# CSW 2016 Program

# June 26th (Sunday)

## Short Course A — Room B (201) 14:00-15:30

**Manipulation of Photons by Photonic Crystals**

Susumu Noda

*Kyoto University, Japan*

In this short course, I will review the recent progresses in photonic crystal research, which includes (1) ultrahigh-Q nanocavities and their applications, (2) broad-area photonic-crystal cavities and their applications to high-power coherent lasers, and (3) thermal-emission control based on control of photonic and electronic states. Through such a broad-range of progresses, I hope that the audience could feel that photonic crystal research is now approaching to a goal towards "ultimate control of photons"

## Short Course B — Room B (201) 16:00-17:30

**New Perspectives for Oxide Semiconductors and Their Applications**

**$\sim$ Tuning The Electronic Properties of Oxide-Semiconductor Heterostructures $\sim$**

Akira Ohtomo

*Tokyo Institute of Technology, Japan*

In this lecture, a review on most intensively studied oxide semiconductors will be given with emphasis on the growth of heterostructures and the physical properties. ZnO has outstanding optical and electronic properties, such as large exciton-binding energy, excellent luminescent properties, high electron mobility, piezoelectricity, and a direct wide bandgap. All of these features and the relatively easy growth of the nanostructures have spurred the investigation of these materials for a large scope of photonics and electronics applications, including light-emitting diodes (LEDs), photodetectors, and transparent field-effect transistors. As for perovskite oxides, high-mobility two-dimensional electron gas and superconductivity can be created in $SrTiO_3$ based heterostructures, allowing us to explore the quantum transport in a novel class of superconducting semiconductors.

**$\sim$ Current Status and Future Prospects of Gallium Oxide Technologies $\sim$**

Masataka Higashiwaki

*National Institute of Information and Communications Technology, Japan*

Gallium oxide ($Ga_2O_3$) possesses excellent material properties especially for power device applications. It is also attractive from an industrial viewpoint since large-size, high-quality wafers can be manufactured by using simple methods. These two features have drawn much

attention to $Ga_2O_3$ as a new wide bandgap semiconductor following SiC and GaN. This lecture will discuss the recent progress in development on fundamental technologies for $Ga_2O_3$ devices, covering wafer production from melt-grown bulk single crystals, homoepitaxial thin-film growth by molecular beam epitaxy and halide vapor phase epitaxy, as well as device processing and characterization of metal-oxide-semiconductor field-effect transistors and Schottky barrier diodes.

# June 27th (Monday)

## Opening Session — Room A (Main Hall) 8:30-8:40

## MoPLN1 Plenary Session 1 — Room A (Main Hall) 8:40-10:00

*Chair:* H. Yamaguchi and K. Hirakawa

MoPLN1-1 8:40 - 9:20
**Quantum cascade laser frequency combs: physics and applications**
Jerome Faist
*Institute for Quantum Electronics, ETH Zurich, Switzerland*

MoPLN1-2 9:20 - 10:00
**Novel Oxide Semiconductors for OLEDs and Catalysis**
Hideo Hosono
*Tokyo Institute of Technology, Japan*

*Coffee Break* 10:00 - 10:30

## MoPLN2 Plenary Session 2 — Room A (Main Hall) 10:30-11:50

*Chair:* Y. Miyamoto and S. Matsuo

MoPLN2-1 10:30 - 11:10
**Nanometer-Scale III-V CMOS**
J. A. del Alamo
*Microsystems Technology Laboratories, Massachusetts Institute of Technology, United States of America*

MoPLN2-2 11:10 - 11:50
**InP-Based Integrated Optical Devices - Present and Future -**
Hajime Shoji
*Transmission Devices Laboratory, Sumitomo Electric Industries, LTD., Japan*

## ISCS/IPRM Award Ceremony — Room A (Main Hall) 11:50-12:30

*Lunch Break* 12:30 - 14:00

## MoB3 Nanocarbon & 2D Properties — Room B (201) 14:00-16:00

*Chair:* T.Machida

MoB3-1 (Invited) 14:00 - 14:30

**What is unique in 2D-layered materials?**

Young Hee Lee

*CINAP, Institute for Basic Science, Sungkyunkwan University, Republic of Korea*

MoB3-2 14:30 - 14:45

**Effect of Defects on Graphene Thermoelectric Properties**

Yuki Anno, Kuniharu Takei, Seiji Akita, and Takayuki Arie

*Department of Physics and Electronics, Osaka Prefecture University, Japan*

MoB3-3 14:45 - 15:00

**Strain-induced Semiconducting Electron Transport in Graphene Field Effect Devices**

Rineka Hiraide,[1] Hiroki Sonoda,[1] Shoma Higuchi,[1] Hikari Tomori,[1,2] and Akinobu Kanda[1]

*[1]Division of Physics and TIMS, University of Tsukuba, Japan, [2]PRESTO-JST, Japan*

MoB3-4 15:00 - 15:15

**Phonon Engineering of Graphene by Local Strain**

Yuki Imakita, Yuki Anno, Kuniharu Takei, Seiji Akita, and Takayuki Arie

*Osaka Prefecture University, Japan*

MoB3-5 15:15 - 15:30

**Detection Kondo effect in Graphene Quantum Dots**

Yasushi Kanai,[1] Takashi Ikuta,[1] Takao Ono,[1] Yasushide Ohno,[1,2] Kenzo Maehashi,[1,3] Koichi Inoue,[1] and Kazuhiko Matsumoto[1]

*[1]The Institute of Scientific and Industrial Research, Osaka University, Japan, [2]Tokushima University, Japan, [3]Tokyo University of Agriculture and Technology, Japan*

MoB3-6 15:30 - 15:45

**Effect of Metal Contact on Electron Transport and Its Removal in Graphene Field Effect Devices**

Shoma Higuchi,[1] Hiroki Sonoda,[1] Yu Ito,[1] Kenta Katakura,[1] Hikari Tomori,[1,2] and Akinobu Kanda[1]

*[1]Division of Physics and TIMS, University of Tsukuba, Japan, [2]PRESTO-JST, Japan*

MoB3-7 15:45 - 16:00
**Electronic structure of CNT thin films with nanointerfaces under an electronic field**
Taketo Kochi and Susumu Okada
*University of Tsukuba, Japan*

## MoC3 Advanced Photonic Devices Room C (202) 14:00-16:00

*Chair:* S. Lourdudoss and M. Kondow

MoC3-1 (Invited) 14:00 - 14:30
**1.5 $\mu$m Quantum Dot Lasers for Data and Telecom Applications**
Johann Peter Reithmaier[1] and Gadi Eisenstein[2]
*[1]Institute of Nanostructure Technologies & Analytics, Cinsat, University of Kassel, Germany, [2]Optical Communication Laboratory, Department of Electrical Engineering, Technion, Israel*

MoC3-2 (Invited) 14:30 - 15:00
**Epitaxial growth on lattice-mismatched substrate for high-performance lasers**
Ryo Nakao,[1,2] Masakazu Arai,[1,2] Wataru Kobayashi,[2] Takaaki Kakitsuka,[1,2] Tsuyoshi Yamamoto,[2] and Shinji Matsuo[1,2]
*[1]NTT Nanophotonics center, NTT Corp., Japan, [2]NTT Device Technology Labs., NTT Corp, Japan*

MoC3-3 15:00 - 15:15
**Direct Modulation of InAs/GaAs Quantum Dot Lasers on Silicon at 60 °C**
Yuan-Hsuan Jhang,[1] Reio Mochida,[2] Katsuaki Tanabe,[2,3] Keizo Takemasa,[4] Mitsuru Sugawara,[4] Satoshi Iwamoto,[1,2] and Yasuhiko Arakawa[1,2]
*[1]Institute of Industrial Science, The University of Tokyo, Japan, [2]Institute of Nano Quantum Information Electronics, The University of Tokyo, Japan, [3]Department of Chemical Engineering, Kyoto University, Japan, [4]QD Laser, Inc., Japan*

MoC3-4 15:15 - 15:30
**Large Modulation Bandwidth (13.1 GHz) of 1.3 $\mu$m-Range Quantum Dot Lasers with High Dot Density and Thin Barrier Layer**
Takeo Kageyama,[1] Quoc Huy Vo,[2] Katsuyuki Watanabe,[2] Keizo Takemasa,[3] Mitsuru Sugawara,[3] Satoshi Iwamoto,[1,2] and Yasuhiko Arakawa[1,2]
*[1]Institute for Nano Quantum Information Electronics, University of Tokyo, Japan, [2]Institute of Industrial Science, University of Tokyo, Japan, [3]QD Laser, Inc., Japan*

MoC3-5 15:30 - 15:45
**Optical Pulse Response of 20 Layer-stacked QD-SOA Grown with the Strain Compensation Technique by Using an Optical Frequency Comb**
Atsushi Matsumoto, Kouichi Akahane, Takahide Sakamoto, Toshimasa Umezawa, Atsushi Kanno, and Naokatsu Yamamoto
*National Institute of Information and Communications Technology, Japan*

MoC3-6 15:45 - 16:00
**Highly Fabrication Tolerant Polarization Converter for Generic Photonic Integration Technology**
Moritz Baier, Francisco Manuel Soares, Tom Gaertner, Robert Weiser, Martin Moehrle, Norbert Grote, and Martin Schell
*Fraunhofer HHI, Germany*

## MoD3 Epitaxy & Nano I — Room D (203) 14:00-16:00

*Chair:* M. Sugiyama and M. Pristovsek

MoD3-1 (Invited) 14:00 - 14:30
**Non-invasive structural analysis of InP quantum dots and other nanostructures using nuclear magnetic resonance**
Evgeny A. Chekhovich
*Department of Physics And Astronomy, University of Sheffield, United Kingdom*

MoD3-2 (Invited) 14:30 - 15:00
**Crossed InSb nanowire junctions for Majorana operations**
Erik Bakkers,[1,2] Marcel Verheijen,[3] Leo Kouwenhoven,[2] Diana Car,[1] Sasa Gazibegovic,[2] Elham Fadaly,[2] and Hao Zhang[2]
*[1]TU Eindhoven, Netherlands, [2]TU Delft, Netherlands, [3]Philips Research, Netherlands*

MoD3-3 15:00 - 15:15
**Site-defined InP/InAs heterostructure nanowires with tunable diameter by in-situ diameter-tuning technique**
Guoqiang Zhang,[1,2] Kouta Tateno,[1,2] Tetsuomi Sogawa,[1] and Hideki Gotoh[1]
*[1]NTT Basic Research Laboratories, NTT Corporation, Japan, [2]NTT Nanophotonics Center, NTT Corporation, Japan*

MoD3-4 15:15 - 15:30
**Bright LEDs Using Position-controlled MOCVD Growth of InP Nanopillar Array on a Silicon Substrate**
Saniya Deshpande, Indrasen Bhattacharya, Gilliard Nardel Malheiros Silveira, Willi Mantei, Kevin Cook, and Constance Chang-Hasnain
*University of California-Berkeley, United States of America*

MoD3-5 15:30 - 15:45
**Synchrotron X-ray Diffraction in Air and Vacuum: Strain and Structure at the Nanoscale**
Christopher Burrows,[1] Thomas Hase,[1] James Aldous,[1] Stuart Hatfield,[1] Mark Ashwin,[2] and Gavin Bell[1]
*[1]Department of Physics, University of Warwick, United Kingdom, [2]Department of Chemistry, University of Warwick, United Kingdom*

MoD3-6 15:45 - 16:00

**Quantum Confinement Phenomena in Ultrathin GaAs Nanowires**

Bernhard Loitsch,[1] Julia Winnerl,[1] Daniel Rudolph,[1] Marcus Müller,[2] Peter Veit,[2] Frank Bertram,[2] Jürgen Christen,[2] Gerhard Abstreiter,[1] Jonathan J. Finley,[1] and Gregor Koblmüller[1]

*[1]Walter Schottky Institut, Technical University of Munich, Germany, [2]Institute of Experimental Physics, Otto-von-Guericke-University Magdeburg, Germany*

*Coffee Break* 16:00 - 16:30

## MoB4 Physics of Nanostructures

Room B (201) 16:30-18:30

*Chair:* S. Moriyama

MoB4-1 (Invited) 16:30 - 17:00

**From charge detection to Coulomb drag in hybrid graphene/GaAs devices**

Pauline Simonet, Clemens Rössler, Tobias Krähenmann, Szymon Hennel, Anastasia Varlet, Hiske Overweg, Marius Eich, Christian Reichl, Werner Wegscheider, Thomas Ihn, and Klaus Ensslin

*Solid State Physics Laboratory, ETH Zürich, Switzerland*

MoB4-2 17:00 - 17:15

**Anomalous Conductance Fluctuations in Bilayer Graphene in h-BN Layers**

Masaaki Mineharu,[1] Masahiro Matsunaga,[1] Yuichi Ochiai,[1] Inyeal Lee,[1,2] Gil-Ho Kim,[2] Kenji Watanabe,[3] Takashi Taniguchi,[3] David K. Ferry,[4] Jonathan P. Bird,[5] and Nobuyuki Aoki[1]

*[1]Chiba University, Japan, [2]Sungkyunkwan University, Republic of Korea, [3]National Institute for Materials Science, Japan, [4]Arizona State University, United States of America, [5]University at Buffalo, Suny, United States of America*

MoB4-3 17:15 - 17:30

**Controlled one-dimensional channel in a quantum point contact with a triple-gate structure**

Motoi Takahashi, Mohammad Hamzah Fauzi, Shunta Maeda, Katsumi Nagase, Ken Sato, and Yoshiro Hirayama

*Department of Physics, Tohoku University, Japan*

MoB4-4 17:30 - 17:45

**Measurement of Polarization Dependence of Two-Photon Absorption Coefficient $\beta$ in InP Using Extended Z-scan Technique for Thick Materials**

Masaki Oishi, Hiroyuki Bando, Tomohisa Shinozaki, Hikaru Hara, and Toshio Matsusue

*Department of Nanomaterial Science, Chiba University, Japan*

MoB4-5 17:45 - 18:00

**Microwave Resonance through the Superconducting Circuit Cavity Coupled with InSb Double Quantum Dots**

Rui Wang,[1] Russell S. Deacon,[1,2] Diana Car,[3] Erik P. A. M. Bakkers,[3] and Koji Ishibashi[1,2]

*[1]Advanced Device Laboratory, Riken , Japan, [2]Center for Emergent Matter Science, Riken , Japan, [3]Department of Applied Physics, Eindhoven University of Technology , Netherlands*

MoB4-6 18:00 - 18:15
**Room temperature, very sensitive bolometer using doubly clamped microelectromechanical oscillators**
Ya Zhang,[1] Yasuyuki Watanabe,[1] Suguru Hosono,[1] Naomi Nagai,[1] and Kazuhiko Hirakawa[1,2]
*[1]Center for Photonics Electronics Convergence, Institute of Industrial Science, University of Tokyo, Japan, [2]Institute for Nano Quantum Information Electronics, University of Tokyo, Japan*

MoB4-7 18:15 - 18:30
**Multi-Mode Optical Feedback Control of GaAs Mechanical Resonators**
Ryuichi Ohta, Hajime Okamoto, Daiki Hatanaka, and Hiroshi Yamaguchi
*NTT Basic Research Laboratories, NTT Corporation, Japan*

## MoC4 Devices for Optical Communication — Room C (202) 16:30-18:30

*Chair:* N. Yokouchi

MoC4-1 (Invited) 16:30 - 17:00
**Narrow Linewidth Tunable Semiconductor Laser**
Yasuhiro Matsui,[1] Urban Eriksson,[2] Jan-Olof Wesstrom,[2] Yitong Liu,[2] Stefan Hammerfeldt,[2] Martin Hassler,[2] Björn Stoltz,[2] Niclas Carlsson,[2] Salehe Siraj,[2] and Edgard Goobar[2]
*[1]Finisar Corp., United States of America, [2]Finisar Sweden Ab, Sweden*

MoC4-2 17:00 - 17:15
**Widely Tunable 1060-nm High-Contrast Grating VCSEL**
Kun Li,[2] Chris Chase,[1] Yi Rao,[1] and Connie J. Chang-Hasnain[2]
*[1]Bandwidth 10 Inc., United States of America, [2]University of California at Berkeley, United States of America*

MoC4-3 17:15 - 17:30
**Monolithically Integrated Low-Cost 10Gb/s Tuneable Transmitter using a Slotted Fabry-Pérot Laser**
Prasanna Ramaswamy,[1] James O'Callaghan,[1] Frank H. Peters,[1,2] Brian Corbett,[1,2] and Brendan Roycroft[1]
*[1]Tyndall National Institute, University College Cork, Ireland, [2]Department of Physics, University College Cork, Ireland*

MoC4-4 17:30 - 17:45
**155nm-Span Multi-Wavelength DFB Laser Array Fabricated by Selective Area Growth**
Francisco Soares,[1] Moritz Baier,[1] Ziyang Zhang,[1] Tom Gaertner,[1] Dieter Franke,[1] Jean Decobert,[2] Mohand Achouche,[2] Detlef Schmidt,[1] Martin Moehrle,[1] Norbert Grote,[1] and Martin Schell[1]
*[1]Fraunhofer Heinrich Hertz Institute, Germany, [2]III-V Lab, France*

MoC4-5 17:45 - 18:00

**Small Responsivity Imbalance of InP-based p-i-n Photodiode Array Monolithically Integrated with 90° Hybrid Using Asymmetric Waveguide Phase Shifter for Coherent Detection**

Takuya Okimoto,[1] Higeki Yagi,[1,2] Ryuji Masuyama,[1,2] Kenji Sakurai,[1] Yoshifumi Nishimoto,[1] Takehiko Kikuchi,[2] Kazuhiko Horino,[1,2] Takayuki Watanabe,[1] Mitsuru Ekawa,[2] Masaru Takechi,[2] and Yoshihiro Yoneda[1]

*[1]Sumitomo Electric Device Innovations, Inc., Japan, [2]Transmission Devices Laboratory, Sumitomo Electric Industries, Ltd., Japan*

MoC4-6 18:00 - 18:15

**Noise investigation of Single Section InAs/ InP Quantum-dash Lasers in Active and Passive Mode-locking**

Vivek Panapakkam,[1] Aravind Anthur,[2] Vidak Vujicic,[2] Rui Zhou,[2] Quentin Gaimard,[1] Kamel Merghem,[1] Guy Aubin,[1] Francois Lelarge,[3] Liam Barry,[2] and Abderrahim Ramdane[1]

*[1]CNRS, Laboratory for Photonics and Nanostructures, France, [2]School of Electronic Engineering, Dublin City University, Ireland, [3]III-V Lab, France*

MoC4-7 18:15 - 18:30

**1.55-$\mu$m ultrashort pulse InAs/InP quantum dot mode-locked lasers with high output power**

Feng Gao, Shuai Luo, Hai-Ming Ji, Feng Xu, Zun-Ren Lv, and Tao Yang

*Institute of Semiconductors, Chinese Academy of Sciences, China*

## MoD4 Epitaxy & Nano II — Room D (203) 16:30-18:30

*Chair:* S. Tsukamoto and M. Yoshimoto

MoD4-1 (Invited) 16:30 - 17:00

**Interface formation in semiconductor heterostructures at atomic resolution**

Kerstin Volz

*Philipps-University Marburg, Germany*

MoD4-2 (Invited) 17:00 - 17:30

**Integration of III-V heterostructure tunnel FETs on Si using template assisted selective epitaxy (TASE)**

Kirsten Emilie Moselund,[1] Davide Cutaia,[1] Heinz Schmid,[1] Mattias Borg,[1] Saurabh Sant,[2] Andreas Schenk,[2] and Heike Riel[1]

*[1]IBM Research Zurich, Switzerland, [2]ETH Zürich, Integrated Systems Laboratory, Switzerland*

MoD4-3 17:30 - 17:45

**Selective-area growth of InGaAs/InP/InAlAs/InP core-multishell nanowires on Si and tunneling transistor application**

Katsuhiro Tomioka,[1,2] Fumiya Ishizaka,[1] Junichi Motohisa,[1] and Takashi Fukui[1]

*[1]Graduate School of Information Science and Technology, and Research Center for Integrated Quantum Electronics (RCIQE), Hokkaido University, Japan, [2]JST-PRESTO, Japan*

MoD4-4 17:45 - 18:00
**Structural and Electrical Properties of GaAs/InSb Core-Shell Nanowires**
Mihail Ion Lepsa,[1,2] Torsten Rieger,[1,2] Patrick Zellekens,[1,2] Franz Josef Hackemüller,[1,2] Thomas Schäpers,[1,2] and Detlev Grützmacher[1,2]
*[1]Peter Grünberg Institute (PGI-9), Forschungszentrum Jülich Gmbh, Germany, [2]Jülich Aachen Research Alliance for Fundamentals of Future Information Technology (JARA-FIT), Germany*

MoD4-5 18:00 - 18:15
**Electrical characteristic of n-InP/ i-GaInAs/ p-InP core-multishell NWs grown by self-catalytic VLS mode**
Keita Asakura, Takehiro Ogino, Kohei Takano, Takao Waho, and Kazuhiko Shimomura
*Sophia University, Department of Engineering and Applied Sciences, Japan*

MoD4-6 18:15 - 18:30
**Vertical III−V Nanowire Transistors and CMOS Circuits on Si**
Johannes Svensson, Anil Dey, Daniel Jacobsson, and Lars-Erik Wernersson
*Lund University, Sweden*

## MoP Poster Session — Reception Hall 18:30-20:30

MoP-ISCS-LN-1
**Circular Photogalvanic effect in CdSe Nanowires at Room Temperature**
Ning Tang, Shan Zhang, Junxi Duan, Xin He, Lun Dai, Weikun Ge, and Bo Shen
*State Key Laboratory of Artificial Microstructure and Mesoscopic Physics, School of Physics, Peking University, China*

MoP-ISCS-LN-2
**Observation of Hofstadter butterfly and valley Hall effect in hBN/graphene/hBN heterostructures**
Katsuyoshi Komatsu,[1,2] Eiichiro Watanabe,[2] Daiju Tsuya,[2] Kenji Watanabe,[2] Takashi Taniguchi,[2] and Satoshi Moriyama[2]
*[1]Tokyo Institute of Technology, Japan, [2]National Institute for Materials Science, Japan*

MoP-ISCS-LN-3
**Ultraviolet GaN-based Light-Emitting Diodes with an Embedded porous-AlGaN Reflectors**
Chia-Feng Lin, Zun-Yao Syu, and Zhong-Jie Yang
*Department of Materials Science and Engineering, National Chung Hsing University, Taiwan*

MoP-ISCS-LN-4
**Electrical Damage Investigation of *n*-GaN Films Treated by $CF_4$ Plasma**
Yoshitaka Nakano,[1] Masahito Niibe,[2] and Retsuo Kawakami[3]
*[1]Chubu University, Japan, [2]University of Hyogo, Japan, [3]Tokushima University, Japan*

MoP-ISCS-LN-5
**Optical Properties of nanoporous GaN structure transformed from GaN epitaxial layer**
Chia-Feng Lin, Guo-Yi Shiu, and Wei-Ju Hsu
*Department of Materials Science and Engineering, National Chung Hsing University, Taiwan*

MoP-ISCS-LN-6
**Fabrication and Improved Performance of AlGaN/GaN HEMTs with Regrown Ohmic Contacts and Passivation-First Process**
Tongde Huang,[1] Chao Liu,[2] Johan Bergsten,[1] Huaxing Jiang,[2] Kei May Lau,[2] and Niklas Rorsman[1]
*[1]Department of Microwave Technology, Chalmers University of Technology, S-412 96 Göteborg, Sweden., Sweden, [2]Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong., Hong Kong*

MoP-ISCS-LN-7
**Dilute-Nitride GaNP Planar and Core/Shell Microwire Solar Cells**
Supanee Sukrittanon,[1] Ren Liu,[2] Janet L Pan,[2] Katherine L Jungjohann,[3] Shadi A Dayeh,[1,2] and Charles W Tu[1,2]
*[1]Graduate Program of Materials Science and Engineering, University of California, San Diego, United States of America, [2]Department of Electrical and Computer Engineering, University of California, San Diego, United States of America, [3]Center for Integrated Nanotechnologies, Sandia National Laboratories, United States of America*

MoP-IPRM-LN-1
**Analysis of Antenna-Integrated Resonant Tunneling Diodes and its Modulation by using Adjacent Photodiodes for Wireless Transmitters in Radio over Fiver Technology**
Naoto Okumura,[1] Kiyoto Asakawa,[2] and Michihiko Suhara[1]
*[1]Electrical and Electronic Engineering, Graduate School of Science and Engineering, Tokyo Metropolitan University, Japan, [2]Electronics and Information Engineering Course, Tokyo Metropolitan College of Industrial Technology, Japan*

MoP-IPRM-LN-2
**High-Current InP-Based Triple Heterojunction Tunnel Transistors**
Pengyu Long,[1] Jun Z Huang,[1] Michael Povolotskyi,[1] Devin Verreck,[1,3] Gerhard Klimeck,[1] and Mark. J.W. Rodwell[2]
*[1]Network for computational nanotechnology, Purdue University, West Lafayette, IN 47906, United States of America, [2]ECE Department, University of California, Santa Barbara, CA 93106-95603, United States of America, [3]Department of Electrical Engineering, imec, KU Leuven, 3001 Leuven, Belgium, Belgium*

MoP-IPRM-LN-3
**Photovoltaic Properties of Perovskite-type Solar Cells with Polysilane-doped Hole Transport Layers**
Yasuhiro Shirahata,[1] Yuki Yamamoto,[1] Atsushi Suzuki,[1] Takeo Oku,[1] Sakiko Fukunishi,[2] and Kazufumi Kohno[2]
*[1]The University of Shiga Prefecture, Japan, [2]Osaka Gas Chemicals Co., Ltd, Japan*

MoP-ISCS-001

**Two-Wavelength Excited Photoluminescence in 4H-SiC Substrate -Dependence on BGE Power Density-**

Keitaro Kondo, Norihiko Kamata, Shuhei Yagi, Hiroyuki Yaguchi, Takeshi Fukuda, and Zentaro Honda

*Department of Functional Materials Science, Saitama University, Japan*

MoP-ISCS-002

**Photoresponse measurement of highly oriented $BaSi_2$ films on Ge(111) using solid phase epitaxy templates**

Ryota Takabe, Kaoru Toko, and Takashi Suemasu

*University of Tsukuba, Japan*

MoP-ISCS-003

**Effect of growth condition of buffer layer for heteroepitaxial InSb films grown on Ge(111) substrate**

Takaaki Mitsueda, Masayuki Mori, and Koichi Maezawa

*Graduate School of Science and Engineering, University of Toyama, Japan*

MoP-ISCS-004

**Effects of Ga deposition rate and antimony flux on morphology of GaSb quantum dots formed on GaAs**

Takuya Kawazu,[1] Takeshi Noda,[1] Yoshiki Sakuma,[1] and Hiroyuki Sakaki[1,2]

*[1]National Institute for Materials Science, Japan, [2]Toyota Technological Institute, Japan*

MoP-ISCS-005

**Growth of GaSb Dots Nucleation Layer and Thin-Film GaSb on Si(100) Substrate by Molecular Beam Epitaxy**

Ryuto Machida,[1] Ryusuke Toda,[1] Sachie Fujikawa,[1] Shinsuke Hara,[2] Issei Watanabe,[2] Kouichi Akahane,[2] Akifumi Kasamatsu,[2] and Hiroki I. Fujishiro[1]

*[1]Tokyo University of Science, Japan, [2]National Institute of Info. & Com. Tech. (NICT), Japan*

MoP-ISCS-006

**Heteroepitaxial growth of InGaSb on GaSb/Si(111)-$\sqrt{3}$x$\sqrt{3}$-Ga surface phase with two step growth method**

A. A. Mohammad Monzur-Ul-Akhir, Masayuki Mori, and Koichi Maezawa

*Nano&Functional Material Sciences, Graduate School of Science & Engineering, University of Toyama, Gofuku, Japan, Japan*

MoP-ISCS-007

**Metalorganic Vapor Phase Epitaxy of GaPN alloys Assisted by Surface nitridation with ammonia**

Kerlee Boualiong,[1] Keisuke Yamane,[1] Masashi Moriyama,[1] Hiroto Sekiguchi,[1] Hiroshi Okada,[1,2] and Akihiro Wakahara[1,2]

*[1]Department of Electrical and Electronic Information Engineering, Toyohashi University of Technology, Japan, [2]Electronics-inspired Interdisciplinary Research Institute, Toyohashi University of Technology, Japan*

MoP-ISCS-008

**Growth and characterization of (Zn, Sn, Ga)$As_2$ thin films grown on GaAs(001) substrate by molecular beam epitaxy**

Hideyuki Toyota, Tatsuya Terauchi, Shiro Hidaka, Takahiro Kato, and Naotaka Uchitomi

*Department of Electrical Engineering, Nagaoka University of Technology , Japan*

MoP-ISCS-009

**Temperature Dependence of Photoluminescence Properties of Zinc Sulfide Grown from Aqueous Solutions by Mist Chemical Vapor Deposition**

Kazuyuki Uno, Yasuyuki Asano, Yuichiro Yamasaki, and Ichiro Tanaka

*Wakayama University, Japan*

MoP-ISCS-010

**Pressure control for the preparation of the large diameter InP crystal by LEC method after in-situ P injection synthesis**

Shujie Wang,[1] Niefeng Sun,[1] Yingkuan Han,[1,2] Xiaolan Li,[1] Huimin Shao,[1] Yanlei Shi,[1] Yang Wang,[1] Lijie Fu,[1] Huisheng Liu,[1] Ruixia Yang,[2] and Tongnian Sun[1]

*[1]National Key Laboratory of Asic, Hebei Semiconductor Research Institute, China, [2]School of Information Engineering, Hebei University of Technology, China*

MoP-ISCS-011

**Evaluation of Etched Pits on InP Substrates by White-light Interference**

Yingkuan Han,[1,2] Ruixia Yang,[2] Niefeng Sun,[1] Shujie Wang,[1] Xiaolan Li,[1] Huimin Shao,[1] Yanlei Shi,[1] Yang Wang,[1] Lijie Fu,[1] Huisheng Liu,[1] and Tongnian Sun[1]

*[1]National Key Laboratory of Asic, Hebei Semiconductor Research Institute, China, [2]School of electronic and information engineering, Hebei University of Technology, China*

MoP-ISCS-012

**The growth process analysis of the ZnTe layer on the m-plane sapphire substrate with nano-facet structures**

Taizo Nakasu,[1] Takaru Kizu,[1] Wei-Che Sun,[1] Fukino Kazami,[1] Masakazu Kobayashi,[1,2] and Toshiaki Asahi[3]

*[1]Department of Electrical Engineering and Bioscience, Waseda University, Japan, [2]Kagami Memorial Research Institute for Materials Science and Technology, Waseda University, Japan, [3]Technology Development Group, JX Nippon Mining & Metals Corporation, Japan*

MoP-ISCS-013

**Local distribution of the material composition in the V-defect region of HgCdTe epitaxial films**

Maxim Yakushev,[2] Vadim Novikov,[1] Denis Grigoryev,[1] Dmitriy Bezrodnyy,[1] and Sergei Dvoretsky[1,2]

*[1]Department of Radio Physics, National Research Tomsk State University, Russia, [2]Laboratory of Epitaxial Technology from Molecular Beams of A2B6 Compounds, Institute of Semiconductor Physics, Russia*

MoP-ISCS-014

**Growth and Solar Cell Applications of $AgGaTe_2$ layers by Closed Space Sublimation using the Mixed Source of $Ag_2Te$ and $Ga_2Te_3$**

Aya Uruno,[1] Shinichiro Kikai,[1] Yuri Suetsugu,[1] and Masakazu Kobayashi[1,2]

*[1]Department of Electrical Engineering and Bioscience, Waseda University, Japan, [2]Kagami Memorial Research Institute for Materials Science and Technology, Waseda University, Japan*

MoP-ISCS-015

**Demonstration of RF-DC conversion using dual diode rectifier circuit for rectenna with diamond Schottky barrier diodes**

Toshiyuki Oishi, Naoto Kawano, and Makoto Kasu

*Saga University, Japan*

MoP-ISCS-016

**Design of DC-DC Buck Converter with Integrated Over-current Protection based on Power AlGaN/GaN MIS-HEMT Configuration**

Ruize Sun,[1,2] Yung C. Liang,[1,2] Yee-Chia Yeo,[1] Yun-Hsiang Wang,[1] and Cezhou Zhao[3]

*[1]Dept of Electrical and Computer Engg, National University of Singapore, Singapore, [2]National University of Singapore (Suzhou) Research Institute, China, [3]Dept of Electrical and Electronic Engg, Xi'an Jiaotong-Liverpool University, China*

MoP-ISCS-017

**Low-frequency noise exponents in InAs thin films on flexible or GaAs(001) substrates**

Son Phuong Le, Toshimasa Ui, and Toshi-kazu Suzuki

*Japan Advanced Institute of Science and Technology (JAIST), Japan*

MoP-ISCS-018

**Demonstration of InGaAs FETs on quartz glass toward terahertz applications**

Eiji Kume,[1] Hiroyuki Ishii,[2] Hiroyuki Hattori,[2] Wen-Hsin Chang,[2] Mutsuo Ogura,[1] and Tatsuro Maeda[2]

*[1]IRspec Corporation, Japan, [2]Nanoelectronics Research Institute, National Institute of Advanced Industrial Science and Technology, Japan*

MoP-ISCS-019

**Modeling edge capacitances in ultra-scaled GaAs Schottky barrier diodes for THz applications**

Diego Moro-Melgar,[1] Alain Maestrini,[1] Jeanne Treuttel,[1] Tomás González,[2] Beatriz G. Vasallo,[2] and Javier Mateos[2]

*[1]Observatory of Paris (LERMA), France, [2]University of Salamanca, Spain*

MoP-ISCS-020

**Enhancement-Mode GaN MIS-HEMTs with $HfLaO_x$ Gate Insulator**

Y. C. Lin,[1] J. C. Lin,[1] Y. Lin,[1] C. H. Wu,[1] Y. X. Huang,[1] S. C. Liu,[1] H. T. Hsu,[2] T. E. Hsieh,[1] K. Kakushima,[3] H. Iwai,[2,3] and E. Y. Chang[1,2]

*[1]Department of Materials Science & Engineering, National Chiao-tung University, Taiwan, [2]International College of Semiconductor Technology, National Chiao-tung University, Taiwan, [3]Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, Japan*

MoP-ISCS-021

**The Effect of Surface Passivation on the Electrical Performance of AlGaN/GaN HEMTs with Slant Field Plates**

Heng-Tung Hsu,[1] Yueh-Chin Lin,[2] Lu-Che Huang,[2] Chia-Hua Chang,[2] Ting-En Hsieh,[2] Yasushi Itoh,[3] and Edward Yi Chang[1,2]

*[1]International College of Semiconductor Technology, National Chiao Tung University, Taiwan, [2]Department of Material Science Engineering, National Chiao Tung University, Taiwan, [3]Department of Electrical & Information Engineering, Shonan Institute of Technology, Japan*

MoP-ISCS-022

**Current Collapse Suppression by $SiO_2$ Passivation in p-GaN/AlGaN/GaN Enhancement-Mode High Electron Mobility Transistors**

Shin-Yi Ho, Chih-Hao Wang, and JianJang Huang

*Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan*

MoP-ISCS-023

**Evaluation of GaN HEMT with Field Plate for Reliability Improvement**

Y. C. Lin,[1] J. C. Lin,[1] Y. Lin,[1] C. H. Wu,[1] P. C. Chin,[1] H. T. Hsu,[2] T. E. Hsieh,[1] H. Iwai,[2,3] and E. Y. Chang[1,2]

*[1]Department of Materials Science & Engineering, National Chiao-tung University, Taiwan, [2]International College of Semiconductor Technology, National Chiao-tung University, Taiwan, [3]Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, Japan*

MoP-ISCS-024

**AlGaN/GaN Metal-Oxide-Semiconductor High-Electron-Mobility Transistors with $TiO_2$ Gate Dielectrics**

Yu-Shyan Lin and Chi-Che Lu

*National Dong Hwa University, Taiwan*

MoP-ISCS-025

**Output Characteristics of GaAs Photoconductive Semiconductor Switch at High Bias Voltages**

Yong-Pyo Kim,[1] Jiheon Ryu,[2] Sung Hyun Baek,[2] Sung-Min Hong,[1] Sungbae Lee,[3] and Jae-Hyung Jang[1]

*[1]School of Information and Communication, Gwangju Institute of Science and Technology, Republic of Korea, [2]Agency for Defense Development, Republic of Korea, [3]Department of Physics and Photon Science, Gwangju Institute of Science and Technology, Republic of Korea*

MoP-ISCS-026

**Two-dimensional electron gas in MgZnO/ZnO heterostructures grown by dual-ion beam sputtering**

Rohit Singh,[1,2] Md Arif Khan,[1,2] Abhinav Kranti,[2] and Shaibal Mukherjee[1]

*[1]Hybrid Nanodevice Research Group (HNRG), Electrical Engineering, Indian Institute of Technology, Indore-452020, India, [2]Low Power Nanoelectronics Research Group, Electrical Engineering, Indian Institute of Technology, Indore-452020, India*

MoP-ISCS-027
**Noise Investigation of DFB Laser Diodes Operating at 894 nm for Compact Commercial Cesium Atomic Clocks**
Nicolas von Bandel,[1] Mikhael Myara,[2] Philippe Signoret,[2] Michel Garcia,[1] Alexandre Larrue,[1] Olivier Parillaud,[1] and Michel Krakowski[1]
*[1]III-V Lab, France, [2]Institut d'Electronique et des Systèmes, University of Montpellier, France*

MoP-ISCS-028
**Monolithic integration and epitaxial gain control of GaAs-based nanowire lasers on Si**
Gregor Koblmüller, Bernhard Loitsch, Benedikt Mayer, Thomas Stettner, Michael Kaniber, Gerhard Abstreiter, and Jonathan Finley
*Walter Schottky Institut, Technical University Munich, Germany*

MoP-ISCS-029
**Comprehensive Analysis on Electrically Pumped Metallic Cavity Lasers**
Chuanqing Yu, Baifu Zhang, Yi Xiao, Takuo Tanemura, and Yoshiaki Nakano
*Department of Electrical Engineering and Information Systems, The Univ of Tokyo, Japan*

MoP-ISCS-030
**Numerical Demonstration of the Feasibility of the Current Driven Photonic Crystal Laser Diode Used for Wavelength Division Multiplexing**
Yifan Xiong, Tomoyuki Okada, Xiuyu Zhang, Masato Morifuji, and Masahiko Kondow
*Graduate School of Engineering, Osaka University, Japan*

MoP-ISCS-031
**GaAs-based 2-dimensional photonic crystal slab with large r/a used for wavelength-division multiplexing**
Xiuyu Zhang, Kentaro Hashimura, Yuta Imada, Takahumi Hino, Tomoyuki Okada, Masato Morifuji, and Masahiko Kondow
*Graduate School of Engineering, Osaka University, Japan*

MoP-ISCS-032
**A Novel Deep Guard-ring InGaAs PIN Photodiode Structure Reducing a Crosstalk in SWIR Imaging Detection**
Inseob Noh, Hyungjun Noh, Youngjun Kim, Kiwon Lee, and Kyounghoon Yang
*School of Electrical Engineering, Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea*

MoP-ISCS-033
**Two-Color Lasing from a GaAs/AlGaAs Coupled Multilayer Cavity by Current Injection**
Hiroto Ota, Xiangmeng Lu, Naoto Kumagai, Takahiro Kitada, and Toshiro Isu
*Graduate School of Science and Technology, Tokushima University, Japan*

MoP-ISCS-034
**GaAs/AlAs triple-coupled cavity with InAs quantum dots for ultrafast wavelength conversion devices**
Xiangmeng Lu, Kumagai Naoto, Takahiro Kitada, and Toshiro Isu
*Graduate School of Science and Technology, Tokushima University, Japan*

MoP-ISCS-035

**Simultaneous lasing at ground and excited states in InAs/GaAs quantum dot laser diodes due to inhomogeneous broadening**

Jong Min Lee,[1] Jungho Kim,[2] and Donghan Lee[1]

*[1]Department of Physics, Chungnam National University, Republic of Korea, [2]Department of Information Display, Kyung Hee University, Republic of Korea*

MoP-ISCS-036

**Polarization anisotropy of electroluminescence and net-modal gain in highly stacked InAs/GaAs quantum-dot laser devices**

Toshiyuki Kaizu, Masaya Suwa, Takaya Andachi, Yukihiro Harada, and Takashi Kita

*Department of Electrical and Electronic Engineering, Graduate School of Engineering, Kobe University, Japan*

MoP-ISCS-037

**Emission wavelength variation of InAs quantum dots grown on GaAs using $As_2$ molecules in molecular beam epitaxy**

Yuma Hayashi,[1] Nobuhiko Ozaki,[1] Shunsuke Ohkouchi,[2] Hirotaka Ohsato,[3] Eiichiro Watanabe,[3] Naoki Ikeda,[3] and Yoshimasa Sugimoto[3]

*[1]Wakayama Univ, Japan, [2]NEC Corp., Japan, [3]National Institute for Materials Science, Japan*

MoP-ISCS-038

**Selective Doping in InAs/GaAs Quantum Dot Solar Cells: Effect on Photoluminescence and Photovoltaic Performance**

Fedeirca Cappelluti, Arastoo Khalili, and Mariangela Gioannini

*Department of Electronics and Telecommunications, Politecnico Di Torino, Italy*

MoP-ISCS-039

**Study of Light-Trapping Enhanced Quantum Dot Solar Cells based on Electrical and Optical Numerical Simulations**

Federica Cappelluti, Antonio Musu, and Arastoo Khalili

*Department of Electronics and Telecommunications, Politecnico Di Torino, Italy*

MoP-ISCS-040

**Colloidal Quantum Dot Photonic Crystal Lasers with M-point Band-edge Emission**

Hojun Chang,[1,2] Kyungtaek Min,[1,2] Myungjae Lee,[1,2] Minsu Kang,[1,2] Yeonsang Park,[3] Kyung Sang Cho,[3] Young-Geun Roh,[3] Sungwoo Hwang,[3] and Heonsu Jeon[1,2]

*[1]Department of Physics and Astronomy, Seoul National University, Republic of Korea, [2]Inter-university Semiconductor Research Center, Seoul National University, Republic of Korea, [3]Samsung Advanced Institute of Technology, Republic of Korea*

MoP-ISCS-041

**Impact of Antiphase Boundaries on Non-linear Frequency Conversion in GaP/Si Microdisks**

Pierre Guillemé,[1] Charles Cornet,[1] Antoine Létoublon,[1] Julien Stodolna,[2] Yannick Dumeige,[1] Julie Le Pouliquen,[1] Patrice Féron,[1] Anne Ponchet,[2] Olivier Durand,[1] and Yoan Léger[1]

*[1]UMR Foton, CNRS, INSA Rennes, Université de Rennes 1, France, [2]CEMES-CNRS, Université de Toulouse, UPS, France*

MoP-ISCS-042
**MBE Deep-UV LEDs on Bulk AlN Substrates**
Sm Moudud Islam,[1] Vladimir Protasenko,[1] Huili (Grace) Xing,[2] and Debdeep Jena[2]
*[1]Department of ECE, Cornell University, United States of America, [2]Department of ECE and MSE, Cornell University, United States of America*

MoP-ISCS-043
**Monolithically integrated GaN-based HEMT-LED and InGaN/GaN photodiodes for on-chip optical interconnects**
Chao Liu, Huaxing Jiang, Yuefei Cai, and Kei May Lau
*Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology, Hong Kong*

MoP-ISCS-044
**AlN/ITO hybrid electrodes with conducting filament for 365 nm ultraviolet light-emitting diodes**
Kyeong Heon Kim, Tae-Ho Lee, Byeong Ryong Lee, Kyung Rock Son, Dae Yun Kang, Ju Hyun Park, Sin Hwan Choi, Dong Su Jeon, Myung Ju Kim, Tae Hun Park, and Tae Geun Kim
*School of Electrical Engineering, Korea University, Republic of Korea*

MoP-ISCS-045
**Electronic Structures Calculation of $Si_{1-x}Sn_x$ Compound Alloy Using Interacting Quasi-band Model**
Masato Oda, Yukina Kuroda, Ayaka Kishi, and Yuzo Shinozuka
*Department of Materials Science and Chemistry, Wakayama University, Japan*

MoP-ISCS-046
**Band alignment study and plasmon generation at dual ion-beam sputtered Ga:ZnO/ Ga:MgZnO heterojunction interface**
Vishnu Awasthi,[1] Vivek Garg,[1] Brajendra S. Sengar,[1] Rohit Singh,[1] Sushil K Pandey,[2] Shailendra Kumar,[3] C. Mukherjee,[4] and Shaibal Mukherjee[1]
*[1]Hybrid Nanodevice Research Group (HNRG), Electrical Engineering, Indian Institute of Technology, India, [2]Department of Electrical Engineering, Indian Institute of Technology Bombay, India, [3]Indus Synchrotron Utilization Division, Raja Ramanna Center for Advanced Technology, India, [4]Laser System Engineering Division, Raja Ramanna Center for Advanced Technology, India*

MoP-ISCS-047
**Growth of ZnO and Indium-doped ZnO Structures for Dye-sensitized Solar Cells**
Ya-Fen Wu,[1] Hung-Pin Hsu,[1] Wei-You Chen,[1] and Jiunn-Chyi Lee[2]
*[1]Department of Electronic Engineering, Ming Chi University of Technology, Taiwan, [2]Department of Electrical Engineering, Taipei City University of Science and Technology, Taiwan*

MoP-ISCS-048
**Fabrication and Characterization of A Multiple Gate Nanowire FET for Detecting Spatially Distributed Molecular Charges**
Kentaro Sasaki,[1] Ryota Kuroda,[1] Xiang Yin,[1] Masaki Sato,[1] Takuji Ogawa,[2] and Seiya Kasai[1]
*[1]Research Center for Integrated Quantum Electronics and Graduate School of Information Science & Technology, Hokkaido University, Japan, [2]Graduate School of Science, Osaka University, Japan*

MoP-ISCS-049

**Shubnikov-de Haas Oscillations Observed in High-Mobility Monolayer Graphene Encapsulated by h-BN**

Masaaki Mineharu,[1] Masahiro Matsunaga,[1] Naoki Matsumoto,[1] Carlo da Cunha,[2] Chiashain Chuang,[1] Yuichi Ochiai,[1] Inyeal Lee,[3] Gil-Ho Kim,[3] Kenji Watanabe,[4] Takashi Taniguchi,[4] David K. Ferry,[5] Jonathan P. Bird,[6] and Nobuyuki Aoki[1]

*[1]Graduate School of Advanced Integration Science, Chiba University, Japan, [2]Department of Physics, Univ. Federal Do Rio Grande Do Sul, Brazil, [3]School of Electronic Electrical Engineering and Sungkyunkwan Advanced Institute of Nanotechnology (SAINT), Sungkyunkwan University, Republic of Korea, [4]National Institute for Materials Science, Japan, [5]School of Electrical, Computer, and Energy Engineering, Arizona State University, United States of America, [6]Department of Electrical Engineering, University at Buffalo, The State University of New York, United States of America*

MoP-ISCS-050

**Investigation of Spin Dynamics Based on Initial Phase Shift Analysis of Kerr Rotation in a CdTe Single Quantum Well**

Satoru Adachi, Liping Yan, and Reina Kaji

*Department of Applied Physics, Hokkaido University, Japan*

MoP-ISCS-051

**Magnetic moment in Diluted Magnetic Semiconductor GaGdAs measured by HX-MCD**

Hayato Miyagawa,[1] Nakaba Funaki,[1] Shyun Koshiba,[1] Naoshi Takahashi,[2] Masaichiro Mizumaki,[2] and Motohiro Suzuki[1]

*[1]Kagawa University, Japan, [2]SPring-8/JASRI, Japan*

MoP-ISCS-052

**Quantum interference of three LO modes in p-type $Ga_{0.5}In_{0.5}P$ : Contribution of a trigonal phonon mode**

Hironori Sakamoto, Bei Ma, Ken Morita, and Yoshihiro Ishitani

*Department of Engineering, Chiba University, Japan*

MoP-ISCS-053

**Picoseconds carrier spin relaxation in $In_{0.8}Ga_{0.2}As/Al_{0.5}Ga_{0.5}As/AlAs_{0.56}Sb_{0.44}$ coupled double quantum wells**

Tomoki Ishikawa,[1] Shin-ichiro Gozu,[2] Teruo Mozume,[2] Masaki Asakawa,[1] Shunsuke Ohki,[1] and Atsushi Tackeuchi[1]

*[1]Depertment of Applied Physics, Waseda University, Japan, [2]National Institute of Advanced Industrial Science and Technology (AIST), Japan*

MoP-ISCS-054

**Anomalous Temperature Dependence of Magnetic Properties in Mn-doped $ZnSnAs_2$ Epitaxial Thin Films**

Shiro Hidaka, Hideyuki Toyota, and Naotaka Uchitomi

*Nagaoka University of Technology, Japan*

MoP-ISCS-055

**Growth and doping control of Ge/Si and Si/Ge core-shell nanowires**

Kotaro Nishibe,[1] Wipakorn Jevasuwan,[1] Masanori Mitome,[1] Yoshio Bando,[1] Zhong Lin Wang,[2] and Naoki Fukata[1]

*[1]National Institute for Materials Science, Japan, [2]Georgia Institute of Technology, United States of America*

MoP-ISCS-056

**Thermal current-induced charge redistribution in wide CVD-grown graphene constriction**

Chiashain Chuang,[1] Tak-Pong Woo,[2,3] Fan-Hung Liu,[4] Masahiro Matsunaga,[1] Yuichi Ochiai,[1] Chi-Te Liang,[2,4] and Nubuyuki Aoki[1]

*[1]Graduate School of Advanced Integration Science, Chiba University, Japan, [2]Department of Physics, National Taiwan University, Taiwan, [3]The Germination Program Office, Science & Technology Policy Research and Information Center, Narlabs, Taiwan, [4]Graduate Institute of Applied Physics, National Taiwan University, Taiwan*

MoP-ISCS-057

**One hundred picosecond spin relaxation in GaAs/GaAsP strain-compensated superlattice as highly spin-polarized electron source**

Shunsuke Ohki,[1] Xiuguang Jin,[2] Masaki Asakawa,[1] Tomoki Ishikawa,[1] and Atsushi Tackeuchi[1]

*[1]Department of Applied Physics, Waseda University, Japan, [2]Accelerator Division 7, Accelerator Laboratory, High Energy Accelerator Research Organization, Japan*

MoP-ISCS-058

**Enhanced Spin Polarization at n-MnSb(0001)/InP(111) Interface**

Ebiyibo Collins Ouserigha, Haiyuan Wang, Christopher W Burrows, and Gavin R Bell

*Department of Physics, University of Warwick, United Kingdom*

MoP-ISCS-059

**Fabrication and Characterization of InGaAs Fin Structure High Electron Mobility Transistors**

Chia-Ming Chang,[1] Li-Cheng Chang,[2] and Chao-Hsin Wu[1,2]

*[1]Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan, [2]Graduate Institute of Electrical Engineering, National Taiwan University, Taiwan*

MoP-ISCS-060

**Sheet Electron Density Dependence of Electron Mobility Anisotropy in $In_{0.75}Ga_{0.25}As$/InP Two-Dimensional Electron Gas**

Masashi Akabori

*Center for Nano Materials and Technology, Japan Advanced Institute of Science and Technology, Japan*

MoP-ISCS-061

**Monopole charge in Weyl semimetals and weak (anti-)localization effect**

Hai-Zhou Lu

*Department of Physics, South University of Science and Technology of China, China*

MoP-ISCS-062

**Influence of MBE Growth Parameters on Film Properties of $ZnSnAs_2$:Mn Thin Films on InP Substrates**

Masaki Ogo, Kenso Takahashi, Shiro Hidaka, Hideyuki Toyota, Takahiro Kato, and Naotaka Uchitomi

*Nagaoka University of Technology, Japan*

MoP-ISCS-063

**Impact of film thickness on crystalline and magnetic properties in Mn-doped $ZnSnAs_2$ thin films**

Tomohiro Kitazawa, Kei Itagaki, Hideyuki Toyota, Takahiro Kato, Shiro Hidaka, and Naotaka Uchitomi

*Nagaoka University of Technology, Japan*

MoP-ISCS-064

**Dependence of Locally Thicker Thin Film Formation by Partial Heating of a Polymer Solution Film on the Substrate from the Bottom during Drying on Latent Heat of Vaporization**

Hiroyuki Kagami

*School of Medicine, Fujita Health University, Japan*

MoP-ISCS-065

**Characterization of In-plane Gate Transistors with Different Geometries**

Li-Cheng Chang,[1] Hao-Yu Lan,[2] and Chao-Hsin Wu[1,2]

*[1]Graduate Institute of Electronics Engineering, National Taiwan University, Taiwan, [2]Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan*

MoP-ISCS-066

**Reduction of thermal conductivity in periodic silicon nanostructures**

Roman Anufriev,[1] Jeremie Maire,[1,2] and Masahiro Nomura[1,3]

*[1]Institute of Industrial Science, The University of Tokyo, Japan, [2]Laboratory for Integrated Micro Mechatronic Systems/national Center for Scientific Research-institute of Industrial Science (LIMMS/CNRS-IIS), The University of Tokyo, Japan, [3]Institute for Nano Quantum Information Electronics, The University of Tokyo, Japan*

MoP-ISCS-067

**Flexible Ultraviolet Photodetector made from ZnO Nanowires Synthesized by Direct Ultraviolet-light Decomposition Process**

Jyh Ming Wu[1] and Wei Tsung Kao[2]

*[1]Department of Materials Science and Engineering, National Tsing Hua University, Taiwan, [2]Department of Materials Science and Engineering, Feng Chia University, Taiwan*

MoP-ISCS-068

**Morphology control of Ag-Te nanostructures by seed silver nanoparticles**

Yusuke Imanishi and Toshihiro Nakaoka

*Faculty of Science and Technology, Sophia University, Japan*

MoP-ISCS-069

**Resistive-Switching Crossbar Memory Based on $Si_3N_4/SiO_2$ Bi-Layer Structure and Copper Chemical Displacement Technique**

Li-Min Lin,[1] Ming-Fang Kao,[2] and Yu-Hsien Lin[3]

*[1]Ph.D. Program of Electrical and Communications Engineering, Feng Chia University, Taiwan, [2]Department of Electronic Engineering, Feng Chia University, Taiwan, [3]Department of Electronic Engineering, National United University, Taiwan*

MoP-ISCS-070

**Two-Dimensional Energy Dispersion in Thermally Annealed Epitaxial Nitrogen Atomic Sheet in GaAs**

Yasuhiro Ogawa, Yukihiro Harada, Kaizu Toshiyuki, and Takashi Kita

*Department of Electrical and Electronic Engineering, Graduate School of Engineering, Kobe University, Japan*

MoP-ISCS-071

**Characterization of Anti-Phase Boundaries at a GaP/Si(001) Cross-Sectional Surface on the Atomic Scale**

Christopher Prohl,[1] Henning Doescher,[2] Peter Kleinschmidt,[3] Thomas Hannappel,[3] and Andrea Lenz[1]

*[1]Institut für Festkörperphysik, Technische Universität Berlin, Germany, [2]WZfM, Philipps Universität Marburg, Germany, [3]Institut für Physik, Technische Universität Ilmenau, Germany*

MoP-ISCS-072

**Surface X-ray diffraction during GaAs/MnSb/Ga(In)As epitaxial growth**

Philip Mousley,[1] Christopher Burrows,[1] Takuo Sasaki,[2] Masamitu Takahasi,[2] and Gavin Bell[1]

*[1]Department of Physics, University of Warwick, United Kingdom, [2]Quantum Beam Science Center, Japan Atomic Energy Agency, Japan*

MoP-ISCS-073

**Selective growth of high crystalline quality $In_{0.71}Ga_{0.29}As$ fin inside nano-trenches by composition graded InGaP buffer for novel CMOS integration**

Shih-Pang Chang,[1] Kun-Lin Lin,[1] Chien-Ting Wu,[1] Mon-Yang Chen,[2] Rong-Ren Lee,[2] Wen-Da Hsu,[1] Shih-Hong Chen,[1] Chun-Jung Su,[1] Guang-Li Luo,[1] Shih-Chang Lee,[2] Ta-Cheng Hsu,[2] Jen-Inn Chyi,[3] and Wen-Kuan Yeh[1]

*[1]National Nano Device Laboratories, Narlabs., Hsinchu, Taiwan, [2]Epistar Corporation, Taiwan, [3]National Central University, Zhongli, Taiwan*

MoP-ISCS-074

**Dielectric oxides grown by atomic layer deposition (ALD) on single-crystal (In)GaAs surfaces studied by synchrotron radiation photoemission**

Tun-Wen Pi,[1] T. D. Lin,[2] K. Y. Lin,[2] Y. H. Lin,[2] H. W. Wan,[2] Y. H. Chang,[2] J. Kwo,[3] and M. Hong[2]

*[1]National Synchrotron Radiation Research Center, Taiwan, [2]Graduate Institute of Applied Physics and Department of Physics, National Taiwan University, Taiwan, [3]Department of Physics, National Tsing Hua University, Taiwan*

MoP-ISCS-075

**Electrical conductivity of the biaxially-strained GaSb(111) films**

Takuya Hatayama, Hideki Kishimoto, Akira Akaishi, and Jun Nakamura

*The University of Electro-Communications (UEC-Tokyo), Japan*

MoP-ISCS-076

**Atomic Structure and Electronic States of InAs(Sb)/GaAs Submonolayer Quantum Dots**

Andrea Lenz, Zeno Diemer, Christopher Prohl, David Quandt, André Strittmatter, Udo W. Pohl, and Holger Eisele

*Technische Universität Berlin, Germany*

MoP-ISCS-077

**InAs/InAlAsSb quantum nanostructures grown on InP substrate for intermediate band solar cell application**

Yasushi Shoji, Nazmul Ahsan, Ryo Tamaki, and Yoshitaka Okada

*Research Center for Advanced Science and Technology (RCAST), The University of Tokyo, Japan*

MoP-ISCS-078

**Electron Eigen-States in InGaAs/InAlAs Multi-Quantum Wells Using Photocurrent Spectroscopy**

Koichi Tanaka,[1] Naohisa Happo,[1] Makoto Fujiwara,[1] and Nobuo Kotera[2]

*[1]Hiroshima City University, 3-4-1 Ozuka-higashi, Asa-minami-ku, Hiroshima, Japan, [2]Kyushu Institute of Technology, 680-4 Kawazu, Iizuka, 820-8502, Japan*

MoP-ISCS-079

**Structural characterization for GaAs nanowires Au-assisted grown by pulsed-jet gas epitaxy measured using Raman spectroscopy**

Hiroki Yoshidome,[1] Kouji Maeda,[1] Kenji Kamimura,[1] Goushi Nakagawa,[1] Hidetoshi Suzuki,[1] and Kentaro Sakai[2]

*[1]Faculty of Engineering, University of Miyazaki, Japan, [2]Center for Collaborative Research & Community Cooperation, University of Miyazaki, Japan*

MoP-ISCS-080

**Development of c-Plane Thin-Film Flip-Chip LEDs Fabricated by Photoelectrochemical (PEC) Liftoff**

David Hwang,[1] Benjamin Yonkee,[1] Robert M. Farrell,[1] Shuji Nakamura,[1,2] James S. Speck,[1] and Steven P. DenBaars[1,2]

*[1]Materials Department, University of California, Santa Barbara, United States of America, [2]Department of Electrical and Computer Engineering, University of California, Santa Barbara, United States of America*

MoP-ISCS-081

**Origin of Unintentional Gallium Incorporation into AlN Layers Grown by Metalorganic Vapor Phase Epitaxy**

Atsushi Yamada, Tetsuro Ishiguro, Junji Kotani, Shuichi Tomabechi, and Norikazu Nakamura

*Fujitsu Laboratories Ltd., Japan*

MoP-ISCS-082

**Tunnel junction devices with monolithic optically pumped and electrically injected InGaN quantum wells for polarized white light emission**

Stacy Kowsz,[1] Christopher Pynn,[1] Robert Farrell,[1] James Speck,[1] Steven DenBaars,[1,2] and Shuji Nakamura[1]

*[1]Materials Department, University of California, Santa Barbara, United States of America, [2]Department of Electrical and Computer Engineering, University of California, Santa Barbara, United States of America*

MoP-ISCS-083

**Relationship between Al content of AlGaN buffer layer on top of initial AlN nucleation layer on Si and vertical leakage current of AlGaN/GaN high-electron-mobility transistor structures**

Yuya Yamaoka,[1,2] Kazuhiro Ito,[2] Akinori Ubukata,[1] Yoshiki Yano,[1] Toshiya Tabuchi,[1] Koh Matsumoto,[1] and Takashi Egawa[2]

*[1]Taiyo Nippon Sanso Corp., Japan, [2]Nagoya Institute of Technology, Japan*

MoP-ISCS-084

**Optical Characterization of Carrier Recombination Processes in GaPN by Two-Wavelength Excited Photoluminescence**

Makiko Suetsugu,[1] Norihiko Kamata,[1] Shuhei Yagi,[1] Hiroyuki Yaguchi,[1] Takeshi Fukuda,[1] Fredrik Karlsson,[2] and Per-Olof Holtz[2]

*[1]Graduate School of Science and Engineering, Saitama University, Japan, [2]Linköping University, Sweden*

MoP-ISCS-085

**Self-Organized Growth of Cubic InN Dot Arrays on MgO (001) Vicinal Substrates**

Kenichi Ishii, Shuhei Yagi, and Hiroyuki Yaguchi

*Graduate School of Science and Engineering, Saitama University, Japan*

MoP-ISCS-086

**$SiN_x$ Passivated GaN HEMT by Plasma Enhanced Atomic Layer Deposition**

Takayuki Suzuki, Tomiaki Yamada, Ryosuke Kawai, Shohei Kawaguchi, Dongyan Zhang, and Naotaka Iwata

*Toyota Technological Institute, Japan*

MoP-ISCS-087

**Band Alignment between High-k $ZrO_2$ and Wide Bandgap Semiconductors: GaN, AlN and SiC**

G. Ye,[1] H. Wang,[1,2] and K. S. Ang[2]

*[1]School of Electrical and Electronic Engineering, Nanyang Technological University , Singapore, [2]Temasek-labs at NTU, Nanyang Technological University, Singapore*

MoP-ISCS-088

**Crystallographic Properties of 3d Transition Metal (Ti, V, and Cr) doped AlN films**

Nobuyuki Tatemizo, Saki Sonoda, Koji Nishio, and Toshiyuki Isshiki

*Faculty of Electrical Engineering and Electronics Kyoto Institute of Technology , Japan*

MoP-ISCS-089

**Improvement of Crystalline Quality of AlN and High-Al-content AlGaN at High Growth Rate Using Horizontal High-flow-rate MOVPE System**

Kazutada Ikenaga, Akira Mishima, Yoshiki Yano, Toshiya Tabuchi, and Koh Matsumoto

*Taiyo Nippon Sanso Corporation, Japan*

MoP-ISCS-090

**Non-radiative Recombination Centers in AlGaN Quantum Well Characterized by Two-Wavelength Excited Photoluminescence**

Md Julkarnain,[1,2] Takeshi Fukuda,[1] Norihiko Kamata,[1] and Hideki Hirayama[3]

*[1]Department of Functional Materials Science, Saitama University, Japan, [2]Department of Applied Physics and Electronic Engineering, University of Rajshahi, Bangladesh, [3]Quantum Optodevice Laboratory, RIKEN, Japan*

MoP-ISCS-091

**Low-threshold Ultraviolet emission from AlGaN based lasers grown on trench-patterned AlN/sapphire template**

Xiang Chen, Jianchang Yan, Yun Zhang, Yingdong Tian, Yanan Guo, Junxi Wang, and Jinmin Li

*Research and Development Center for Solid State Lighting, Institute of Semiconductors, Chinese Academy of Sciences, China*

MoP-ISCS-092

**First principles study of carbon diffusion in GaN**

Alexandros Kyrtsos, Masahiko Matsubara, and Enrico Bellotti

*Department of Electrical and Computer Engineering, Boston University, United States of America*

MoP-ISCS-093

**Influence of p-type Doping on GaN Junction Barrier Schottky Diode with Array Pillar**

Shao-Yen Chiu,[1] Chih-Wei Yang,[1] Yu-Li Wang,[2] Wei-Chen Yang,[2] Yu-Teng Tseng,[2] and Keh-Yung Cheng[2]

*[1]Episil Technologies Inc., Taiwan, [2]National Tsing Hua University, Department of Electrical Engineering, Taiwan*

MoP-ISCS-094

**Electronic States of III-V and II-VI Alloys Calculated by IQB Theory**

Ayaka Kishi, Masato Oda, and Yuzo Shinozuka

*Wakayama University, Japan*

MoP-ISCS-095

**Reduction of Threshold Voltage Instability in Recessed-gate AlGaN/GaN MOSHEMTs by KOH Passivation**

Tzung-Han Tsai,[1] Min Yang,[1] Li-Cheng Chang,[1] and Chao-Hsin Wu[1,2]

*[1]Graduate Institute of Electronic and Engineering, National Taiwan University, Taiwan, [2]Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan*

MoP-ISCS-096

**Effect of Ultraviolet Light-Assisted $CF_4$ Plasma Irradiation on AlGaN Thin Film Surface**

Retsuo Kawakami,[1] Masahito Niibe,[2] Yoshitaka Nakano,[3] and Takashi Mukai[4]

*[1]Tokushima University, Japan, [2]University of Hyogo, Japan, [3]Chubu University, Japan, [4]Nichia Corporation, Japan*

MoP-ISCS-097

**Effect of Nonuniform Current Injection on Electroluminescence Spectra of InGaN-GaN Blue-Green Light-Emitting Diode**

Irina Khmyrova,[1] Yulia Kholopova,[2] Sergey Larkin,[2] Valery Zemlyakov,[3] Bogdan Shevchenko,[4] Andrei Tsatsul'nikov,[5] and Sergei Shapoval[2]

*[1]University of Aizu, Japan, [2]IMT RAS, Russia, [3]NRUET, Russia, [4]LETI, Russia, [5]A. F. Ioffe Physico-Technical Institute RAS, Russia*

MoP-ISCS-098

**Variations in Photoluminescence Properties of GaN-based Thin Films Directly Grown on an Amorphous Quartz Glass Substrate**

Atomu Fujiwara, Shota Ishizaki, Shun Nakane, Yoshifumi Murakami, and Yuichi Sato

*Department of Electrical and Electronic Engineering, Akita University, Japan*

MoP-ISCS-099

**Hall factor for hopping conduction in n- and p-type GaN**

Yasutomo Kajikawa

*Department of Electric and Control Systems Engineering, Interdisciplinary Faculty of Science and Engineering, Shimane University, Japan*

MoP-ISCS-100

**Electrical and Optical Properties of Polycrystalline $NbO_2$ Thin Films Grown by Solid Phase Crystallization**

Shoichiro Nakao,[1] Hideyuki Kamisaka,[2] Yasushi Hirose,[1,2] and Tetsuya Hasegawa[1,2]

*[1]Kanagawa Agency of Science and Technology , Japan, [2]Department of Chemistry, The University of Tokyo, Japan*

MoP-ISCS-101

**$SnO_2$ Thin Films Grown on *m*-Plane Sapphire Substrate by Mist Chemical Vapor Deposition**

Tatsuya Otabe,[1] Takehide Sato,[2] Junya Matsushita,[2] Zenji Yatabe,[3] Koji Sue,[2] Shoji Nagaoka,[4,5] and Yusui Nakamura[1,5]

*[1]Graduate School of Science and Technology, Kumamoto University, Japan, [2]Fuculty of Engineering, Kumamoto University, Japan, [3]Priority Organization for Innovation and Excellence, Kumamoto University, Japan, [4]Kumamoto Industrial Research Institute, Japan, [5]Kumamoto Institute for Photo-electro Organics, Japan*

MoP-ISCS-102

**Influence of plasma treatments and $SnO_2$ alloying on the conductive properties of epitaxial $Ga_2O_3$ films deposited on C-sapphire by chemical vapor deposition**

Alban Maertens,[1,2] Samuel Margueron,[1,2] Frédéric Genty,[1,2] Adulfas Abrutis,[3] Thierry Belmonte,[4] Pascal Boulet,[4] Jaafar Ghanbaja,[4] Abdelkrim Talbi,[5] and Ausrine Bartasyte[6]

*[1]Centrale Supélec, France, [2]Université de Lorraine, France, [3]Department of General and Inorganic Chemistry, University of Vilnius, Lithuania, [4]Université de Lorraine, Institut Jean Lamour, CNR UMR 7198, France, [5]Lia LEMAC/LICS - IEMN, EC Lille-CNRS UMR 8520, France, [6]Femto-ST Institute, CNRS UMR 6174, Université de Franche-comté, France*

MoP-ISCS-103

**Improvement of *m*-plane ZnO Films Formed on Buffer Layers on Sapphire Substrates by Mist Chemical Vapor Deposition**

Hironobu Tanoue,[1] Tatsuya Yamashita,[1] Shohei Wada,[1] Zenji Yatabe,[2] Shoji Nagaoka,[3,4] and Yusui Nakamura[1,4]

*[1]Graduate School of Science and Technology, Kumamoto University, Japan, [2]Priority Organization for Innovation and Excellence, Kumamoto University, Japan, [3]Kumamoto Industrial Research Institute, Japan, [4]Kumamoto Institute for Photo-electro Organics, Japan*

MoP-ISCS-104

**Effects of oxygen flows and annealing temperature on properties of cosputtering $In_2O_3$-$Ga_2O_3$-Zn thin films**

Yih-Shing Lee,[1] Sheng-Yu Zhao,[1] Yuan-Zhe Lin,[2] and Glen Andrew Porter[3]

*[1]Department of Optoelectronic System Engineering, Minghsin University of Science and Technology, Taiwan, [2]Institute of Electronics, Minghsin University of Science and Technology, Xinfeng, Taiwan, [3]Department of Electronics Engineering, National Kaohsiung University of Applied Sciences, Taiwan*

MoP-ISCS-105

**Facile synthesis of Au-decorated ZnO nanorod substrates for visible-light-driven photocatalytic activity and plasmonic luminescence properties**

Da-Ren Hang,[1] Sk Emdadul Islam,[1] Chun-Hu Chen,[2] and Krishna Hari Sharma[1]

*[1]Department of Materials and Optoelectronic Science, National Sun Yat-sen University, Taiwan, [2]Department of Chemistry, National Sun Yat-sen University, Taiwan*

MoP-ISCS-106

**Surface plasmon resonant emission from Ag dispersed ZnO films fabricated by molecular precursor method**

Daichi Taka,[1] Takeyoshi Onuma,[1] Takashi Shibukawa,[1] Hiroki Nagai,[1] Tomohiro Yamaguchi,[1] Ja-Soon Jang,[2] Mitsunobu Sato,[1] and Tohru Honda[1]

*[1]Kogakuin Univ., Japan, [2]Yeungnam Univ., Republic of Korea*

MoP-ISCS-107

**Time-Resolved Spectroscopy of luminescence in Wide Gap Si Doped $\beta$-$Ga_2O_3$**

Hisaya Oda, Nana Kimura, Dai Yasukawa, Hirofumi Wakai, and Akio Yamanaka

*Chitose Institute of Science and Technology, Japan*

MoP-ISCS-108

**Microstructural Analysis of Nb-doped Anatase $TiO_2$ Transparent Conductive Films by Transmission Electron Microscopy**

Daisuke Ogawa,[1] Shoichiro Nakao,[2] Kazuo Morikawa,[1] Yasushi Hirose,[2,3] and Tetsuya Hasegawa[2,3]

*[1]Tokyo Metropolitan Industrial Technology Research Institute, Japan, [2]Kanagawa Agency of Science and Technology, Japan, [3]Department of Chemistry, Graduate School of Science, The University of Tokyo, Japan*

MoP-ISCS-110

**Fabrication and Characterization of $BiFeO_3$ Thin Films and Application for Photovoltaic Devices**

Yasuhiro Shirahata, Atsushi Suzuki, and Takeo Oku

*Department of Materials Science, The University of Shiga Prefecture, Japan*

MoP-ISCS-111

**Low-temperature carrier transport properties of n-type ultrananocrystalline diamond/p-type Si heterojunction diodes**

Abdelrahman Zkria Ahmed[1,2] and Tsuyoshi Yoshitake[1]

*[1]Department of Applied Sciences for Electronics & Materials, Kyushu University, Japan, [2]Department of Physics, Faculty of Science, Aswan University, Egypt*

MoP-ISCS-112
**Characterization of Carbon/Carbon Composites Containing Cellulose by Electrospinning**
Shouta Nakajo,[1] Takuya Murakami,[1] Haruka Shimada,[1] Kozo Osawa,[1] Masahiko Murata,[1] Tomoyuki Itaya,[1] Kyoichi Oshida,[1] Kenji Takeuchi,[2] and Morinobu Endo[2]
*[1]National Institute of Technology, Nagano College, Japan, [2]ICST, Shinsyu University, Japan*

MoP-ISCS-113
**Molecular Design of Functionalized Fullerenes and Graphenes: Density Functional Theory (DFT) Study**
Hiroto Tachikawa, Tetsuji Iyama, and Hiroshi Kawabata
*Hokkaido University, Japan*

MoP-ISCS-114
**Electronic States of Organic Radical-Functionalized Graphenes and Fullerenes: Density Functional Theory (DFT) Study**
Tetsuji Iyama, Hiroshi Kawabata, Takahiro Fukuzumi, and Hiroto Tachikawa
*Hokkaido University, Japan*

MoP-ISCS-115
**Hydrophilic Graphene Film by Molecular Functionalization**
Yoshiaki Taniguchi, Tsubasa Miki, Takanori Mitsuno, Yasuhide Ohno, Masao Nagase, Keiji Minagawa, and Mikito Yasuzawa
*Graduate School of Advanced Technology and Science, Tokushima University, Japan*

MoP-ISCS-116
**Epitaxial growth on a dynamically rough substrate: a Monte Carlo model of graphene / Cu(111)**
Gwilym Enstone,[1] Peter Brommer,[2] David Quigley,[3] and Gavin Bell[3]
*[1]Centre for Complexity Science, University of Warwick, United Kingdom, [2]Centre for Predictive Modelling, University of Warwick, United Kingdom, [3]Department of Physics, University of Warwick, United Kingdom*

MoP-ISCS-117
**Extraction of Intrinsic and Extrinsic Parameters of Graphene Field-Effect Transistor from Its Asymmetric I-V Characteristic**
Akira Satou, Gen Tamamushi, Kenta Sugawara, Junki Mitsushio, Victor Ryzhii, and Taiichi Otsuji
*Research Institute of Electrical Communication, Tohoku University, Japan*

MoP-ISCS-118
**Introducing Uniaxial Local Strain to Graphene Encapsulated with hBN**
Hikari Tomori,[1,2] Rineka Hiraide,[1] Youiti Ootuka,[1] Kenji Watanabe,[3] Takashi Taniguchi,[3] and Akinobu Kanda[1]
*[1]University of Tsukuba, Japan, [2]PRESTO-JST, Japan, [3]National Institute for Materials Science (NIMS), Japan*

MoP-ISCS-119
**Intrinsic pH Sensitivity of Graphene Field-Effect Transistors**
Takanori Mitsuno, Yoshiaki Taniguchi, Yasuhide Ohno, and Masao Nagase
*Graduate School of Advanced Technology and Science, Tokushima University, Japan*

MoP-ISCS-120
**Local Strain Engineering in Monolayer $MoS_2$**
Wataru Tomita,[1] Katsushi Hashimoto,[1] Ziqian Wang,[2] Mingwei Chen,[2] and Yoshiro Hirayama[1]
*[1]Department of Physics, Tohoku University, Japan, [2]WPI Advanced Institute for Materials Research, Tohoku University, Japan*

MoP-ISCS-121
**Fabrication of $MoS_2$ thin films on oxide-dielectric-covered substrates**
Joonam Kim[1] and Eisuke Tokumitsu[1,2]
*[1]School of Materials Science, Japan Advanced Institute of Science and Thechnology, Japan, [2]Green Devices Research Center, Japan Advanced Institute of Science and Thechnology, Japan*

MoP-ISCS-122
**Crystal $MoS_2$ grown on Si substrates by sulfuring Mo thin films**
Tsung-Shine Ko, Ding-Jie Liao, Nai-Wen Chang, and Der-Yuh Lin
*Department of Electronic Engineering, National Changhua University of Education, Taiwan*

MoP-ISCS-123
**Morphology and photoluminescence of nanoscale few-layered $MoS_2$ prepared by liquid phase exfoliation**
Da-Ren Hang, Krishna Hari Sharma, De-You Sun, Fong-Yao Su, and Sk Emdadul Islam
*Department of Materials and Optoelectronic Science, National Sun Yat-sen University, Taiwan*

MoP-ISCS-124
**Optical and transport properties of Ni-doped $MoS_2$**
Tsung-Shine Ko, Shi-Ming Jian, Cheng-Ching Huang, and Der-Yuh Lin
*Department of Electronic Engineering, National Changhua University of Education, Taiwan*

MoP-ISCS-125
**Geometric and Electronic Structures of GaN Sheet**
Yanlin Gao and Susumu Okada
*University of Tsukuba, Japan*

MoP-ISCS-126
**Deposition properties of small molecular organic thin films by multi-jet mode electrospray deposition**
Ryo Terada,[1] Yoshiki Niinuma,[1] Yusuke Takatsuka,[1] Hiroyuki Ueda,[1] and Akihiko Kikuchi[1,2]
*[1]Sophia University, Japan, [2]Sophia Nanotechnology Research Center, Japan*

MoP-ISCS-127
**Fabrication of Alq3/NPB small-molecule laminated structures with suppressed interface mixing by multi-jet mode electrospray deposition**
Hiroyuki Ueda,[1] Yusuke Takatsuka,[1] Yoshiki Ninuma,[1] Ryo Terada,[1] and Akihiko Kikuchi[1,2]
*[1]Sophia Univ, Japan, [2]Sophia Nanotech Research Center, Japan*

MoP-ISCS-128
**Organic Photovoltaic Cell Fabricated by Electrospray Deposition Using Non-Halogenated Solvent**
Kazuya Takahira, Asuki Toda, Katsumi Suzuki, Takeshi Fukuda, Norihiko Kamata, and Zentaro Honda
*Saitama University, Japan*

MoP-ISCS-129
**Semi-transparent OLEDs Fabrication using Lamination Process**
Yuuki Nishioka, Shigeki Naka, and Hiroyuki Okada
*University of Toyama, Japan*

MoP-ISCS-130
**Structural and thermoelectric properties of TTF-$I_{0.71}$ organic compound**
Kei Hayashi, Kento Kuba, and Yuzuru Miyazaki
*Department of Applied Physics, Graduate School of Engineering, Tohoku University, Japan*

MoP-ISCS-131
**Gate-bias and Temperature Dependence in Pentacene-based Organic Thin Film Transistor with $MoO_3$/Au Contacts**
Safizan Shaari,[1,2] Shigeki Naka,[1] and Hiroyuki Okada[1]
*[1]Graduate School of Science and Engineering, University of Toyama, Japan, [2]School of Microelectronic Enginnering, Universiti Malaysia Perlis, Malaysia*

MoP-ISCS-132
**Pentacene Memory Transistors Using Monolayer of Ligand-removed Semiconductor Colloidal Nano-dots as a Floating Gate**
Fumihoru Nakano, Kazuyuki Uno, and Ichiro Tanaka
*Wakayama University, Japan*

MoP-ISCS-133
**Nonvolatile organic transistor-memory devices based on pentacene semiconductors and poly (methyl methacrylate)/graphene quantum-dot composite trap layers**
Ying-Jun Shen,[1] Yan-Kuin Su,[1,2] Hsin-Chieh Yu,[1] and Tsung-Hsien Kao[1]
*[1]Institute of Microelectronics and Department of Electrical Engineering, Advanced Optoelectronic Technology Center, Center for Micro/Nano Science and Technology, National Cheng Kung University, Taiwan, [2]Department of Electrical Engineering, Kun Shan University, Taiwan*

MoP-IPRM-001
**Material Conversion of GaAs Nanowires by Post Growth Treatment**
Kohei Nishioka,[1] Hidetoshi Suzuki,[2] Kentaro Sakai,[2] and Fumitaro Ishikawa[1]
*[1]Graduate School of Science and Engineering, Ehime University, Japan, [2]Faculty of Engineering, University of Miyazaki, Japan*

MoP-IPRM-002
**Selective area growth of GaSb nano-templates on GaAs (001) using atomic hydrogen assisted molecular beam epitaxy**
Ludovic Desplanque,[1] Maria Fahed,[1] David Troadec,[1] Pierre Ruterana,[2] and Xavier Wallart[1]
*[1]IEMN, UMR 8520, CNRS and University of Lille, France, [2]CIMAP, UMR 6252 CNRS-ENSICAEN-CEA-UCBN, France*

MoP-IPRM-003
**High-efficiency cryogenic temperatures yellow quantum dot for light emitting diodes**
Andrea Pescaglini, Agnieszka Gocalinska, Gediminas Juska, Stefano Moroni, and Emanuele Pelucchi
*Tyndall National Institute, University College Cork, Ireland*

MoP-IPRM-004
**Growth of Type-II InP Quantum Dots in InGaP Matrix by Using Solid-Source Molecular Beam Epitaxy for Intermediate-Band solar cells**
Takeyoshi Sugaya and Takeshi Tayagaki
*National Institute of Advanced Industrial Science and Technology (AIST), Japan*

MoP-IPRM-005
**Fabrication of nanowire growth templates by forming pinholes in $SiO_x$ on Si**
Huan Zhao Ternehäll, Elham Fadaly, and Mahdad Sadeghi
*Department of Microtechnology and Nanoscience, Chalmers University of Technology, Sweden*

MoP-IPRM-006
**Influence of temperature on Sn incorporation into GeSn alloy grown by molecular beam epitaxy**
Hui Li, Chiao Chang, and Hung-Hsiang Cheng
*Center for Condensed Matter Sciences and Graduate Institute of Electronics Engineering, National Taiwan University, Taiwan*

MoP-IPRM-007
**Modeling InGaAs MOVPE in v-grooves and pyramidal recesses**
Stefano Moroni,[1] Valeria Dimastrodonato,[1] Tung-Hsun Chung,[1] Gediminas Juska,[1] Agnieszka Gocalinska,[1] Dimitri Vvedensky,[2] and Emanuele Pelucchi[1]
*[1]Tyndall National Institute, University College Cork, Ireland, [2]The Blackett Laboratory, Imperial College London, United Kingdom*

MoP-IPRM-008
**Shape evolution and emission property of InP nanostructures under hydrides influence**
Enrica Mura, Agnieszka Gocalinska, Gediminas Juska, Stefano Moroni, Andrea Pescaglini, and Emanuele Pelucchi
*Tyndall National Institute, "lee Maltings", University College Cork, Ireland*

MoP-IPRM-009
**MBE growth and characterization of strained GaAsBi/GaAs MQWs**
Pallavi Patil, Fumitaro Ishikawa, and Satoshi Shimomura
*Department of Nano-electronics, Ehime University , Japan*

MoP-IPRM-010
**Annealing effects on the electroluminescence of InGaAsN/GaAsSb Type-II Quantum Well Diodes Grown on InP Substrates**
Yuichi Kawamura,[1,2] Ikuya Shishido,[1] Sho Tanaka,[1] and Shuichi Kawamata[1,2]
*[1]Graduate School of Engineering, Osaka Prefecture University, Japan, [2]Research Organization for University-community Collaboration, Osaka Prefecture University, Japan*

MoP-IPRM-011
**Growth and characterisation of InAsP/AlGaInP QD laser structures**
Andrey B Krysa,[1] John S Roberts,[1] Jan Devenson,[1] Richard Beanland,[2] Ivan Karomi,[3,4] Samuel Shutts,[3] and Peter M Smowton[3]
*[1]University of Sheffield, United Kingdom, [2]University of Warwick, United Kingdom, [3]Cardiff University, United Kingdom, [4]University of Mosul, Iraq*

MoP-IPRM-012
**Statistical Investigations on the Development of GaAs/GaAsBi Core-Multi Shell Nanowires**
Kyohei Takada, Yuto Kubota, Yoshihiko Akamatsu, Pallavi Patil, Fumitaro Ishikawa, and Satoshi Shimomura
*Graduate School of Science and Engineering, Ehime University, Japan*

MoP-IPRM-013
**Optimizing the concentration profile of Zn with ruthenium doped InP**
Harunaka Yamaguchi, Eiji Nakai, Hiroyuki Kawahara, Takehiro Nishida, and Hitoshi Watanabe
*Mitsubishi Electric Corporation, Japan*

MoP-IPRM-014
**Cryogenic DC and RF Characteristics of InP HEMTs with Various Drain-Side Recess Lengths**
Akira Endoh,[1,2] Issei Watanabe,[1] Akifumi Kasamatsu,[1] Tsuyoshi Takahashi,[2] Shoichi Shiba,[2] Yasuhiro Nakasha,[2] Taisuke Iwai,[2] and Takashi Mimura[1,2]
*[1]National Institute of Info. & Com. Tech., Japan, [2]Fujitsu Laboratories Ltd., Japan*

MoP-IPRM-015
**Low-frequency and radio-frequency C-V characterization of epitaxially grown InAs/high-k vertical nanowire MOS gate stacks**
Jun Wu, Kristofer Jansson, Aein Shiri Banadi, Erik Lind, and Lars-Erik Wernersson
*Lund University, Sweden*

MoP-IPRM-016
**InAs/$Al_{0.4}Ga_{0.6}Sb$ side gated vertical TFET on GaAs substrate**
Vinay Chinni, Mohammed Zaknoune, Xavier Wallart, and Ludovic Desplanque
*Institut D'electronique de Microélectronique et de Nanotechnologie, Lille University of Science and Technology, France*

MoP-IPRM-017
**Comparative Study on Noise Characteristics of As and Sb-based HEMTs**
Takuto Takahashi, Shota Hatsushiba, Sachie Fujikawa, and Hiroki Inomata Fujishiro
*Department of Applied Electronics, Tokyo University of Science, Japan*

MoP-IPRM-018
**RTD-based Reconfigurable Logic Gates for Programmable Logic Array Applications**
Donghyeok Bae, Jaehong Park, Maengkyu Kim, Yongsik Jeong, and Kyounghoon Yang
*School of Electrical Engineering, Korea Advanced Institute of Science and Technology, Republic of Korea*

MoP-IPRM-019

**Effects of Border Traps on Transfer Curve Hysteresis and Split-CV Mobility Measurement in InGaAs Quantum-Well MOSFETs**

Paolo Pavan,[1] Nicolò Zagni,[1] Francesco Maria Puglisi,[1] Alireza Alian,[2] Aaron Thean,[2] Nadine Collaert,[3] and Giovanni Verzellesi[3]

*[1]DIEF, University of Modena and Reggio Emilia, Italy, [2]IMEC, Belgium, [3]DISMI, University of Modena and Reggio Emilia, Italy*

MoP-IPRM-020

**A Physical Based Equivalent Circuit Modeling Approach for Ballasted InP DHBT Multi-finger devices at Millimeter-wave Frequencies**

Virginio Midili,[1] Michele Squartecchia,[1] Tom Keinicke Johansen,[1] Virginie Nodjiadjim,[2] Muriel Riet,[2] Jean-Yves Dupuy,[2] and Agnieszka Konczykowska[2]

*[1]Technical University of Denmark, Denmark, [2]III-V Lab, France*

MoP-IPRM-021

**Cryogenic low-noise InP HEMTs: A source-drain distance study**

Eunjung Cha,[1] Arsalan Pourkabirian,[1] Joel Schleeh,[2] Niklas Wadefalk,[2] Giuseppe Moschetti,[2] Piotr Starski,[1] Göran Alestig,[1] John Halonen,[1] Bengt Nilsson,[1] Per-åke Nilsson,[1] and Jan Grahn[1]

*[1]Department of Microtechnology and Nanoscience, Chalmers University of Technology, Sweden, [2]Low Noise Factory AB, Mölndal, Sweden*

MoP-IPRM-022

**Long tail Zn diffusion in InGaAsP and InGaAlAs quaternary alloys**

Takeshi Kitatani, Kaoru Okamoto, Kenji Uchida, and Shigehisa Tanaka

*Oclaro Japan, Inc., Japan*

MoP-IPRM-023

**Bismuth for tailoring and modification of InP-based detector and laser structures in 2-3 $\mu$m band**

Yi Gu, Yong-Gang Zhang, Xing-You Chen, Ying-Jie Ma, Su-Ping Xi, Ben Du, and Ai-Zhen Li

*Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China*

MoP-IPRM-024

**Selective Area Grown AlGaInAs Multi-quantum Wells Characterization and Modeling for Photonic Integrated Devices**

Binet Guillaume,[1,2] Decobert Jean,[1] Nadine Lagay,[1] Alvaro Maia,[2] Pierre-Yves Lagrée,[2] and Fernando Rinaldi[3]

*[1]III-V Lab, France, [2]Institut Jean Le Rond D'alembert, Sorbonne Universités, France, [3]Bruker Axs GmbH, Germany*

MoP-IPRM-025

**InP-based Uni-Traveling-Carrier Photodiodes (UTC-PDs) with 3-dB Bandwidth Over 135 GHz**

Qianqian Meng,[1] Hong Wang,[1,2] Chongyang Liu,[1] Xin Guo,[1] and Kiansiong Ang[1]

*[1]Temasek Laboratories, Nanyang Technological University, Singapore, [2]School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore*

MoP-IPRM-026

**Monolithic Fabrication of InSb-based Photo-Pixel for Mid-IR Imaging**

Chengzhi Xie, Vincenzo Pusino, Ata Khalid, Mohsin Aziz, Matthew Steer, and David Cumming

*Electronics and Nanoscale Division in The School of Engineering at The University of Glasgow, United Kingdom*

MoP-IPRM-027

**A Low Dark Current Planar-type InGaAs Guard-ring PIN Photodiode Using an ALD-$Al_2O_3$ Passivation for Short-wave Infrared Imaging Applications**

Youngjun Kim, Inseob Noh, Hyungjun Noh, Jeahong Park, and Kyounghoon Yang

*School of Electrical Engineering, Korea Advanced Institute of Science and Technology, Republic of Korea*

MoP-IPRM-028

**Photonic Integrated Device of Highly-Stacked Quantum Dot using Quantum Dot Intermixing by Ion Implantation**

Shin'e Matsui,[1] Yuki Takei,[1] Atsushi Matsumoto,[2] Koichi Akahane,[2] Yuichi Matsushima,[1] Hiroshi Ishikawa,[1] and Katsuyuki Utaka[1]

*[1]Faculty of Science and Engineering, Waseda University, Japan, [2]National Institute of Information and Communications Technology (NICT), Japan*

MoP-IPRM-029

**Monitoring the Long-term Frequency Stability of InAs/InP Quantum-dash-based Mode Locked Lasers via Terminal Voltage**

Kamel Merghem,[1] Vivek Panapakham,[1] Quentin Gaimard,[1] Francois Lelarge,[2] and Abderrahim Ramdane[1]

*[1]CNRS LPN, France, [2]III-V Lab, France*

MoP-IPRM-030

**Two-state Lasing in GaAs-based InAs/InGaAs Quantum Dot Mode-locked Laser**

Zhongliang Qiao,[1] Xiang Li,[1] Xin Guo,[1] Hong Wang,[1] Rui Wang,[2] Kian Siong Ang,[3] and Chongyang Liu[3]

*[1]NOVITAS, Nanoelectronics Centre of Excellence, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, [2]Bruker Singapore Pte. Ltd., Singapore, [3]Temasek Laboratories, Nanyang Technological University, Singapore*

MoP-IPRM-031

**Evidence of Quantum Confined Stark Effect Due to Doping Profile in InAsP/InP Quantum Well Structures and its Modification by Ion Bombardment**

Jean-Pierre Landesman,[1] Juan Jiménez,[2] Christophe Levallois,[3] Frédéric Pommereau,[4] Alexandre Beck,[3] and Alfredo Torres[2]

*[1]University of Rennes 1 and CNRS, France, [2]University of Valladolid, Spain, [3]INSA Rennes and CNRS, France, [4]III-V Lab, France*

MoP-IPRM-033

**Thermal Management of Monolithic and Heterogeneous Integrated Lasers**

Ida Lucci,[1] Mounib Bahri,[2] Yoan Léger,[1] and Charles Cornet[1]

*[1]UMR Foton, CNRS, INSA Rennes, Université de Rennes 1, France, [2]Laboratoire de Photonique et Nanostructures, CNRS UPR 20, France*

MoP-IPRM-034
**Optimization of Semiconductor Ridge Waveguide Lasers for Improved Temperature Characteristics**
Xiang Li,[1] Hong Wang,[1] Zhongliang Qiao,[1] Xin Guo,[1] Kian Siong Ang,[2] and Chongyang Liu[2]
*[1]Novitas, Nanoelectronics Centre of Excellence, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, [2]Temasek Laboratories, Nanyang Technological University, Singapore*

MoP-IPRM-035
**Fabrication of nitride LEDs using chemical lift-off from a GaN/sapphire template**
Ray-Hua Horng,[1] Hsu-Hung Hsueh,[2] Sin-Liang Ou,[3] and Dong-Sing Wuu[4]
*[1] Department of Electronics Engineering, National Chiao Tung University, Taiwan, [2]Graduate Institute of Precision Engineering, National Chung Hsing University, Taiwan, [3]Department of Materials Science and Engineering, Da Yeh University, Taiwan, [4]Department of Materials Science and Engineering, National Chung Hsing University, Taiwan*

MoP-IPRM-036
**The electrical properties of HgCdTe layers grown by MBE on Si and P + / n junction formed on its basis**
Maxim Yakushev,[1] Alexandr Guzev,[2] Anatoliy Kovchavtcev,[2] Alexey Tsarenko,[2] Vasiliy Varavin,[1] Vladimir Vasilyev,[3] Sergei Dvoretsky,[1] Denis Marin,[1] Irina Sabinina,[3] Dmitriy Shefer,[1] Georgiy Sidorov,[3] and Yuriy Sidorov[1]
*[1]Laboratory of Epitaxial Technology from Molecular Beams of A2B6 Compounds, Institute of Semiconductor Physics, Russia, [2]Laboratory of Physical Principles for Integrated Microelectronics, Institute of Semiconductor Physics, Russia, [3]Laboratory for Physical-technological Principles of Making A2B6-based Devices, Institute of Semiconductor Physics, Russia*

# June 28th (Tuesday)

## TuB1 High-voltage Devices — Room B (201) 8:30-10:30

*Chair:* K. J. Chen and T. Tanaka

TuB1-1 (Invited) 8:30 - 9:00
**Epitaxial growth of GaN-based heterostructures of high quality on Si substrates using a large lattice-mismatch induced stress control technology**
Jianpeng Chen, Xuelin Yang, Maojun Wang, and Bo Shen
*State Key Laboratory of Artificial Microstructure and Mesoscopic Physics, School of Physics, Peking University, China*

TuB1-2 (Invited) 9:00 - 9:30
**Measurement of Channel Temperature in $Ga_2O_3$ MOSFETs**
Man Hoi Wong,[1] Yoji Morikawa,[2] Kohei Sasaki,[3,1] Akito Kuramata,[3] Shigenobu Yamakoshi,[3] and Masataka Higashiwaki[1]
*[1]National Institute of Information and Communications Technology, Japan, [2]Silvaco Japan Co., Ltd., Japan, [3]Tamura Corporation, Japan*

TuB1-3 9:30 - 9:45

**High Voltage Low Current Collapse AlGaN/GaN MISHEMTs with in-situ SiN Gate Dielectric**

Huaxing Jiang,[1] Chao Liu,[1] Xing Lu,[2] and Kei May Lau[1]

*[1]Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology, Hong Kong, [2]State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, China*

TuB1-4 9:45 - 10:00

**Optimization of the source field-plate design for low dynamic $R_{DS\text{-}ON}$ dispersion of AlGaN/GaN MIS-HEMTs**

Nicolo Ronchi,[1] Benoit Bakeroot,[2] Shuzhen You,[1] Jie Hu,[1] Steve Stoffels,[1] and Stefaan Decoutere[1]

*[1]IMEC, Belgium, [2]CMST, IMEC & Ghent University, Belgium*

TuB1-5 10:00 - 10:15

**Impact of Drain Electrode Shape Irregularities on Breakdown Voltage of AlGaN/GaN HEMTs**

Shintaro Ohi, Shinya Makino, Taisei Yamazaki, Hirokuni Tokuda, Joel Tacla Asubar, and Masaaki Kuzuhara

*Graduate School of Engineering, University of Fukui, Japan*

TuB1-6 10:15 - 10:30

**Critical Heterostructure Design for Low On-Resistance Normally-Off Double-Channel MOS-HEMT**

Jin Wei, Shenghou Liu, Baikui Li, Xi Tang, Gaofei Tang, Zhaofu Zhang, and Kevin J. Chen

*Department of Electronic and Computer Engineering, The Hong Kong University of Science and Technology, Hong Kong*

## TuC1 Nanostructures Room C (202) 8:30-10:30

*Chair:* K. Volz and T. Nakaoka

TuC1-1 (Invited) 8:30 - 9:00

**Electronic properties of chalcogenide semiconductor nanostructures and thin-films**

Oded Millo

*Racah Institute of Physics, The Hebrew University of Jerusalem, Israel*

TuC1-2 9:00 - 9:15

**Nanoscale heat transport in single-crystalline Si and amorphous SiGe phononic crystals**

Junki Nakagawa,[1] Jeremie Maire,[1] Kentaro Sawano,[2] and Masahiro Nomura[1,3,4]

*[1]Institute of Industrial Science, The University of Tokyo, Japan, [2]Advanced Research Laboratories, Tokyo City University, Japan, [3]Institute for Nano Quantum Information Electronics, The University of Tokyo, Japan, [4]JST, PRESTO, Japan*

TuC1-3 9:15 - 9:30

**Terahertz spectroscopy of single Ce-doped $C_{82}$ molecules using sub-nm-scale gap electrodes**

Shaoqing Du,[1] Kenji Yoshida,[1] Ya Zhang,[1] and Kazuhiko Hirakawa[1,2]

*[1]Center for Photonics Electronics Convergence, Institute of Industrial Science, University of Tokyo, Japan, [2]Institute for Nano Quantum Information Electronics, University of Tokyo, Japan*

TuC1-4 9:30 - 9:45

**1-D Electronic Density of States for InAs/InP Quantum Dashes probed by Scanning Tunneling Spectroscopy**

Jean-Christophe Girard,[1] Konstantinos Papatryfonos,[1] Guillemin Rodary,[1] Christophe David,[1] François Lelarge,[2] and Abderrahim Ramdane[1]

*[1]Cnrs Laboratory for Photonics and Nanostructures, France, [2]III-V Lab, a Joint Lab of 'Alcatel Lucent Bell Labs', 'Thales Research and Technology', and 'CEA Leti', France*

TuC1-5 9:45 - 10:00

**Hybrid InAs/GaAs and GaSb/GaAs Quantum Dot Structure**

Hai-Ming Ji,[1] Baolai Liang,[2] Paul J. Simmonds,[2] Bor-Chau Juang,[3] Tao Yang,[1] and Diana L. Huffaker[2,3]

*[1]Institute of Semiconductors, Chinese Academy of Sciences, China, [2]California Nanosystems Institute, University of California Los Angeles, Los Angeles, United States of America, [3]Department of Electrical Engineering, University of California Los Angeles, United States of America*

TuC1-6 10:00 - 10:15

**Nanostructures and surface reconstructions in Mn / III-V systems and MnSb**

Haiyuan Wang, Collins Ouserigha, Christopher Burrows, and Gavin Bell

*Department of Physics, University of Warwick, Coventry, United Kingdom, United Kingdom*

TuC1-7 10:15 - 10:30

**Photonic crystal membrane with single crystalline rare-earth oxide using selective area growth by MBE**

Takehiko Tawara,[1,2] Hiroo Omi,[1,2] Thomas McManus,[1] Aleix Llenas,[1] Eiichi Kuramochi,[1,2] Satoru Adachi,[3] and Hideki Gotoh[1]

*[1]NTT Basic Research Laboratories, Japan, [2]NTT Nanophotonics Center, Japan, [3]Hokkaido University, Japan*

## TuD1 Organic Semiconductor & Flexible Materials — Room D (203) 8:30-10:30

*Chair:* H. Okada and T. Mori

TuD1-1 (Invited) 8:30 - 9:00

**Scaling of Organic Thin-Film Transistors and circuits**

Dietmar Knipp

*Jacobs University Bremen, Germany*

TuD1-2 (Invited) 9:00 - 9:30

**Challenges for ultra-thin and highly flexible OLEDs fabricated by roll to roll process**

Takashi Minakata,[1,2] Mitsuru Tanamura,[1] Yasuhiro Mitamura,[1] Masayuki Imashiro,[1] Akira Horiguchi,[1] Akira Sugimoto,[1] Masahiko Yamashita,[1,2] Yukito Yada,[1] Nobuki Ibaraki,[1] and Hiroshi Tomiyasu[1]

*[1]Cereba, Japan, [2]Asahikasei, Japan*

TuD1-3 (Invited) 9:30 - 10:00

**Efficient and Stable Large-area Perovskite Solar Cells**

Liyuan Han

*National Institute for Materials Science, Japan*

TuD1-4 10:00 - 10:15

**Effect of Alkyl Chain Length of Fluorinated Self-Assemble Monolayer to Organic Light-Emitting Diodes as a Hole Injection Layer**

Tatsuo Mori,[1] Tomoya Inden,[2] and Takao Nishikawa[3]

*[1]Department of Electrical Engineering, Aichi Institute of Technology, Japan, [2]Department of Electrical Engineering and Computer Science, Graduate School of Engineering, Nagoya University, Japan, [3]Center for Regional Collaboration in Research and Education, Iwate University, Japan*

TuD1-5 10:15 - 10:30

**Vertically Graded Organic Photovoltaic Cells Using Alternative Intermittent Electrospray Co-deposition**

Takeshi Fukuda and Katsumi Suzuki

*Saitama University, Japan*

*Coffee Break* 10:30 - 11:00

## TuB2 GaN: Growth & Characterization Room B (201) 11:00-12:30

*Chair:* K.Matsumoto and Y.Otoki

TuB2-1 (Invited) 11:00 - 11:30

**Spatio-time-resolved cathodoluminescence study on high AlN mole fraction $Al_xGa_{1-x}N$ structures grown by metalorganic vapor phase epitaxy**

Shigefusa F Chichibu,[1] Youichi Ishikawa,[1] Kentaro Furusawa,[1] Akira Uedono,[2] Hideto Miyake,[3] and Kazumasa Hiramatsu[3]

*[1]IMRAM, Tohoku University, Japan, [2]University of Tsukuba, Japan, [3]Mie University, Japan*

TuB2-2 11:30 - 11:45

**Structural and Electrical Transport Properties of Si Doped GaN Nanowires**

Zhihua Fang,[1,2,3] Eric Robin,[4] Elena Rozas-Jiménez,[5] Ana Cros,[5] Fabrice Donatini,[1,3] Nicolas Mollard,[4] Julien Pernot,[1,3,6] and Bruno Daudin[1,2]

*[1]Univ. Grenoble Alpes, France, [2]Cea, Inac-sp2m, "nanophysique et Semiconducteurs" Group, France, [3]Cnrs, Inst. Neel, France, [4]Cea, Inac, Minatec Campus, France, [5]Materials Science Institute, University of Valencia, Spain, [6]Institut Universitaire de France, France*

TuB2-3 11:45 - 12:00
**Flow-rate Modulation Epitaxy of Nonpolar m-plane AlN Homoepitaxial Layers Grown on AlN Bulk Substrates**
Junichi Nishinaka, Yoshitaka Taniyasu, Tetsuya Akasaka, and Kazuhide Kumakura
*NTT Basic Research Laboratories, NTT corporation, Japan*

TuB2-4 12:00 - 12:15
**Fabrication of an a-plane AlGaN Quantum well on r-plane sapphire**
Masafumi Jo and Hideki Hirayama
*Riken, Japan*

TuB2-5 12:15 - 12:30
**Curvature of HVPE c-Plane Grown GaN Wafers in the Relation to Stress Gradients Caused by Inclined Threading Dislocations**
Humberto Miguel Foronda,[1] Alexey E Romanov,[1,2,3] Erin C Young,[1] Christian A Robertson,[1] Glenn E Beltz,[4] and James S Speck[1]
*[1]Materials Department, UC Santa Barbara, United States of America, [2]Ioffe Physico-Technical Institute RAS, Russia, [3]ITMO University, Russia, [4]Mechanical Engineering Department, UC Santa Barbara, United States of America*

## TuC2 Oxide Electronics — Room C (202) 11:00-12:30

*Chair:* T. Omata

TuC2-1 (Invited) 11:00 - 11:30
**Properties and functionalities of organic-oxide heterointerfaces**
Masaki Nakano
*QPEC and Department of Applied Physics, The University of Tokyo, Japan*

TuC2-2 11:30 - 11:45
**Vertical Schottky Barrier Diodes Fabricated on Un-intentionally Doped and Sn-doped (-201) bulk $\beta$-$Ga_2O_3$ Substrates**
Amit Verma[1] and Debdeep Jena[1,2]
*[1]School of Electrical and Computer Engineering, Cornell University, United States of America, [2]Department of Materials Science and Engineering, Cornell University, United States of America*

TuC2-3 11:45 - 12:00
**Fabrication of $\alpha$-$Ga_2O_3$ using $\alpha$-$(Al_xGa_{1-x})_2O_3$ Buffer Layers and its Crystal Structure Properties**
Riena Jinno,[1] Takayuki Uchida,[1] Kentaro Kaneko,[2] and Shizuo Fujita[2]
*[1]Department of Electronic Science and Engineering, Kyoto University, Japan, [2]Photonics and Electronics Science and Engineering Center, Kyoto University, Japan*

TuC2-4 12:00 - 12:15
**Scalability of Zinc Oxide Thin-Film Transistors for RF Amplifiers and DC Switch Applications**
Gregg Huascar Jessen,[1] Michael Schuette,[1] Kevin Leedy,[1] Antonio Crespo,[1] Thomas Donigan,[1] Andrew Green,[2] Dennis Walker, Jr.,[1] Stephen Tetlak,[1] and Karynn Sutherlin[1]
*[1]Air Force Research Laboratory, United States of America, [2]Wyle, United States of America*

TuC2-5 12:15 - 12:30

**Mapping of Au/a-IGZO Schottky Contacts by Using Scanning Internal Photoemission Microscopy**

Kenji Shiojima and Masato Shingo

*Graduate School of Electrical and Electronics Engineering, University of Fukui, Japan*

## TuD2 Nano Materials Growth Room D (203) 11:00-12:30

*Chair:* H.Udono and S. Wang

TuD2-1 (Invited) **Cancelled** 11:00 - 11:30

**Patterned III-V Nanopillars: A platform for integrated optoelectronic devices**

Diana Huffaker

*Cardiff University, United Kingdom*

TuD2-2 11:30 - 11:45

**Increasing the emission wavelength of InAs quantum dot grown on InP substrates using a dot in well structure**

Kouichi Akahane,[1] Atsushi Matsumoto,[1] Toshimasa Umezawa,[1] Naokatsu Yamamoto,[1] Keita Hashimoto,[2] and Hiroshi Takai[2]

*[1]National Institute of Information and Communications Technology, Japan, [2]Tokyo Denki University, Japan*

TuD2-3 11:45 - 12:00

**Self-Catalyzed Growth of Highly Vertical GaAs Core-Shell Nanowires on Chemically-Treated Si(111) Surfaces**

Siew Li Tan,[1,2] Yann Genuist,[1,3] Henri Mariette,[2,3] and Nikos T. Pelekanos[1,2,4]

*[1]INAC, CEA Grenoble, France, [2]Univ. Grenoble Alpes, France, [3]Institut NEEL, CNRS, France, [4]Materials Science & Technology Dept., Univ. of Crete and IESL/FORTH, Greece*

TuD2-4 12:00 - 12:15

**Study of Re, Au, and Fe Dopant Effect on the Structure and Optical Properties of Molybdenum Disulfide Single Crystals**

Sigiro Mula[1,2] and Ho Ching-Hwa[3]

*[1]Department of Physics Education, Faculty of Teacher Training and Education, University of HKBP Nommensen, Indonesia, [2]Department of Electronic and Computer Engineering, National Taiwan University of Science and Technology, Taiwan, [3]Graduate Institute of Applied Science and Technology, National Taiwan University of Science and Technology, Taiwan*

TuD2-5 12:15 - 12:30

**p-$BaSi_2$/n-Si heterojunction solar cells with 9.0 % efficiency**

Suguru Yachi, Ryota Takabe, Daichi Tsukahara, Hiroki Takeuchi, Kaoru Toko, and Takashi Suemasu

*University of Tsukuba, Japan*

*Lunch Break* 12:30 - 14:00

## TuB3 Nanostructured Photonic Devices Room B (201) 14:00-16:00

*Chair:* J. P. Reithmaier and T. Asano

TuB3-1 (Invited) 14:00 - 14:30

**Current Trends in High-Efficiency III-V Nanostructured Solar Cells**

Yoshitaka Okada

*RCAST, University of Tokyo, Japan*

TuB3-2 14:30 - 14:45

**Two-wavelength Switchable Narrowband Thermal Emitters**

Takuya Inoue, Anqi Ji, Menaka De Zoysa, Takashi Asano, and Susumu Noda

*Department of Electronic Science and Engineering, Kyoto University, Japan*

TuB3-3 14:45 - 15:00

**Demonstration of a Plasmonic Laser using Quantum Dot Gain Medium**

Jinfa Ho,[1] Jun Tatebayashi,[1] Sylvain Sergent,[1] Chee Fai Fong,[2] Yasutomo Ota,[1] Satoshi Iwamoto,[1,2] and Yasuhiko Arakawa[1,2]

*[1]Institute for Nano Quantum Information Electronics, University of Tokyo, Japan, [2]Institute of Industrial Science, University of Tokyo, Japan*

TuB3-4 15:00 - 15:15

**InP on SOI Electrically Driven Photonic Crystal Nanolasers**

Guillaume Crosnier,[1,2] Dorian Sanchez,[2] Paul Monnier,[2] Sophie Bouchoule,[2] Gregoire Beaudoin,[2] Isabelle Sagnes,[2] Rama Raj,[2] and Fabrice Raineri[2,3]

*[1]Stmicroelectronics, France, [2]CNRS-lPN, France, [3]Université Paris Diderot, France*

TuB3-5 15:15 - 15:30

**Highly pure and stable single photon source directly coupled to a fiber**

Satoru Odashima,[1] Hirotaka Sasakura,[2] Hideaki Nakajima,[3] and Hidekazu Kumano[3]

*[1]Department of Mechanical Engineering, Hachinohe Institute of Technology, Japan, [2]Creative Research Institution, Hokkaido University, Japan, [3]Research Institute for Electronic Science, Hokkaido University, Japan*

TuB3-6 15:30 - 15:45

**Fabrication of photonic-crystal structures by TBAs-based MOVPE for photonic-crystal lasers**

Masahiro Yoshida, Menaka De Zoysa, Kenji Ishizaki, Ranko Hatsuda, Yoshinori Tanaka, Hitoshi Kitagawa, and Susumu Noda

*Department of Electronic Science and Engineering Kyoto University, Japan*

TuB3-7 15:45 - 16:00

**Refractive index control by quantum well intermixing for light confinement in VCSEL**

Minoru Saito, Shouhei Moriwaki, and Tomoyuki Miyamoto

*Photonic Integration System Research Center, P&I Lab., Tokyo Institute of Technology, Japan*

## TuC3 Spin-related Physics Room C (202) 14:00-16:00

*Chair:* N.Aoki

TuC3-1 (Invited) 14:00 - 14:30

**Spintronics with semiconductor nanowires**

Thomas Schäpers,[1] Sebastian Heedt,[1] Andreas Bringer,[2] Isabel Otto,[1] Kamil Sladek,[1] Hilde Hardtdegen,[1] Detlev Grützmacher,[1] and Werner Prost[3]

*[1]Peter Grünberg Institut 9, Forschungszentrum Jülich, 52425 Jülich, Germany, [2]Peter Grünberg Institut 1, Forschungszentrum Jülich, 52425 Jülich, Germany, [3]State Electronics Department, University of Duisburg-essen, 47057 Duisburg, Germany*

TuC3-2 14:30 - 14:45

**Vertical spin electric-double-layer transistor**

Hiroshi Terada,[1] Le Duc Anh,[1] Shinobu Ohya,[1] Yoshihiro Iwasa,[2] and Masaaki Tanaka[1]

*[1]Department of Electrical Engineering and Information Systems, The University of Tokyo, Japan, [2]Department of Applied Physics, The University of Tokyo, Japan*

TuC3-3 14:45 - 15:00

**Determination of the bulk Dresselhaus spin-orbit interaction parameter in an InGaAs quantum well**

Kohei Yoshizumi, Makoto Kohda, and Junsaku Nitta

*Department of Materials Science, Tohoku University, Japan*

TuC3-4 15:00 - 15:15

**Spin coherence enhanced by in-plane electric field-induced spin-orbit interaction**

Yoji Kunihashi,[1] Haruki Sanada,[1] Hideki Gotoh,[1] Koji Onomitsu,[1] Makoto Kohda,[2] Nitta Junsaku,[2] and Tetsuomi Sogawa[1]

*[1]NTT Basic Research Laboratories, NTT Corporation, Japan, [2]Department of Materials Science, Tohoku University, Japan*

TuC3-5 15:15 - 15:30

**Hole g-Factor Anisotropies in Individual InAs Quantum Rings**

Reina Kaji,[1] Takahiro Tominaga,[1] Yu-Nien Wu,[2] Ming-Fan Wu,[2] Shun-Jen Cheng,[2] and Satoru Adachi[1]

*[1]Department of Applied Physics, Hokkaido University, Japan, [2]Department of Electrophysics, National Chiao Tung University, Taiwan*

TuC3-6 15:30 - 15:45

**Auger Recombination in InAs: Role of Spin-Orbit Coupling and Phonons**

Jimmy-Xuan Shen,[1] Daniel Steiauf,[2] Emmanouil Kioupakis,[3] and Chris G. van de Walle[2]

*[1]Department of Physics, University of California Santa Barbara, United States of America, [2]Materials Deparment, University of California Santa Barbara, United States of America, [3]Department of Matrial Science, University of Michigan, United States of America*

TuC3-7 15:45 - 16:00

**Simulating the Ising Hamiltonian with phonons**

Imran Mahboob, Hajime Okamoto, and Hiroshi Yamaguchi

*NTT Basic Research Labs. , Japan*

## TuD3 Epitaxy & Novel Materials Room D (203) 14:00-16:00

*Chair:* K. E. Moselund

TuD3-1 (Invited) 14:00 - 14:15

**Heteroepitaxy of InP on Si for photonic and photovoltaic applications**

Sebastian Lourdudoss

*Department of Materials and Nano Physics, Royal Institute of Technology, Sweden*

TuD3-2 14:30 - 14:45

**Growth of InGaAsP-based MQW Layer on InP Template Bonded to Si Substrate for Fabricating Membrane Lasers**

Takuro Fujii,[1,2] Koji Takeda,[1,2] Erina Kanno,[1] Hidetaka Nishi,[1,2] Koichi Hasebe,[1,2] Takaaki Kakitsuka,[1,2] Tsuyoshi Yamamoto,[1] and Shinji Matsuo[1,2]

*[1]NTT Device Technology Labs., Japan, [2]NTT Nanophotonics Center, Japan*

TuD3-3 14:45 - 15:00

**Enhancing Light Extraction from III-Nitride Devices Using Moth-Eye Nanostructures Formed by Colloidal Lithography**

Christopher D. Pynn,[1] Federico L. Gonzalez,[2] Lesley Chan,[2] Alexander Berry,[2] Sang Ho Oh,[3] Tal Margalith,[1] Daniel E. Morse,[4] Shuji Nakamura,[1,3] Michael J. Gordon,[2] and Steven P. DenBaars[1,3]

*[1]Materials Department, University of California, Santa Barbara, United States of America, [2]Department of Chemical Engineering, University of California, Santa Barbara, United States of America, [3]Department of Electrical and Computer Engineering, University of California, Santa Barbara, United States of America, [4]Department of Molecular, Cellular, and Developmental Biology, University of California, Santa Barbara, United States of America*

TuD3-4 15:00 - 15:15

**Anomalous Ga incorporation into InGaAs microdiscs selectively grown on Si (111)**

Tohma Watanabe, Masakazu Sugiyama, and Yoshiaki Nakano

*Department of Electronic Engineering, School of Engineering, The University of Tokyo, Japan*

TuD3-5 15:15 - 15:30

**Suppressing Ge Diffusion by GaAsSb for Molecular Beam Epitaxy of InGaAs on Ge**

Wei-Jen Hsueh,[1] Pei-Chin Chiu,[1] Ming-Hwei Hong,[2] and Jen-Inn Chyi[1,3]

*[1]Department of Electrical Engineering, National Central University, Taiwan, [2]Department of Physics, National Taiwan University, Taiwan, [3]Research Center for Applied Sciences, Taiwan*

TuD3-6 15:30 - 15:45

**MBE-grown $Mg_{0.13}Cd_{0.87}Te$ for MgCdTe (1.7 eV)/Si (1.1 eV) tandem solar cell applications**

Calli Campbell,[1,2] Ernesto Suarez,[1,3] Yuan Zhao,[1,3] Xin-Hao Zhao,[1,2] Jacob Becker,[1,3] and Yong-Hang Zhang[1,3]

*[1]Center for Photonics Innovation, Arizona State University, United States of America, [2]School for Engineering of Matter, Transport and Energy, Arizona State University, United States of America, [3]School of Electrical, Computer and Energy Engineering, Arizona State University, United States of America*

TuD3-7 15:45 - 16:00

**Epitaxial Lateral Overgrowth of $Ga_xIn_{1-x}P$ Towards Coherent $Ga_xIn_{1-x}P$/Si Heterojunction by Hydride Vapor Phase Epitaxy**

Giriprasanth Omanakuttan, Stamoulis Stergiakis, Abhishek Sahgal, Ilya Sychugov, Sebastian Lourdudoss, and Yan-Ting Sun

*Department of Materials and Nano Physics, School of Information and Communication Technology, KTH Royal Institute of Technology, Sweden*

*Coffee Break* 16:00 - 16:30

## TuB4 Novel Optical Devices & Applications Room B (201) 16:30-18:30

*Chair:* H. Yagi

TuB4-1 (Invited) 16:30 - 17:00

**Photonic Crystal Nanolasers and Its Application to Bio-Sensing**

Toshihiko Baba

*Yokohama National University, Japan*

TuB4-2 17:00 - 17:15

**InGaAs/AlGaAsSb APD with over 200 GHz gain-bandwidth product**

Xinxin Zhou, Shiyu Xie, Shiyong Zhang, Jo Shien Ng, and Chee Hing Tan

*Department of Electronic and Electrical Engineering, University of Sheffield, United Kingdom*

TuB4-3 17:15 - 17:30

**Temperature dependence of avalanche gain in $Al_{0.85}Ga_{0.15}As_{0.56}Sb_{0.44}$ APD**

Shiyu Xie, Xinxin Zhou, Shiyong Zhang, Jo Shien Ng, and Chee Hing Tan

*Department of Electronic and Electrical Engineering, University of Sheffield, United Kingdom*

TuB4-4 17:30 - 17:45

**Guided mode resonant photodiode for highly sensitive infrared imaging**

Michaël Verdun,[1,2] Benjamin Portier,[1] Katarzyna Jaworowicz,[1] Julien Jaeck,[2] François Lelarge,[3] Stéphane Guilet,[1] Christophe Dupuis,[1] Riad Haïdar,[2,4] Fabrice Pardo,[1] and Jean-Luc Pelouard[1]

*[1]MiNaO - LPN-CNRS, France, [2]MiNaO - ONERA The French Aerospace Lab, France, [3]III-V Lab, France, [4]Ecole Polytechnique, France*

TuB4-5 17:45 - 18:00

**Structural and electrical properties of InAs/GaSb superlattices grown by metalorganic vapor phase epitaxy for midwavelength infrared detectors**

Suguru Arikata,[1] Takashi Kyono,[1] Kouhei Miura,[2] Sundararajan Balasekaran,[2] Hiroshi Inada,[2] Yasuhiro Iguchi,[2] Michito Sakai,[3] Haruyoshi Katayama,[3] Masafumi Kimata,[4] and Katsushi Akita[1]

*[1]Semiconductor Technologies Laboratory, Sumitomo Electric Industries, Ltd., Japan, [2]Transmission Devices Laboratory, Sumitomo Electric Industries, Ltd., Japan, [3]Sensor System Research Group, Japan Aerospace Exploration Agency (JAXA), Japan, [4]College of Science and Engineering, Ritsumeikan Univ., Japan*

TuB4-6 18:00 - 18:15

**Homojunction GaAs diode with periodically-inverted structure for nonlinear optical devices**

Ryosuke Suzuki,[1] Tomonori Matsushita,[1,2] and Takashi Kondo[1,2]

*[1]Department of Materials Engineering, School of Engineering, University of Tokyo, Japan, [2]Research Center for Advanced Science and Technology, University of Tokyo, Japan*

TuB4-7 18:15 - 18:30

**Array of Entangled-light-emitting Diodes with Site-controlled Pyramidal Quantum Dots**

Tung-Hsun Chung, Gediminas Juska, Stefano T. Moroni, Agnieszka Gocalinska, Andrea Pescaglini, and Emanuele Pelucchi

*Tyndall National Institute, University College Cork, Ireland*

## TuC4 2D Materials Room C (202) 16:30-18:30

*Chair:* K.Matsumoto

TuC4-1 (Invited) 16:30 - 17:00

**Quantum Transport in van der Waals Junctions of Graphene and 2D Materials**

Tomoki Machida

*Institute of Industrial Science, University of Tokyo, Japan*

TuC4-2 17:00 - 17:15

**Vertical Transport in Graphene/Transition Metal Dichalcogenide van der Waals Heterostructure**

Rai Moriya,[1] Yohta Sata,[1] Takehiro Yamaguchi,[1] Yoshihisa Inoue,[1] Sei Morikawa,[1] Satoru Masubuchi,[1] and Tomoki Machida[1,2]

*[1]Institute of Industrial Science, University of Tokyo, Japan, [2]Institute for Nano Quantum Information Electronics, University of Tokyo, Japan*

TuC4-3 17:15 - 17:30

**Imaging local transport property within $MoS_2$ transistors by scanning gate microscopy**

Masahiro Matsunaga,[1] Ayaka Higuchi,[1] Guanchen He,[2] Jonathan P Bird,[2] Yuichi Ochiai,[1] and Nobuyuki Aoki[1,3]

*[1]Graduate School of Advanced Integration Science, Chiba University, Japan, [2]Department of Electrical Engineering, University at Buffalo, SUNY, United States of America, [3]JST-PRESTO, Japan*

TuC4-4 17:30 - 17:45

**Electronic Properties of $MoS_2$ Nanoribbon with Strain Using Tight Binding Method**

Shuo-Fan Chen and Yuh-Renn Wu

*Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan*

TuC4-5 17:45 - 18:00

**Photoluminescence Quantum Yield and Long Exciton Radiative Lifetime in Monolayer Two-Dimensional Transition Metal Dichalcogenides**

N. Baizura Mohamed,[1,2] Feijiu Wang,[1] Sandhaya Koirala,[1] Hong En Lim,[1] Shinichiro Mouri,[1] Yuhei Miyauchi,[1] and Kazunari Matsuda[1]

*[1]Institute of Advanced Energy, Kyoto University, Kyoto, Japan, [2]Universiti Teknologi Mara Malaysia, Selangor, Malaysia*

TuC4-6 18:00 - 18:15
**Synthesis of 2D materials on epitaxial catalyst films by chemical vapor deposition**
Daiyu Kondo,[1,2] Kenjiro Hayashi,[1,2] Masako Kataoka,[1] Taisuke Iwai,[1] and Shintaro Sato[1,2]
*[1]Fujitsu Laboratories Ltd., Japan, [2]Fujitsu Limited, Japan*

TuC4-7 18:15 - 18:30
**Dielectric breakdown of layered insulator**
Kosuke Nagashio,[1,2] Yoshiaki Hattori,[1] Takashi Taniguchi,[3] and Kenji Watanabe[3]
*[1]University of Tokyo, Japan, [2]PRESTO-JST, Japan, [3]NIMS, Japan*

## TuD4 MOSFET, HEMT & Nanowire FET Room D (203) 16:30-18:30

*Chair:* J. A. del Alamo

TuD4-1 (Invited) 16:30 - 17:00
**III-V MOS device technologies for advanced CMOS and tunneling FET**
Shinichi Takagi[1,2] and Mitsuru Takenaka[1,2]
*[1]The University of Tokyo, Japan, [2]JST-CREST, Japan*

TuD4-2 17:00 - 17:15
**Operation of 16-nm InGaAs channel multi-gate MOSFETs with regrown source/drain**
Haruki Kinoshita, Nobukazu Kise, Atsushi Yukimachi, Toru Kanazawa, and Yasuyuki Miyamoto
*Tokyo Institute of Technology, Japan*

TuD4-3 17:15 - 17:30
**$In_{0.7}Ga_{0.3}As$ quantum-well MOSFETs with record $g_m$ and effective mobility.**
Seung-Woo Son, Jin Su Kim, Jung Ho Park, Ji Min Baek, Do-Kywn Kim, Jung-Hee Lee, and Dae-Hyun Kim
*School of Electronics Engineering, Kyungpook National University, Republic of Korea*

TuD4-4 17:30 - 17:45
**Ultra-thin Body InAs-MOSFETs with elevated Source/Drain contacts**
Mohamed Ridaoui,[1,2] Matej Pastorek,[1] Alain Bruno Fadjie-Djomkam,[1] Nicolas Wichmann,[1] Abdelatif Jaouad,[2] Hassan Maher,[2] and Sylvain Bollaert[1]
*[1]IEMN, CNRS UMR 8520, Université de Lille 1, France, [2]LN2-CNRS UMI-3463, 3IT, Canada*

TuD4-5 17:45 - 18:00
**Gate delay analysis in two-step recess gate InGaAs-HEMTs with slant field plates**
Tomotaka Hosotani, Taiichi Otsuji, and Tetsuya Suemitsu
*RIEC, Tohoku University, Japan*

TuD4-6 (Invited) 18:00 - 18:30
**InAs/InP Core-shell Nanowire Transistors with Outstanding Device Performance**
Satoshi Sasaki
*NTT Basic Research Laboratories, Japan*

# June 29th (Wednesday)

## WeB1 GaN: Electrical/ Optical Characterization Room B (201) 8:30-10:30

*Chair:* T.Kachi and S.Chichibu

WeB1-1 (Invited) 8:30 - 9:00

**Characterization of n-type and p-type GaN layers grown on free-standing GaN substrates**

Jun Suda and Masahiro Horita

*Kyoto University, Japan*

WeB1-2 9:00 - 9:15

**A First-Principles Study of Carbon-Related Complexes and Energy Levels in GaN Using Heyd-Scuseria-Ernzerhof Hybrid Functionals**

Masahiko Matsubara and Enrico Bellotti

*Department of Electrical and Computer Engineering, Boston University, United States of America*

WeB1-3 9:15 - 9:30

**MOVPE Growth of N-polar GaN/$Al_xGa_{1-x}N$/GaN Heterostructure on Small Off-cut Substrate for Flat Interface**

Kiattiwut Prasertsuk,[1,3] Shinji Tanaka,[1] Tomoyuki Tanikawa,[1] Kanako Shojiki,[1] Takeshi Kimura,[1] Akinori Miura,[1] Ryohei Nonoda,[1] Fuyumi Hemmi,[2] Shigeyuki Kuboya,[1] Ryuji Katayama,[1] Tetsuya Suemitsu,[2] and Takashi Matsuoka[1]

*[1]Institute for Materials Research, Tohoku University, Japan, [2]Research Institute of Electrical Communication, Tohoku University, Japan, [3]Thai Microelectronics Center, National Electronics and Computer Technology Center, Thailand*

WeB1-4 9:30 - 9:45

**Eu concentration dependence of Eu doped GaN nanocolumns grown by RF-plasma-assisted molecular beam epitaxy**

Tomohiko Imanishi,[1] Hiroto Sekiguchi,[1] Satoshi Nishikawa,[1] Kohei Ozaki,[1] Keisuke Yamane,[1] Hiroshi Okada,[2] Katsumi Kishino,[3] and Akihiro Wakahara[1]

*[1]Department of Electrical and Electronic Information Engineering, Toyohashi University of Technology, Japan, [2]Electronics-inspired Interdisciplinary Research Institute, Toyohashi University of Techonology, Japan, [3]Department of Engineering and Applied Science, Sophia University, Japan*

WeB1-5 9:45 - 10:00

**Introducing of Biexciton Processes into Exciton Dynamics Simulation for GaN Based on Collisional Phononic and Radiative Model**

Kentaro Nomachi, Tomohiro Iwahori, Kensuke Oki, Bei Ma, Ken Morita, and Yoshihiro Ishitani

*Chiba University, Japan*

## WeC1 Extended Wavelength Photonic Devices Room C (202) 8:30-10:30

*Chair:* H.Hirayama

WeC1-1 (Invited) **Cancelled** 8:30 - 9:00

**Monolithic integration of a widely-tunable mid-infrared source based on DFB QCL array and echelle grating.**

Grégory Maisons,[1] Clément Gilles,[1] Luis Orbe,[2] Guillermo Carpintero,[2] Johan Abautret,[1] and Mathieu Carras[1]

*[1]mirSense, France, [2]Universidad Carlos III de Madrid, Spain*

WeC1-2 9:00 - 9:15

**A novel patch-array antenna single-mode low electrical dissipation continuous wave Terahertz Quantum Cascade Laser**

Lorenzo Bosco,[1] Christopher Benjamin Paul Bonzon,[1] Keita Otani,[1] Matthias Justen,[2] Mattias Beck,[1] and Jerome Faist[1]

*[1]Institute of Quantum Electronics, ETH Zürich, Switzerland, [2]I. Institute of Physics, University of Cologne, Germany*

WeC1-3 9:15 - 9:30

**Analysis of dual-section DFB-QCLs for spectroscopic applications**

Martin Josef Sueess,[1] Johanna Maria Wolf,[1] Pierre Jouy,[1] Christopher Bonzon,[1] Mattias Beck,[1] Morten Hundt,[2] Bela Tuzson,[2] Lukas Emmenegger,[2] and Jerome Faist[1]

*[1]Institute for Quantum Electronics, ETH Zürich, , Switzerland, [2]Laboratory for Air Pollution and Environmental Technology, EMPA Duebendorf, Switzerland*

WeC1-4 9:30 - 9:45

**ITO/nano-Ag Plasmonic Window Applied for Efficiency Improvement of Near-Ultraviolet Light Emitting Diodes**

Ching-Ho Tien,[1] Chia-Hao Zhang,[1] Shih-Hao Chung,[1] Sin-Liang Ou,[2] Ray-Hua Horng,[3] and Dong-Sing Wuu[1,2]

*[1]Department of Materials Science & Engineering, National Chung Hsing University, Taiwan, [2]Department of Materials Science & Engineering, Da-yeh University, Taiwan, [3]Department of Electronics Engineering, National Chiao Tung University, Taiwan*

WeC1-5 9:45 - 10:00

**A Novel Directional Light-Emitting Diode Based on Evanescent Wave Coupling**

Xuelun Wang, Guodong Hao, and Naoya Toda

*Electronics and Photonics Research Institute, AIST, Japan*

## WeD1 Ultrahigh-frequency Devices Room D (203) 8:30-10:30

*Chair:* T.Suemitsu

WeD1-1 (Invited) 8:30 - 9:00

**InP/GaInAsSb DHBT Evolution in the THz Era**

Colombo R. Bolognesi, Ralf Fluckiger, Maria Alexandrova, Rickard Lövblom, and Olivier Ostinelli

*Millimeter-wave Electronics Group, ETH-Zürich, Switzerland*

WeD1-2 9:00 - 9:15

**A High Efficiency RTD-based Sub-THz Differential Oscillator Pair for a Spatial Power Combining Array**

Maengkyu Kim and Kyounghoon Yang

*Korea Advanced Institute of Science and Technology , Republic of Korea*

WeD1-3 9:15 - 9:30

**Improvement in Noise Characteristics of GaAsSb-based Backward Diodes by Using a Modified Junction Structure**

Tsuyoshi Takahashi,[1,2] Masaru Sato,[1,2] Shoichi Shiba,[1,2] Yasuhiro Nakasha,[1,2] Naoki Hara,[1,2] Taisuke Iwai,[1] Naoya Okamoto,[1] and Keiji Watanabe[1]

*[1]Fujitsu Laboratories Ltd., Japan, [2]Fujitsu Limited, Japan*

WeD1-4 9:30 - 9:45

**Frequency Increase in Resonant-Tunneling-Diode Terahertz Oscillator by Reduction in Conduction Loss with Thick Antenna Electrode**

Takeru Maekawa, Hidetoshi Kanaya, Safumi Suzuki, and Masahiro Asada

*Tokyo Institute of Technology, Japan*

WeD1-5 9:45 - 10:00

**InSb-based HEMT with Over 300 GHz-$f_T$ using Evaporated $SiO_x$ Film**

Kyousuke Isono,[1] Daisuke Tsuji,[1] Tatsuya Taketsuru,[1] Sachie Fujikawa,[1] Issei Watanabe,[2] Yoshimi Yamashita,[2] Akira Endoh,[2] Shinsuke Hara,[2] Akifumi Kasamatsu,[2] and Hiroki I. Fujishiro[1]

*[1]Tokyo University of Science, Japan, [2]National Institute of Information and Communications Technology, Japan*

*Coffee Break* 10:00 - 10:30

## WeB2 GaN: Electron Devises Room B (201) 10:30-12:00

*Chair:* N.Nakata and J.Suda

WeB2-1 (Invited) 10:30 - 11:00

**Performance Enhancement and Characterization Techniques for GaN Power Devices**

Shu Yang,[1,2] Shenghou Liu,[1] Cheng Liu,[1] Mengyuan Hua,[1] Giorgia Longobardi,[2] Florin Udrea,[2] and Kevin J. Chen[1]

*[1]The Hong Kong University of Science and Technology, Hong Kong, [2]University of Cambridge, United Kingdom*

WeB2-2 11:00 - 11:15

**Controllability improvement of $Al_2O_3$-gate structure for GaN transistors**

Kenya Nishiguchi, Joji Ohira, Syota Kaneki, Syota Toiya, and Tamotsu Hashizume

*RCIQE, Hokkaido Univ, Japan*

WeB2-3 11:15 - 11:30
**High Pressures Water Vapor Annealing for Atomic-Layer-Deposited $Al_2O_3$ on GaN**
Koji Yoshitugu, Masahiro Horita, Mustunori Uenuma, Yasuaki Ishikawa, and Yukiharu Uraoka
*Nara Institute of Science and Technology, Japan*

WeB2-4 11:30 - 11:45
**The effect of neutral beam etching on device isolation in AlGaN/GaN HEMTs**
Fuyumi Hemmi,[1] Cedric Thomas,[2] Yi-Chun Lai,[3] Akio Higo,[3] Alex Guo,[4] Shireen Warnock,[4] Jesús. A. del Alamo,[4] Seiji Samukawa,[2,3] Taiichi Otsuji,[1] and Tetsuya Suemitsu[1]
*[1]Research Institute of Electrical Communication, Tohoku University, Japan, [2]Institute of Fluid Science, Tohoku University, Japan, [3]Advanced Institute of Materials Research, Tohoku University, Japan, [4]Microsystems Technology Laboratories, Massachusetts Institute of Technology, United States of America*

WeB2-5 11:45 - 12:00
**AlGaN/GaN High Electron Mobility Transistors on Si with Sputtered TiN Gate**
Yang Li,[1] Geok Ing Ng,[1,2] Subramaniam Arulkumaran,[2] Chandra Mohan Manoj Kumar,[2] Kian Siong Ang,[2] and Zhi Hong Liu[3]
*[1]School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, [2]Tamasek Laboratories, Nanyang Technological University, Singapore, [3]Singapore-MIT Alliance of Research and Technology, Singapore*

## WeC2 Novel Materials — Room C (202) 10:30-12:00

*Chair:* K.Ishibashi

WeC2-1 (Invited) 10:30 - 11:00
**Topological Spintronics**
Nitin Samarth
*Dept. of Physics, The Pennsylvania State University, United States of America*

WeC2-2 11:00 - 11:15
**Robust Manipulation of Magnetism in Dilute Magnetic Semiconductor (Ga,Mn)As by Organic Molecules**
Xiaolei Wang,[1] Hailong Wang,[1] Dong Pan,[1] Timothy Keiper,[2] Lixia Li,[1] Xuezhe Yu,[1] Jun Lu,[1] Eric Lochner,[2] Stephan von Molnar,[2] Peng Xiong,[2] and Jianhua Zhao[1]
*[1]State Key Laboratory of Superlattices and Microstructures, Institute of Semiconductors, Chinese Academy of Sciences, China, [2]Department of Physics, Florida State University, United States of America*

WeC2-3 11:15 - 11:30
**High-temperature ferromagnetism in heavily Fe-doped ferromagnetic semiconductor (Ga,Fe)Sb**
Nguyen Thanh Tu,[1] Pham Nam Hai,[1,2] Le Duc Anh,[1] and Masaaki Tanaka[1]
*[1]Department of Electrical Engineering & Information Systems, The University of Tokyo, Japan, [2]Department of Physical Electronics, Tokyo Institute of Technology, Japan*

WeC2-4 11:30 - 11:45

**Bandgap Engineering for Normally-off GaAsSb/InGaAs Hetero-junction Tunneling Field-Effect Transistors with High On-state Current**

Jhih-Cheng Wu,[1] Cheng-Yu Chen,[1] and Jen-Inn Chyi[1,2]

*[1]Department of Electrical Engineering, National Central University, Jhongli, Taiwan, [2]Research Center for Applied Sciences, Academia Sinica, Taipei, Taiwan*

WeC2-5 11:45 - 12:00

**Frequency Division Multiplexed Logic Circuits in a GaAs/AlGaAs-Based Phonon Waveguide**

Daiki Hatanaka, Tom Darras, Imran Mahboob, Koji Onomitsu, and Hiroshi Yamaguchi

*NTT Basic Research Laboratories, Japan*

## WeD2 Growth techniques Room D (203) 10:30-12:00

*Chair:* T.Suemasu

WeD2-1 (Invited) 10:30 - 11:00

**In Situ X-Ray Measurement of Changes in Buried Structure during Crystal Growth**

Masamitu Takahasi

*National Institutes for Quantum and Radiological Science and Technology, Japan*

WeD2-2 11:00 - 11:15

**GaAs first-spacer-layer thickness dependence of polarized photoluminescence properties of closely-stacked InAs/GaAs quantum dots with long-wavelength emission**

Yusuke Tajiri, Toshiyuki Kaizu, and Takashi Kita

*Department of Electrical and Electronic Engineering, Graduate School of Engineering, Kobe University, Japan*

WeD2-3 11:15 - 11:30

**Structural and Optical Properties of High Bi Content GaSbBi Films Grown by Molecular Beam Epitaxy**

Li Yue,[1] Yanchao Zhang,[1] Fan Zhang,[1] Lijuan Wang,[1] Yunshen Zhuzhong,[1] Juanjuan Liu,[1] and Shumin Wang[2]

*[1]State Key Laboratory of Functional Materials for Informatics, Shanghai Institute of Microsystem and Information Technology, CAS, China, [2]Department of Microtechnology and Nanoscience, Chalmers University of Technology, Sweden*

WeD2-4 11:30 - 11:45

**Enhanced Thermoelectric Properties of ZLAST by Combinatorial Sputtering Approach**

Shih Chun Tseng, Wen Hsuan Chao, Ping Hsing Yang, and Hsu Shen Chu

*Material and Chemical Research Laboratories, Industrial Technology Research Institute , Taiwan*

WeD2-5 11:45 - 12:00

**Observation of pn-junction depth in $Mg_2Si$ photodiode fabricated by thermal diffusion of Ag acceptor**

Haruhiko Udono,[1] Nobuhiko Hori,[1] Tomohiro Akiyama,[1] Yuuma Onizawa,[1] Tsubasa Ootsubo,[1] and Fumitaka Esaka[2]

*[1]Ibaraki University, Japan, [2]Japan Atomic Energy Agency, Japan*

| *Excursion* | 12:30 - 18:45 |
|---|---|

| *Banquet* | ANA Crown Plaza Banquet Room **"**OHTORI**"** | 19:00 - 21:00 |
|---|---|---|

# June 30th (Thursday)

## ThB1 GaN: Optical Devices — Room B (201) 8:30-10:00

*Chair:* Y.Ishitani and K.M.Lau

ThB1-1 8:30 - 8:45

**Measurement of Internal Loss, Injection Efficiency, and Gain for Continuous-wave Semipolar ($20\bar{2}\bar{1}$) III-nitride Laser Diodes**

Daniel Becerra,[1] Leah Kuritzky,[1] Joseph Nedy,[2] Arwa Abbas,[1] Arash Pourhashemi,[1] Robert Farrell,[1] Daniel Cohen,[1] Steven DenBaars,[1,2] James Speck,[1] and Shuji Nakamura[1,2]

*[1]Materials Department, University of California Santa Barbara, United States of America, [2]Department of Electrical and Computer Engineering, University of California Santa Barbara, United States of America*

ThB1-2 8:45 - 9:00

**Efficient Use of Uniform GaN HVLEDs for Small-Flicker General Illumination Applications with Converter-free LED Drivers**

Yuefei Cai,[1] Xinbo Zou,[1,2] Yuan Gao,[1] Lisong Li,[1] Philip K.T. Mok,[1] and Kei May Lau[1,2]

*[1]Department of Electronic and Computer Engineering, Hong Kong University Science and Technology, Hong Kong, [2]Jockey Club Institute for Advanced Study, Hong Kong University Science and Technology, Hong Kong*

ThB1-3 9:00 - 9:15

**Fabrication of InGaN/GaN multi quantum well based nano-LEDs by hydrogen environment anisotropic thermal etching (HEATE) technique**

Kohei Ogawa,[1] Ryo Hachiya,[1] Tomoya Mizutani,[1] Shun Ishijima,[1] and Akihiko Kikuchi[1,2]

*[1]Sophia University, Japan, [2]Sophia Nanotechnology Research Center, Japan*

ThB1-4 9:15 - 9:30

**High-speed Performance of III-nitride 410 nm Ridge Laser Diode on ($20\bar{2}\bar{1}$) plane for Visible Light Communication**

Changmin Lee,[1] Chong Zhang,[2] Daniel L Becerra,[1] Seungguen Lee,[2] Robert M Farrell,[1,2] James S Speck,[1] Shuji Nakamura,[1,2] John E Bowers,[1,2] and Steven P DenBaars[1,2]

*[1]Materials Department, University of California, Santa Barbara, United States of America, [2]Department of Electrical & Computer Engineering, University of California, Santa Barbara, United States of America*

ThB1-5 9:30 - 9:45

**Improved conversion efficiency of InN/p-GaN heterojunction solar cells with the InON quantum dots interlayer**

Zhong-Yi Liang,[1] Cheng-Yi Yang,[1] Yu-Teng Chan,[2] Chi-Yung Jiang,[2] and Wen-Cheng Ke[1]

*[1]Department of Materials Science and Engineering, National Taiwan University of Science and Technology, Taiwan, [2]Department of Mechanical Engineering, Yuan Ze University, Taiwan*

ThB1-6 9:45 - 10:00

**Breakdown of the Green Gap in (0001) InGaN LEDs**

Markus Pristovsek,[1] Rachel A. Oliver,[1] Tom Badcock,[2] Muhammad Ali,[2] and Andrew Shields[2]

*[1]Department of Materials Science and Metallurgy, University of Cambridge, United Kingdom, [2]Toshiba Research Europe Ltd., United Kingdom*

## ThLN Late News — Room B (201) 10:00-10:30

*Chair:* Y.Ishitani and K.M.Lau

ThLN1 10:00 - 10:15

**Hybrid MOCVD/MBE GaN Tunnel Junction LEDs with Greater than 70% Wall Plug Efficiency**

Benjamin P. Yonkee,[1] Erin C. Young,[1] John T. Leonard,[1] Changmin Lee,[2] Sang Ho Oh,[2] Steven P. DenBaars,[1,2] James S. Speck,[1] and Shuji Nakamura[1,2]

*[1]Materials Department, University of California, Santa Barbara, United States of America, [2]Department of Electrical And Computer Engineering, University of California, Santa Barbara, United States of America*

ThLN2 10:15 - 10:30

**GaSb lasers grown on Silicon substrate emitting in the telecom wavelength range**

Andrea Castellano,[1,2,3] Laurent Cerutti,[1,2] Grégoire Narcy,[1,2] Jean-Baptiste Rodriguez,[1,2] Alexandre Garreau,[3] François Lelarge,[3] and Eric Tournié[1,2]

*[1]University of Montpellier, France, [2]CNRS, France, [3]III-V Lab, France*

## ThC1 Oxide Materials & Properties — Room C (202) 8:30-10:30

*Chair:* M. Nakano and G.Jessen

ThC1-1 (Invited) 8:30 - 9:00

**Ternary and quaternary wurtzite-type oxide semiconductors: $\beta$-$CuGaO_2$ and its related materials**

Takahisa Omata,[1,2] Yuki Mizuno,[2] Issei Suzuki,[2] Hiraku Nagatani,[2] and Masao Kita[3]

*[1]IMRAM, Tohoku University, Japan, [2]Graduate School of Engineering, Osaka University, Japan, [3]Department of Mechanical Engineering, National Institute of Technology, Toyama College, Japan*

ThC1-2 9:00 - 9:15

**Transparent Conducting Amorphous CdO-$Ga_2O_3$ Films Synthesized by Room Temperature Sputtering**

Kin Man Yu,[1] Chaoping Liu,[1] Chun Yuen Ho,[1] Yishu Foo,[1] M Kamruzzaman,[1] Juan Antonio Zapien,[1] Weiwei Gao,[2] and Wladek Walukiewicz[2]

*[1]Department of Physics and Materials Science, City Univerisity of Hong Kong, Hong Kong, [2]Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, United States of America*

ThC1-3 9:15 - 9:30

**Formation of Nanoscale Composites of Compound Semiconductors Driven by Charge Transfer**

Weiwei Gao,[1] Roberto Reis,[1,2] Laura Schelhas,[3] Vanessa Vanessa L. Pool,[3] Michael Toney,[3] Kin Man Yu,[1,4] and Wladek Walukiewicz[1]

*[1]Materials Sciences Division, Lawrence Berkeley National Laboratory, United States of America, [2]National Center for Electron Microscopy/molecular Foundry, Lawrence Berkeley National Laboratory, United States of America, [3]Stanford Synchrotron Radiation Lightsource, SLAC National Accelerator Laboratory, United States of America, [4]Department of Physics and Materials Science, City University of Hong Kong, Hong Kong*

ThC1-4 (Invited) 9:30 - 10:00

**Band Offsets of Oxide, 3D and 2D Semiconductors and their Implications**

John Robertson

*Cambridge University, Cambridge, United Kingdom*

ThC1-5 10:00 - 10:15

**Characterization of band offset in $\alpha$-$(Al_xGa_{1-x})_2O_3$/ $\alpha$-$Ga_2O_3$ heterostructures**

Takayuki Uchida, Riena Jinno, Shu Takemoto, Kentaro Kaneko, and Shizuo Fujita

*Graduate School of Engineering, Kyoto University, Japan*

ThC1-6 10:15 - 10:30

**First principles study of the diffusion of oxygen vacancies in $Ga_2O_3$**

Alexandros Kyrtsos, Masahiko Matsubara, and Enrico Bellotti

*Department of Electrical and Computer Engineering, Boston University, United States of America*

## ThD1 Heterogeneous Integration & High-speed Lasers Room D (203) 8:30-10:30

*Chair:* Y. Matsui

ThD1-1 (Invited) 8:30 - 9:00

**Heterogeneous Integration of InP Devices on Silicon**

Zhechao Wang,[1,2] Marianna Pantouvaki,[2] Geert Morthier,[1] Clement Merckling,[2] Joris van Campenhout,[2] Dries van Thourhout,[1] and Gunther Roelkens[1]

*[1]Ghent University, Belgium, [2]IMEC, Belgium*

ThD1-2 9:00 - 9:15

**Continuous-wave Operation of Ultra-short Cavity Distributed Bragg Reflector Lasers on Si Substrates**

Koji Takeda,[1,2] Erina Kanno,[1] Takuro Fujii,[1,2] Koichi Hasebe,[1,2] Tsuyoshi Yamamoto,[1] Takaaki Kakitsuka,[1,2] and Shinji Matsuo[1,2]

*[1]NTT Device Technology Labs., Japan, [2]Nanophotonics Center, Japan*

ThD1-3 9:15 - 9:30

**10 Gbps Operation of Membrane DFB Laser on Silicon with Record High Modulation Efficiency**

Daisuke Inoue,[1] Takuo Hiratani,[1] Kai Fukuda,[1] Takahiro Tomiyasu,[1] Tomohiro Amemiya,[2] Nobuhiko Nishiyama,[1] and Shigehisa Arai[1,2]

*[1]Department of Electrical and Electronic Engineering, Tokyo Institute of Technology, Japan, [2]Quantum Nanoelectronics Research Center, Tokyo Institute of Technology, Japan*

ThD1-4 9:30 - 9:45

**GaInAsP/SOI Hybrid Laser with AlInAs-oxide Confinement Structure Fabricated by Plasma Activated Bonding**

Junichi Suzuki,[1] Satoshi Inoue,[1] Shovon MD Tanvir Hasan,[1] Yusuke Hayashi,[1] Tomohiro Amemiya,[2] Nobuhiko Nishiyama,[1] and Shigehisa Arai[1,2]

*[1]Department of Electrical and Electronic Engineering, Tokyo Institute of Technology, Japan, [2]Quantum Nanoelectronics Research Center, Japan*

ThD1-5 9:45 - 10:00

**Design and Fabrication of Directly-Modulated 1.3-$\mu$m Lateral-current-injection Lasers**

Koichi Hasebe, Junichi Nishinaka, Takuro Fujii, Koji Takeda, Tsuyoshi Yamamoto, Takaaki Kakitsuka, and Shinji Matsuo

*NTT Device Technology Labs, NTT Corporation, Japan*

ThD1-6 10:00 - 10:15

**Analysis of Voltage Dependence on Lasing Characteristics of 1.3-$\mu$m npn-AlGaInAs/InP Transistor Lasers**

Shotaro Tadano,[1] Takaaki Kaneko,[1] Kentaro Yamanaka,[1] Nobuhiko Nishiyama,[1] and Shigehisa Arai[1,2]

*[1]Department of Electrical and Electronic Engineering, Tokyo Institute of Technology, Japan, [2]Quantum Nanoelectronics Research Center, Japan*

ThD1-7 10:15 - 10:30

**Transmission Performance Improvement of Semiconductor Lasers by Hybrid Modulation Scheme**

Shigeru Mieda,[1] Nobuhide Yokota,[1] Wataru Kobayashi,[2] and Hiroshi Yasaka[1]

*[1]Tohoku University, Japan, [2]NTT Corporation, Japan*

*Coffee Break* 10:30 - 11:00

## ThB2 High-frequency & high-power Devices — Room B (201) 11:00-12:30

*Chair:* M. Kuzuhara and S.Arulkumaran

ThB2-1 (Invited) 11:00 - 11:30

**Vertical GaN Bipolar Devices: Gaining Competitive Advantage from Photon Recycling**

Kazuhiro Mochizuki

*[1]National Institute of Advanced Industrial Science and Technology, Japan, [2]Hitachi, Ltd., Japan*

ThB2-2 11:30 - 11:45
**Impact of AlGaN Barrier Recess on the DC and Dynamic Characteristics of AlGaN/GaN Schottky Barrier Diodes with Gated Edge Termination**
Jie Hu,[1,2] Steve Stoffels,[2] Silvia Lenci,[2] Nicolò Ronchi,[2] Brice De Jaeger,[2] Shuzhen You,[2] Benoit Bakeroot,[2,3] Guido Groeseneken,[1,2] and Stefaan Decoutere[2]
*[1]ESAT-MICAS, KU Leuven, Leuven 3001, Belgium, [2]IMEC, Kapeldreef 75, Leuven 3001, Belgium, [3]Ghent University, Ghent 9052, Belgium*

ThB2-3 11:45 - 12:00
**G-Band MMIC Resonant Tunneling Diode Oscillators**
Jue Wang, Abdullah Khalidi, Khalid Alharbi, Afesomeh Ofiare, Haiping Zhou, and Edward Wasige
*University of Glasgow, United Kingdom*

ThB2-4 12:00 - 12:15
**Experimental Demonstration of Strain Detection Using Resonant Tunneling Delta-Sigma Modulation Sensors**
Takumi Tajika, Yuichiro Kakutani, Masayuki Mori, and Koichi Maezawa
*Graduate School of Science and Engineering, University of Toyama, Japan*

ThB2-5 12:15 - 12:30
**Lamb Wave Dispersion in Gallium Nitride Micromechanical Resonators**
Haoshen Zhu, Azadeh Ansari, and Mina Rais-Zadeh
*Department of Electrical Engineering and Computer Science, University of Michigan, United States of America*

## ThC2 Nanocarbon Applications — Room C (202) 11:00-12:30

*Chair:* A. Kanda

ThC2-1 (Invited) 11:00 - 11:30
**Graphene for Digital Logic Applications**
Hyeonjun Hwang, Jinho Yang, Yunji Kim, Sangkyung Lee, and Byoung Hun Lee
*Gwangju Institute of Science and Technology, Republic of Korea*

ThC2-2 11:30 - 11:45
**Observation of Spontaneous Terahertz Emission from Optically Pumped Monolayer Intrinsic Graphene**
Takayuki Watanabe,[1] Hiroyuki Wako,[1] Akira Satou,[1] Alexander A. Dubinov,[2] Kenji Kawahara,[3] Hiroki Ago,[3] Victor Ryzhii,[1] and Taiichi Otsuji[1]
*[1]Research Institute of Electrical Communication, Tohoku University, Japan, [2]Institute for Physics of Microstructures, RAS, Lobachevsky State University, Russia, [3]Institute for Materials Chemistry and Engineering, Kyushu University, Japan*

ThC2-3 11:45 - 12:00
**An Application of Graphene Field Effect Transistor to Enzymatic Assay**
Takao Ono,[1] Yasushi Kanai,[1] Yasuhide Ohno,[1,2] Kenzo Maehashi,[1,3] Koichi Inoue,[1] and Kazuhiko Matsumoto[1]
*[1]The Institute of Scientific and Industrial Research, Osaka University, Japan, [2]Graduate School of Science and Technology, Tokushima University, Japan, [3]Institute of Engineering, Tokyo University of Agriculture and Technology, Japan*

ThC2-4 12:00 - 12:15
**Large Scale Fabrication of Suspended Graphene Nanoribbon Arrays**
Hiroo Suzuki, Toshiaki Kato, and Toshiro Kaneko
*Department of Electronic Engineering, Tohoku University, Japan*

ThC2-5 12:15 - 12:30
**Electrostatic actuation of electrically floating carbon nanotube cantilever**
Kenshi Inotani, Kuniharu Takei, Takayuki Arie, and Seiji Akita
*Department of Physics and Electronics, Osaka Prefecture University, Japan*

## ThD2 Group-III Nitrides Growth Room D (203) 11:00-12:30

*Chair:* T.Suemasu and M. Takahashi

ThD2-1 (Invited) 11:00 - 11:30
**Large Area Flexible Devices Based on Group-III Nitrides**
Hiroshi Fujioka,[1,2] Kohei Ueno,[1] Atsushi Kobayashi,[1] and Jitsuo Ohta[1]
*[1]Institute of Industrial Science, The University of Tokyo, Japan, [2]JST-ACCEL, Japan*

ThD2-2 11:30 - 11:45
**Influences of Mask Materials in Selective-Area RF-MBE Growth for GaN Nanowires**
Naoto Tamaki, Akihito Sonoda, Aya Onodera, and Junichi Motohisa
*Graduate School of Information Science and Technology, Hokkaido University, Japan*

ThD2-3 11:45 - 12:00
**High Quality Bulk GaN Crystal Grown by Acidic Ammonothermal Method**
Quanxi Bao,[1,3] Makoto Saito,[1,2] Kouhei Kurimoto,[3] Daisuke Tomida,[1] Kazunobu Kojima,[1] Yuji Kagamitani,[2] Rinzo Kayano,[3] Tohru Ishiguro,[1] and Shigefusa F. Chichibu[1]
*[1] Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Japan, [2]Mitsubishi Chemical Corp., Japan, [3]The Japan Steel Works, Japan*

ThD2-4 12:00 - 12:15
**Realization of Conductive AlN Epitaxial Layer on Si Substrate using Spontaneously Formed Nano-Size Via-Holes for Vertical AlGaN High Power FET**
Noriko Kurose,[1] Kota Ozeki,[2] Tsutomu Araki,[2] Naotaka Iwata,[3] Itaru Kamiya,[3] and Yoshinobu Aoyagi[1]
*[1]Research Organization of Science and Technology, Ritsumeikan University, Japan, [2]Faculty of Science and Technology, Ritsumeikan University, Japan, [3]Faculty of Engineering, Toyota Technological Institute, Japan*

ThD2-5 12:15 - 12:30
**Improvement of 1.0 eV GaInNAsSb solar cell performance upon annealing**
Naoya Miyashita,[1,2] Nazmul Ahsan,[1,2] and Yoshitaka Okada[1,2]
*[1]RCAST, The University of Tokyo, Japan, [2]NextPV, RCAST and CNRS, The University of Tokyo, Japan*

## Closing and Student Award Ceremony

Room A (Main Hall) 12:30-13:00