

**2nd FIR-LAB Workshop -
«Bright Far-Infrared Optoelectronic Sources Applied to Field-Matter Interaction Studies, Life
Sciences and Environmental Monitoring International Workshop»**

July 6 – 7, 2019 Nizhny Novgorod, Russia

Program

July, 6, 2019

09:00-18:00	Registration	
10:00-12:00	<p>Special section devoted to the KOMFI Project: “Informative characteristics of socially significant diseases in the terahertz frequency range: the multimodal studies of biological tissues, fluids and exhaled breath» <i>Chair: Alexander Shkurinov</i></p>	
	<p>Project 1: Molecular imaging of oncological pathologies of biological tissues in the terahertz spectral region using time-resolved laser spectroscopy, big data analysis technologies and machine learning</p>	<p><u>Yury Kistenev</u> <i>Tomsk State University, Tomsk, Russia</i></p>
	<p>Project 2: Development of scientific and methodological basis of the use of THz radiation for selective diagnostics based on the control of metabolites in exhaled air in oncological diseases</p>	<p><u>Vladimir Vaks</u> <i>Institute for Physics of Microstructures RAS, Nizhny Novgorod, Russia</i></p>
	<p>Project 3: Multispectral diagnostics of human fluids for the determination of informative features of socially significant diseases in the terahertz frequency range</p>	<p><u>Maxim Nazarov</u> <i>National Research Center «Kurchatov Institute», Moscow, Russia</i></p>
	<p>Project 4: Imaging of biological tissues (bio-imaging) using magnetic nanoparticles and hyperosmotic agents</p>	<p><u>Olga Smolyanskaya</u> <i>ITMO University, Saint Petersburg, Russia</i></p>
14:00-14:20	<p>Opening Ceremony <i>Juliette Mangeney, Jean-Louis Coutaz, Alexander Shkurinov</i></p>	
	<p>Section 1: Terahertz air- and liquid photonics <i>Chair: Wojciech Knap</i></p>	
14:20-14:40	<p>Secondary emission from the plasma generated by organized superfilaments</p>	<p><u>Arnaud Couairon</u> <i>Centre de Physique Théorique, Ecole polytechnique, CNRS, Institut Polytechnique de Paris, France</i></p>
14:40-15:00	<p>THz yield dependence on the initial and local phase shift in a two-color filament</p>	<p><u>Olga Kosareva</u> <i>Lomonosov Moscow State University, Moscow, Russia</i></p>

15:00-15:20	THz radiation spectra emitted by a single-color infrared and ultraviolet filaments	<u>Leonid Seleznev</u> <i>P.N. Lebedev Physical Institute of Russian Academy of Sciences, Moscow, Russia</i>
15:20-15:40	Generation of Terahertz Radiation from Liquid Nitrogen	<u>Alexei Balakin</u> <i>Lomonosov Moscow State University, Moscow, Russia</i>
15:40-16:00	Efficient conversion of intense laser pulses to THz in a low pressure gas	<u>Maxim Nazarov</u> <i>National Research Center «Kurchatov Institute», Moscow, Russia</i>
16:00-16:40	Coffee break	
	Section 2: Biomedical applications of THz waves. Chair: Juliette Mangeney	
16:40-17:00	Breathomics Applications of IR and Terahertz Spectroscopy and Machine Learning	<u>Yury Kistenev</u> <i>Tomsk State University, Tomsk, Russia</i>
17:00-17:20	Interaction of terahertz radiation with bio-like objects: theoretical and numerical modelling, real objects and phantom experiments	<u>Olga Smolyanskaya</u> <i>ITMO University, Saint Petersburg, Russia</i>
17:20-17:40	Research and development of effective optical technologies for diagnostics in dermatology	<u>Valery Tuchin</u> <i>Research-Educational Institute of Optics and Biophotonics, Saratov State University, Saratov, Russia</i>
17:40-18:00	Spectroscopy of pre-cancer states with using THz emitters based on superlattices	<u>Vladimir Vaks</u> <i>Institute for Physics of Microstructures RAS, Nizhny Novgorod, Russia</i>
18:00-18:20	Theoretical and experimental analysis of the mechanisms of the interaction of terahertz radiation with neurons	<u>Olga Cherkasova</u> <i>Institute of Laser Physics of SB RAS, Novosibirsk, Russia</i>
18:20-18:40	Silicon based technologies advances for biomedical imaging and non-destructive test	<u>Jean-Paul Guillet</u> <i>Laboratoire IMS, UMR CNRS 5218, 351 cours de la Libération 33405 Talence, France</i>

July, 7

	Section 3: Terahertz nonlinear phenomena. Chair: Alexei Baranov	
9:00-9:20	Controllable synthesis of DAST submicron crystals and their microstructuration by direct laser writing	<u>Tamara Pogosian</u> <i>ITMO University, Saint Petersburg, Russia</i>
9:20-9:40	Co-crystal 4-aminopyridine-4-nitrophenol-4-nitrophenolate for terahertz applications	<u>Igor Denisyuk</u> <i>ITMO University, Saint Petersburg, Russia</i>
9:40-10:00	Numerical study of ZnGeP ₂ and GaSe crystals for CO laser down-conversion into the THz range	<u>Yuri Klimachev</u> <i>P.N. Lebedev Physical Institute of Russian Academy of Sciences, Moscow, Russia</i>
10:40-11:00	Towards sub-wavelength THz imaging through nonlinear optical techniques	<u>Jean-Louis Coutaz</u> <i>IMEP-LAHC, UMR CNRS 5130, Université Savoie Mont-Blanc, Campus scientifique, 73376 Le Bourget du Lac Cedex, France</i>

11:00-11:20	Coffee break	
	Section 4: Semiconductor and nanotechnologies in THz phonics <i>Chair: Vladimir Vaks</i>	
11:20-11:40	THz Cyclotron Emission from HgCdTe Alloys with Dirac-like Band Structure.	<u>Wojciech Knap</u> <i>Laboratory Charles Coulomb, University of Montpellier&CNRS, Montpellier, France</i>
11:40-12:00	THz excited state level spacing in encapsulated graphene quantum dots	<u>Juliette Mangeney</u> <i>Laboratoire de Physique de l'Ecole normale supérieure, ENS, Université PSL, CNRS, Sorbonne Université, Université Paris-Diderot, Sorbonne Paris Cité, Paris, France</i>
12:00-12:20	Terahertz emission from HgCdTe quantum wells under long-wavelength optical pumping	<u>Vladimir Rumyantsev</u> <i>Institute for Physics of Microstructures RAS, Nizhny Novgorod, Russia</i>
12:20-13:40	Lunch	
13:40-14:00	Terahertz Quantum Cascade Laser with Non-Resonant Depopulation	<u>Alexei Baranov</u> <i>Institute of Electronics and Systems (IES), UMR 5214 CNRS - University of Montpellier, France</i>
14:00-14:20	Molecular THz lasers pumped by mid-infrared quantum cascade lasers	<u>Jean-François Lampin</u> <i>Terahertz Photonics Group, Institute of Electronics Microelectronics and Nanotechnology (IEMN) UMR CNRS 8520, Lille University, Villeneuve d'Ascq, France</i>
14:20-14:40	Fundamental principles for the development of new functional nanocomposite materials based on oxide 3D nanostructures for applications in THz optics and information transfer	<u>Andrei Kanaev</u> <i>Laboratoire des Sciences des Procédés et des Matériaux (LSPM), CNRS, Université Paris 13, Villetaneuse, France</i>
14:40-15:00	Coffee break	
	Section 5: THz spectroscopy <i>Chair: Jean-François Lampin</i>	
15:00-15:20	Experimental study and modeling of the spectral line shape and continuum absorption by atmospheric molecules in the THz range	<u>Mikhail Tretyakov</u> <i>Institute of Applied Physics RAS, Nizhniy Novgorod, Russia</i>
15:20-15:40	Rovibrational Spectroscopy of the Ground-State and some Fundamental Bands of SO ₂ F ₂	<u>Maud Rotger</u> <i>University of Reims Champagne-Ardenne, Reims, France</i>
15:40-16:00	Closing remarks.	