PROGRAM

9TH INTERNATIONAL WORKSHOP ON TERAHERTZ TECHNOLOGY AND APPLICATIONS

March 3rd – 4th, 2020, Fraunhofer-Center, Fraunhofer-Platz 1, Kaiserslautern
Terahertz technology has proven to be a valuable tool for applications in diagnostics, measurement, and testing. The industrial use of this technology, however, raises a lot of challenging questions. The “International Workshop on Terahertz Technology and Applications” fosters the exchange of knowledge and experience between academics and industry in this exciting and rapidly developing field. The following renowned experts have confirmed their participation and will give invited lectures to the forum:

- Martina Havenith-Newen, Ruhr-Universität Bochum, Germany
- Peter Uhd Jepsen, Technical University of Denmark, Denmark
- Christoph Lange, Universität Regensburg, Germany
- Tadao Nagatsuma, Osaka University, Japan

The ninth workshop will address primarily the topics:
- Industrial Applications
- Homeland Security
- Communications
- New Terahertz System Technologies

Chairmen
Georg von Freymann, Technische Universität Kaiserslautern, Germany
Joachim Jonascheit, Fraunhofer Institute for Industrial Mathematics ITWM, Germany
PROGRAM
Tuesday, March 3rd, 2020

11:00   Registration and laboratory tour at Fraunhofer ITWM
12:00   Snack
13:00   Welcome and opening remarks, Georg von Freymann, Fraunhofer ITWM

SESSION 1: NEW TECHNOLOGIES I
13:10   Physics and Applications of Terahertz-driven Electrons – from Thin-film Conductivity Characterization to THz Photomultipliers (invited)
        Peter Uhd Jepsen, Technical University of Denmark, Kgs. Lyngby, DK
13:40   THz Fourier Imaging Based on Heterodyne Detection
        Hui Yuan, Goethe-Universität Frankfurt am Main, DE
14:00   THz Pulse Detection with Graphene and Related Materials
        Petr A. Obraztsov, Russian Academy of Sciences, Moscow, RU
14:20   Palmtop, Tunable Backward Terahertz-wave Parametric Oscillator
        Kouji Nawata, Riken, Sendai, JP
14:40   Lithium Niobate based Single-cycle THz Source with 66 mW of Average Power at MHz-repetition Rate
        Tim Vogel, Ruhr-Universität Bochum, DE
15:00   Coffee break

SESSION 2: NEW TECHNOLOGIES II
15:30   Subcycle THz Dynamics in Extreme Settings of Light-matter Interaction: From Atomically Strong Fields to Vacuum Fields (invited)
        Christoph Lange, University of Regensburg, DE
16:00   Coherent Sampling of Injection-locked Resonant Tunneling Diode Terahertz Oscillators
        Takashi Arikawa, Kyoto University, JP
16:20   Coherent Lensless Imaging Techniques Using Terahertz Radiation
        Erwin Hack, Empa, Dübendorf, CHE
16:40   Broadband Infrared Field-resolved Spectroscopy
        Christina Hofer, Max-Planck-Institute of Quantum Optics, Garching, DE
17:00   Probing Surface States on Topological Insulators Using Mid-infrared Nano-tomography
        Martin Zirnisperger, University of Regensburg, DE
17:20   Poster session
19:00   Bus transfer to hotels
20:00   Evening reception at the “Fruchthalle”
8:30 Bus transfer to Fraunhofer ITWM

SESSION 3: COMMUNICATION

9:00 Recent Progress and Future Prospect of THz Communications Research enabled by Photonics (invited)
Tadao Nagatsuma, Osaka University, JP

9:30 Photonic Sampling for the Metrology of THz Wireless Communications
Ranjan Das, Technische Universität Braunschweig, DE

9:50 High Capacity Terahertz Communication Links Combining Photonic and Electronic Technologies in the Transmit-Receive Frontend
Ingmar Kallfass, University of Stuttgart, DE

10:10 True Time Delay Beamforming for THz Wireless Communications based on Photonic Chip and Photoconductive Antennas
Alvaro Morales, Eindhoven University of Technology, NL

10:30 Coffee Break

SESSION 4: SPECTROSCOPY

10:50 Ultrasensitive Marker-free Biomolecular THz Detection for Tumor Related Analytics
Peter Haring Bolvar, University of Siegen, DE

11:10 All-electronic THz Nanoscopy: Local Permittivity Mapping of Bacteria
Peter Haring Bolvar, University of Siegen, DE

11:30 Application of Terahertz-/Millimeter-Wave Gas Spectroscopy for Detection of Volatile Organic Compounds in Gases
Nick Rothbart, German Aerospace Center (DLR), Berlin, DE

11:50 Ultra-long Carrier Recombination Processes for Hot Carriers in Undoped Graphene/hBN Heterostructures
Panhuai Huang, Sorbonne Université, FR; East China Normal University, Shanghai, CN

12:10 Lunch

SESSION 5: APPLICATION

13:00 Comparison of optoelectronic Time and Frequency Domain Systems for Multilayer Thickness Determination
Lars Liebermeister, Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute, Berlin, DE

13:20 Layer-thickness Measurements with Incoherent Terahertz Light
Daniel Molter, Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern, DE

13:40 Examination of Wax-resin lining Condition of Oil Paintings by using THz time-domain Imaging
Kaori Fukunaga, National Institute of ICT, Tokyo, JP

14:00 Sensor Fusion of Ultrasound Excitation and Terahertz Detection to Image Concealed Impact Damage within Carbon Fiber Composites
David Zimdars, TeraMetrix, Ann Arbor, Michigan, USA

14:20 Analysis of Pore Structure in Pharmaceutical Tablets using THz TDS
Mira Naftaly, National Physical Laboratory, Teddington, UK

14:40 Mobile Handheld Imaging System for Nondestructive Testing with Millimeter Waves
Fabian Friederich, Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern, DE

15:00 Closing remarks, Georg von Freymann, Fraunhofer ITWM

15:15 Coffee Break

15:15 Laboratory tour at Fraunhofer ITWM

17:00 End of workshop
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<td>A. Singh, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, DE</td>
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J. Mornhinweg, University of Regensburg, DE

P30 Terahertz Signal and Image Processing for Enhancement of Air Voids Detection
N. Palka, Military University of Technology, Warsaw, PL

P31 Permittivity Determination by Polarimetric MMW Radiometry
M. Peichl, DLK, Oberpaffenhofen, DE

P32 An Efficient Terahertz Rectifier on the SiC/Graphene Platform
M. Schlecht, FAU Erlangen-Nürnberg, DE

P33 Photonic Sources and Beam Steering Techniques for Mobile THz Imaging and Spectroscopy
A. Stöhr, University of Duisburg-Essen, Duisburg, DE

P34 Foreign Body Detection in Food Enabled by a 4096 Pixel Terahertz Camera
S. C. Tonder, University of Duisburg-Essen, Duisburg, DE

P35 Design and Simulation of a Metasurface Enhanced THz Sensor
H. Tugay, Middle East Technical University, Ankara, TR

P36 Function of Human Fingerprint as Capillary Channel to Prevent Slipping when Gripping
S.-M. Yuma, Seoul National University, KR

P37 Terahertz Sensing with Visible Light
M. Kutas, Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern, DE

P38 Design of a Mobile Scanning System for Imaging with Frequency-Modulated Continuous-Wave Terahertz Radiation
S. Mohammadzadeh, Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern, DE

P39 Multilayer Thickness Inspection with W FrequencyBand FMCW Radar
N. S. Schreiner, Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern, DE

P40 Iterative Algorithms in the Context of Terahertz Tomographic Imaging
F. Friederich, Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern, DE

P41 New Series of Standards VDI/VDE 5590 on Terahertz Systems
Technical Committee VDI/VDE-GMA FA 8.17 TERAHERTZ SYSTEMS, Düsseldorf, DE