

# Program of RJUSE TeraTech-2021

MONDAY, Nov. 1st, 2021

## 10:15-10:25 Opening

### Session Mo1 Plasmonic THz Devices I

10:25-11:15 Chair: Taiichi Otsuji (*Tohoku University, Japan*)

- 10:25-11:15 Mo1-1 **Terahertz plasmonics: from terahertz detection and spectroscopy to twisted plasmons**  
Michael S. Shur  
*Rensselaer Polytechnic Institute, USA*
- Plenary

## 11:15-11:30 Coffee Break

### Session Mo2 Graphene THz Devices I

11:30-13:00 Chair: Vladimir Mitin (*University at Buffalo, USA*)

- 11:30-12:00 Mo2-1 **Plasma instability and generation of THz radiation using graphene-based field-effect transistors and lateral diodes with the coulomb electron drag**  
Invited Victor Ryzhii  
*Institute of Ultra-High Frequency Semiconductor Electronics, Russia*
- 12:00-12:30 Mo2-2 **Plasmon scattering in graphene junctions from scanning near-field microscopy simulations**  
Invited V. Perebeinos  
*University at Buffalo, USA*
- 12:30-12:45 Mo2-3 **THz generation from Van der Waals crystals**  
Contributed Chao Tang  
*Tohoku University, Japan*
- 12:45-13:00 Mo2-4 **High speed terahertz detection by an asymmetric dual-grating-gate graphene FET**  
Contributed Koichi Tamura  
*Tohoku University, Japan*

## 13:00-14:15 Lunch

### Session Mo3 Graphene THz Devices II

14:15-15:45 Chair: Dmitry Svintsov (*MIPT, Russia*)

- 14:15-14:45 Mo3-1 **Terahertz ratchet effects in graphene**  
Invited Sergey Ganichev  
*Regensburg University, Germany*
- 14:45-15:15 Mo3-2 **Encapsulated graphene devices for the terahertz technology**  
Invited Yahya M. Meziani  
*Universidad de Salamanca, Spain*
- 15:15-15:30 Mo3-3 **Graphene plasmon transformation at a periodic modulation of carrier density**  
Contributed Anastasiia Shirokova  
*University of Nizhny Novgorod, Russia*

15:30-15:45 **Strong polarization sensitivity in metal-graphene-metal far-infrared detectors**  
Mo3-4  
Contributed  
Valentin Semkin  
*Moscow Institute of Physics and Technology, Russia*

**15:45-16:00 Coffee Break**

**Session Mo4 Narrow Bandgap Materials for THz Devices I**

**16:00-17:30** Chair: TBA

16:00-16:30 **THz and multi- THz stimulated emission of Dirac fermions in CdHgTe QW dielectric and "phonon" waveguide heterostructures: the present and future**  
Mo4-1

Invited  
Sergey V. Morozov  
*Inst. for Physics of Microstructures, Russia*

16:30-17:00 **Terahertz plasmon in narrow gap HgTe/CdHgTe quantum wells**  
Mo4-2

Invited  
Alexander A. Dubinov  
*Inst. for Physics of Microstructures, Russia*

17:00-17:30 **MBE growth of complex CdHgTe infrared detector, laser and nBn heterostructures**  
Mo4-3

Invited  
Nikolai Mikhailov  
*Novosibirsk State University, Russia*

**17:30-17:45 Coffee Break**

**Session Mo5 2D Electron Systems for THz Devices**

**17:45-19:00** Chair: Denis Fateev (*IREE, Russia*)

17:45-18:00 **Thresholdless excitation of edge plasmons by transverse current**  
Mo5-1

Contributed  
Aleksandr S. Petrov  
*Moscow Institute of Physics and Technology, Russia*

18:00-18:15 **Dipole excitation of terahertz plasmons in electrically biased two-dimensional electron systems**  
Mo5-2

Contributed  
Aleksandr S. Petrov  
*Moscow Institute of Physics and Technology, Russia*

18:15-18:30 **The in-plane photoelectric effect - Experiment**  
Mo5-3

Contributed  
Wladislaw Michailow  
*University of Cambridge, England*

18:30-19:00 **The in-plane photoelectric effect – Theory**  
Mo5-4

Invited  
Sergey Mikhailov  
*University of Augsburg, Germany*

## TUESDAY, Nov. 2nd, 2021

<b>Session Tu1</b> <b>11:30-12:30</b>	<b>Nanostructured THz Devices</b> Chair: Berardi Sensale-Rodriguez ( <i>The University of Utah, USA</i> )
11:30-12:00 Tu1-1 Invited	<b>Fast switching based on a one-dimensional electron gas in a Y-shaped device</b> Vladimir V. Mitin <i>University at Buffalo, USA</i>
12:00-12:30 Tu1-2 Invited	<b>Terahertz detection by thermomechanical transduction using MEMS technology</b> Kazu Hirakawa <i>University of Tokyo, Japan</i>

### 12:30-14:15 Lunch

<b>Session Tu2</b> <b>14:15-15:50</b>	<b>Nonlinear THz Generation</b> Chair: Kosuke Murate ( <i>Nagoya University, Japan</i> )
14:15-15:05 Tu2-1 Plenary	<b>Leading-edge THz-wave research opened up by nonlinear photon-conversion devices</b> Hiroaki Minamide <i>RIKEN Center for Advanced Photonics, Japan</i>
15:05-15:20 Tu2-2 Contributed	<b>Multiphoton ionization fronts in ZnS for terahertz light conversion</b> M. A. Kurnikov <i>Novosibirsk State University, Russia</i>
15:20-15:35 Tu2-3 Contributed	<b>Generation of unipolar electromagnetic missiles by optical rectification of ultrashort laser pulses</b> Alina Novokovskaya <i>University of Nizhny Novgorod, Russia</i>
15:35-15:50 Tu2-4 Contributed	<b>Terahertz emission from epitaxial InAs</b> Valerii Trukhin <i>Ioffe Institute, Russia</i>

### 15:50-16:05 Coffee Break

<b>Session Tu3</b> <b>16:05-17:50</b>	<b>Graphene THz Devices III</b> Chair: Yahya M. Meziani ( <i>Universidad de Salamanca, Spain</i> )
16:05-16:35 Tu3-1 Invited	<b>Graphene Diodes for Terahertz Rectification</b> Max Lemme <i>Aachen University, Germany</i>
16:35-17:05 Tu3-2 Invited	<b>Tunnel field-effect transistors for terahertz detection</b> Dmitry Svintsov

*Moscow Institute of Physics and Technology, Russia*

17:05-17:35  
Tu3-3  
Invited

**Photovoltaics of spatially modulated bilayer graphene: evidence of hydrodynamic regime**  
Valentin Kachorovskii  
*Ioffe Physico-Technical Institute, Russia*

17:35-17:50  
Tu3-4  
Contributed

**Unveiling the microscopic origin of the terahertz conductance in strained polycrystalline graphene**  
Simone Zanotto  
*NEST, Istituto Nanoscienze, Italy*

**17:50-18:05 Coffee Break**

**Session Tu4 Narrow Bandgap Materials for THz Devices II**

**18:05-19:05**

Chair: Sergey Mikhailov (*University of Augsburg, Germany*)

18:05-18:35  
Tu4-1  
Invited

**Terahertz and multiterahertz nonlinear responses in 3D Dirac semimetal Cd<sub>3</sub>As<sub>2</sub>**  
Ryusuke Matsunaga  
*University of Tokyo, Japan*

18:35-19:05  
Tu4-2  
Invited

**Lorentz-driven Landau emission of Dirac and Kane fermions in graphene and CdHgTe bulk films**  
Frederic Teppe  
*University of Montpellier and CNRS, France*

## WEDNESDAY, Nov. 3rd, 2021

### Session We1 Carrier Dynamics and Material Properties in THz Regime I

10:15-11:45

Chair: Michael S. Shur (*Rensselaer Polytechnic Institute, USA*)

10:15-11:45

We1-1

Invited

**Magnonic simulations of terahertz ultrastrong light-matter coupling**

Junichiro Kono

*Rice University, USA*

10:45-11:15

We1-2

Invited

**THz characterization and applications of wide bandgap materials: III-Nitrides and gallium oxide**

Berardi Sensale-Rodriguez

*The University of Utah, USA*

11:15-11:30

We1-3

Contributed

**Hot carrier dynamics and electron-phonon coupling studied by time-resolved THz spectroscopy**

Masatsugu Yamashita

*RIKEN Center for Advanced Photonics, Japan*

11:30-11:45

We1-4

Contributed

**THz spectra of thermal degraded polyethylene**

Fumiki Iwasaki

*Shibaura Institute of Technology, Japan*

11:45-12:00 **Coffee Break**

### Session We2 Superconducting THz Devices

12:00-12:50

Chair: Victor Ryzhii (*IUHFSE, Russia*)

12:00-12:50

We2-1

Plenary

**Superconducting single-photon detector technology on the way to the terahertz range**

Gregory N. Goltsman

*Moscow State Pedagogical University, Russia*

12:50-14:15 **Lunch**

### Session We3 THz Wireless Communications

14:15-16:05

Chair: Akira Satou (*Tohoku University, Japan*)

14:15-15:05

We3-1

Plenary

**Terahertz photonics for sensing and communications applications**

Tadao Nagatsuma

*Osaka University, Japan*

15:05-15:35

We3-2

Invited

**Technical issues in sub-terahertz band communications and 300 GHz CMOS transceivers**

Minoru Fujishima

*Hiroshima University, Japan*

15:35-16:05

We3-3

Invited

**300 GHz links enabled by Yagi-Uda antenna**

Guillaume Ducournau

*Lille 1 University, France*

16:05-16:20 Coffee Break

**Session We4 Plasmonic THz Devices II**

16:20-17:35 Chair: Frederic Teppe (*U. Montpellier and CNRS, France*)

16:20-16:50  
We4-1  
Invited  
**Use of weak plasmon modes for detection and amplification of terahertz radiation**  
Denis Fateev  
*Kotelnikov Institute of Radio Engineering and Electronics, Russia*

16:50-17:05  
We4-2  
Contributed  
**Giant enhancement of photovoltage from InP-based dual-grating-gate HEMT plasmonic THz detector due to 3D rectification effect**  
Takumi Negoro  
*Tohoku University, Japan*

17:05-17:20  
We4-3  
Contributed  
**Modal analysis of 2D plasmon-polariton in plasmonic THz detector with 2D diffraction grating structure**  
Yuma Sasaki  
*Tohoku University, Japan*

17:20-17:35  
We4-4  
Contributed  
**Optimal asymmetry of transistor-based terahertz detectors**  
Alexander Shabanov  
*Moscow Institute of Physics and Technology, Russia*

17:35-17:50 Coffee Break

**Session We5 THz Measurement Methods I**

17:50-19:05 Chair: Chiko Otani (*RAP, Japan*)

17:50-18:20  
We5-1  
Invited  
**Nanothermometry of hot electrons**  
Susumu Komiyama  
*University of Tokyo, Japan*

18:20-18:50  
We5-2  
Invited  
**Nano-seismology on GaInN/GaN MQWs sandwiched in GaN medium by LTEM**  
Masayoshi Tonouchi  
*Osaka University, Japan*

18:50-19:05  
We5-3  
Contributed  
**Depth super-resolution terahertz tomography for inspection inside of walls**  
Homare Momiyama  
*Topcon corporation, Japan*

## THURSDAY, Nov. 4th, 2021

<b>Session Th1</b> <b>10:15-12:15</b>	<b>Electronic/Photonic THz Devices and Components I</b> Chair: Minoru Fujishima ( <i>Hiroshima University, Japan</i> )
10:15-10:45 Th1-1 Invited	<b>Recent progress of terahertz emitters using resonant tunneling diodes</b> Masahiro Asada <i>Tokyo Institute of Technology, Japan</i>
10:45-11:15 Th1-2 Invited	<b>Photonics-assisted terahertz beam control</b> Kazutoshi Kato <i>Kyushu University, Japan</i>
11:15-11:45 Th1-3 Invited	<b>Enhanced terahertz emission and detection through plasmonic nanocavities</b> Mona Jarrahi <i>University of California at Los Angeles, USA</i>
11:45-12:00 Th1-4 Contributed	<b>Resonant-tunneling-diode oscillator array with zigzag arrangement for terahertz power combination</b> Mai Van Ta <i>Tokyo Institute of Technology, Japan</i>
12:00-12:15 Th1-5 Contributed	<b>Scaling rule of double-mixing conversion gain of UTC-PD-integrated HEMT on UTC-PD mesa size</b> Dai Nakajima <i>Tohoku University, Japan</i>

### 12:15-14:15 Lunch

<b>Session Th2</b> <b>14:15-16:15</b>	<b>Electronic/Photonic THz Devices and Components II</b> Chair: Hiroaki Minamide ( <i>RAP, Japan</i> )
14:15-14:45 Th2-1 Invited	<b>Terahertz detection through strain-induced photoconductive devices</b> Dmitry Ponomarev <i>Institute of Ultra-High Frequency Semiconductor Electronics, Russia</i>
14:45-15:15 Th2-2 Invited	<b>Three-dimensional printing of photonic components for the terahertz band</b> Enrique Castro Camus <i>Philipps University of Marburg, Germany</i>
15:15-15:45 Th2-3 Invited	<b>Nanomaterials and microstructures for THz devices</b> Alessandro Tredicucci <i>University of Pisa, Italy</i>

15:45-16:15  
Th2-4  
invited

## **Germanium as an ultrabroadband THz material**

Manfred Helm  
*Helmholtz-Zentrum Dresden-Rossendorf, Germany*

**16:15-16:30 Coffee Break**

### **Session Th3 Carrier Dynamics and Material Properties in THz Regime II**

**16:30-17:20**

Chair: Manfred Helm (*HZDR, Germany*)

16:30-17:20  
Th3-1  
Plenary

#### **Terahertz enhancement of dynamic nuclear polarization in semiconductors**

Wojciech Knap  
*CENTERA LABORATORIES, Institute of High Pressure Physics  
PAS, Poland*

**17:20-17:35 Coffee Break**

### **Session Th4 THz Measurement Methods II**

**17:35-18:50**

Chair: Masayoshi Tonouchi (*Osaka University, Japan*)

17:35-18:05  
Th4-1  
Invited

#### **Development of 300 GHz walk-through body scanner by THz radar technology**

Chiko Otani  
*RIKEN Center for Advanced Photonics, Japan*

18:05-18:35  
Th4-2  
Invited

#### **Development of terahertz parametric generator for real-time measurement**

Kosuke Murate  
*Nagoya University, Japan*

18:35-18:50  
Th4-3  
Contributed

#### **THz Detection of E-waste**

Toa Yoshizumi  
*Shibaura Institute of Technology, Japan*

**18:50-19:00 Closing**