery of the absolute temporal fields of THz-infrared continuum pulses using field-induced second-harmonic detection
Mark D. Thomson O-09
- 14:45 Extreme THz radiation from relativistic laser plasmas
Guo-Qian Liao O-10
- 15:00 Generation of intense THz pulses with tunable elliptical polarization
Xavier Ropagnol O-11
- 15:15 Controllable generation of azimuthal and radial THz beams using multi-pixel photoconductive emitters
Justas Deveikis O-12
- 15:30 Ultra-low noise THz photoconductive metasurface detectors
Igal Brener O-13
- 15:45 Coffee break
- 16:15 Enhanced spintronic THz emission by plasmonic nanostructures
Shaojie Liu O-14
- 16:30 Magnetic-field free THz emission from two-dimensional ferromagnet and antiferromagnet heterostructures at room temperature
Peiyan Li O-15
- 16:45 Terahertz single-pixel & single-shot object recognition
Benedikt Limbacher O-16

Monday, 20 June

Session: **Applications in nanomaterial characterization**

Session Chair: **Emma MacPherson**

- 17:00 Band bending in GaAs nanobars revealed by near- and far-field terahertz photoconductivity measurements
Petr Kužel O-17
- 17:15 High electron mobility in strained core/shell nanowires revealed by optical pump – THz probe spectroscopy
Alexej Pashkin O-18
- 17:30 Time-resolved THz spectroelectrochemistry and complementary techniques provide insight into electron transfer processes
Jacob A. Spies O-19

Tuesday, 21 June

Session: THz spectroscopy II - Novel methods

Session Chair: **Jens Neu**

- 09:00 THz detection with 2D materials
Leonardo Viti I-02
- 09:30 Direct, spatially localized detection of THz-induced orientation dynamics of gas phase molecular rotors
Sharly Fleischer O-20
- 09:45 Time-domain THz superoscillations for superspectroscopy
Diyar Talbayev O-21
- 10:00 THz photoconductivity dynamics of semiconductors from sub-nanosecond to millisecond timescales
Edward Butler-Caddle O-22
- 10:15 Classification of THz reflection spectra using machine learning algorithms
Mathias Hedegaard Kristensen O-23
- 10:30 The role of surface nonlinearity in THz generation from GaAs metasurfaces
Lucy L. Hale O-24
- 10:45 Coffee break

Session: Communication

Session Chair: **Abdul K. Azad**

- 11:15 Conformal leaky-wave antennas for THz wireless communications
Daniel Mittleman O-25
- 11:30 A broadband dispersion-free THz waveguide platform featuring field-enhancement
David Rohrbach O-26
- 11:45 The effect of the complex geometries of building materials on scattering properties for the design of THz communication channels
Fatima Taleb O-27
- 12:00 Parallel generation and modulation of THz pulse trains
Joel Edouard Nneck O-28
- 12:15 Jamming vulnerabilities in THz wireless communications
Hichem Guerboukha O-29
- 12:30 Lunch break

Tuesday, 21 June

Session: High-field THz physics and nonlinear optics I

Session Chair: **Koichiro Tanaka**

- 14:00 Nonlinear terahertz conductivity in semiconductor nanobars:
Semiclassical calculations
Hynek Němec I-03
- 14:30 Discriminating THz-frequency nonlinear optical processes in ZnTe with
two-dimensional spectroscopy
Martin J. Cross O-30
- 14:45 Reconstruction of effective Hamiltonian of holes in bulk GaAs
Seamus O'Hara O-31
- 15:00 Field-resolved high-order nonlinearities in a free-running terahertz
semiconductor laser
Josef Riepl O-32
- 15:15 Direct sub-ps electro-absorption modulation in colloidal quantum dots
driven by THz field
Rokas Jutas O-33
- 15:30 Pump-induced terahertz anisotropy in graphene
Stephan Winnerl O-34
- 15:45 Coffee break

Session: Applications in biology and medicine

Session Chair: **Martina Havenith**

- 16:15 *In vivo* THz ellipsometry of human skin: Breakthroughs and next steps
Emma MacPherson I-04
- 16:45 THz imaging of the feet reveals evidence of the underlying neurological
mechanism of hydration depletion in diabetics
Enrique Castro-Camus O-35
- 17:00 Analysing the influence of the stomatal activity on the drying process of
Arabidopsis thaliana using THz spectroscopy
Jochen Taiber O-36
- 17:15 Poster session I.
Posters of odd numbers

Wednesday, 22 June

Session: Quantum phenomena and particle acceleration

Session Chair: **Sebastian Maehrlein**

- 09:00 Characterization and manipulation of relativistic electron bunches using THz pulses
Matthias C. Hoffmann I-05
- 09:30 THz-driven acceleration and manipulation of relativistic electron beams
Steven P. Jamison O-37
- 09:45 Light emission from gases and liquids excited by THz-driven field-emitted electrons
Malte L. Welsch O-38
- 10:00 Masing of nitrogen-vacancy centers in the THz regime
Sándor Kollarics O-39
- 10:15 Liquid-crystal-based optics for use at THz-QCL frequencies
Michael D. Horbury O-40
- 10:30 Coffee break
- 11:00 Poster Session II.
Posters of even numbers
- 12:45 Lunch break

Session: THz spectroscopy III

Session Chair: **Daniel Mittleman**

- 14:15 Microscopic theory of the THz modes and their nonreciprocal directional dichroism in the antiferromagnet $\text{Fe}_2\text{Mo}_3\text{O}_8$
Kirill Vasin O-41
- 14:30 Combined analysis of amplitude and phase modes in a quasi-one-dimensional charge density wave system up to 7 THz
Konstantin Warawa O-42
- 14:45 Pump-pulse activation of anharmonic coupling in CdWO_4
Megan F. Nielson O-43
- 15:00 Few-cycle THz pulses from intersubband shift currents in asymmetric AlGaAs quantum wells
Matthias Runge O-44
- 15:15 Ultrafast long-distance electron-hole plasma expansion in GaAs mediated by stimulated emission and reabsorption of photons
Tinkara Troha O-45
- 15:30 Coffee break

Wednesday, 22 June

Session: **Near-field microscopy and nanoscopy I**

Session Chair: **David Cooke**

- 16:00 Phase-resolved THz bias sampling and its application for ultrafast scanning tunneling microscopy
Melanie Müller I-06
- 16:30 Hyperspectral near-field nanoscopy with THz frequency combs
Valentino Pistore O-46
- 16:45 Quantitative sampling of THz waveforms on atomic scales
Carmen Roelcke O-47
- 17:00 Nonlocal laser THz emission nanoscopy
Angela Pizzuto O-48
- 17:15 Time-resolved nanospectroscopy on Si-doped GaAs-InGaAs core-shell nanowires
Andrei Luferau O-49
- 17:30 THz near-field nanoscopy of hyperbolic phonon-polaritons hybridized with Dirac plasmons in topological insulators
Eva Arianna Aurelia Pogna O-50
- 19:30 Conference dinner

Thursday, 23 June

Session: High-field THz physics and nonlinear optics II

Session Chair: **Stephan Winnerl**

- 09:00 Controlling functionality by terahertz nonlinear phononics
Michael Först KN-02
- 09:45 Nonlinear phonon excitation in lead halide perovskites traced via THz Kerr effect
Sebastian F. Maehrlein O-51
- 10:00 Tunable non-integer high-harmonic generation from a topological insulator surface
Manuel Meierhofer O-52
- 10:15 Subcycle nonlinearities of ultrastrong light-matter coupling
Joshua Mornhinweg O-53
- 10:30 Coffee break

Session: Optical THz generation and detection II - Optical rectification

Session Chair: **Matthias Hoffmann**

- 11:00 High power and high repetition rate ultrafast THz sources
Clara J. Saraceno I-07
- 11:30 Generation of ultra-broadband THz pulses at a 200 kHz repetition rate with peak electric field above 100 kV/cm
Niloufar Nilforoushan O-54
- 11:45 High-field THz generation from a new organic crystal: PNPA
Claire Rader O-55
- 12:00 Development of an efficient intense THz source and its application for super-resolution imaging
Leo Guiramand O-56
- 12:15 Efficient multicycle THz generation based on tilted-pulse-front technique
Baolong Zhang O-57
- 12:30 Strong THz generation and characterization from lithium niobate wafer pumped by SILEX-II petawatt laser facility
Dong-Wen Zhang O-58
- 12:45 Lunch break

Thursday, 23 June

Session: Quantum cascade lasers

Session Chair: **Hynek Nemeč**

- 14:15 Silicon integrated terahertz quantum cascade ring laser frequency comb
Michael Jaidl O-59
- 14:30 Power-locking of a 3.5-THz quantum-cascade laser using an integrated photonic circuit
Alexander Valavanis O-60
- 14:45 Deep learning powered adaptive tuning of quantum cascade random lasers
Benedikt Limbacher O-61
- 15:00 Metrological-grade frequency combs engineering from terahertz quantum cascade lasers
Valentino Pistore O-62
- 15:15 Coffee break

Session: Near-field microscopy and nanoscopy II

Session Chair: **Karl Unterrainer**

- 15:45 THz near-field imaging of 2D materials and subwavelength metal structures
Mengkun Liu I-08
- 16:15 Surface Cooper-pair plasma waves in a high-T_c cuprate superconductor
Adrian Gozar O-63
- 16:30 Ultrafast nanoscopy of an exciton Mott transition in bilayer WSe₂
Thomas Siday O-64
- 16:45 Broadband THz near-field microscopy of resonant metasurfaces: Making bound states in the continuum visible
Jaime Gómez Rivas O-65
- 17:00 Ultrafast directional photocurrents and terahertz emission from plasmonic nanoantennas on graphene
Hou-Tong Chen O-66
- 17:15 Closing remarks
PC member or chairs

List of posters

Poster Session I (Tuesday, 17:15)

Posters odd numbers

- P-01 Development and testing of a THz-TDS handheld probe for in vivo detection of skin cancer
Arturo Hernandez Serrano
- P-03 Terahertz anisotropy in striated biological samples
Hongting Xiong
- P-05 Terahertz birefringence in enamel
Jiahua Cai
- P-07 Disentangling complex current pathways in metallic nanostructures by terahertz spectroscopy
Nicolas S. Beermann
- P-09 Magnetic circular dichroism in terahertz frequency range
Roman Tesař
- P-11 3D-printed THz wave- and phaseplates
David Rohrbach
- P-13 Passive mode-locking in resonant-tunneling-diode terahertz oscillator
Tomoki Hiraoka
- P-15 Plasmon-polariton excitation and hydrodynamic rectification effects in plasmonic terahertz detector with two-dimensional diffraction grating structure
Akira Satou
- P-21 Characterization of a novel terahertz cross correlation spectroscopy device
Thorsten Bæk
- P-23 Disentangling 2D THz measurements with models derived from first-principles
Jeremy A. Johnson
- P-25 The role of asymmetry in mid-infrared, few-cycle pulses during terahertz pulse generation
Roland Flender

- P-27 Frequency-mixing process in resonant tunneling diode terahertz oscillator
Koichiro Tanaka
- P-29 Extracting scattering rates of coherently driven charge carriers via
temperature dependence of high-order sideband polarimetry in GaAs
Joseph B. Costello
- P-31 Above-threshold ionization assisted by a terahertz pulse
Dejan B. Milošević
- P-33 Ultracompact terahertz plasmonic filter based on multimode interference
Xinyu Ma
- P-35 Terahertz optical filtering with large area all-metal and polymer-metal
meshes
Simon Rossel
- P-37 Ultrafast switch-off of metamaterial polariton modes in a terahertz
photonic crystal cavity
Fanqi Meng
- P-39 Investigating Bi_2Se_3 plasmons using terahertz near field spectroscopy
Lucy L. Hale
- P-41 Antireflection properties and THz conductivity of ultrathin Bi(111) films
Alexander Stroh
- P-43 Simple experimental verification for a terahertz finite rate of innovation
method
Xavier E. Ramirez Barker
- P-45 High-efficiency infrared-light up-conversion detection system with
picosecond time gate using repetition-synchronized fiber lasers
Masayuki Hojo

List of posters

Poster Session II (Wednesday, 11:00)

Posters even numbers

- P-02 Terahertz generation through optical rectification in a reflection scheme
Mathias Hedegaard Kristensen
- P-04 Compact 750- μJ , 75-W, sub-40-fs laser for efficient THz light sources driven by a two-color scheme
Tino Eidam
- P-06 Strongly nonlinear excitation of antiferromagnetic resonance in high magnetic fields
Pavel Stremoukhov
- P-08 Tailoring terahertz frequency combs for molecular sensing
Dominik Theiner
- P-12 Enhanced THz emission from single crystals of Bi_2Te_3 and Bi_2Se_3 Topological Insulator at Lower Excitation Wavelengths
Anand Nivedan
- P-14 Waveguide integration of a 4.7–5.1-THz quantum cascade laser
Alex Valavanis
- P-16 Epi-down bonded quantum cascade patch antenna array laser
Michael Jaidl
- P-18 Strong light-matter coupling in the terahertz for a quantum emitter near a topological insulator nanoparticle
Emmanuel Paspalakis
- P-20 Sub-bandgap photoactivity of MoS_2 monolayer in a graphene- MoS_2 -graphene heterostructure
Arvind Singh
- P-22 Two-dimensional terahertz spectroscopy of coupling between fundamental excitations in solids
Jeremy A. Johnson
- P-24 Variables affecting accurate THz measurements with compact microfluidic device
Xuefei Ding

- P-26 Improvements in windowless spectroscopy: 3D printed nozzles
Adrian Buchmann
- P-28 Conduction properties of poly(ethylene oxide) electrolytes with lithium salts at terahertz frequencies
Johanna Weidelt
- P-30 Terahertz Time-Domain Spectroscopy on the topological Insulator Bi_2Se_3
Pascal Strathkötter
- P-32 Lock-In based continuous THz ATR TDS ellipsometry
Cornelius Mach
- P-34 Retrieving graphene electrical conductivity using terahertz cross correlation spectroscopy
Bjørn Mølvig
- P-36 Untangling ultrafast spectroscopy measurements of two-dimensional metal halide perovskites
Folusho Helen Balogun
- P-38 Frequency-resolved beam profile of a two-color air-plasma THz source
Mattias Rasmussen
- P-40 THz nanoscopy of platinum thin film conductivity
Henrik B. Lassen
- P-42 Ultra-broadband, transient THz spectroscopy of two-dimensional single- and multilayer perovskite single crystals
Binbin Zhou
- P-44 Mechanism of electromagnetic field emission during laser ablation
Shuntaro Tani

Notes

Notes

Program Overview

	Sunday June 19	Monday June 20	Tuesday June 21	Wednesday June 22	Thursday June 23	Friday June 24
8:45		Teahertz spectroscopy I	Teahertz spectroscopy II - Novel methods	Quantum phenomena and particle acceleration	High-field THz physics and nonlinear optics I	
9:00		Opening	Leonardo Viti	Mathias Hoffmann		
9:15		David Cooke	Shariy Reischer	Steven Jamson	Michael Frit	
9:30			Diyar Talbayev	Malte L. Welsch	Sebastian F. Mahrlein	
9:45		Jake Hutchison	Edward Butler-Cottle	Sandro Kollaris	Manuel Maierhofer	
10:00		Poornam Singh	Mathias Hegedgaard Kristensen	Michael Horbny	Joshua Morhinweg	
10:15		Wenqiao Zhang	Lucy Hale	Coffee break	Coffee break	
10:30		Coffee break			Optical THz generation and detection - Opt. rectification	
10:45		Metamaterials and plasmonics	Communication			
11:00			Daniel Mitterman		Ciro Srisiriso	
11:15		Abul K. Aard	David Rohrbach	Poster session II	Nicolai Miloroushin	
11:30		Jongwoo Han	Faima Talib		Clare Butler	
11:45		Diakar Roy Chowdhury	Joel Edouard Meeck		Leo Sulimand	
12:00		Iya Shadrinov	Hichem Guerboukha		Baokong Zhang	
12:15	Start of registration	Abulhish M. Zaman			Dong-Wen Zhang	
12:45						
13:00		Lunch break	Lunch break	Lunch break	Lunch break	
13:15	Tutorials I		High-field THz physics and nonlinear optics I			
13:30	Lei Zhou					
13:45			Hyek Noh	Teahertz spectroscopy III	Quantum cascade lasers	
14:00		Joschim Bude	Martin I. Cross	Kerill Vain	Michael Jahl	
14:15			Mark D. Thomson	Konstantin Warawa	Alexander Valavakis	
14:30			Guo-Qian Luo	Megan Nielson	Benedikt Limbacher	
14:45	Tobias Kampfarth	Xavier Ropagnol	Josef Riepl	Mathias Bunge	Valentino Pistone	
15:00		Juste Dovelis	Rokas Jusas	Tinkara Troha	Coffee break	
15:15		Igor Bremer	Stephan Winnerl	Coffee break		
15:30	Tutorials II		Applications in biology and medicine	Near-field microscopy and nanoscopy I	Near-field microscopy and nanoscopy II	
15:45		Coffee break				
16:00		Shiqin Liu	Emma Murphy	Melanie Müller	Mingjun Liu	
16:15	Jens Neu	Peyan Li	Enrique Castro-Camus	Valentino Pistone	Adrian Gozar	
16:30		Benedikt Limbacher	Jochen Talber	Carsten Rockle	Tom Sclay	
16:45				Angela Pirzolo	Jaime Gomez Rivas	
17:00		Peter Kubel		Andreas Lührer	Hao-Tong Chen	
17:15	Junichiro Kono	Alavi Pashkin	Poster session I	Eva Alkama Aurelia Pogna	PC member of Chairs - Closing remarks	
17:30		Jacob A. Spies		End of presentations	End of presentations	
17:45		End of presentations				
18:00						
18:15						
18:30						
18:45						
19:00	Welcome reception			Conference dinner		
19:15						
19:30						
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20:00						
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20:45						
21:00						
21:15						

Visit to the University of Pecs or ELIAPS

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Floor plan

