

TeraNano III: Third International Symposium on Terahertz Nanoscience

December 10-12, 2012
Hilton Hawaiian Village, Honolulu, Hawaii, U.S.A.

Co-chairs: Junichiro Kono (Rice University) and Masayoshi Tonouchi (Osaka University)

MONDAY, December 10, 2012

11:00 - 12:00 Check in, *Registration table will be in front of Honolulu Suite #1*

12:00 - 13:00 Opening Lunch, *Honolulu Prefunction*

13:00 - 13:15 Welcome Remarks: Junichiro Kono (Rice University, U.S.A.)
Honolulu Suites

13:15 - 14:45 **SESSION 1: THz Dynamics in Graphene**
Chair: Junichiro Kono (Rice University, U.S.A.)
Honolulu Suites

13:15 - 13:45 Theodore B. Norris (University of Michigan, U.S.A.)
THz Dynamics in Epitaxial, CVD, and Functionalized Graphene (invited talk)

13:45 - 14:15 Hugen Yan (IBM T. J. Watson Research Center, U.S.A.)
THz Plasmons and Magnetoplasmons in Graphene (invited talk)

14:15 - 14:45 Alexey A. Belyanin (Texas A&M University, U.S.A.)
Nonlinear Generation of THz Radiation and Entangled Photons in Graphene (invited talk)

14:45 - 15:15 Coffee Break

15:15 - 17:00 **SESSION 2: THz and GHz Devices**
Chair: Alessandro Tredicucci (Istituto Nanoscienze-CNR and Scuola Normale Superiore, Italy)
Honolulu Suites

15:15 - 15:45 Berardi Sensale-Rodriguez (University of Notre Dame, U.S.A.)
Reconfigurable THz Devices Using Graphene (invited talk)

15:45 - 16:00 Maki Suemitsu (Tohoku University, Japan)
High Frequency Performance of Graphene Field-Effect Transistors with Extremely Small Access Length

16:00 - 16:15 Vladimir V. Mitin (University at Buffalo, U.S.A.)
Distinctiveness of Non-equilibrium Carriers in Disordered Graphene

16:15 - 16:30 Nobuyuki Aoki (Chiba University, Japan)
Fabrication and Characterization of Carbon-Nanotube Network Transistors

16:30 - 17:00 Iwao Hosako (National Institute of Information and Communications Technology, Japan)
Intensity Modulation of THz Quantum Cascade Lasers by Near-Infrared Optical Pulse Injection (invited talk)

Evening Free - Enjoy Honolulu!

TUESDAY, December 11, 2012

Breakfast on your own. We recommend the Rainbow Lanai.

09:00 - 10:30 **SESSION 3: THz Detection, Generation, and Modulation**
Chair: Theodore B. Norris (University of Michigan, U.S.A.)
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- 09:00 - 09:30 **Alessandro Tredicucci** (Istituto Nanoscienze-CNR and Scuola Normale Superiore, Italy)
THz Detection with Graphene and Nanowire Transistor Devices (invited talk)
- 09:30 - 09:45 **Daichi Suzuki** (Tokyo Institute of Technology, Japan)
Solid-State Frequency-Tunable THz Detector with Gate-Voltage-Controlled Modulation by a GaAs/AlGaAs Quantum Device
- 09:45 - 10:00 **Akira Satou** (Tohoku University, Japan)
Numerical Study of Plasmons in Gated Graphene Structures
- 10:00 - 10:15 **Young-Dahl Jho** (Gwangju Institute of Science and Technology, South Korea)
Directional THz Emission from InAs-Based Micro-scale Groove Patterns
- 10:15 - 10:30 **Christopher J. Stanton** (University of Florida, U.S.A.)
Coherent Phonons in Carbon-Based Nanostructures for THz Optical Modulators

10:30 - 11:00 Coffee Break

11:00 - 12:00 **SESSION 4: Novel THz Materials and Structures**
Chair: Masayoshi Tonouchi (Osaka University, Japan)
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- 11:00 - 11:15 **Shigeo Maruyama** (University of Tokyo, Japan)
Multi-layer Film of Vertically Aligned Single-Walled Carbon Nanotubes with Vastly Different Properties
- 11:15 - 11:30 **Robert Vajtai** (Rice University, U.S.A.)
Two-Dimensional Materials and Structures for THz Applications
- 11:30 - 11:45 **Hitoshi Tabata** (University of Tokyo, Japan)
Biomedical Sensing by THz-ATR with Micro-nano Patterned Metal Arrays
- 11:45 - 12:00 **Daniel M. Mittleman** (Rice University, U.S.A.)
Spoof Surface Plasmon Enhanced Reflection in THz Parallel-Plate Waveguides

12:00 - 13:15 Included Lunch, *Honolulu Prefunction*

13:15 - 14:45 **SESSION 5: International THz Education**
Chair: Christopher J. Stanton (University of Florida, U.S.A.)
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- 13:15 - 13:45 **Jean Léotin** (Laboratoire National des Champs Magnétiques Intenses de Toulouse, France) & **Gigi Nevils-Noe** (Rice University, U.S.A.)
RAMSES: Repetitive Advanced Magnet for Student Experiments and Science
- 13:45 - 14:15 **Thomas A. Searles** (Morehouse College, U.S.A.)
Undergraduate THz Exercises for Advanced Laboratory

14:15 - 14:45 Cheryl A. Matherly (University of Tulsa, U.S.A.) & Sarah R. Phillips (Rice University, U.S.A.)
A U.S. and Japanese Student Outlook on the Impact of International Research Internships

14:45 - 15:15 Coffee Break

15:15 - 17:00 **SESSION 6: Ultrafast THz Dynamics**
Chair: Alexey A. Belyanin (Texas A&M University, U.S.A.)
Honolulu Suites

15:15 - 15:45 Mackillo Kira (Philipps-Universität Marburg, Germany)
Unveiling Many-Body Physics with THz Spectroscopy (invited talk)

15:45 - 16:00 Hyunyong Choi (Yonsei University, South Korea)
Ultrafast THz and Mid-Infrared Intra-excitonic Dynamics of Individualized Semiconducting Carbon Nanotubes

16:00 - 16:15 Benedict N. Murdin (University of Surrey, U.K.)
THz Dynamics of Shallow Acceptors in Silicon

16:15 - 16:30 Qi Zhang (Rice University, U.S.A.)
Coherent THz Magneto-spectroscopy of High-Mobility Two-Dimensional Electron Gases

16:30 - 17:00 Tetsuo Ogawa (Osaka University, Japan)
Lasing and Polariton Condensation in Semiconductors (invited talk)

17:15 - 20:00 Waikiki Starlight Luau at Hilton Hawaiian Village on the rooftop of the Mid-Pacific Conference Center

WEDNESDAY, December 12, 2012

08:30 - 11:00 **SESSION 7: Posters and Industry Exhibitions**
Tapa Ball Room #3, Continental breakfast will be served

11:00 - 12:00 **SESSION 8: Future THz Science and Technology to Come**
Chair: Junichiro Kono (Rice University, U.S.A.)
Honolulu Suites

11:00 - 11:30 Mikhail E. Portnoi (University of Exeter, U.K.)
Prospective THz Applications of Carbon Nanotubes and Graphene (invited talk)

11:30 - 12:00 Karl Unterrainer (Vienna University of Technology, Austria)
Linear and Nonlinear THz Dynamics in Nanostructures (invited talk)

12:00 - 12:15 **CLOSING: Junichiro Kono (Rice University, U.S.A.)**
Honolulu Suites

Poster Presentations

- P-1 **Jason R. Ball** (Rice University, U.S.A.)
Search for Conduction Electron Spin Resonance in Single-Wall Carbon Nanotubes
- P-2 **Kofi S. S. Christie** (Morehouse College, U.S.A.)
THz Time-Domain Spectroscopy of Gold Nanorods
- P-3 **Sakura Hatakeyama** (Ibaraki University, Japan)
THz Time-Domain Spectroscopy for Lactose Analysis on the Stereoisomer and the Particle Size
- P-4 **Roland Holzwarth** (Menlo Systems GmbH, Germany)
Coherent THz Magneto-spectroscopy Using a Repetitive Pulsed Magnet
- P-5 **Yoh Imai** (Ibaraki University, Japan)
Analysis of Multilayered THz Waveguide by Using Polymer Tubes with Different Indices
- P-6 **Young-Dahl Jho** (Gwangju Institute of Science and Technology, Korea)
Relationship between Electron-Phonon Interactions and Electronic Transport in Narrow-Gap Semiconductors
- P-7 **Takafumi Kamimura** (Osaka University, Japan)
Room Temperature Operation of Multilevel Single Hole Memory of Carbon Nanotube Wrapped by Double-Gate Insulator Layers of $\text{SiN}_x/\text{Al}_2\text{O}_3$
- P-8 **Iwao Kawayama** (Osaka University, Japan)
Infrared and THz Properties of Composition-Tuned Boron Nitride Thin Films
- P-9 **Kazuki Kojima** (Tohoku University, Japan)
Study on THz Negative Dynamic Conductivity in Optically Pumped Graphene
- P-10 **Nobuhiro Kondo** (Tokyo Institute of Technology, Japan)
THz Camera Imaging of Crystalline Polyhydroxybutyrates
- P-11 **Takayoshi Kuqa** (Tokyo Institute of Technology, Japan)
THz Detection with Log-Spiral Antenna-Coupled Si Quantum Dots
- P-12 **Yuki Kurita** (Tohoku University, Japan)
THz Population Inversion in Graphene under Pulse Excitation: Dependence on Pumping Photon Energy
- P-13 **Alec Nicol** (University of Minnesota, U.S.A.)
Development of a Graphene Field Effect Transistor for GHz/THz Sensing
- P-14 **G. Timothy Noe II** (Rice University, U.S.A.)
THz Magneto-optics in Pulsed High Magnetic Fields
- P-15 **Eric Rosenthal** (University of Pennsylvania, U.S.A.)
Coherent Phonon Model for Radial Breathing Mode in Carbon Nanotubes
- P-16 **Paul A. Russell** (Rice University, U.S.A.)
THz Spectroscopy of Aligned Carbon Nanotubes and Graphene Microribbon Arrays

- P-17 **Khandoker Abu Salek** (Osaka University, Japan)
Effect of CW Laser Illumination on THz Emission from Solar Cell Investigated by Laser THz Emission Microscope
- P-18 **Yuki Sano** (Osaka University, Japan)
Imaging of Graphene Films on Indium Phosphide with Laser THz Emission Microscopy
- P-19 **Aren Siekmeier** (University of Minnesota, U.S.A.)
Carbon Nanotube Capture by AC Dielectrophoresis for the Fabrication of a Thin Film Transistor and Investigation of Its Properties by Scanning Gate Microscopy
- P-20 **Ratchanok Somphonsane** (University at Buffalo, U.S.A.)
Energy Relaxation in Mesoscopic Graphene
- P-21 **Mika Tabata** (Rice University, U.S.A.)
Characterization of Graphene Films Using THz Imaging and Spectroscopy
- P-22 **Yuhei Yabe** (Tohoku University, Japan)
Measurement of the Field Distribution of THz Photon Echo Pulses in an Electro-optic Crystal
- P-23 **Rusen Yan** (University of Notre Dame, U.S.A.)
Near-Field Enhanced Graphene THz Modulators
- P-24 **Qi Zhang** (Rice University, U.S.A.)
THz to UV Spectroscopy of Semiconductor and Metal Enriched Single-Wall Carbon Nanotubes
- P-25 **Zhaohui Zhang** (University of Science and Technology Beijing, China)
Extra THz Absorptions by Some Nano-Mixture Samples