

# CSW2019 Program

## May 19 (Sun)

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Special Lecture I

Room C 15:00-16:00

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Special Lecture

15:00 - 16:00

**The Fundamentals of Quantum Dots for Advanced Photonics I**

Yasuhiko Arakawa

*The University of Tokyo, Japan*

Coffee Break
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16:00 - 16:30

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Special Lecture II

Room C 16:30-17:30

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Special Lecture

16:30 - 17:30

**The Fundamentals of Quantum Dots for Advanced Photonics II**

Yasuhiko Arakawa

*The University of Tokyo, Japan*

## May 20 (Mon)

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Opening Session Room A 08:30-08:40

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MoPLN1 Plenary Session 1 Room A 08:40-10:00

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MoPLN1-1 (Plenary) 08:40 - 09:20

**GaN as a Key Material for Realizing Internet of Energy**

Hiroshi Amano  
*Nagoya University, Japan*

MoPLN1-2 (Plenary) 09:20 - 10:00

**Large-Scale Integrated Photonics for Accelerated Communication and Computing**

Ray Beausoleil  
*Hewlett Packard Enterprise, United States of America*

Coffee Break	10:00 - 10:30
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MoPLN2 Plenary Session 2 Room A 10:30-11:50

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MoPLN2-1 (Plenary) 10:30 - 11:10

**Bottom-Up Grown Nanowire Quantum Devices**

Erik Bakkers  
*Eindhoven University of Technology, Netherlands*

MoPLN2-2 (Plenary) 11:10 - 11:50

**Materials and Device Challenges for Next Generation LIDARS**

James Harris  
*Stanford University, United States of America*

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ISCS/IPRM Award Ceremony & Photo Room A 11:50-12:30

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Lunch Break	12:30 - 14:00
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**MoA3 Advanced Lasers**

Room A 14:00-16:00

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*Chair: Mike Larson and Mitsuru Takenaka*

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MoA3-1 (Invited)

14:00 - 14:30

**Uncooled 53-Gbaud PAM4 Operation of EA/DFB and Directly Modulated DFB Laser for 400GbE Applications**Kazuhiko Naoe,\* Takayuki Nakajima, Yoshihiro Nakai, Yoriyoshi Yamaguchi, Yasushi Sakuma, and Noriko Sasada  
*Datacom Business Unit, Lumentum, Japan*

MoA3-3 (Oral)

14:30 - 14:45

**Single-mode Operation of 1.3- $\mu\text{m}$  Membrane Distributed Reflector Lasers on SiC Wafers**Suguru Yamaoka,\* Ryo Nakao, Takuro Fujii, Koji Takeda, Tatsuuro Hiraki, Hidetaka Nishi, Takaaki Kakitsuka, Tai Tsuchizawa, and Shinji Matsuo  
*NTT Device Technology Labs, NTT Corporation, Japan*

MoA3-4 (Oral)

14:45 - 15:00

**Buried Tunnel Junction VCSEL with High Contrast Grating Top Reflector**Jonas Kapraun,\* Jiaying Wang, Jipeng Qi, Kevin Cook, Emil Kolev, and Connie J. Chang-Hasnain  
*Department of Electrical Engineering and Computer Sciences and Tsinghua-Berkeley Shenzhen Institute, University of California Berkeley, United States of America*

MoA3-5 (Oral)

15:00 - 15:15

**InP-based devices integrating liquid crystals microcells for a tunable laser emission or a wavelength selective photodetection**Christophe LEVALLOIS,\*<sup>1</sup> Benjamin BOISNARD,<sup>2</sup> Cyril PARANTHOEN,<sup>1</sup> Salvatore PES,<sup>1</sup> Thierry CAMPS,<sup>2</sup> Benattou SADANI,<sup>2</sup> Sophie BOUCHOULE,<sup>3</sup> Laurent DUPONT,<sup>4</sup> Mehdi ALOUINI,<sup>1</sup> and Veronique BARDINAL<sup>2</sup>  
*<sup>1</sup>Univ Rennes, INSA Rennes, CNRS, Institut FOTON, France, <sup>2</sup>Univ Toulouse, CNRS, LAAS, France, <sup>3</sup>Centre de Nanosciences et de Nanotechnologies, CNRS, Université Paris-Sud, France, <sup>4</sup>IMT Atlantique, Optics Department, France*

MoA3-6 (Oral)

15:15 - 15:30

**Electrically injected 1.64  $\mu\text{m}$ -emitting In<sub>0.65</sub>Ga<sub>0.35</sub>As 3-QW laser diodes grown on mismatched substrates by MOVPE**Honghyuk Kim,\*<sup>1</sup> Bei Shi,<sup>2</sup> Qiang Li,<sup>2</sup> Ayushi Rajeev,<sup>1</sup> Kei May Lau,<sup>2</sup> Thomas F. Kuech,<sup>3</sup> and Luke J. Mawst<sup>1</sup>  
*<sup>1</sup>Department of Electrical and Computer Engineering, University of Wisconsin-Madison, United States of America, <sup>2</sup>Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology, Hong Kong, <sup>3</sup>Department of Chemical and Biological Engineering, University of Wisconsin-Madison, United States of America*

MoA3-7 (Oral)

15:30 - 15:45

**Low Loss InP Membrane Photonic Integrated Circuits Enabled by 193-nm Deep UV Lithography**Jorn van Engelen,\* Sander Reniers, Jeroen Bolk, Kevin Williams, Jos van der Tol, and Yuqing Jiao  
*Institute for Photonic Integration, Eindhoven University of Technology, Netherlands*

MoA3-8 (Oral)

15:45 - 16:00

**Low Noise Monolithically Integrated Membrane DFB Laser on Silicon**Vadim Pogoretskiy,\* Jos van der Tol, and Yuqing Jiao  
*Eindhoven University of Technology, Netherlands*

**MoB3 Growth of Nitrides**

Room B 14:00-16:00

*Chair: Takahiro Nagata and Yosuke Shimura*

MoB3-1 (Invited)

14:00 - 14:30

**III-Nitride Nanocrystals: From Low Threshold Ultraviolet Laser Diodes to High Efficiency Artificial Photosynthesis**

Zetian Mi

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

MoB3-3 (Invited)

14:30 - 15:00

**Molecular Beam Epitaxy of Transition Metal Nitrides for Superconducting Device Applications**D Scott Katzer,\*<sup>1</sup> Neeraj Nepal,<sup>1</sup> Matthew T. Hardy,<sup>1</sup> Brian P. Downey,<sup>1</sup> David F. Storm,<sup>1</sup> Eric N. Jin,<sup>2</sup> David J. Meyer,<sup>1</sup> Rusen Yan,<sup>3</sup> Guru Khalsa,<sup>3</sup> John Wright,<sup>3</sup> Huili (Grace) Xing,<sup>3</sup> and Debdeep Jena<sup>3</sup>*<sup>1</sup>US Naval Research Laboratory, United States of America, <sup>2</sup>National Research Council (Residing at the US Naval Research Laboratory), United States of America, <sup>3</sup>Cornell University, United States of America*

MoB3-5 (Oral)

15:00 - 15:15

**Impact of the insertion of AlGaIn back barrier on crystal quality,  $N_S$ , and mobility of GaN-channel HEMTs with high-Al-content AlGaIn top barrier grown on high-resistivity Si substrate**

Takuya Hoshi,\* Hiroki Sugiyama, Fumito Nakajima, and Hideaki Matsuzaki

*NTT Device Research Labs, NTT Corporation, Japan*

MoB3-6 (Oral)

15:15 - 15:30

**Effect of introducing optical blanking to GaN epitaxy by using pulsed laser deposition technology**

Kazuki Kodama\* and Daisuke Ueda

*Green Innovation Lab, Kyoto Institute of Technology, Japan*

MoB3-7 (Oral)

15:30 - 15:45

**Fabrication of c-AlN/a-Sapphire Templates by Sputtering and High-Temperature Annealing**Yusuke Hayashi,\*<sup>1</sup> Kaito Fujikawa,<sup>2</sup> Kenjiro Uesugi,<sup>3</sup> Kanako Shojiki,<sup>2</sup> and Hideto Miyake<sup>1,2</sup>*<sup>1</sup>Mie Univ., Grad. School of RIS, Japan, <sup>2</sup>Mie Univ., Grad. School of Eng., Japan, <sup>3</sup>Mie Univ., SPORR, Japan*

MoB3-8 (Oral)

15:45 - 16:00

**Low resistivity ohmic contacts to n-ZnSe by utilizing a novel regrowth technique**Johanna Janßen,\*<sup>1</sup> Felix Hartz,<sup>2</sup> Till Huckemann,<sup>2</sup> Lars Reiner Schreiber,<sup>2</sup> Detlev Grützmacher,<sup>1</sup> and Alexander Pawlis<sup>1</sup>*<sup>1</sup>Peter Grünberg Institute 9, Forschungszentrum Jülich, Germany, <sup>2</sup>JARA - Institute for Quantum Information, RWTH Aachen University, Germany***MoC3 Electrical and Optical Devices of 2D Materials**

Room C 14:00-16:00

*Chair: Masaki Nakano and Seiji Akita*

MoC3-1 (Invited)

14:00 - 14:30

**Mid-infrared photoresponse and robotic fabrication of graphene/h-BN van der Waals heterostructures**

Tomoki Machida

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

MoC3-3 (Oral) 14:30 - 14:45

### All solid-state 2D tunnel FET

Kosuke Nagashio

*Department of Materials Engineering, The University of Tokyo, Japan*

MoC3-4 (Oral) 14:45 - 15:00

### Resonant Enhancement of Band-to-band Tunneling in In-plane MoS<sub>2</sub>/WS<sub>2</sub> Heterojunction Tunnel Transistors

Tatsuya Kuroda, Futo Hashimoto, and Nobuya Mori\*

*Graduate School of Engineering, Osaka University, Japan*

MoC3-5 (Oral) 15:00 - 15:15

### Cyclotron resonance absorption in trilayer graphene

Momoko Onodera,<sup>\*,1</sup> Miho Arai,<sup>1</sup> Satoru Masubuchi,<sup>1</sup> Kei Kinoshita,<sup>1</sup> Rai Moriya,<sup>1</sup> Kenji Watanabe,<sup>2</sup> Takashi Taniguchi,<sup>2</sup> and Tomoki Machida<sup>1,3</sup>

*<sup>1</sup>Institute of Industrial Science, University of Tokyo, Japan, <sup>2</sup>National Institute for Materials Science, Japan, <sup>3</sup>CREST, JST, Japan*

MoC3-6 (Invited) 15:15 - 15:45

### Atomically-Thin Photovoltaics: Progress, Promise and Interface Physics

Deep Manoj Jariwala

*Department of Electrical and Systems Engineering, United States of America*

MoC3-8 (Oral) 15:45 - 16:00

### Exciton Diffusion in hBN-encapsulated Monolayer MoSe<sub>2</sub>

Takato Hotta,<sup>\*,1</sup> Shohei Higuchi,<sup>1</sup> Uchiyama Yosuke,<sup>1</sup> Keiji Ueno,<sup>2</sup> Kenji Watanabe,<sup>3</sup> Takashi Taniguchi,<sup>3</sup> Hisanori Shinohara,<sup>1</sup> and Ryo Kitaura<sup>1</sup>

*<sup>1</sup>Department of Chemistry, Nagoya University, Japan, <sup>2</sup>Department of Chemistry, Saitama University, Japan, <sup>3</sup>National Institute for Materials Science, Japan*

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## MoD3 GaN and Related Technologies I

Room D 14:00-16:00

*Chair: Tsuyoshi Tanaka and Tetsu Kachi*

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MoD3-1 (Oral) 14:00 - 14:15

### Aluminum Phase Segregation Effect in Growing an AlGa<sub>N</sub> Nanorod with the Self-catalytic Vapor-liquid-solid Mode

Chang-Gan Tu,<sup>1</sup> Xu Zhang,<sup>2</sup> Keng-Ping Chou,<sup>1</sup> Wai Fong Tse,<sup>1</sup> Yi-Chiao Hsu,<sup>1</sup> Yen-Po Chen,<sup>1</sup> Yean-Woei Kiang,<sup>1</sup> and Chih-Chung Yang<sup>\*,1</sup>

*<sup>1</sup>National Taiwan University, Taiwan, <sup>2</sup>Zhengzhou University, China*

MoD3-2 (Oral) 14:15 - 14:30

### Current injection and light confinement for UVB light emitting devices with graded p-AlGa<sub>N</sub>

Kosuke Sato,<sup>\*,1,2</sup> Shinji Yasue,<sup>2</sup> Yuya Ogino,<sup>2</sup> Motoaki Iwaya,<sup>2</sup> Tetsuya Takeuchi,<sup>2</sup> Satoshi Kamiyama,<sup>2</sup> and Isamu Akasaki<sup>2,3</sup>

*<sup>1</sup>Asahi-Kasei Corporation, Japan, <sup>2</sup>Faculty of Science and Technology, Meijo University, Japan, <sup>3</sup>Akasaki Research Center, Nagoya University, Japan*

MoD3-3 (Oral)

14:30 - 14:45

**Green Semipolar (11 $\bar{2}$ 2) InGa $\bar{N}$  Micro-Light-Emitting-Diodes on (11 $\bar{2}$ 2) Ga $\bar{N}$ /Sapphire Template**Matthew S. Wong,<sup>\*,1</sup> Michel Khoury,<sup>1</sup> Hongjian Li,<sup>1</sup> Bastien Bonafant,<sup>1</sup> Aidan A. Taylor,<sup>1</sup> Haojun Zhang,<sup>2</sup> Philippe De Mierry,<sup>3</sup> Shuji Nakamura,<sup>1,2</sup> and Steven P. DenBaars<sup>1,2</sup><sup>1</sup>Materials Department, University of California Santa Barbara, United States of America, <sup>2</sup>Department of Electrical and Computer Engineering, University of California Santa Barbara, United States of America, <sup>3</sup>CNRS-CRHEA, Rue Bernard Grégory, France

MoD3-4 (Oral)

14:45 - 15:00

**Relaxed InGa $\bar{N}$  engineered substrates with lattice parameter of 3,205Å and beyond enabling direct emission at 630nm**Eric Guiot,<sup>\*,1</sup> David Sotta,<sup>1</sup> Olivier Ledoux,<sup>1</sup> Mélanie Lagrange,<sup>1</sup> Guillaume Lavaitte,<sup>1</sup> Amélie Dussaigne,<sup>2</sup> Sébastien Chenot,<sup>3</sup> and Benjamin Damilano<sup>3</sup><sup>1</sup>SOITEC, France, <sup>2</sup>Univ. Grenoble Alpes, France, <sup>3</sup>Université Côte d'Azur, France

MoD3-5 (Oral)

15:00 - 15:15

**Optical Properties of Room Temperature Single Photon Emitters in Ga $\bar{N}$** Mehran Kianinia,<sup>\*,1</sup> Minh Nguyen,<sup>1</sup> Tongtong Zhu,<sup>2</sup> Carlo Bradac,<sup>1</sup> Milos Toth,<sup>1</sup> Rachel Oliver,<sup>2</sup> and Igor Aharonovich<sup>1</sup><sup>1</sup>School of Mathematical and Physical Sciences, University of Technology Sydney, Australia, <sup>2</sup>Department of Materials Science and Metallurgy, University of Cambridge, United Kingdom

MoD3-6 (Oral)

15:15 - 15:30

**Probing alloy formation using different excitonic species: The particular case of InGa $\bar{N}$** Gordon Callsen,<sup>\*</sup> Raphael Butté, and Nicolas Grandjean*Institute of Physics, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland*

MoD3-7 (Oral)

15:30 - 15:45

**Hybrid III-Nitride Tunnel Junctions for Low Excess Voltage Blue LEDs and UVC LEDs**Jianfeng Wang,<sup>\*,1</sup> Erin Young,<sup>1</sup> Burhan SaifAddin,<sup>1</sup> Chris Zollner,<sup>1</sup> Abdullah Almogbel,<sup>1</sup> Micha Fireman,<sup>1</sup> Michael Izza,<sup>1</sup> Shuji Nakamura,<sup>1,2</sup> Steve Denbaars,<sup>1,2</sup> and James Speck<sup>1</sup><sup>1</sup>Materials Department, University of California, Santa Barbara, United States of America, <sup>2</sup>Department of Electrical and Computer Engineering, University of California, Santa Barbara, United States of America

MoD3-8 (Oral)

15:45 - 16:00

**Recent progress in AlGa $\bar{N}$  UV-C LEDs grown on SiC**Abdullah Almogbel,<sup>\*,1,2</sup> Burhan SaifAddin,<sup>1,2</sup> Christian Zollner,<sup>1</sup> Michael Iza,<sup>1</sup> Hamad Albrithen,<sup>2,3</sup> Ahmed Alyamani,<sup>2</sup> Abdulrahman Albadri,<sup>2</sup> Shuji Nakamura,<sup>1</sup> Steven DenBaars,<sup>1</sup> and James Speck<sup>1</sup><sup>1</sup>University of California, Santa Barbara, United States of America, <sup>2</sup>King Abdulaziz City for Science and Technology, Saudi Arabia, <sup>3</sup>King Saud University, Saudi Arabia**MoE3 Oxides: Structures and Properties**

Room E 14:00-16:00

*Chair: Elzbieta Guziewicz and Atsushi Tsukazaki*

MoE3-1 (Invited)

14:00 - 14:30

**Interface engineering of Sn-based oxide semiconductors**Atsushi Tsukazaki<sup>\*</sup> and Kohei Fujiwara*Institute for Materials Research, Tohoku University, Japan*

MoE3-3 (Invited)

14:30 - 15:00

**Hydrogen in semiconducting oxides**

Farida Selim

<sup>1</sup>Department of Physics and Astronomy, Bowling Green State University, United States of America, <sup>2</sup>Center for Photochemical sciences, Bowling Green State University, United States of America

MoE3-5 (Oral)

15:00 - 15:15

**VUV Cathodoluminescence Spectra of Rocksalt-structured MgZnO/MgO Quantum Wells**

Kanta Kudo,<sup>\*</sup><sup>1</sup> Kyouhei Ishii,<sup>2</sup> Mizuki Ono,<sup>1</sup> Yuki Fujiwara,<sup>1</sup> Kentaro Kaneko,<sup>2,3</sup> Tomohiro Yamaguchi,<sup>1</sup> Tohru Honda,<sup>1</sup> Shizuo Fujita,<sup>2,3</sup> and Takeyoshi Onuma<sup>1</sup>

<sup>1</sup>Department of Applied Physics, School of Advanced Engineering, Graduate School of Engineering, Kogakuin University, Japan, <sup>2</sup>Department of Electronic Science and Engineering, Kyoto University, Japan, <sup>3</sup>Photonics and Electronics Science and Engineering Center, Kyoto University, Japan

MoE3-6 (Oral)

15:15 - 15:30

**Effects of the Growth Environment on the Phase Stability of Sputter-deposited Cd<sub>x</sub>Zn<sub>1-x</sub>O Alloys**

Chun Yuen Ho,<sup>\*</sup><sup>1</sup> Chao Ping Liu,<sup>1,2</sup> Yi-Chun Chen,<sup>3</sup> Zhi-Quan Huang,<sup>3</sup> Feng-Chuan Chuang,<sup>3</sup> and Kin Man Yu<sup>1,4</sup>

<sup>1</sup>Department of Physics, City University of Hong Kong, Hong Kong, <sup>2</sup>Department of Physics, College of Science, Shantou University, China, <sup>3</sup>Department of Physics, National Sun Yat-Sen University, Taiwan, <sup>4</sup>Department of Materials Science and Engineering, City University of Hong Kong, Hong Kong

MoE3-7 (Oral)

15:30 - 15:45

**Growth of Single Crystalline c-In<sub>2</sub>O<sub>3</sub>(111) Layers on Off-Axis c-Plane Sapphire Substrates by Halide Vapor Phase Epitaxy**

Yuya Saimoto,<sup>\*</sup><sup>1</sup> Kenta Nagai,<sup>1</sup> Hidetoshi Nakahata,<sup>1</sup> Keita Konishi,<sup>1</sup> and Yoshinao Kumagai<sup>1,2</sup>

<sup>1</sup>Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan, <sup>2</sup>Institute of Global Innovation Research, Tokyo University of Agriculture and Technology, Japan

MoE3-8 (Oral)

15:45 - 16:00

**Properties of the In<sub>2</sub>O<sub>3</sub>(111) and the β-Ga<sub>2</sub>O<sub>3</sub>(100) non-polar surfaces**

Celina Seraphin Schulze,<sup>\*</sup><sup>1</sup> Jonathan Hofmann,<sup>1</sup> Christian Bruckmann,<sup>1</sup> Robert Zielinski,<sup>1</sup> Wjatscheslav Martyanov,<sup>1</sup> Hendrik Janssen,<sup>1</sup> Andrea Lenz,<sup>1</sup> Martin Franz,<sup>1</sup> Zbigniew Galazka,<sup>2</sup> and Holger Eisele<sup>1</sup>

<sup>1</sup>Institut für Festkörperphysik, Technische Universität Berlin, Germany, <sup>2</sup>Leibniz-Institut für Kristallzüchtung, Germany

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**MoP Poster Session I**

Reception Hall 16:00-18:00

MoP-A-1 (Poster)

**Investigation of Morphology of InSb/InAs Quantum Nano-Stripe Grown by Molecular Beam Epitaxy**

Karn Rongruengkul,<sup>\*</sup><sup>1</sup> Panithan Srisinsuphya,<sup>1</sup> Supachok Thainoi,<sup>1</sup> Suwit Kiravittaya,<sup>2</sup> Noppadon Nuntawong,<sup>3</sup> Suwat Sopitpan,<sup>3</sup> Visittapong Yordsri,<sup>3</sup> Chanchana Thanachayanont,<sup>3</sup> Songphol Kanjanachuchai,<sup>1</sup> Somchai Ratanathamphan,<sup>1</sup> Aniwat Tandaechanurat,<sup>1</sup> and Somsak Panyakeow<sup>1</sup>

<sup>1</sup>Faculty of Engineering, Chulalongkorn University, Thailand, <sup>2</sup>Faculty of Engineering, Naresuan University, Thailand, <sup>3</sup>National Science and Technology Development Agency, Thailand

MoP-A-2 (Poster)

### Improved Electron Transport Properties of $\text{Ga}_{1-x}\text{In}_x\text{Sb}$ Quantum Well Channel Using Strained- $\text{Al}_{0.40}\text{In}_{0.60}\text{Sb}/\text{Al}_{1-y}\text{In}_y\text{Sb}$ Stepped Buffer

Mizuho Hiraoka,\* Yuki Endoh, Koki Osawa, Naoyuki Kishimoto, Takuya Hayashi, Ryuto Machida, Akira Endoh, and Hiroki Fujishiro

*Tokyo University of Science, Japan*

MoP-A-3 (Poster)

### Crystal structures of GaAs/GaNAs core- multishell nanowire

Takaya Mita,\* Ryo Fujiwara, Mitsuki Yukimune, and Fumitaro Isikawa

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

MoP-A-4 (Poster)

### Selective Area Epitaxy of GaP Nanowire Array on Si (111) by MOCVD

Wonsik Choi, Shizhao Fan, Parsian Mohseni, Minjoo Larry Lee, and Xiuling Li\*

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

MoP-A-5 (Poster)

### Monte Carlo simulation of In/GaAs droplet epitaxy on the substrates with different patterns

Mikhail Eremenko,\*<sup>1</sup> Sergey Balakirev,<sup>2</sup> Natalia Chernenko,<sup>1</sup> Maxim Solodovnik,<sup>1,2</sup> and Oleg Ageev<sup>1</sup>

*<sup>1</sup>Research and Education Center "Nanotechnologies", Southern Federal University, Russia, <sup>2</sup>Department of Nanotechnologies and Microsystems, Southern Federal University, Russia*

MoP-A-6 (Poster)

### Effect of chemical composition on the critical thickness of In/AlGaAs nanostructures formation and their characteristics during droplet MBE

Sergey Balakirev,<sup>1</sup> Mikhail Eremenko,<sup>2</sup> Ilya Milhaylin,<sup>2</sup> Natalia Chernenko,<sup>2</sup> Maxim Solodovnik,\*<sup>1,2</sup> and Oleg Ageev<sup>2</sup>

*<sup>1</sup>Department of Nanotechnologies and Microsystems, Southern Federal University, Russia, <sup>2</sup>Research and Education Center "Nanotechnologies", Southern Federal University, Russia*

MoP-A-7 (Poster)

### 1.6 $\mu\text{m}$ Emission from InAs QDs in Metamorphic InGaAs Matrix

Wenbo Zhan,\*<sup>1</sup> Satomi Ishida,<sup>2</sup> Jinkwan Kwoen,<sup>1</sup> Satoshi Iwamoto,<sup>1,3</sup> and Yasuhiko Arakawa<sup>1</sup>

*<sup>1</sup>Institute for Nano Quantum Information Electronics, the University of Tokyo, Japan, <sup>2</sup>Research Center for Advanced Science and Technology, the University of Tokyo, Japan, <sup>3</sup>Institute of Industrial Science, the University of Tokyo, Japan*

MoP-A-8 (Poster)

### Investigation of InAs Quantum Dot Deformation During Capping with an InGaAs Layer Using Time-resolved RHEED Measurements

Daigo Ikuno, Tao Wang, Naoki Okada, and Nobuhiko Ozaki\*

*Faculty of Systems Eng., Wakayama Univ., Japan*

MoP-A-9 (Poster)

### Suppression of Three-Dimensional Pit Formation of InAs on GaSb(001) by Two-Step MBE

Shigkezu Okumura,\*<sup>1,2</sup> Ryo Suzuki,<sup>1</sup> Koji Tsunoda,<sup>1</sup> Hironori Nishino,<sup>1</sup> and Masakazu Sugiyama<sup>2</sup>

*<sup>1</sup>Fujitsu Laboratories Limited, Japan, <sup>2</sup>Research Center for Advanced Science and Technology, The University of Tokyo, Japan*



MoP-A-10 (Poster)

### **Molecular Beam Epitaxial Growth of InSb and AlSb Heterostructure on InSb Substrates**

Jirapat Ounpipat,<sup>\*</sup> Engrhyt Rattanawongnara,<sup>1</sup> Zon,<sup>1</sup> Supachok Thainoi,<sup>1</sup> Suwit Kiravittaya,<sup>2</sup> Aniwat Tандаechnurat,<sup>3</sup> Nopadon Nuntawong,<sup>4</sup> Suwat Sopitpan,<sup>5</sup> Visittapong Yordsri,<sup>6</sup> Chanchana Thanachayanont,<sup>6</sup> Songphol Kanjanachuchai,<sup>1</sup> Somchai Ratanathamaphan,<sup>1</sup> and Somsak Panyakeow<sup>1</sup>

<sup>1</sup>SDRL, Chulalongkorn University, Thailand, <sup>2</sup>AOT Lab., Naresuan University, Thailand, <sup>3</sup>ISE, Chulalongkorn University, Thailand, <sup>4</sup>NECTEC, NSTDA, Thailand, <sup>5</sup>TMEC, NSTDA, Thailand, <sup>6</sup>MTEC, NSTDA, Thailand

MoP-A-11 (Poster)

### **Effect of Annealing on The Bottom Cell in GaInP/GaAs/GaInNAsSb Triple Junction Solar Cells by MBE/MOCVD Hybrid Growth**

Naoya Miyashita,<sup>\*</sup> Yilun He, Nazmul Ahsan, and Yoshitaka Okada

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

MoP-A-12 (Poster)

### **Effects of Channel Scaling on Electron Transport Properties of Sb-based HEMTs**

Naoyuki Kishimoto,<sup>\*</sup> Yuki Endoh, Takuya Hayashi, Mizuho Hiraoka, Ryuto Machida, Akira Endoh, and Hiroki I. Fujishiro  
Department of Applied Electronics, Tokyo University of Science, Japan

MoP-A-13 (Poster) - Late News -

### **Below-bandgap photoluminescence from GaAs**

Ronel Christian Roca,<sup>\*</sup> Kosei Fukui, Hiroto Mizuno, Mikihito Suzuki, and Itaru Kamiya

Toyota Technological Institute, Japan

MoP-B-1 (Poster)

### **A Sub-THz RTD-pair Oscillator with Enhanced RF Output Power Characteristics**

Maengkyu Kim<sup>\*</sup> and Kyounghoon Yang

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

MoP-B-2 (Poster)

### **The Output Power Characteristics of the Series-connected RTD Pair**

Maengkyu Kim<sup>\*</sup> and Kyounghoon Yang

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

MoP-B-3 (Poster)

### **1.2 THz maximum frequency of oscillation achieved by using 75 nm gate length and asymmetric gate recess for InGaAs/InAlAs PHEMT**

mohammed SAMNOUNI,<sup>\*</sup> Nicolas WICHMANN, Xavier Wallart, Christophe COINION, Sylvie LEPILLIET, and Sylvain Bollaert

IEMN, University of Lille, CNRS, France

MoP-B-4 (Poster)

### **Fabrication of 0.25 $\mu\text{m}$ T-Gate AlInGaN/AlN/GaN HEMTs by I-Line Optical Lithography**

Yi-Zhen Liu,<sup>\*</sup> Wei-Chih Ho,<sup>2</sup> Indraneel Sanyal,<sup>1</sup> and Jen-Inn Chyi<sup>1,3</sup>

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<sup>3</sup>Research Center for Applied Sciences, Academia Sinica, Taiwan

MoP-B-5 (Poster)

### **Angular Dependence of InP High Electron Mobility Transistors for Cryogenic Low Noise Amplifiers under a magnetic field**

Isabel Hanna Harrysson Rodrigues,<sup>\*</sup> David Niepce,<sup>1</sup> Giuseppe Moschetti,<sup>2</sup> Arsalan Pourkabirian,<sup>2</sup> Joel Schlee,<sup>2</sup> Thilo Bauch,<sup>1</sup> and Jan Grahn<sup>1</sup>

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MoP-B-6 (Poster)

### Quaternary $\text{In}_{0.05}\text{Al}_{0.70}\text{Ga}_{0.25}\text{N}/\text{GaN}$ HEMTs With On-Resistance of $0.97 \Omega\text{-mm}$

Ji Hyun Hwang,\* Mi Jang, Juyeong Park, and Jae-Hyung Jang  
Gwangju Institute of Science and Technology, Republic of Korea

MoP-B-7 (Poster) - Late News -

### Characterization of the Effective Tunneling Time and Phase Relaxation Time in Triple-Barrier Resonant Tunneling Diodes

Kotaro Aikawa,\*<sup>1</sup> Michihiko Suhara,<sup>1</sup> Kiyoto Asakawa,<sup>2</sup> Khaled Arzi,<sup>3</sup> Nils Weimann,<sup>3</sup> and Werner Prost<sup>3</sup>  
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MoP-B-8 (Poster) - Late News -

### Experimental Observation of Rectification Around 280 GHz Wave in the GaAsSb/InGaAs Backward Diode Rectenna Monolithically Integrated with a Bow-Tie Antenna

Michihiko Suhara,\*<sup>1</sup> Masataka Nakanishi,<sup>1</sup> Shintaro Kitakado,<sup>1</sup> Kiyoto Asakawa,<sup>2</sup> Masaru Sato,<sup>3</sup> Tsuyoshi Takahashi,<sup>3</sup> Kenichi Kawaguchi,<sup>3</sup> and Naoya Okamoto<sup>3</sup>  
<sup>1</sup>Tokyo Metropolitan University, Japan, <sup>2</sup>Tokyo Metropolitan College of Industrial Technology, Japan, <sup>3</sup>Fujitsu Laboratories Ltd., Japan

MoP-D-1 (Poster)

### Electric-field control of optical-spin injection from an InGaAs quantum well to p-doped quantum dots

Soyoung Park,\* Hang Chen, Junichi Takayama, Satoshi Hiura, and Akihiro Murayama  
GSIST, Hokkaido University, Japan

MoP-D-2 (Poster)

### Chiral Cavity Mode in a GaAs-Based Three-Dimensional Photonic Crystal Fabricated by a Micro-Manipulation Method using an Optical Microscope

Yuzo Kinuta,\*<sup>1</sup> Shun Takahashi,<sup>1</sup> Kenichi Yamashita,<sup>1</sup> Jun Tatebayashi,<sup>2</sup> Satoshi Iwamoto,<sup>2,3</sup> and Yasuhiko Arakawa<sup>2</sup>  
<sup>1</sup>Kyoto Institute of Technology, Japan, <sup>2</sup>INQIE, Univ. of Tokyo, Japan, <sup>3</sup>IIS, Univ. of Tokyo, Japan

MoP-D-3 (Poster)

### Transmission Characteristics of a Novel Waveguide Structure for Wavelength Division Multiplexing

Takuya Yamaguchi,\* Takahiro Horiba, Masato Morifuji, and Masahiko Kondow  
Division of Electrical, Electronic and Information Engineering, Osaka University, Japan

MoP-D-4 (Poster)

### Regional band-gap tailoring of 1550nm-band InAs quantum dot

Shohei Isawa,\*<sup>1</sup> Yota Akashi,<sup>1</sup> Atsushi Matsumoto,<sup>2</sup> Kouichi Akahane,<sup>2</sup> Yuichi Matsushima,<sup>1</sup> Hiroshi Ishikawa,<sup>1</sup> and Kat-suyuki Utaka<sup>1</sup>  
<sup>1</sup>University of Waseda, Japan, <sup>2</sup>NICT, Japan

MoP-D-5 (Poster)

### Numerical Investigation of Topological Edge States in a GaAs-Based Three-Dimensional Chiral Photonic Crystal

Shun Takahashi,\*<sup>1</sup> Shuhei Oono,<sup>2</sup> Yasuhiro Hatsugai,<sup>2</sup> Yasuhiko Arakawa,<sup>3</sup> and Satoshi Iwamoto<sup>3,4</sup>  
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MoP-D-6 (Poster)

### **Metamaterial perfect absorber based on heavily doped semiconductor for thermal emission**

Franziska Barho, Laurent Cerutti,\* Fernando Gonzalez-Posada Flores, and Thierry Taliercio  
*IES, Univ. Montpellier, CNRS, 34000 Montpellier, France*

MoP-D-7 (Poster)

### **Efficient plasmon-assisted terahertz emitter for operation with low-power laser pumps**

Denis Lavrukhin,\*<sup>1,2</sup> Alexander Yachmenev,<sup>1,2</sup> Igor Glinskiy,<sup>1,2</sup> Rustam Khabibullin,<sup>1,2,3</sup> Yurii Goncharov,<sup>2</sup> Igor Spector,<sup>2</sup> Maxim Ryzhii,<sup>4</sup> Taiichi Otsuji,<sup>5</sup> Michael Shur,<sup>6,7</sup> Maksim Skorobogatiy,<sup>8</sup> Kirill Zaytsev,<sup>2,9</sup> and Dmitry Ponomarev<sup>1,2,3</sup>

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MoP-D-8 (Poster)

### **Two-dimensional photonic crystal phosphors for efficient and polarization-insensitive excitation**

Tae-Yun Lee,\*<sup>1,2</sup> Jongho Lee,<sup>1,2</sup> Yeonsang Park,<sup>3</sup> Kyung-Sang Cho,<sup>3</sup> Myeong-Eun Kim,<sup>1,2</sup> Kyungtaek Min,<sup>4</sup> and Heonsu Jeon<sup>1,2,5</sup>

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MoP-D-9 (Poster)

### **InAs/GaAs quantum Dot Intermixing by Dry Etching and Ion Implantation**

Yu Hiraishi,\*<sup>1</sup> Tomohiro Shirai,<sup>1</sup> Jinkwan Kwoen,<sup>2</sup> Yuichi Matsushima,<sup>1</sup> Hiroshi Ishikawa,<sup>1</sup> Yasuhiko Arakawa,<sup>2</sup> and Katsuyuki Utaaka<sup>1</sup>

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MoP-D-10 (Poster)

### **InGaAs Quantum Dot Dual-Band Photodetector of Bipolar Photocurrent**

Tsong-Sheng Lay,\* Z. H. Lin, and T. E. Tzeng

*Department of Electrical Engineering, and Graduate Institute of Optoelectronic Engineering, National Chung Hsing University, Taiwan*

MoP-D-11 (Poster)

### **Buried-ridge-waveguide Type GaInAsP/InP Membrane Distributed-Reflector Lasers for Reduction of Differential Resistance**

Naoki Takahashi,\*<sup>1</sup> Nagisa Nakamura,<sup>1</sup> Takamasa Yoshida,<sup>1</sup> Weicheng Fang,<sup>1</sup> Tomohiro Amemiya,<sup>1,2</sup> Nobuhiko Nishiyama,<sup>1,2</sup> and Shigehisa Arai<sup>1,2</sup>

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MoP-D-12 (Poster)

### **Dilute Waveguide Reflective Semiconductor Optical Amplifier for 3D Hybrid Silicon Photonics Integration**

Bowen Song,\* Youning Luo, Sergio Pinna, Yuan Liu, and Jonathan Klamkin

*Department of Electrical and Computer Engineering University of California, Santa Barbara, United States of America*

MoP-D-13 (Poster)

### **Thin Film Optical Characteristics of InP/Si Hybrid Wafers by Chip-on-Wafer Direct Transfer Bonding Technology**

Nobuhiko Nishiyama,<sup>\*,1,2</sup> Kazuya Ohira,<sup>3</sup> Liu Bai,<sup>1</sup> Yoichiro Kurita,<sup>3</sup> Hideto Furuyama,<sup>3</sup> Miki Inamura,<sup>4</sup> Tomoyuki Abe,<sup>4</sup> Takuya Mitarai,<sup>1</sup> Kenji Morita,<sup>1</sup> and Shigehisa Arai<sup>1,2</sup>

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MoP-D-14 (Poster)

### **Investigation of InP/Si bonding condition for optimizing Photoluminescence property by Surface Activated Bonding based on Fast Atom Beam**

Yuning Wang,<sup>\*,1</sup> Takuya Mitarai,<sup>1</sup> Tomohiro Amemiya,<sup>1,2</sup> Nobuhiko Nishiyama,<sup>1,2</sup> and Shigehisa Arai<sup>1,2</sup>

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MoP-E-1 (Poster)

### **Spin-valve magnetoresistance in ferromagnetic semiconductor (Ga,Fe)Sb heterostructures with high Curie temperature**

Kengo Takase,<sup>\*,1</sup> Le Duc Anh,<sup>1,2</sup> Kosuke Takiguchi,<sup>1</sup> Nguyen Thanh Tu,<sup>1,3</sup> and Masaaki Tanaka<sup>1,4</sup>

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MoP-E-2 (Poster)

### **Heavily Fe-doped n-type ferromagnetic semiconductor (In,Fe)Sb with high Curie temperature and large magnetic anisotropy**

Thanh Tu Nguyen,<sup>\*,1,2</sup> Nam Hai Pham,<sup>3,4</sup> Duc Anh Le,<sup>1,5</sup> and Masaaki Tanaka<sup>1,4</sup>

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MoP-E-3 (Poster)

### **Spin dependent transport properties of spin bipolar transistors using a (Ga,Fe)Sb/(In,Fe)As p-n junction**

Koki Chonan,<sup>\*,1</sup> Yuto Arakawa,<sup>1</sup> Masaaki Tanaka,<sup>2,3</sup> and Pham Nam Hai<sup>1,3</sup>

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MoP-E-4 (Poster)

### **Spin Detection in GaAs/AlGaAs Quantum Wells by Inverse Spin-Hall Effect**

Yuji Sakai,<sup>\*,1</sup> Tomoki Chatani,<sup>1</sup> Tomohiro Nakagawa,<sup>1</sup> Julian Ritzmann,<sup>2</sup> Arne Ludwig,<sup>2</sup> Andreas Wieck,<sup>2</sup> and Akira Oiwa<sup>1</sup>

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MoP-E-5 (Poster)

### **Real space imaging of the quantum-Hall incompressible states influenced by the strong disorder**

Yihao Wang,<sup>\*,1</sup> Katsushi Hashimoto,<sup>1,2</sup> and Yoshiro Hirayama<sup>1,2,3</sup>

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MoP-E-6 (Poster)

### **Spin Blockade and Magnetoresistance in Double Quantum Well Diode with Inverted Electric Field**

Yoshiaki Hashimoto,\* Tong Ke, Taketomo Nakamura, and Shingo Katsumoto  
*Institute for Solid State Physics, University of Tokyo, Japan*

MoP-E-7 (Poster)

### **Control of electron spin at spin-resolved quantum Hall edges**

Takase Shimizu,\* Yoshiaki Hashimoto, Taketomo Nakamura, Akira Endo, and Shingo Katsumoto  
*Institute for Solid State Physics, The University of Tokyo, Japan*

MoP-E-8 (Poster)

### **Spin-conserved electron transport to InGaAs quantum dots through GaAs/AlGaAs superlattice**

Satoshi Hiura,\*<sup>1</sup> Junichi Takayama,<sup>1</sup> Takayuki Kiba,<sup>2</sup> and Akihiro Murayama<sup>1</sup>  
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MoP-E-9 (Poster)

### **Effects of p-doping on excited spin states and the dynamics in InGaAs quantum dots**

Shino Sato,\*<sup>1</sup> Motoya Murakami,<sup>1</sup> Yuto Nakamura,<sup>1</sup> Satoshi Hiura,<sup>2</sup> Junichi Takayama,<sup>2</sup> and Akihiro Murayama<sup>2</sup>  
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MoP-E-10 (Poster)

### **Diffusive spin dynamics in 10 nm wide InGaAs/InAlAs quantum wells**

Hiroki Shida,\*<sup>1</sup> Yasuhito Saito,<sup>1</sup> Kohei Kawaguchi,<sup>1</sup> Ichirota Takazawa,<sup>1</sup> Takahiro Kitada,<sup>3</sup> Makoto Kohda,<sup>2</sup> Yoshihiro Ishitani,<sup>1</sup> and Ken Morita<sup>1</sup>  
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MoP-E-11 (Poster)

### **Picosecond spin relaxation in GaSb/AlSb multiple quantum wells with a 1.55- $\mu$ m energy band gap**

Yuichi Nakamura,\*<sup>1</sup> Lianhe Li,<sup>2</sup> Takuya Kamezaki,<sup>1</sup> Kizuku Yamada,<sup>1</sup> Edmund Linfield,<sup>2</sup> and Atsushi Tackeuchi<sup>1</sup>  
*<sup>1</sup>Waseda Univ., Japan, <sup>2</sup>Univ. of Leeds, United Kingdom*

MoP-E-12 (Poster) - Late News -

### **Simultaneous extraction of Rashba and Dresselhaus spin-orbit coefficients in GaAs/AlGaAs (110) two-dimensional electron gas**

Daisuke Iizasa,\*<sup>1</sup> Shu Kitamura,<sup>1</sup> Dai Sato,<sup>1</sup> Satoshi Iba,<sup>2</sup> Yuzo Ohno,<sup>3</sup> Shutaro Karube,<sup>1,4</sup> Junsaku Nitta,<sup>1,4,5</sup> and Makoto Kohda<sup>1,4,5</sup>  
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MoP-E-13 (Poster) - Late News -

### **Topological semimetals in InAs/GaInSb superlattices at room temperature**

Mikhail Patrashin,\* Norihiko Sekine, Kouichi Akahane, Akifumi Kasamatsu, and Iwao Hosako  
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MoP-F-1 (Poster)

### **One-dimensional electronic states in highly-stacked InAs/GaAs quantum dot superlattices**

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MoP-F-2 (Poster)

### **Lateral Photocurrent Spectroscopy of Stacked InAs QDs Layers in Embedded Strain-Relaxed InGaAs Matrix**

Naoto Kumagai,<sup>\*1,2</sup> Xiangmeng Lu,<sup>3</sup> Yasuo Minami,<sup>3</sup> and Takahiro Kitada<sup>3</sup>

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MoP-F-3 (Poster)

### **GaSb/GaAs quantum nanostructures for intermediate band solar cell under high sunlight concentration**

Yusuke Oteki,<sup>\*1,2</sup> Yasushi Shoji,<sup>3</sup> Naoya Miyashita,<sup>1</sup> Yilun He,<sup>1,2</sup> and Yoshitaka Okada<sup>1,2</sup>

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MoP-F-4 (Poster)

### **AlGaAs/GaAs Heterostructure with Hybrid InSb/GaAs and GaSb/GaAs Quantum Dots and Its Optical Characteristics**

Thanadol Korkerdsantisuk,<sup>\*1</sup> Katanyu Tharawatcharasart,<sup>1</sup> Zon,<sup>1</sup> Supachok Thainoi,<sup>1</sup> Suwit Kiravittaya,<sup>2</sup> Aniwat Tandaechanurat,<sup>3</sup> Noppadon Nuntawong,<sup>4</sup> Suwat Sopotpan,<sup>5</sup> Visittapong Yordsri,<sup>6</sup> Chanchana Thanachayanont,<sup>6</sup> Songphol Kanjanachuchai,<sup>1</sup> Somchai Ratanathamphan,<sup>1</sup> and Somsak Panyakeow<sup>1</sup>

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MoP-F-5 (Poster)

### **Photoluminescence Mapping Analysis of In-Plane Ultrahigh-Density InAs/GaAsSb Quantum Dot Layers**

Sho Tatsugi,\* Ryo Sugiyama, and Koichi Yamaguchi

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MoP-F-6 (Poster)

### **Observation on Carrier Dynamics of Intermediate Band in Multi Stacked InGaAs Quantum Dots using Two Color Excitation**

Keishiro Goshima,<sup>\*1</sup> Norio Tsuda,<sup>1</sup> and Takeyoshi Sugaya<sup>2</sup>

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MoP-F-7 (Poster)

### **Adsorption of Oxygen and Hydrogen Atoms on the GaAs(110) Surface**

Dorothee Sophie Eckert,\* Christian Bruckmann, Sam Baraz, and Holger Eisele

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MoP-F-8 (Poster)

### **Mode Coupling Measurement in Dual-Frequency Quantum Well-based VECSEL**

Gaëlle Brévalle,\*<sup>1</sup> Salvatore Pes,<sup>1</sup> Cyril Paranthoën,<sup>1</sup> Mathieu Perrin,<sup>1</sup> Christophe Levallois,<sup>1</sup> Cyril Hamel,<sup>1</sup> Alexandru Mereuta,<sup>2</sup> Andrei Caliman,<sup>2</sup> Eli Kapon,<sup>2</sup> Laurent Chusseau,<sup>3</sup> Hervé Folliot,<sup>1</sup> and Mehdi Alouini<sup>1</sup>

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MoP-F-9 (Poster)

### **In situ synchrotron X-ray reciprocal space mapping during InGaN/GaN heterostructure nanowire growth**

Uesugi Tomohiro,<sup>\*,1,2</sup> Takuo Sasaki,<sup>1</sup> Kanya Sugitani,<sup>1,2</sup> and Masamitsu Takahasi<sup>1,2</sup>

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MoP-F-10 (Poster)

### **In situ study of strain and composition of InGaN/GaN multi-quantum-well nanowires**

Kanya Sugitani,<sup>\*,1,2</sup> Takuo Sasaki,<sup>1</sup> Uesugi Tomohiro,<sup>1,2</sup> and Masamitsu Takahasi<sup>1,2</sup>

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MoP-F-11 (Poster)

### **Light-emitting InAs nanowires grown by MOVPE directly on flexible plastic substrates**

Vladislav Khayrudinov,<sup>\*,1</sup> Tuomas Haggren,<sup>1</sup> Maxim Remenny,<sup>2</sup> Prokhor Alekseev,<sup>2</sup> Boris Matveev,<sup>2</sup> and Harri Lipsanen<sup>1</sup>

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MoP-F-12 (Poster)

### **InAs/GaSb Core-Shell Nanowires: Growth and Characterization**

Mihail Ion Lepsa,<sup>\*,1,4</sup> Gunjan Nagda,<sup>2,4</sup> Pujitha Perla,<sup>2,4</sup> Nataliya Demarina,<sup>3,4</sup> and Detlev Grützmacher<sup>1,2,4</sup>

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MoP-F-13 (Poster)

### **Dimension Engineering of Narrow Bandgap Semiconductor InAs Nanostructures in Wafer-Scale**

Dong Pan\* and Jianhua Zhao

Institute of Semiconductors, Chinese Academy of Sciences, China

MoP-F-14 (Poster)

### **Integration of AlGaSb/GaSb Heterostructure and InSb/GaSb Quantum Nano-Stripes**

Kiattisak Luangjarunrat,<sup>\*,1</sup> Zon,<sup>1</sup> Supachok Thainoi,<sup>1</sup> Suwit Kiravittaya,<sup>2</sup> Aniwat Tандаеchanurat,<sup>3</sup> Noppadon Nuntawong,<sup>4</sup> Suwat Sopotpan,<sup>5</sup> Visittapong Yordsri,<sup>6</sup> Chanchana Thanachayanont,<sup>6</sup> Songphol Kanjanachuchai,<sup>1</sup> Somchai Ratanathammaphan,<sup>1</sup> and Somsak Panyakeow<sup>1</sup>

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MoP-F-15 (Poster)

### **Epitaxial Lift-Off of Ultrathin Heterostructures for Hot-Carrier Solar Cell Applications**

Maxime Giteau,<sup>\*,1,4</sup> Kentaroh Watanabe,<sup>1,4</sup> Hassanet Sodabanlu,<sup>1,4</sup> Naoya Miyashita,<sup>1,4</sup> Masakazu Sugiyama,<sup>1,4</sup> Andrea Cattoni,<sup>2,4</sup> Stéphane Collin,<sup>2,4</sup> Jean-François Guillemoles,<sup>3,4</sup> and Yoshitaka Okada<sup>1,4</sup>

<sup>1</sup>RCAST, The University of Tokyo, Japan, <sup>2</sup>C2N, CNRS, University Paris-Sud/Paris-Saclay, France, <sup>3</sup>CNRS, IPVF, UMR 9006, France, <sup>4</sup>NextPV, The University of Tokyo, Japan

MoP-F-16 (Poster)

### **Numerical Demonstration of Trade-off between Carrier Confinement Effect and Carrier Transport for Multiple-Quantum-Well Based High-efficiency InGaP Solar Cells**

Hsiang-Hung Huang,\* Kasidit Toprasertpong, Amaury Delamarre, Kentaroh Watanabe, Masakazu Sugiyama, and Yoshiaki Nakano

Department of Electrical Engineering and Information Systems, University of Tokyo, Japan

MoP-F-18 (Poster) - Late News -

### Chalcogen passivation of GaAs(111)B surfaces

Takayuki Suga,<sup>\*,1</sup> Shunji Goto,<sup>1</sup> Akihiro Ohtake,<sup>2</sup> and Jun Nakamura<sup>1</sup>

<sup>1</sup>Department of Engineering Science, The University of Electro-Communications (UEC-Tokyo), Japan, <sup>2</sup>National Institute for Materials Science, Japan

MoP-G-1 (Poster)

### Performance Projection of 500V - 5kV AlGaAs/GaAs Vertical Polarization and Doped Superjunction (PDSJ) Devices

Xiang Zhou\* and T. Paul Chow

Rensselaer Polytechnic Institute, United States of America

MoP-G-2 (Poster)

### Improved Electrical Degradation of AlInGaN/GaN HEMT by using Triethylgallium Grown GaN channel and Cap

Indraneel Sanyal,<sup>\*,1</sup> Ting-Yu Hu,<sup>1</sup> Yen-Chang Lee,<sup>1</sup> En-Shuo Lin,<sup>1</sup> and Jen-Inn Chyi<sup>1,2</sup>

<sup>1</sup>Department of Electrical Engineering, National Central University, Taiwan, <sup>2</sup>Research Center for Applied Sciences, Academia Sinica, Taiwan

MoP-G-3 (Poster)

### Current Collapse Suppression by Silicon Substrate Removal Technique in AlGaIn/GaN HEMT

YUEH-TING CHEN<sup>\*,1</sup> and JIAN-JANG HUANG<sup>1,2</sup>

<sup>1</sup>Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan, <sup>2</sup>Department of Electrical Engineering, National Taiwan University, Taiwan

MoP-G-4 (Poster)

### Impact of Lowering Threading Dislocation Density on Performances of Vertical GaN p-n Junction Diodes

Hiroshi Ohta,<sup>\*,1</sup> Naomi Asai,<sup>1</sup> Fumimasa Horikiri,<sup>2</sup> Yoshinobu Narita,<sup>2</sup> Takehiro Yoshida,<sup>2</sup> and Tomoyoshi Mishima<sup>1</sup>

<sup>1</sup>Hosei University, Japan, <sup>2</sup>SCIOCS Co. Ltd., Japan

MoP-G-5 (Poster)

### Device characteristics and MIS interface evaluation of Al<sub>2</sub>O<sub>3</sub>/AlGaInN/AlGaIn MIS HFET

Saki Saito,<sup>\*</sup> Daiki Hosomi, Keita Furuoka, Heng Chen, Toshiharu Kubo, Takashi Egawa, and Makoto Miyoshi

Nagoya Institute of Technology, Japan

MoP-G-6 (Poster)

### The origin of on-state stress degradation of T-gate AlGaIn/GaN HEMTs: experimental and first-principles insights

Rong Wang,<sup>\*,1,2</sup> Xiaodong Tong,<sup>1,2</sup> Jianxing Xu,<sup>1,2</sup> Shiyong Zhang,<sup>1,2</sup> Penghui Zheng,<sup>1,2</sup> and Feng-Xiang Chen<sup>3</sup>

<sup>1</sup>Microsystem and Terahertz Research Center, China Academy of Engineering Physics, China, <sup>2</sup>Institute of Electronic Engineering, China Academy of Engineering Physics, China, <sup>3</sup>Department of physics, School of Science, Wuhan University of Technology, China

MoP-G-7 (Poster)

### Development of Hall Effect Sensor on AlGaIn/GaN FinFET Structure

Lili Huo,<sup>\*,1,2</sup> Yung C Liang,<sup>1,2</sup> and Xiao Gong<sup>1</sup>

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>National University of Singapore (Suzhou) Research Institute, China



MoP-G-8 (Poster)

### **N-polar GaN HEMT with Al<sub>2</sub>O<sub>3</sub> gate insulator**

Akihiro Hayasaka,<sup>\*</sup><sup>1</sup> Ryosuke Aonuma,<sup>1</sup> Koushi Hotta,<sup>1</sup> Isao Makabe,<sup>2</sup> Shigeki Yoshida,<sup>2</sup> and Yasuyuki Miyamoto<sup>1</sup>

<sup>1</sup>Department of Electrical and Electronic Engineering, Tokyo Institute of Technology, Japan, <sup>2</sup>Transmission Devices Laboratory, Sumitomo Electric Industries, Ltd, Japan

MoP-G-9 (Poster)

### **Characterization of Silicon Nitride Capping Dielectrics on AlGaIn/GaN/Silicon Substrate HEMT Structures with a Mercury Probe**

Timothy Boles,<sup>\*</sup><sup>1</sup> Wayne Strubble,<sup>1</sup> Gabriel Cueva,<sup>1</sup> Robert Joseph Hillard,<sup>2</sup> Win Ye,<sup>2</sup> John Byrnes,<sup>2</sup> and Jonny Hoglund<sup>2</sup>

<sup>1</sup>MACOM, United States of America, <sup>2</sup>Semilabusa, United States of America

MoP-G-10 (Poster) - Late News -

### **GaN-based Inverter by Monolithic Integration of Threshold Controlled MOSFETs**

Hiroto Sekiguchi, Kiyomasa Miwa, Keisuke Yamane, Akihiro Wakahara, and Hiroshi Okada<sup>\*</sup>

Toyohashi University of Technology, Japan

MoP-I-1 (Poster)

### **Turbostratic stacking effect in multilayer graphene on the electrical transport properties**

Ryota Negishi,<sup>\*</sup><sup>1</sup> Chaopeng Wei,<sup>1</sup> Yui Ogawa,<sup>2</sup> Masashi Akabori,<sup>3</sup> Yoshikata Taniyasu,<sup>2</sup> and Yoshihiro Kobayashi<sup>1</sup>

<sup>1</sup>Osaka university, Japan, <sup>2</sup>NTT Basic Research Laboratories, Japan, <sup>3</sup>JAIST, Japan

MoP-I-2 (Poster)

### **Carbon nanowalls/diamond heterojunctions as novel photo-switching memory devices**

Yuuta Imai,<sup>\*</sup> Kenji Ueda, Hideharu Itou, Yuki Mizuno, and Hidefumi Asano

Graduate School of Engineering, Nagoya University, Japan

MoP-I-3 (Poster)

### **The underlying signatures of the spin- and momentum-forbidden dark exciton states in the temperature-dependent photoluminescences from WSe<sub>2</sub> monolayers**

Guan-Hao Peng,<sup>\*</sup><sup>1</sup> Ping-Yuan Lo,<sup>1</sup> Wei-Hua Li,<sup>1</sup> Yan-Chen Huang,<sup>1</sup> Yan-Hong Chen,<sup>1</sup> Chi-Hsuan Lee,<sup>2</sup> Chih-Kai Yang,<sup>2</sup> and Shun-Jen Cheng<sup>1</sup>

<sup>1</sup>Department of Electrophysics, National Chiao Tung University, Taiwan, <sup>2</sup>Graduate Institute of Applied Physics, National Chengchi University, Taiwan

MoP-I-4 (Poster)

### **Polariton lasing in transition metal dichalcogenides**

Alexey Kavokin

Westlake University, 18 Shilongshan Road, Hangzhou 310024, Zhejiang Province., China

MoP-I-5 (Poster)

### **Fabrication of Transparent Solar Cell with Atomically Thin Layered Materials**

Xing He,<sup>\*</sup><sup>1</sup> Yoshiki Yamaguchi,<sup>1</sup> Toshiro Kaneko,<sup>1</sup> and Toshiaki Kato<sup>1,2</sup>

<sup>1</sup>Department of Electronic Engineering, Tohoku University, Japan, <sup>2</sup>JST-PRESTO, Japan

MoP-I-6 (Poster)

### **Improvement of External Quantum Efficiency of C<sub>60</sub>/ZnPc Organic Photovoltaic Cells by Polymerization between C<sub>60</sub> molecules**

Yuki Matoba,<sup>\*</sup><sup>1</sup> Masahiro Kato,<sup>1</sup> Shinta Watanabe,<sup>1</sup> Koichi Okamoto,<sup>2</sup> Masato Nakaya,<sup>1</sup> and Jun Onoe<sup>1</sup>

<sup>1</sup>Graduate School of Engineering, Nagoya University, Japan, <sup>2</sup>Graduate School of Engineering, Osaka Prefecture University, Japan

MoP-I-7 (Poster)

### **Bio-sensing of small peptides by open sandwich immunoassay on graphene FETs**

Yasusshi Kanai,<sup>\*1</sup> Yuki Ohmuro-Matsuyama,<sup>2</sup> Masami Tanioku,<sup>1</sup> Shota Ushiba,<sup>3</sup> Takao Ono,<sup>1</sup> Kouichi Inoue,<sup>1</sup> Masahiko Kimura,<sup>3</sup> Hiroshi Ueda,<sup>2</sup> and Kazuhiko Matsumoto<sup>1</sup>

<sup>1</sup>ISIR Osaka University, Japan, <sup>2</sup>Lab. Chem. Life Sci., Tokyo Institute of Technology, Japan, <sup>3</sup>Murata Mfg., Japan

MoP-I-8 (Poster)

### **The influence of the developed relief of the carbon nanoscale sensitive element on the characteristics of the ionization sensor of gases**

Victor Klimin,<sup>\*</sup> Alexey Rezvan, and Oleg Ageev

Department of Nanotechnology and Microsystems, Southern Federal University, Russia

MoP-I-9 (Poster)

### **Chemical vapor deposition growth of boron incorporated graphitic carbon nitride film for carbon based semiconductor systems**

Noriyuki Urakami,<sup>\*1,2</sup> Maito Kosaka,<sup>1</sup> and Yoshio Hashimoto<sup>1,2</sup>

<sup>1</sup>Shinshu Univ., Japan, <sup>2</sup>Inst. of Carbon and Tech., Japan

MoP-I-10 (Poster)

### **High stability of the epitaxial graphene film on SiC substrate**

Takaya Kujime,<sup>\*</sup> Yoshiaki Taniguchi, Daiu Akiyama, Yusuke Kawamura, Yasuhide Ohno, and Masao Nagase

Graduate School of Advanced Technology and Science, Tokushima University, Japan

MoP-I-11 (Poster)

### **Physical vapor transport growth of trigonal selenium crystal**

Yuichiro Suzuki,<sup>\*1</sup> Noriyuki Urakami,<sup>1,2</sup> and Yoshio Hashimoto<sup>1,2</sup>

<sup>1</sup>Shinshu University, Japan, <sup>2</sup>Institute of Carbon Science and Technology, Japan

MoP-I-12 (Poster) - Late News -

### **Tunable Single-Photon Emission in Hexagonal Boron Nitride Films**

Zaiquan Xu,<sup>\*</sup> Noah Mendelson, Chi Li, Milos Toth, and Igor Aharonovich

School of Mathematical and Physical Sciences University of Technology Sydney, Australia

MoP-I-13 (Poster) - Late News -

### **High-Frequency Nanomechanical Resonator in a Ballistic Graphene p-n Junction**

Minkyung Jung,<sup>\*1,2</sup> Peter Rickhaus,<sup>2,3</sup> Simon Zihlmann,<sup>2</sup> Alexander Eichler,<sup>3</sup> Peter Makk,<sup>2,4</sup> and Christian Schönenberger<sup>2</sup>

<sup>1</sup>DGIST Research Institute, DGIST, Republic of Korea, <sup>2</sup>Department of Physics, University of Basel, Switzerland, <sup>3</sup>Institute for Solid State Physics, ETH, Switzerland, <sup>4</sup>Department of Physics, Budapest University of Tech. and Econ., Hungary

## May 21 (Tue)

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**TuA1 Nanomechanics, Thermal and Phonon Transport** Room A 08:30-10:30
 

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*Chair: Minoru Kawamura and Hiroshi Yamaguchi*


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TuA1-1 (Oral) 08:30 - 08:45

**Nonlinear Acoustic Dynamics in Nanoelectromechanical Waveguides**

 Megumi Kurosu,<sup>\*,1,2</sup> Daiki Hatanaka,<sup>1</sup> and Hiroshi Yamaguchi<sup>1,2</sup>
*<sup>1</sup>NTT Basic Research Laboratories, NTT Corporation, Japan, <sup>2</sup>Department of Physics, Tohoku University, Japan*

TuA1-2 (Oral) 08:45 - 09:00

**An AlGaAs/GaAs Mechanical Mode-Locked Cavity**

 Samer Hourri,<sup>\*</sup> Daiki Hatanaka, Ryuichi Ohta, Motoki Asano, and Hiroshi Yamaguchi

*NTT-Basic Research Laboratories, Japan*

TuA1-3 (Oral) 09:00 - 09:15

**Thermoelectric Transport in GaAs-AlGaAs Core-Shell Modulation-Doped Nanowires**

 Sergej Fust,<sup>\*</sup> Jonathan Becker, Damon James Carrad, Dominik Irber, Jakob Seidl, Anton Faustmann, Bernhard Loitsch, Gerhard Abstreiter, Jonathan James Finley, and Gregor Koblmüller

*Walter Schottky Institute and Physics Department, TU Munich, Germany*

TuA1-4 (Oral) 09:15 - 09:30

**Quasi-ballistic thermal phonon transport in nanostructured Si nanowires**

 Masahiro Nomura<sup>\*,1,2</sup> and Roman Anufriev<sup>1</sup>
*<sup>1</sup>University of Tokyo, Japan, <sup>2</sup>PRESTO JST, Japan*

TuA1-5 (Oral) 09:30 - 09:45

**Semi-ballistic thermal phonon transport in Si<sub>1-x</sub>Gex nanowires**

 Noboru Okamoto,<sup>1</sup> Ryoto Yanagisawa,<sup>1</sup> Md. Mahfuz Alam,<sup>2</sup> Kentarou Sawano,<sup>2</sup> Masashi Kurosawa,<sup>3,4</sup> and Masahiro Nomura<sup>\*,1,4</sup>
*<sup>1</sup>Univ. of Tokyo, Japan, <sup>2</sup>Tokyo City Univ., Japan, <sup>3</sup>Nagoya Univ., Japan, <sup>4</sup>PRESTO, JST, Japan*

TuA1-6 (Oral) 09:45 - 10:00

**Control of absorption properties of MEMS terahertz bolometers using metamaterials**

 Tianye Niu,<sup>\*,1</sup> Boqi Qiu,<sup>1</sup> Ya Zhang,<sup>2</sup> and Kazuhiko Hirakawa<sup>1,3</sup>
*<sup>1</sup>Institute of Industrial Science, University of Tokyo, Japan, <sup>2</sup>Tokyo University of Agriculture and Technology, Japan, <sup>3</sup>Institute for Nano Quantum Information Electronics, University of Tokyo, Japan*

TuA1-7 (Oral) 10:00 - 10:15

**Magnetic anisotropy switching in heavily-Fe-doped high-Curie-temperature ferromagnetic semiconductor (Ga<sub>0.7</sub>Fe<sub>0.3</sub>)Sb with a critical thickness**

 Shobhit Goel,<sup>\*,1</sup> Le Duc Anh,<sup>1,2</sup> Nguyen Thanh Tu,<sup>1</sup> Shinobu Ohya,<sup>1,2,3</sup> and Masaaki Tanaka<sup>1,3</sup>
*<sup>1</sup>Department of Electrical Engineering & Information Systems, The University of Tokyo, Japan, <sup>2</sup>Institute of Engineering Innovation, The University of Tokyo, Japan, <sup>3</sup>Center for Spintronics Research Network (CSRN), The University of Tokyo, Japan*

TuA1-8 (Oral) 10:15 - 10:30

**Multi-band valley-protected topological edge states in GaAs-based nanophononic crystals with complete phononic bandgaps**

Ingi Kim,<sup>1</sup> Zhaoyin Sun,<sup>1</sup> Yasuhiko Arakawa,<sup>2</sup> and Satoshi Iwamoto<sup>\*,1,2</sup>

<sup>1</sup>Institute of Industrial Science, The University of Tokyo, Japan, <sup>2</sup>Institute for Nano Quantum Information Electronics, The University of Tokyo, Japan

TuB1 GaN MOS Power FETs Room B 08:30-10:30

Chair: Tetsu Kachi and Toshikazu Suzuki

TuB1-1 (Invited) 08:30 - 09:00

**Improvement of channel mobility and reliability in GaN-MOSFETs**

Masahiko Kuraguchi,\* Yosuke Kajiwar, Daimotsu Kato, Toshiki Hikosaka, Hiroshi Ono, Aya Shindome, Akira Mukai, and Shinya Nunoue

Corporate Research & Development Center, Toshiba Corporation, Japan

TuB1-3 (Invited) 09:00 - 09:30

**High-performance nanowire-based E-mode Power GaN MOSHEMTs**

Luca Nela,\* Minghua Zhu, Jun Ma, and Elison Matioli

POWERLAB, IEL, STI, École Polytechnique Fédéral de Lausanne (EPFL), Switzerland

TuB1-5 (Oral) 09:30 - 09:45

**Switching and HTRB characteristics of Highly reliable GaN MOS-HFET**

Shinichi Hoshi,\* Kensuke Hata, Youngshin Eum, and Kazuki Arakawa

Sensor & Semiconductor Process R&D Div., DENSO CORPORATION, Japan

TuB1-6 (Oral) 09:45 - 10:00

**Threshold voltages of AlGaIn/GaN metal-insulator-semiconductor devices with AlN or Al<sub>2</sub>O<sub>3</sub> gate insulators**

Hiroto Demura,\* Yuchen Deng, Duong Dai Nguyen, and Toshi-kazu Suzuki

Japan Advanced Institute of Science and Technology, Japan

TuB1-7 (Oral) 10:00 - 10:15

**Improved insulator/semiconductor interfaces in Al<sub>2</sub>O<sub>3</sub>/AlGaIn/GaN structures by AlGaIn layer regrowth**

Shinsaku Kawabata,\* Joel Tacla Asubar, Hirokuni Tokuda, Akio Yamamoto, and Masaaki Kuzuhara

University of Fukui, Japan

TuB1-8 (Oral) - Late News - 10:15 - 10:30

**1.2 kV regrown GaN vertical p-n power diodes with ultra low leakage using advanced materials engineering**

Kai Fu,<sup>1</sup> Houqiang Fu,<sup>1</sup> Hanxiao Liu,<sup>2</sup> Shanthan Reddy Alugubelli,<sup>2</sup> Xuanqi Huang,<sup>1</sup> Hong Chen,<sup>1</sup> Tsung-Han Yang,<sup>1</sup> Jossue Montes,<sup>1</sup> Chen Yang,<sup>1</sup> Jingan Zhaou,<sup>1</sup> Fernando A. Ponce,<sup>2</sup> and Yuji Zhao<sup>\*,1</sup>

<sup>1</sup>School of Electrical, Computer and Energy Engineering, Arizona State University, United States of America, <sup>2</sup>Department of Physics, Arizona State University, United States of America

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**TuC1 Growth and Sensor of 2D Materials**

Room C 08:30-10:30

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*Chair: Tomoki Machida and Deep Jariwala*


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TuC1-1 (Oral)

08:30 - 08:45

**Elimination of photothermal effect on nano-mechanical resonator consisting of optically transparent h-BN sheet**

Daiki Yoshikawa, Kuniharu Takei, Takayuki Arie, and Seiji Akita\*

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

TuC1-2 (Oral)

08:45 - 09:00

**Persistent resonance frequency shift of MoS<sub>2</sub> mechanical resonator by laser irradiation**
Taichi Inoue,<sup>\*1</sup> Takahiko Endo,<sup>2</sup> Kuniharu Takei,<sup>1</sup> Takayuki Arie,<sup>1</sup> Yasumitsu Miyata,<sup>2</sup> and Seiji Akita<sup>1</sup><sup>1</sup>Osaka prefecture University, Japan, <sup>2</sup>Tokyo Metropolitan University, Japan

TuC1-3 (Oral)

09:00 - 09:15

**1-aminopyrene-modified epitaxial graphene device for pH sensors**
Yasuhide Ohno,<sup>\*</sup> Takanori Mitsuno, Yoshiaki Taniguchi, and Masao Nagase*Tokushima University, Japan*

TuC1-4 (Oral)

09:15 - 09:30

**Influence of DNA Sequences on Gas Responses Using DNA-modified Graphene Devices**
Ryo Nozaki,<sup>\*</sup> Takashi Ikuta, Kinuko Ueno, Kaori Tsukakoshi, Kazunori Ikebukuro, and Kenzo Maehashi*Institute of Engineering, Tokyo University of Agriculture and Technology, Japan*

TuC1-5 (Invited)

09:30 - 10:00

**Emergent transport phenomena in MBE-grown 2D materials and their heterostructures**
Masaki Nakano<sup>\*,1</sup> and Yoshihiro Iwasa<sup>1,2</sup><sup>1</sup>QPEC and Department of Applied Physics, the University of Tokyo, Japan, <sup>2</sup>RIKEN Center for Emergent Matter Science (CEMS), Japan

TuC1-7 (Oral)

10:00 - 10:15

**Integrated synthesis of graphene nanoribbon-based field effect transistor with high on/off ratio**
Noritada Ogura,<sup>\*,1</sup> Hiroo Suzuki,<sup>1</sup> Toshiro Kaneko,<sup>1</sup> and Toshiaki Kato<sup>1,2</sup><sup>1</sup>Department of Electronic Engineering, Tohoku University, Japan, <sup>2</sup>JST-PRESTO, Japan

TuC1-8 (Oral)

10:15 - 10:30

**Expansion of Solid-phase Interactions between Carbon and Metals: Layer Exchange for Multilayer Graphene on Insulator**
Yoshiki Nakajima,<sup>\*</sup> Hiromasa Murata, Takashi Suemasu, and Kaoru Toko*University of Tsukuba, Japan*


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**TuD1 Ga<sub>2</sub>O<sub>3</sub> Bulk and Epitaxial Growth**

Room D 08:30-10:30

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*Chair: Yoshinao Kumagai and Gregg Jessen*


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TuD1-1 (Invited)

08:30 - 09:00

**Halide Vapor Phase Epitaxy of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub>**

Yuichi Oshima

*National Institute for Materials Science, Japan*

TuD1-3 (Oral) 09:00 - 09:15

**Investigation of Fe incorporation in (010)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> films grown by plasma-assisted molecular beam epitaxy**

Akhil Mauze,\* Yuwei Zhang, Tom Mates, and James Speck  
Materials Department, University of California, Santa Barbara, United States of America

TuD1-4 (Oral) 09:15 - 09:30

**(010)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Metal Oxide Catalyzed Epitaxy (MOCATAXY) growth and Sn doping in plasma-assisted molecular beam epitaxy**

Akhil Mauze,\* Yuwei Zhang, and James Speck  
Materials Department, University of California, Santa Barbara, United States of America

TuD1-5 (Oral) 09:30 - 09:45

**High Concentration N-Doping into Ga<sub>2</sub>O<sub>3</sub> Films by Using Pulsed-Laser Deposition with NO Plasma**

Jung-Soo Lee,<sup>1</sup> Ryo Wakabayashi,<sup>1</sup> Takumi Saito,<sup>1</sup> Kohei Yoshimatsu,<sup>1</sup> Motohisa Kado,<sup>2</sup> and Akira Ohtomo\*<sup>1,3</sup>  
<sup>1</sup>Department of Chemical Science and Engineering, Tokyo Institute of Technology, Japan, <sup>2</sup>Toyota Motor Corporation, Japan, <sup>3</sup>MCES, Tokyo Institute of Technology, Japan

TuD1-6 (Oral) 09:45 - 10:00

**Impact of Substrate Miscut Angle on Surface Morphology and Electrical Properties of Homoepitaxial  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Grown by MOVPE**

Saud Bin Anooz,\* Andreas Popp, Raimund Grüneberg, Andreas Fiedler, Klaus Irmscher, Robert Schewski, Martin Albrecht, Zbigniew Galazka, and Günter Wagner  
Leibniz-Institut für Kristallzüchtung, Germany

TuD1-7 (Oral) 10:00 - 10:15

**Growth of Ga<sub>2</sub>O<sub>3</sub> Regular Column Structures by Halide Vapour Phase Epitaxy:  $\alpha$ - and  $\epsilon$ - phase Relation**

Vladimir Nikolaev,\*<sup>1,2</sup> Aleksei Pechnikov,<sup>1,2</sup> Vasilii Nikolaev,<sup>1</sup> Mihail Sheglov,<sup>2</sup> Andrey Chikiryaka,<sup>2</sup> and Sergey Stepanov<sup>1,2</sup>  
<sup>1</sup>Perfect Crystals LLC, Russia, <sup>2</sup>Ioffe Institute, Russia

TuD1-8 (Oral) 10:15 - 10:30

**Synchrotron X-Ray Topography Observation and Classification of Dislocations in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> single crystal substrates grown by EFG**

Yongzhao YAO,\*<sup>1</sup> Yoshihiro SUGAWARA,<sup>1</sup> Yukari ISHIKAWA,<sup>1</sup> Yumiko TAKAHASHI,<sup>2</sup> and Keiichi HIRANO<sup>3</sup>  
<sup>1</sup>Japan Fine Ceramics Center, Japan, <sup>2</sup>Nihon University, Japan, <sup>3</sup>High Energy Accelerator Research Organization, Japan

TuE1 hBN : Growth I

Room E 08:30-10:30

Chair: Guillaume Cassabois and Kenji Watanabe

TuE1-1 (Invited) 08:30 - 09:00

**Atmospheric Pressure Solution Growth of Monoisotopic Hexagonal Boron Nitride**

James Howard Edgar,\*<sup>1</sup> Jiahn Li,<sup>1</sup> Song Liu,<sup>1</sup> Chao Yuan,<sup>2</sup> Martin Kuball,<sup>2</sup> Christine Elias,<sup>3</sup> T.Q.P. Vuong,<sup>3</sup> Guillaume Cassabois,<sup>3</sup> and Bernard Gil<sup>3</sup>

<sup>1</sup>Kansas State University, United States of America, <sup>2</sup>University of Bristol, United Kingdom, <sup>3</sup>Université de Montpellier, France

TuE1-3 (Oral) 09:00 - 09:15  
**Impurity and isotope control of cubic and hexagonal boron nitride crystals under solution growth process**

Takashi Taniguchi  
 National Institute for Materials Science, Japan

TuE1-4 (Oral) 09:15 - 09:30  
**Wafer-scale single-crystal hexagonal boron nitride film via self-collimated grain formation**

Soo Min Kim  
 Korea Institute of Science and Technology, Republic of Korea

TuE1-5 (Invited) 09:30 - 10:00  
**High-temperature Plasma-assisted Molecular Beam Epitaxy of hBN Layers**

T. S. Cheng,<sup>1</sup> A. Summerfield,<sup>1</sup> C. J. Mellor,<sup>1</sup> G. Cassabois,<sup>2</sup> B. Gil,<sup>2</sup> L. Eaves,<sup>1</sup> C. T. Foxon,<sup>1</sup> P. H. Beton,<sup>1</sup> and S. V. Novikov<sup>\*1</sup>  
<sup>1</sup>School of Physics and Astronomy, University of Nottingham, Nottingham, United Kingdom, <sup>2</sup>Laboratoire Charles Coulomb, CNRS-Université de Montpellier, Montpellier, France

TuE1-7 (Oral) 10:00 - 10:15  
**Low temperature growth of h-BN on graphene via molecular beam epitaxy**

Martin Heilmann,<sup>\*1</sup> Alexander S. Prikhodko,<sup>2</sup> Michael Hanke,<sup>1</sup> Muhammad Y. Bashouti,<sup>3</sup> Nikolai I. Borgardt,<sup>2</sup> Henning Riechert,<sup>1</sup> and Marcelo J. Lopes<sup>1</sup>  
<sup>1</sup>Paul-Drude-Institut für Festkörperelektronik, Germany, <sup>2</sup>National Research University of Electronic Technology, Russia, <sup>3</sup>Ben-Gurion University of the Negev, Israel

TuE1-8 (Oral) 10:15 - 10:30  
**Ultra-high Temperature Growth of Layered Hexagonal Boron Nitride on Sapphire by Molecular Beam Epitaxy**

Ryan Lowry Page,<sup>\*1</sup> Yongjin Cho,<sup>2</sup> Joseph Casamento,<sup>1</sup> Sergei Rouvimov,<sup>3</sup> Huili Grace Xing,<sup>1,2,4</sup> and Debdeep Jena<sup>1,2,4</sup>  
<sup>1</sup>Department of Materials Science and Engineering, Cornell University, United States of America, <sup>2</sup>School of Electrical and Computer Engineering, Cornell University, United States of America, <sup>3</sup>Department of Electrical Engineering, University of Notre Dame, United States of America, <sup>4</sup>Kavli Institute at Cornell for Nanoscale Science, United States of America

Coffee Break	10:30 - 11:00
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TuA2 Superconductor-Semiconductor Hybrid Structures Room A 11:00-12:30

Chair: Koji Ishibashi and Hongqi Xu

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TuA2-1 (Invited) 11:00 - 11:30  
**Superconductor/Semiconductor Devices for Majorana Zero Modes**

Antonio Fornieri,<sup>1</sup> Alexander M. Whiticar,<sup>1</sup> F. Setiawan,<sup>2</sup> Elias Portoles Marin,<sup>1</sup> Asbjørn C. C. Drachmann,<sup>1</sup> Anna Keselman,<sup>3</sup> Sergei Gronin,<sup>4,5</sup> Candice Thomas,<sup>4,5</sup> Tian Wang,<sup>4,5</sup> Ray Kallaher,<sup>4,5</sup> Geoffrey C. Gardner,<sup>4,5</sup> Erez Berg,<sup>2,6</sup> Michael J. Manfra,<sup>4,5,7,8</sup> Ady Stern,<sup>6</sup> Charles M. Marcus,<sup>1</sup> and Fabrizio Nichele<sup>\*1</sup>  
<sup>1</sup>University of Copenhagen and Microsoft Quantum Lab Copenhagen, Denmark, <sup>2</sup>James Franck Institute, The University of Chicago, United States of America, <sup>3</sup>Microsoft Research, United States of America, <sup>4</sup>Department of Physics and Astronomy and Microsoft Quantum Lab Purdue, Purdue University, United States of America, <sup>5</sup>Birck Nanotechnology Center, Purdue University, United States of America, <sup>6</sup>Department of Condensed Matter Physics, Weizmann Institute of Science, Ireland, <sup>7</sup>School of Materials Engineering, Purdue University, United States of America, <sup>8</sup>School of Electrical and Computer Engineering, Purdue University, United States of America

TuA2-3 (Oral) 11:30 - 11:45

### Towards semiconductor-superconductor hybrid qubits based on InAs/Al core/shell nanowires

Patrick Zellekens,<sup>\*,1,2</sup> Russell Deacon,<sup>4,5</sup> Steffen Schlör,<sup>3</sup> Pujitha Perla,<sup>1,2</sup> Patrick Liebisch,<sup>1,2</sup> Benjamin Bennemann,<sup>1,2</sup> Mihail Lepsa,<sup>1,2</sup> Martin Weides,<sup>3</sup> Koji Ishibashi,<sup>4,5</sup> Detlev Grützmacher,<sup>1,2</sup> and Thomas Schäpers<sup>1,2</sup>

<sup>1</sup>Peter Grünberg Institute, Forschungszentrum Jülich, Germany, <sup>2</sup>JARA-FIT, Fundamentals of Future Information Technology, Germany, <sup>3</sup>Karlsruhe Institute of Technology, Germany, <sup>4</sup>RIKEN Center for Emergent Matter Science, Japan, <sup>5</sup>Advanced Device Laboratory, RIKEN, Japan

TuA2-4 (Oral) 11:45 - 12:00

### The Josephson effect in InAs quantum wells with the spin Hall effect

Taketomo Nakamura,<sup>\*</sup> Yoshiaki Hashimoto, and Shingo Katsumoto

*Institute for Solid State Physics, The University of Tokyo, Japan*

TuA2-5 (Oral) 12:00 - 12:15

### Observation of a.c. Josephson effect in gate tunable Josephson junction on topological insulator (Bi<sub>0.2</sub>Sb<sub>0.8</sub>)<sub>2</sub>Te<sub>3</sub> films

Yuusuke Takeshige,<sup>\*,1</sup> Sadashige Matsuo,<sup>1,2</sup> Russell Stewart Deacon,<sup>3,4</sup> Kento Ueda,<sup>1</sup> Yosuke Sato,<sup>1</sup> Yi-Fan Zhao,<sup>5</sup> Ling Zhang,<sup>5</sup> Cui-Zu Chang,<sup>5</sup> Koji Ishibashi,<sup>3,4</sup> and Seigo Tarucha<sup>1,4</sup>

<sup>1</sup>Department of Applied Physics, University of Tokyo, Japan, <sup>2</sup>PRESTO, Japan Science and Technology Agency (JST), Japan, <sup>3</sup>Advanced Device Laboratory, RIKEN, Japan, <sup>4</sup>Center for Emergent Matter Science, RIKEN, Japan, <sup>5</sup>Department of Physics, The Pennsylvania State University, United States of America

TuA2-6 (Oral) 12:15 - 12:30

### Superconductor connection to InAs two-dimensional electrons with accumulation edges

Makoto Onizaki,<sup>\*</sup> Yoshiaki Hashimoto, Taketomo Nakamura, and Shingo Katsumoto

*Institute for Solid State Physics, University of Tokyo, Japan*

TuB2 Quantum Dot Lasers Room B 11:00-12:30

*Chair: Johann Peter Reithmaier and Masahiro Nada*

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

### Multi-wavelength DFB laser array in InAs/GaAs quantum dot material epitaxially grown on Silicon

Siyuan Yu,<sup>\*,1</sup> Huiyun Liu,<sup>3</sup> Ying Yu,<sup>2</sup> and Yi Wang<sup>2</sup>

<sup>1</sup>University of Bristol, United Kingdom, <sup>2</sup>Sun Yat-sen University, China, <sup>3</sup>University College London, United Kingdom

TuB2-3 (Oral) 11:30 - 11:45

### InAs/InP QD and InGaAsP/InP QW comb lasers for > 1 Tb/s transmission

Marlene Zander,<sup>\*,1</sup> Wolfgang Rehbein,<sup>1</sup> Martin Möhrle,<sup>1</sup> Steffen Breuer,<sup>1</sup> Dieter Franke,<sup>1</sup> and Dieter Bimberg<sup>2,3</sup>

<sup>1</sup>Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institute, Germany, <sup>2</sup>“Bimberg Chinese-German Center for Green Photonics”, CAS at CIOMP, China, <sup>3</sup>Center of Nanophotonics, Institute of Solid State Physics, TU Berlin, Germany

TuB2-4 (Oral) 11:45 - 12:00

### 1545 μm Quantum Dot Vertical Cavity Surface Emitting Laser with low threshold

Cyril Paranthoen,<sup>\*,1</sup> Christophe Levallois,<sup>1</sup> Nicolas Chevalier,<sup>1</sup> Alain Le Corre,<sup>1</sup> Gaëlle Brevalle,<sup>1</sup> Mathieu Perrin,<sup>1</sup> Karine Tavernier,<sup>1</sup> Herve Folliot,<sup>1</sup> and Mehdi Alouini<sup>2</sup>

<sup>1</sup>Univ Rennes, INSA Rennes, CNRS, Institut FOTON, France, <sup>2</sup>Univ Rennes, Université de Rennes 1, CNRS, Institut FOTON, France



TuB2-5 (Oral) 12:00 - 12:15

### Relative intensity noise of silicon-based quantum dot lasers

Jianan Duan,<sup>\*1</sup> Heming Huang,<sup>1</sup> Daehwan Jung,<sup>2</sup> Justin C. Norman,<sup>2,3</sup> John E. Bowers,<sup>2,3,4</sup> and Frédéric Grillot<sup>1,5</sup>

<sup>1</sup>LTCI, Télécom ParisTech, France, <sup>2</sup>Institute for Energy Efficiency, University of California Santa Barbara, United States of America, <sup>3</sup>Materials Department, University of California Santa Barbara, United States of America, <sup>4</sup>Department of Electrical and Computer Engineering, University of California Santa Barbara, United States of America, <sup>5</sup>Center for High Technology Materials, University of New-Mexico, United States of America

TuB2-6 (Oral) 12:15 - 12:30

### Thermal dependence of the emission linewidth of 1.52- $\mu\text{m}$ single mode InAs/InP quantum dot lasers

Jianan Duan,<sup>\*1</sup> Bozhang Dong,<sup>1</sup> Heming Huang,<sup>1</sup> Zhenguo Lu,<sup>2</sup> Philip Poole,<sup>2</sup> and Frédéric Grillot<sup>1,3</sup>

<sup>1</sup>LTCI, Telecom ParisTech, France, <sup>2</sup>Advanced Electronics and Photonics Research Centre, NRC Canada, Canada, <sup>3</sup>Center for High Technology Materials, University of New-Mexico, United States of America

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TuC2 RF and on-Si Technology Room C 11:00-12:30

Chair: Yuichi Oshima and Huili Grace Xing

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TuC2-1 (Invited) 11:00 - 11:30

### GaN HEMT Characterization for Base Stations

Hiroshi Yamamoto,<sup>\*</sup> Ken Kikuchi, and Norihiko Ui  
Sumitomo Electric Industries, Ltd., Japan

TuC2-3 (Oral) 11:30 - 11:45

### InAlN-MIS-HEMTs with High $F_{\text{max}}$ on Si Substrates

Tomohiro Yoshida,<sup>\*1</sup> Yoshimi Yamashita,<sup>2</sup> Isao Makabe,<sup>1</sup> Issei Watanabe,<sup>2</sup> Akifumi Kasamatsu,<sup>2</sup> Ken Nakata,<sup>1</sup> and Kazutaka Inoue<sup>1</sup>  
<sup>1</sup>Sumitomo Electric Industries, Ltd., Japan, <sup>2</sup>National Institute of Information and Communications Technology, Japan

TuC2-4 (Oral) 11:45 - 12:00

### High Frequency Characteristics of AlInGaN HEMTs on Low Resistance Silicon for Millimeter-Wave Applications

Indraneel Sanyal,<sup>\*1</sup> En-Shuo Lin,<sup>1</sup> Yu-Chen Wan,<sup>1</sup> and Jen-Inn Chyi<sup>1,2</sup>

<sup>1</sup>Department of Electrical Engineering, National Central University, Taiwan, <sup>2</sup>Research Center for Applied Sciences, Academia Sinica, Taiwan

TuC2-5 (Oral) 12:00 - 12:15

### Ka band LNA and PA based on 100 nm GaN/Si HEMT process

XIAODONG TONG,<sup>\*1,2</sup> SHIYONG ZHANG,<sup>1,2</sup> PENGHUI ZHENG,<sup>1,2</sup> JIANXING XU,<sup>1,2</sup> and RONG WANG<sup>1,2</sup>

<sup>1</sup>Microsystem and Terahertz Research Center, China Academy of Engineering Physics, China, <sup>2</sup>Institute of Electronic Engineering, China Academy of Engineering Physics, China

TuC2-6 (Oral) 12:15 - 12:30

### Effects of thermal annealing on film quality of InAs-On-Insulator structures fabricated by Smart Cut method

Kei Sumita,<sup>\*</sup> Jun Takeyasu, Kimihiko Kato, Mitsuru Takenaka, and Shinichi Takagi

Department of Electrical Engineering and Information Systems, The University of Tokyo, Japan

**TuD2 Ga<sub>2</sub>O<sub>3</sub> Process and Characterization**

Room D 11:00-12:30

*Chair: Julien Barjon and James Edgar*

TuD2-1 (Oral)

11:00 - 11:15

**On the Surface Properties of High Aspect Ratio  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Fin Structures Formed by I-MacEtch**Hsien-Chih Huang,<sup>1</sup> Munho Kim,<sup>1</sup> Xun Zhan,<sup>2</sup> Kelson Chabak,<sup>3</sup> Jeongdong Kim,<sup>1</sup> Jian-min Zuo,<sup>2</sup> and Xiuling Li<sup>\*,1</sup><sup>1</sup>Electrical and Computer Engineering Department, University of Illinois, United States of America, <sup>2</sup>Materials Science and Engineering Department, University of Illinois, United States of America, <sup>3</sup>Air Force Research Laboratory, Sensors Directorate at WPAFB, United States of America

TuD2-2 (Oral)

11:15 - 11:30

**Observation of Electroreflectance Spectra of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Single Crystal**Takeyoshi Onuma,<sup>\*,1,2</sup> Kouya Tanaka,<sup>1</sup> Kohei Sasaki,<sup>3</sup> Tomohiro Yamaguchi,<sup>1</sup> Tohru Honda,<sup>1</sup> Akito Kuramata,<sup>3</sup> Shigenobu Yamakoshi,<sup>4</sup> and Masataka Higashiwaki<sup>2</sup><sup>1</sup>Department of Applied Physics, Kogakuin University, Japan, <sup>2</sup>National Institute of Information and Communications Technology, Japan, <sup>3</sup>Novel Crystal Technology Inc., Japan, <sup>4</sup>Tamura Corporation, Japan

TuD2-3 (Oral)

11:30 - 11:45

**Suppression of Parallel Conduction at the Interface in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Homoepitaxial Layer Using Semi-Insulating Intermediate Layer**Takumi Saito,<sup>\*,1</sup> Ryo Wakabayashi,<sup>1</sup> Jung-Soo Lee,<sup>1</sup> Kaisei Kamei,<sup>1</sup> Kohei Yoshimatsu,<sup>1</sup> Motohisa Kado,<sup>2</sup> and Akira Ohtomo<sup>1,3</sup><sup>1</sup>Department of Chemical Science and Engineering, Tokyo Institute of Technology, Japan, <sup>2</sup>Toyota Motor Corporation, Japan, <sup>3</sup>MCES, Tokyo Institute of Technology, Japan

TuD2-4 (Oral)

11:45 - 12:00

**Influence of Charged Dislocation on Mobility in Degenerate Homoepitaxial Si-Doped Ga<sub>2</sub>O<sub>3</sub> Films on (201)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> by Laser Molecular Beam Epitaxy**Xuanhu Chen,<sup>\*</sup> Jiandong Ye, Shulin Gu, Rong Zhang, and Youdou Zheng  
Nanjing University, China

TuD2-5 (Invited)

12:00 - 12:30

 **$\beta$ -Ga<sub>2</sub>O<sub>3</sub> MOSFETs with Nitrogen-Ion-Implanted Back-Barrier: DC Performance and Trapping Effects**Man Hoi Wong,<sup>\*,1</sup> Ken Goto,<sup>2</sup> Hisashi Murakami,<sup>2</sup> Yoshinao Kumagai,<sup>2</sup> and Masataka Higashiwaki<sup>1</sup><sup>1</sup>National Institute of Information and Communications Technology, Japan, <sup>2</sup>Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan**TuE2 hBN : Point Defects**

Room E 11:00-12:30

*Chair: Di Liang and Hideki Yagi*

TuE2-1 (Invited)

11:00 - 11:30

**Spin-dependent quantum emission from defects in hexagonal boron nitride**

Lee Bassett

*Quantum Engineering Laboratory, Department of Electrical & Systems Engineering, University of Pennsylvania, United States of America*

TuE2-3 (Oral) 11:30 - 11:45

### Hexagonal Boron Nitride Nanophotonics

Hanh Duong  
University of Technology Sydney, Australia

TuE2-4 (Oral) 11:45 - 12:00

### Improved theoretical spectroscopy of semiconductor defects, with application to 2D hexagonal boron nitride nanophotonics

Ali Sajid,<sup>1,2</sup> Jeffery R. Reimers,<sup>1,3</sup> Rika Kobayashi,<sup>3,4</sup> and Michael J. Ford<sup>\*,1,3</sup>  
<sup>1</sup>University of Technology Sydney, Australia, <sup>2</sup>GC University Faisalabad, Pakistan, <sup>3</sup>International Centre for Quantum and Molecular Structures, Shanghai University, China, <sup>4</sup>NCL, The Australian National University, Australia

TuE2-5 (Oral) 12:00 - 12:15

### Pressure characters of defects in hexagonal boron nitride flakes

baquan sun,<sup>\*</sup> Yongzhou xue, and xiuming dou  
Institute of Semiconductors, Chinese Academy of Sciences, China

TuE2-6 (Oral) 12:15 - 12:30

### Enhanced Super-Resolution Imaging of Quantum Emitters in Hexagonal Boron Nitride

Mehran Kianinia,<sup>\*,1</sup> Carlo Bradac,<sup>1</sup> Bernd Sontheimer,<sup>2</sup> Fan Wang,<sup>1</sup> Toan Trong Tran,<sup>1</sup> Minh Nguyen,<sup>1</sup> Sejeong Kim,<sup>1</sup> Zai-Quan Xu,<sup>1</sup> Dayong Jin,<sup>1</sup> Andreas W. Schell,<sup>3</sup> Charlene Lobo,<sup>1</sup> Igor Aharanovich,<sup>1</sup> and Milos Toth<sup>1</sup>  
<sup>1</sup>School of Mathematical and Physical Sciences, University of Technology Sydney, Australia, <sup>2</sup>Institut für Physik, Humboldt-Universität zu Berlin, Germany, <sup>3</sup>Department of Electronic Science and Engineering, Kyoto University, Japan

Lunch Break

12:30 - 14:00

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TuA3 **Advanced Photonic Integration** Room A 14:00-16:15

Chair: Di Liang and Hideki Yagi

TuA3-1 (Invited) 14:00 - 14:30

### Ultra-low Noise Widely-Tunable Semiconductor Lasers Fully Integrated on Silicon

Minh A. Tran,<sup>\*,1</sup> Duanni Huang,<sup>1</sup> Joel Guo,<sup>1</sup> Jon Peters,<sup>1</sup> Tin Komljenovic,<sup>1</sup> Paul A. Morton,<sup>2</sup> Jacob B. Khurgin,<sup>2</sup> Christopher C. Morton,<sup>2</sup> and John E. Bowers<sup>1</sup>  
<sup>1</sup>Dept. of Electrical and Computer Engineering, University of California Santa Barbara, United States of America, <sup>2</sup>Morton Photonics Inc., United States of America

TuA3-3 (Oral) 14:30 - 14:45

### Investigation of optical loss and bandwidth of InP-organic hybrid optical modulator

Naoki Sekine,<sup>\*</sup> Shinichi Takagi, and Mitsuru Takenaka  
The University of Tokyo, Japan

TuA3-4 (Oral) 14:45 - 15:00

### Equivalent oxide thickness scaling for efficient III-V/Si hybrid MOS optical phase shifter

Qiang Li,<sup>\*,1</sup> Jae-Hoon Han,<sup>1,2</sup> Tsung-En Lee,<sup>1</sup> Shinichi Takagi,<sup>1</sup> and Mitsuru Takenaka<sup>1</sup>  
<sup>1</sup>University of Tokyo, Japan, <sup>2</sup>Korean Institute of Science and Technology, Republic of Korea

TuA3-5 (Oral) 15:00 - 15:15

### Numerical Analysis of III-V/Si Hybrid MOS Microdisk Modulator

Shuhei Ohno,<sup>\*</sup> Shinichi Takagi, and Mitsuru Takenaka  
Department of Electrical Engineering and Information Systems, The University of Tokyo, Japan

TuA3-6 (Oral)

15:15 - 15:30

**Taper Length Dependence of Double-Taper-Type Coupler for GaInAsP/SOI Hybrid Integrated Platform**Takayuki Miyazaki,<sup>\*1</sup> Fumihito Tachibana,<sup>1</sup> Takehiko Kikuchi,<sup>1,3</sup> Takuo Hiratani,<sup>3</sup> Hideki Yagi,<sup>3</sup> Moataz Eissa,<sup>1</sup> Takuya Mitarai,<sup>1</sup> Tomohiro Amemiya,<sup>1,2</sup> Nobuhiko Nishiyama,<sup>1,2</sup> and Shigehisa Arai<sup>1,2</sup><sup>1</sup>Dept. of Electrical and Electronic Engineering, Tokyo Institute of Technology, Japan, <sup>2</sup>Institute of Innovative Research (IIR), Tokyo Institute of Technology, Japan, <sup>3</sup>Transmission Devices Laboratory, Sumitomo Electric Industries, Ltd, Japan

TuA3-7 (Invited)

15:30 - 16:00

**InP membrane lasers and active-passive integration**Yuqing Jiao,<sup>\*</sup> Vadim Pogoretskii, Jorn van Engelen, Niall Kelly, and Jos van der Tol

Institute for Photonic Integration (IPI), Eindhoven University of Technology, Netherlands

TuA3-9 (Oral) - Late News -

16:00 - 16:15

**Highly efficient and fabrication-tolerant InP polarization rotator-splitter**Shahram Keyvaninia,<sup>1</sup> Hendrik Boerma,<sup>1</sup> Markus Wössner,<sup>2</sup> Felix Ganzer,<sup>1</sup> Patrick Runge,<sup>\*1</sup> and Martijn Schell<sup>1</sup><sup>1</sup>Fraunhofer Heinrich-Hertz-Institut, Germany, <sup>2</sup>Robert Bosch GmbH, Germany

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**TuB3 Epitaxial Growth on Group IV Substrates**

Room B 14:00-16:00

*Chair:* Yosuke Shimura and D. Scott Katzer

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TuB3-1 (Invited)

14:00 - 14:30

**Epitaxial Growth of (Si)GeSn Source/Drain Layers for Advanced Ge Gate All Around Devices**Roger Loo,<sup>\*1</sup> Anurag Vohra,<sup>1,2</sup> Clement Porret,<sup>1</sup> Andriy Hikavyi,<sup>1</sup> Erik Rosseel,<sup>1</sup> Marc Schaeckers,<sup>1</sup> Elena Capogreco,<sup>1</sup> Yosuke Shimura,<sup>1,2,3</sup> David Kohen,<sup>4</sup> John Tölle,<sup>4</sup> and Wilfried Vandervorst<sup>1,2</sup><sup>1</sup>Imec, Belgium, <sup>2</sup>KU Leuven, Department of Physics, Belgium, <sup>3</sup>Graduate School of Integrated Science and Technology, Shizuoka University, Japan, <sup>4</sup>ASM, United States of America

TuB3-3 (Invited)

14:30 - 15:00

**Formation and Characterization of Si Quantum Dots with Ge Core for Electroluminescent Devices**Katsunori Makihara,<sup>\*</sup> Mitsuhsa Ikeda, Akio Ohta, and Seiichi Miyazaki

Nagoya University, Japan

TuB3-5 (Oral)

15:00 - 15:15

**Structural and optical properties of GaAs film grown on a glass substrate using a large-grained Ge seed layer for solar cell applications**Takeshi Nishida,<sup>\*</sup> Kenta Moto, Takashi Suemasu, and Kaoru Toko

Institute of Applied Physics, University of Tsukuba, Japan

TuB3-6 (Oral)

15:15 - 15:30

**Crystalline and Electrical Properties of Ge<sub>1-x</sub>Sn<sub>x</sub>/Ge<sub>1-x-y</sub>Si<sub>x</sub>Sn<sub>y</sub> Quantum Well Structures**Galih Ramadana Suwito,<sup>\*1</sup> Masahiro Fukuda,<sup>2</sup> Shigehisa Shibayama,<sup>2</sup> Mitsuo Sakashita,<sup>2</sup> Osamu Nakatsuka,<sup>2,3</sup> and Shigeaki Zaima<sup>4</sup><sup>1</sup>Department of Physical Science and Engineering, School of Engineering, Nagoya University, Japan, <sup>2</sup>Department of Materials Physics, Graduate School of Engineering, Nagoya University, Japan, <sup>3</sup>Institute of Materials and Systems for Sustainability, Nagoya University, Japan, <sup>4</sup>Institute of Innovation for Future Society, Nagoya University, Japan

TuB3-7 (Oral) 15:30 - 15:45

**Dislocation free InP/InGaAs/InP islands on Si by micro-channel selective area MOVPE**

Yufeng Fu,<sup>\*</sup><sup>1</sup> Nobuyuki Otake,<sup>1</sup> and Masakazu Sugiyama<sup>2</sup>

<sup>1</sup>DENSO CORPORATION, Japan, <sup>2</sup>The University of Tokyo, Japan

TuB3-8 (Oral) 15:45 - 16:00

**Epitaxial growth of BaSi<sub>2</sub> light absorbers by molecular beam epitaxy and significant photoresponsivity enhancement by increased growth temperatures**

Yudai Yamashita,<sup>\*</sup> Kaoru Toko, and Takashi Suemasu

University of Tsukuba, Japan

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TuC3 Characterization of Nanostructures Room C 14:00-16:00

Chair: Shinjiro Hara and Ryo Tamaki

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

**Characterization of Nanowire Devices Using Nano-Focused X-Ray Beams**

Jesper Wallentin

Synchrotron Radiation Research and NanoLund, Lund University, Sweden

TuC3-3 (Oral) 14:30 - 14:45

**Observation of dominant non-local superconducting proximity effect due to electron-electron interaction in a ballistic double nanowire**

Kento Ueda,<sup>\*</sup><sup>1</sup> Sadashige Matsuo,<sup>1</sup> Hiroshi Kamata,<sup>2</sup> Yosuke Sato,<sup>1</sup> Yusuke Takeshige,<sup>1</sup> K. Li,<sup>3</sup> Soren Jeppessen,<sup>4</sup> Lars Samuelson,<sup>4</sup> Hongqi Xu,<sup>3,4</sup> and Seigo Tarucha<sup>1,2</sup>

<sup>1</sup>Department of Applied physics, University of Tokyo, Japan, <sup>2</sup>RIKEN, Japan, <sup>3</sup>Peking University, China, <sup>4</sup>Lund University, Sweden

TuC3-4 (Oral) 14:45 - 15:00

**2DEG formation in doped polytype InP nanowires: an optical study**

Irene Geijselaers,<sup>\*</sup><sup>1</sup> Sebastian Lehmann,<sup>1</sup> Kimberly Dick-Thelander,<sup>1,2</sup> and Mats-Erik Pistol<sup>1</sup>

<sup>1</sup>Department of Solid State Physics and NanoLund, Lund University, Sweden, <sup>2</sup>Centre for Analysis and Synthesis, Lund University, Sweden

TuC3-5 (Oral) 15:00 - 15:15

**Irradiation Effects on Induced Electron Conductivity in an un-doped GaAs/AlGaAs Quantum Well Hall Bar**

Takafumi Fujita,<sup>\*</sup><sup>1</sup> Ryota Hayashi,<sup>1</sup> Makoto Kohda,<sup>2</sup> Julian Ritzmann,<sup>3</sup> Arne Ludwid,<sup>3</sup> Junsaku Nitta,<sup>2</sup> Andreas D. Wieck,<sup>3</sup> and Akira Oiwa<sup>1</sup>

<sup>1</sup>The Institute of Scientific and Industrial Research, Osaka University, Japan, <sup>2</sup>Department of Materials Science, Tohoku University, Japan, <sup>3</sup>Lehrstuhl für Angewandte Festkörperphysik, Ruhr-Universität Bochum, Germany

TuC3-6 (Oral) 15:15 - 15:30

**Lateral electronic coupling among self-assembled semiconductor quantum dots promoted by adjoining tunnel-coupled quantum-well potentials**

Junichi Takayama,<sup>1</sup> Satoshi Hiura,<sup>1</sup> Kazuki Takeishi,<sup>1</sup> Takayuki Kiba,<sup>2</sup> and Akihiro Murayama<sup>\*</sup><sup>1</sup>

<sup>1</sup>GSIST, Hokkaido University, Japan, <sup>2</sup>Kitami Institute of Technology, Japan

TuC3-7 (Oral) 15:30 - 15:45

### Spectral Hole Burning Spectroscopy on Quantum Dashes and Quantum Dots for Dual-Frequency Laser Engineering

Gaëlle Brévalle,\* Mathieu Perrin, Cyril Paranthoën, Yoan Léger, Christophe Levallois, Nicolas Chevalier, Hervé Folliot, and Mehdi Alouini

*Institut FOTON, France*

TuC3-8 (Oral) 15:45 - 16:00

### Extension of excitation energy to generate terahertz wave to smaller than GaAs bandgap energy due to growth of InAs quantum dots and nitrogen doped layer

Osamu Kojima\* and Takashi Kita

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

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TuD3 Ga<sub>2</sub>O<sub>3</sub> Electrical Devices Room D 14:00-16:00

*Chair: Masataka Higashiwaki and Martin Kuball*

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TuD3-1 (Invited) 14:00 - 14:30

### Pulsed RF Power Measurements of Laterally Scaled Ga<sub>2</sub>O<sub>3</sub> FETs

Gregg Jessen,\*<sup>1</sup> Kelson Chabak,<sup>1</sup> Andrew Green,<sup>1</sup> Neil Moser,<sup>1</sup> Kevin Leedy,<sup>1</sup> Dennis Walker, Jr.,<sup>1</sup> Antonio Crespo,<sup>1</sup> Miles Lindquist,<sup>2</sup> Peter Zwyth,<sup>3</sup> and Ryan Gilbert<sup>4</sup>

<sup>1</sup>*Sensors Directorate, Air Force Research Laboratory, United States of America, <sup>2</sup>KBRwyle, United States of America, <sup>3</sup>SelectTech Services Corp., United States of America, <sup>4</sup>The Design Knowledge Company, United States of America*

TuD3-3 (Oral) 14:30 - 14:45

### Dynamic R<sub>ON</sub> in β-Ga<sub>2</sub>O<sub>3</sub> MOSFET Power Devices

Taylor Moule,\*<sup>1</sup> Manikant Singh,<sup>1</sup> James Pomeroy,<sup>1</sup> Serge Karboyan,<sup>1</sup> Michael J. Uren,<sup>1</sup> Man Hoi Wong,<sup>2</sup> Kohei Sasaki,<sup>3</sup> Akito Kuramata,<sup>3</sup> Shigenobu Yamakoshi,<sup>3</sup> Masataka Higashiwaki,<sup>2</sup> and Martin Kuball<sup>1</sup>

<sup>1</sup>*Centre for Device Thermography and Reliability, University of Bristol, United Kingdom, <sup>2</sup>National Institute of Information and Communications Technology, Japan, <sup>3</sup>Tamura Corporation, Japan*

TuD3-4 (Oral) 14:45 - 15:00

### Nitrogen-Doped Channel β-Ga<sub>2</sub>O<sub>3</sub> MOSFET with Normally-Off Operation

Takafumi Kamimura,\* Yoshiaki Nakata, Man Hoi Wong, Phuc Hong Than, and Masataka Higashiwaki

*National Institute of Information and Communications Technology, Japan*

TuD3-5 (Invited) 15:00 - 15:30

### Ga<sub>2</sub>O<sub>3</sub> Power Schottky Barrier Diodes and Transistors: Design Principles and Experimental Validation

Huili Grace Xing,\* Wenshen Li, Zongyang Hu, Nicholas Tanen, Riena Jinno, Kazuki Nomoto, and Debdeep Jena

*Cornell University, United States of America*

TuD3-7 (Oral) 15:30 - 15:45

### Vertical Schottky barrier diodes based on a bulk β-Ga<sub>2</sub>O<sub>3</sub> substrate with high switching performance

Xing Lu,\*<sup>1,2</sup> Xu Zhang,<sup>2</sup> Huaxing Jiang,<sup>2</sup> Xinbo Zou,<sup>3</sup> and Kei May Lau<sup>2</sup>

<sup>1</sup>*School of Electronics and Information Technology, Sun Yat-sen University, China, <sup>2</sup>ECE Department, Hong Kong University of Science and Technology, Hong Kong, <sup>3</sup>School of Information Science and Technology, ShanghaiTech University, China*

TuD3-8 (Oral)

15:45 - 16:00

**Vertical Ga<sub>2</sub>O<sub>3</sub> Schottky Barrier Diodes with Guard Ring Formed by Nitrogen-Ion Implantation**Chia-Hung Lin,<sup>\*</sup>1 Yohei Yuda,<sup>2</sup> Man Hoi Wong,<sup>1</sup> Mayuko Sato,<sup>3</sup> Nao Takekawa,<sup>3</sup> Keita Konishi,<sup>3</sup> Tatsuro Watahiki,<sup>2</sup> Mikio Yamamuka,<sup>2</sup> Hisashi Murakami,<sup>3</sup> Yoshinao Kumagai,<sup>3</sup> and Masataka Higashiwaki<sup>1</sup><sup>1</sup>National Institute of Information and Communications Technology, Japan, <sup>2</sup>Mitsubishi Electric Corporation, Japan, <sup>3</sup>Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan**TuE3 hBN : Spectroscopy and Growth II**

Room E 14:00-16:00

Chair: Takashi Taniguchi and Sergei Novikov

TuE3-1 (Invited)

14:00 - 14:30

**Luminescence efficiency of hexagonal boron nitride**Julien Barjon,<sup>\*</sup>1 Alexandre Plaud,<sup>1,2</sup> Lorenzo Sponza,<sup>2</sup> Léonard Schué,<sup>1,2</sup> Ingrid Stenger,<sup>1</sup> Frédéric Fossard,<sup>2</sup> Kenji Watanabe,<sup>3</sup> Takashi Taniguchi,<sup>3</sup> François Ducastelle,<sup>2</sup> and Annick Loiseau<sup>2</sup><sup>1</sup>Groupe d'Etude de la Matière Condensée, Université de Versailles St Quentin en Yvelines, CNRS, Université Paris Saclay, Versailles, France, <sup>2</sup>Laboratoire d'Etude des Microstructures, ONERA, CNRS, Université Paris Saclay, Chatillon, France, <sup>3</sup>National Institute for Material Sciences, Tsukuba, Japan

TuE3-3 (Oral)

14:30 - 14:45

**Quantification of external quantum efficiency for near-band-edge emission of h-BN bulk crystals under photo-excitation**Kazunobu Kojima,<sup>\*</sup>1 Kenji Watanabe,<sup>2</sup> Takashi Taniguchi,<sup>2</sup> and Shigefusa F. Chichibu<sup>1</sup><sup>1</sup>Institute of Multidisciplinary Research for Advanced Materials (IMRAM), Tohoku University, Japan, <sup>2</sup>National Institute for Materials Science (NIMS), Japan

TuE3-4 (Oral)

14:45 - 15:00

**Ultralow Loss Polaritons in Isotopically Pure Hexagonal Boron Nitride**Alexander J. Giles,<sup>\*</sup>1 Swathi Iyer,<sup>1</sup> Sai S. Sunku,<sup>2</sup> Thomas G. Folland,<sup>3</sup> Song Liu,<sup>4</sup> Chase T. Ellis,<sup>1</sup> Joseph G. Tischler,<sup>1</sup> Jeff C. Owrutsky,<sup>1</sup> James H. Edgar,<sup>4</sup> D. N. Basov,<sup>2</sup> and Joshua D. Caldwell<sup>3</sup><sup>1</sup>US Naval Research Laboratory, United States of America, <sup>2</sup>Department of Physics, Columbia University, United States of America, <sup>3</sup>Mechanical Engineering Department, Vanderbilt University, United States of America, <sup>4</sup>Department of Chemical Engineering, Kansas State University, United States of America

TuE3-5 (Invited)

15:00 - 15:30

**Observation of impurity incorporated domain in h-BN single crystals**Kenji Watanabe<sup>\*</sup> and Takashi Taniguchi

National Institute for Materials Science, Japan

TuE3-7 (Oral)

15:30 - 15:45

**Kinetic limitations of h-BN MOVPE growth**Krzysztof Pakula,<sup>\*</sup> Aleksandra Dabrowska, Mateusz Tokarczyk, Johannes Binder, Jolanta Borysiuk, Rafal Bozek, Grzegorz Kowalski, Andrzej Wyszomolek, and Roman Stepniowski

Faculty of Physics, University of Warsaw, Poland

TuE3-8 (Oral)

15:45 - 16:00

**Large area hexagonal boron nitride coatings for SERS applications with silver nanoparticles**Dipankar Chugh,<sup>\*</sup>1 Jennifer Wong-Leung,<sup>1</sup> Li Li,<sup>2</sup> Mykhaylo Lysevych,<sup>2</sup> Hark Hoe Tan,<sup>1</sup> and Chennupati Jagadish<sup>1,2</sup><sup>1</sup>Department of Electronic Materials Engineering, Australian National University, Australia, <sup>2</sup>Australian National Fabrication Facility, Australian National University, Australia

## TuP Poster Session II

Reception Hall 16:00-18:00

TuP-A-1 (Poster)

**High-Temperature Annealing of Sputter-Deposited AlN on Diamond Substrate**Tatsuya Shirato,\*<sup>1</sup> Yusuke Hayashi,<sup>2</sup> Kenjiro Uesugi,<sup>3</sup> Kanako Shojiki,<sup>2</sup> and Hideto Miyake<sup>1,2</sup><sup>1</sup>Mie Univ., Grad. School of Eng., Japan, <sup>2</sup>Mie Univ., Grad. School of RIS, Japan, <sup>3</sup>Mie Univ., SPORR, Japan

TuP-A-2 (Poster)

**Enabling Low Temperature Aluminum Nitride ALD by Use of a Novel Hydrazine Source**Daniel Alvarez,\*<sup>1</sup> Jeffrey J. Spiegelman,<sup>1</sup> Keisuke Andachi,<sup>2</sup> Aswin Kondusamy,<sup>3</sup> and Jiyoung Kim<sup>3</sup><sup>1</sup>RASIRC, United States of America, <sup>2</sup>Taiyo Nippon Sanso Corporation, Japan, <sup>3</sup>University of Texas, Dallas, United States of America

TuP-A-3 (Poster)

**Growth and characterization of InN epi-films on nitrided Si<sub>3</sub>N<sub>4</sub> layer by RF-MOMBE**Sheng Chen,\*<sup>1</sup> Wei-Chun Chen,<sup>2</sup> and Chin-Pao Cheng<sup>1</sup><sup>1</sup>Department of Mechatronic Engineering, National Taiwan Normal University, Taiwan, <sup>2</sup>Instrument Technology Research Center, National Applied Research Laboratories, Taiwan

TuP-A-4 (Poster)

**Effects of growth temperature of a capping layer on excited spin properties of In<sub>0.5</sub>Ga<sub>0.5</sub>As quantum dots**Yuto Nakamura,\*<sup>1</sup> Satoshi Hiura,<sup>2</sup> Shino Sato,<sup>1</sup> Junichi Takayama,<sup>2</sup> and Akihiro Murayama<sup>2</sup><sup>1</sup>Faculty of Engineering, Hokkaido University, Japan, <sup>2</sup>GSIST, Hokkaido University, Japan

TuP-A-5 (Poster)

**High-quality epitaxial growth of half-metallic Co<sub>2</sub>FeSi films on a Co-terminated GaN(0001) surface**Shinya Yamada,\*<sup>1,2</sup> Yuki Goto,<sup>1</sup> Jun Tatebayashi,<sup>3</sup> Shuhei Ichikawa,<sup>3</sup> Yasufumi Fujiwara,<sup>3</sup> and Kohei Hamaya<sup>1,2</sup><sup>1</sup>Department of Systems Innovation, Graduate School of Engineering Science, Osaka University, Japan, <sup>2</sup>Center for Spintronics Research Network, Graduate School of Engineering Science, Osaka University, Japan, <sup>3</sup>Department of Materials and Manufacturing Science, Graduate School of Engineering, Osaka University, Japan

TuP-A-6 (Poster)

**Effects of post-growth annealing in vacuum and Zn vapor on the electrical and optical properties of magnetron sputtered GaMgZnO films**Che-Sin Lee,<sup>1</sup> Vijay Balaso Patil,\*<sup>1</sup> Sang-Hun Jeong,<sup>2</sup> and Byung-Teak Lee<sup>1</sup><sup>1</sup>Chonnam National University, Republic of Korea, <sup>2</sup>Korea Basic Science Institute, Republic of Korea

TuP-A-7 (Poster)

**Effects of Bi Irradiation for the MBE Growth of GaSb on Ge(111) Vicinal Substrates**

Yasutomo Kajikawa,\* Makoto Nishigaichi, Masahiro Inoue, and Mitsunori Kayano

Interdisciplinary Faculty of Science and Engineering, Shimane University, Japan

TuP-A-8 (Poster)

**Growth Temperature and Sb Flow Dependence of Surface Morphology of Metamorphic InAs(Sb) on GaAs substrate Grown by MOVPE**

Yuki Imamura,\* Miki Shoiriki, Koji Maeda, and Masakazu Arai

University of Miyazaki, Japan



TuP-A-9 (Poster)

### **The atomic configuration dependence of the electronic, thermodynamic, and structural properties of $\text{InAs}_x\text{Sb}_{1-x}$ alloys**

Alexandros Kyrtosos,<sup>\*1</sup> Masahiko Matsubara,<sup>1</sup> and Enrico Bellotti<sup>1,2</sup>

<sup>1</sup>Department of Electrical and Computer Engineering, Boston University, United States of America, <sup>2</sup>Division of Materials Science and Engineering, Boston University, United States of America

TuP-A-10 (Poster)

### **Using optical emission spectroscopy (OES) to monitor In-line very high-frequency plasma enhanced chemical vapor deposition (VHF-PECVD) technique optoelectrical properties**

Jia-Yan Lin,<sup>\*1</sup> Cheng-Yuan Hung,<sup>2</sup> Wei-Chen Tien,<sup>2</sup> Hung-Wei Wu,<sup>3</sup> Yung-Der Juang,<sup>4</sup> Jia-Hao Lin,<sup>5</sup> and Shih-Kun Liu<sup>6</sup>

<sup>1</sup>Department of Greenery, National University of Tainan, Tainan, Taiwan, <sup>2</sup>Medical Devices and Opto-Electronics Equipment Department, Metal Industries Research & Development Centre, Kaohsiung, Taiwan, <sup>3</sup>Department of computer and communication, Kun Shan University, Tainan, Taiwan, <sup>4</sup>Department of Materials Science, National University of Tainan, Tainan, Taiwan, <sup>5</sup>Department of Electronic Engineering, National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan, <sup>6</sup>Institute of Photonics and Communications, National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan

TuP-A-11 (Poster)

### **Effects of chamber pressure on the hydrogenated amorphous silicon thin film by microwave annealing**

Jia-Hao Lin,<sup>\*1</sup> Hung-Wei Wu,<sup>2</sup> Wei-Chen Tien,<sup>3</sup> Cheng-Yuan Hung,<sup>3</sup> and Shih-Kun Liu<sup>4</sup>

<sup>1</sup>Department of Electronic Engineering, National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan, <sup>2</sup>Department of computer and communication, Kun Shan University, Tainan, Taiwan, <sup>3</sup>Medical Devices and Opto-Electronics Equipment Department, Metal Industries Research & Development Centre, Kaohsiung, Taiwan, <sup>4</sup>Institute of Photonics and Communications, National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan

TuP-A-12 (Poster) - Late News -

### **Characterization of Si(111) surface nitridation on the properties of $\text{Si}_3\text{N}_4$ films grown by RF- $\text{N}_2$ plasma exposure**

Wei-Chun Chen,<sup>1</sup> Sheng Chen,<sup>\*2</sup> James Su,<sup>1</sup> Hung-Pin Chen,<sup>1</sup> Yu-Wei Lin,<sup>1</sup> and Chin-Pao Cheng<sup>2</sup>

<sup>1</sup>Taiwan Instrument Research Institute, National Applied Research Laboratories, Taiwan, <sup>2</sup>Department of Mechatronic Engineering, National Taiwan Normal University, Taiwan

TuP-A-13 (Poster) - Late News -

### **Demonstration of Germanium Doping to GaP-based Dilute Nitrides**

Keisuke Yamane,<sup>\*</sup> Shunsuke Tanaka, and Akihiro Wakahara

Department of Electrical and Electronic Information Engineering, Toyohashi University of Technology, Japan

TuP-C-1 (Poster)

### **Development of High-power High-thermal Conductivity GaN High Electron Mobility Transistors**

Dai-Jie Lin,<sup>\*1</sup> Yu-Hsuan Lee,<sup>1</sup> and Jian-Jang Huang<sup>1,2</sup>

<sup>1</sup>Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan, <sup>2</sup>Department of Electrical Engineering, National Taiwan University, Taiwan

TuP-C-2 (Poster)

### **Analysis of threshold voltage in GaN MOSFETs on homoepitaxial p-type GaN layers**

Daigo Kikuta,<sup>\*1</sup> Kenji Ito,<sup>1</sup> Tetsuo Narita,<sup>1</sup> and Tetsu Kachi<sup>2</sup>

<sup>1</sup>Toyota Central R&D Labs, Japan, <sup>2</sup>Nagoya University, Japan

TuP-C-3 (Poster)

### Improved on-state breakdown characteristics in AlGa<sub>N</sub>/Ga<sub>N</sub> MOS-HEMTs with a gate field plate

Takashi Nishitani,\* Ryota Yamaguchi, Joel Tacla Asubar, Hirokuni Tokuda, and Masaaki Kuzuhara  
*University of Fukui, Japan*

TuP-C-4 (Poster)

### Relationship between High Frequency Power Characteristics and Current Collapse of AlGa<sub>N</sub>/Ga<sub>N</sub> HEMTs

Takashi Ozawa,\*<sup>1</sup> Joel Tacla Asubar,<sup>1</sup> Hirokuni Tokuda,<sup>1</sup> Yohei Yagishita,<sup>2</sup> Yoichi Kawano,<sup>2</sup> and Masaaki Kuzuhara<sup>1</sup>  
*<sup>1</sup>University of Fukui, Japan, <sup>2</sup>Fujitsu Laboratories Ltd, Japan*

TuP-C-5 (Poster)

### High Performance Normally-Off AlGa<sub>N</sub>/Ga<sub>N</sub> MIS-HEMT Using Charge Storage Technique

Ping-Cheng Han,<sup>1</sup> Chih-Yi Yang,\*<sup>1</sup> Ming-Wen Lee,<sup>1</sup> Jui-Sheng Wu,<sup>2</sup> Chia-Hsun Wu,<sup>2</sup> and Edward Yi Chang<sup>1,2</sup>  
*<sup>1</sup>International college of Semiconductor Technology, National Chiao Tung University, Taiwan, <sup>2</sup>Department of Materials Science & Engineering, National Chiao Tung University, Taiwan*

TuP-C-6 (Poster)

### Double-Channel High-Electron-Mobility Transistor for Linearity Enhancement in RF/Microwave Applications

Wenjie Song,\*<sup>1</sup> Zheyang Zheng,<sup>1</sup> Jiacheng Lei,<sup>1</sup> Jin Wei,<sup>1</sup> Li Yuan,<sup>2</sup> and Kevin J. Chen<sup>1</sup>  
*<sup>1</sup>Hong Kong University of Science and Technology, Hong Kong, <sup>2</sup>Genettice Co., Ltd., China*

TuP-C-7 (Poster)

### Low 0.3 V Turn-on of Gated-Anode Ga<sub>N</sub>-Cap/AlGa<sub>N</sub>/Ga<sub>N</sub> HEMT Diode with Selective Dry-Etching Technique

Jumpei Sumino,<sup>1</sup> Momoe Shojima,\*<sup>1</sup> Ryohei Yamaguchi,<sup>1</sup> Yamato Osada,<sup>2</sup> Kamimura Ryuichiro,<sup>2</sup> and Akio Wakejima<sup>1</sup>  
*<sup>1</sup>Nagoya Institute of Technology, Japan, <sup>2</sup>ULVAC Inc., Japan*

TuP-C-8 (Poster) - Late News -

### Superpower Transistor Consisting of Only LED and Silicon Solar Cell -Its Application to Electric Vehicle Drive Control-

Kensho Okamoto,\*<sup>1</sup> Itsuo Nakano,<sup>2</sup> Masami Hosokawa,<sup>3</sup> and Fumio Matsushita<sup>3</sup>  
*<sup>1</sup>Kagawa University, Japan, <sup>2</sup>Okayama University, Japan, <sup>3</sup>Optoelectronic semiconductor Application Laboratory, Japan*

TuP-D-1 (Poster)

### Study on epitaxial lift-off of stacked GaAs solar cells for low-cost photovoltaic application

Yasushi Shoji\* and Takeyoshi Sugaya  
*Research Center for Photovoltaics, AIST, Japan*

TuP-D-2 (Poster)

### Theoretical study of InGa<sub>N</sub>/Ga<sub>N</sub> based p-i-n solar cells

Gaurav Siddharth, Vivek Garg, Brajendra Singh Sengar, Mangal Das,\* Ruchi Singh, and Shaibal Mukherjee  
*Department of Electrical Engineering, Indian Institute of Technology Indore, India*

TuP-D-3 (Poster)

### Enhancement of Infrared Photo-responses of the Schottky Gate Region of an n-AlGaAs/GaAs Heterojunction FET by a Second Light Illumination

Takuya Kawazu,\* Takeshi Noda, and Yoshiki Sakuma  
*National Institute for Materials Science, Japan*

TuP-D-5 (Poster)

**High-speed uni-travelling carrier photodiode at 1064nm wavelength**

Zhiyang Xie, Yaojiang Chen, and Baile Chen\*  
ShanghaiTech University, China

TuP-D-6 (Poster)

**Thermoelectrically Cooled nBn T2SLs InAs/InAsSb/B-AlAsSb MWIR Detector**

Piotr Martyniuk,\*<sup>1</sup> Krystian Michalczewski,<sup>1</sup> Tsung Yin Tsai,<sup>2</sup> Chao-Hsin Wu,<sup>2</sup> and Yuh-Renn Wu<sup>2</sup>  
<sup>1</sup>Applied Physics Institute, Military University of Technology, Poland, <sup>2</sup>Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan

TuP-D-8 (Poster)

**First-principles study of defect properties in radiation-detectable TlBr**

Masato Ishikawa\* and Takashi Nakayama  
Department of Physics, Chiba University, Japan

TuP-D-9 (Poster)

**Novel Composite Substrates for Thin Film AlGaInP-based High Power LEDs**

Ray Hua Horng,\*<sup>1,2,3</sup> ShreeKant Sinha,<sup>1</sup> Hsiang-An Feng,<sup>4</sup> Cheng-Yu Chung,<sup>4</sup> and Chia-Wei Tu<sup>4</sup>  
<sup>1</sup>Institute of Electronics, National Chiao Tung University, Taiwan, <sup>2</sup>Center for Emergent Functional Matter Science, National Chiao Tung University, Taiwan, <sup>3</sup>Department of Photonics, National Chiao Tung University, Taiwan, <sup>4</sup>Ingentec Corporation, Taiwan

TuP-D-10 (Poster)

**Detection of Nonradiative Recombination Centers in GaPN (N:0.105%) by Below-Gap Excitation Light without Temperature Effect**

Sanjida Ferdous,\* Chika Negishi, Norihiko Kamata, Shuhei Yagi, and Hiroyuki Yaguchi  
Graduate School of Science and Engineering, Saitama University, Japan

TuP-D-11 (Poster)

**Detection of Nonradiative Recombination Levels in UV-LEDs by Irradiating Below-Gap Excitation Light**

Norihiko Kamata,\*<sup>1</sup> Ken Matsuda,<sup>1</sup> Sota Shirai,<sup>1</sup> Zentaro Honda,<sup>1</sup> and Hideki Hirayama<sup>2</sup>  
<sup>1</sup>Department of Functional Materials Science, Saitama University, Japan, <sup>2</sup>Quantum Optodevice Lab., RIKEN, Japan

TuP-D-12 (Poster)

**Simulation Study of Front-illuminated GaN Avalanche Photodiodes with Hole-initiated Multiplication**

Yangqian Wang,<sup>1</sup> Yuliang Zhang,<sup>1</sup> Yang A. Yang,<sup>1</sup> Xing Lu,<sup>3</sup> and Xinbo Zou\*<sup>1,2</sup>  
<sup>1</sup>School of Information Science and Technology, ShanghaiTech University, Shanghai, China, <sup>2</sup>GaNology Semiconductor Co., Ltd, China, <sup>3</sup>School of Electronics and Information Technology, Sun Yat-sen University, Guangzhou, China

TuP-D-13 (Poster)

**High-reflectivity and Smaller Period Deep-UV GaN-based Distributed Bragg Reflectors**

Galih Ramadana Suwito\*<sup>1</sup> and Bernard Gelloz<sup>2</sup>  
<sup>1</sup>Department of Physical Science and Engineering, School of Engineering, Nagoya University, Japan, <sup>2</sup>Department of Applied Physics, Graduate School of Engineering, Nagoya University, Japan

TuP-D-14 (Poster) - Late News -

**Growth of InGaAs solar cells on InP(001) miscut substrates using solid-source molecular beam epitaxy**

Yuki Ishitsuka,\*<sup>1,2</sup> Ryuji Oshima,<sup>1</sup> Takeyoshi Sugaya,<sup>1</sup> and Yoshinobu Okano<sup>2</sup>  
<sup>1</sup>National Institute of Advanced Industrial Science and Technology, Japan, <sup>2</sup>Tokyo City University, Japan

TuP-E-1 (Poster)

**Heat transport in GaAs membranes studied by using a GaAs MEMS thermal sensor**Ya Zhang,<sup>\*</sup>1 Boqi Qiu,<sup>2</sup> Shaoqing Du,<sup>2</sup> Naomi Nagai,<sup>2</sup> and Kazuhiko Hirakawa<sup>2,3</sup><sup>1</sup>Institute of Engineering, Tokyo University of Agriculture and Technology, Japan, <sup>2</sup>Institute of Industrial Science, University of Tokyo, Japan, <sup>3</sup>Institute for Nano Quantum Information Electronics, University of Tokyo, Japan

TuP-E-2 (Poster)

**Suppressing beam deflections by introducing phosphorous in the GaAs-based terahertz MEMS bolometers**Boqi Qiu,<sup>\*</sup>1 Ya Zhang,<sup>2</sup> Kouichi Akahane,<sup>3</sup> Naomi Nagai,<sup>1</sup> and Kazuhiko Hirakawa<sup>1,4</sup><sup>1</sup>Institute of Industrial Science, University of Tokyo, Japan, <sup>2</sup>Tokyo University of Agriculture and Technology, Japan, <sup>3</sup>National Institute of Information and Communications Technology, Japan, <sup>4</sup>Institute for Nano Quantum Information Electronics, University of Tokyo, Japan

TuP-E-4 (Poster)

**Novel Fabrication Technique of Suspended Nanowire Devices for Nanomechanical Applications**Wataru Tomita,<sup>\*</sup>1,2 Satoshi Sasaki,<sup>1</sup> Kouta Tateno,<sup>1</sup> Hajime Okamoto,<sup>1</sup> and Hiroshi Yamaguchi<sup>1,2</sup><sup>1</sup>NTT Basic Research Laboratories, NTT Corporation, Japan, <sup>2</sup>Department of physics, Tohoku University, Japan

TuP-E-5 (Poster)

**Effect of Surface Roughness on the Resistive Switching of Yttrium Oxide Based System**Mangal Das,<sup>\*</sup> Amitesh Kumar, Sanjay Kumar, Biswajit Mandal, Gaurav Siddharth, and Shaibal Mukherjee

Electrical Engineering, Indian Institute of Technology Indore, India

TuP-E-6 (Poster)

**Threshold and Resistive Switching Behaviors in Epitaxially Regrown GaN P-N Diodes for High Temperature Applications**Kai Fu, Houqiang Fu, Xuanqi Huang, Tsung-Han Yang, Hong Chen, Jossue Montes, Chen Yang, Jinan Zhou, and Yuji Zhao<sup>\*</sup>

School of Electrical, Computer, and Energy Engineering, Arizona State University, United States of America

TuP-E-7 (Poster)

**Radiative and Nonradiative Tunneling in Nanowire Light-Emitting Diodes**Junichi Motohisa,<sup>\*</sup>1,2 Hiroki Kameda,<sup>1,2</sup> Masahiro Sasaki,<sup>1,2</sup> and Katsuhiko Tomioka<sup>1,2</sup><sup>1</sup>Graduate School of IST, Hokkaido University, Japan, <sup>2</sup>RCIQE, Hokkaido University, Japan

TuP-E-8 (Poster)

**Effects of Impurity Hubbard Bands on the Hall Effect in n-InP**

Yasutomo Kajikawa

Interdisciplinary Faculty of Science and Engineering, Shimane University, Japan

TuP-G-1 (Poster)

**Development of n-type GaN film by Si and Ti co-sputtering technique on a glass substrate**Wei-Sheng Liu,<sup>\*</sup> Chun-Yuan Tan, Yu-Lin Chang, and Cheng-Ting Tsai

Department of Electrical Engineering, Yuan Ze University, Taiwan

TuP-G-2 (Poster)

**Evaluate Fixed Charge and Oxide Trapped Charge on SiO<sub>2</sub>/GaN MOS Structure Before and After Post Annealing**Masaaki Furukawa,<sup>\*</sup> Mutsunori Uenuma, Yasuaki Ishikawa, and Yukiharu Uraoka

Nara Institute of Science and Technology, Japan

TuP-G-3 (Poster)

**Investigation of Impact of Dosage on Electrical Properties of Mg-Ion-Implanted GaN before Activation Annealing Using MOS Structures**

Ryo Kamoshida,\* Kei Uetake, Shunta Murai, and Masamichi Akazawa

*Research Center for Integrated Quantum Electronics, Hokkaido University, Japan*

TuP-G-4 (Poster)

**Multi-wavelength Reflectivity Monitoring on Growth of AlN on Si**

Yasushi Iyechika,\* Masayuki Tsukui, Kiyotaka Miyano, and Hideshi Takahashi

*NuFlare Technology, Inc., Japan*

TuP-G-5 (Poster)

**Analysis of emission characteristics of deep levels in GaN by direct photo excitation**Moe Kikuchi,\*<sup>1</sup> Daisuke Uehara,<sup>1</sup> Bei Ma,<sup>1</sup> Ken Morita,<sup>1</sup> Hideto Miyake,<sup>2</sup> and Yoshihiro Ishitani<sup>1</sup><sup>1</sup>Graduate School of Electrical and Electronic Engineering, Chiba University, Japan, <sup>2</sup>Graduate School of Regional Innovation Studies, Mie University, Japan

TuP-G-6 (Poster)

**MOCVD growth and characterization of Si-doped thick-AlInN epitaxial films**Mizuki Yamanaka,\*<sup>1</sup> Makoto Miyoshi,<sup>1</sup> Takashi Egawa,<sup>1</sup> and Tetsuya Takeuchi<sup>2</sup><sup>1</sup>Nagoya Institute of Technology, Japan, <sup>2</sup>Meijo University, Japan

TuP-G-7 (Poster)

**Local phonon analysis in InGaN film by mapping of Raman peak energy**Shungo Okamoto,\*<sup>1</sup> Naomichi Saito,<sup>1</sup> Bei Ma,<sup>1</sup> Kensuke Oki,<sup>1</sup> Ken Morita,<sup>1</sup> Kazuhiro Ohkawa,<sup>2</sup> and Yoshihiro Ishitani<sup>1</sup><sup>1</sup>Graduate School of Electrical and Electronic Engineering, Chiba University, Japan, <sup>2</sup>Computer, Electrical and Mathematical Sciences and Engineering Division, King Abdullah University of Science and Technology, Saudi Arabia

TuP-G-8 (Poster)

**Enhanced Electrical Properties of AlInN/AlN/GaN Heterostructure using Al<sub>x</sub>Ga<sub>1-x</sub>N/Al<sub>y</sub>Ga<sub>1-y</sub>N superlattice**Yu-Chih Chen,\*<sup>1</sup> Indraneel Sanyal,<sup>1</sup> and Jen-Inn Chyi<sup>1,2</sup><sup>1</sup>Department of Electrical Engineering, National Central University, Taiwan, <sup>2</sup>Research Center for Applied Sciences, Academia Sinica, Taiwan

TuP-G-9 (Poster)

**The effects of the atomic configuration on the electronic, thermodynamic, and structural properties of Al<sub>x</sub>Ga<sub>1-x</sub>N alloys**Alexandros Kyrtos,\*<sup>1</sup> Masahiko Matsubara,<sup>1</sup> and Enrico Bellotti<sup>1,2</sup><sup>1</sup>Department of Electrical and Computer Engineering, Boston University, United States of America, <sup>2</sup>Division of Materials Science and Engineering, Boston University, United States of America

TuP-G-10 (Poster)

**Enhanced excitonic emission efficiency in porous GaN and GaInN-GaN quantum wells grown along the polar direction**Thi Huong NGO,<sup>1</sup> Bernard Gil,\*<sup>2,3</sup> Tatiana Shubina,<sup>3</sup> Pierre Valvin,<sup>2</sup> Benjamin Damilano,<sup>1</sup> Stephane Veizian,<sup>1</sup> and Jean Massies<sup>1</sup><sup>1</sup>Centre de Recherche sur l'Hetero-Epitaxie et ses Applications, France, <sup>2</sup>Laboratoire Charles Coulomb- University Montpellier 34095 Montpellier France, France, <sup>3</sup>Ioffe Institute, 194021 St Petersburg, Russia, Russia

TuP-G-11 (Poster) - Late News -

### **Picosecond Time-Resolved Excitation Dynamics and Emission Manipulation of Eu<sup>3+</sup> Ions Doped into GaN**

Brandon Mitchell,<sup>\*,1,2,3</sup> Ruoqiao Wei,<sup>2</sup> Dolf Timmerman,<sup>3</sup> Tom Gregorkiewicz,<sup>3,4</sup> Shuhei Ichikawa,<sup>3</sup> Jun Tatebayashi,<sup>3</sup> Volkmar Dierolf,<sup>2</sup> and Yasufumi Fujiwara<sup>3</sup>

<sup>1</sup>West Chester University, United States of America, <sup>2</sup>Lehigh University, United States of America, <sup>3</sup>Osaka University, Japan, <sup>4</sup>University of Amsterdam, Netherlands

TuP-G-13 (Poster) - Late News -

### **High efficiency 100-nm-sized InGaN/GaN active region fabricated by neutral-beam-etching and GaN regrowth for directional micro-LED**

Kexiong Zhang,<sup>\*,1</sup> Tokio Takahashi,<sup>2</sup> Daisuke Ohori,<sup>3</sup> Guangwei Cong,<sup>2</sup> Kazuhiko Endo,<sup>4</sup> Naoto Kumagai,<sup>1</sup> Seiji Samukawa,<sup>3,4,5</sup> Mitsuaki Shimizu,<sup>1,6</sup> and Xuelun Wang<sup>1,6</sup>

<sup>1</sup>GaN-OIL, AIST, Japan, <sup>2</sup>ESPRIT, AIST, Japan, <sup>3</sup>IFS, Tohoku University, Japan, <sup>4</sup>NeRI, AIST, Japan, <sup>5</sup>AIMR, Tohoku University, Japan, <sup>6</sup>IMaSS, Nagoya University, Japan

TuP-H-2 (Poster)

### **Growth and Deep UV Luminescent Properties of Rocksalt-Structured Ultra-Wide Bandgap MgZnO on MgO Substrates**

Kentarō Kaneko,<sup>\*,1,2,3</sup> Kyohei Ishii,<sup>2</sup> Mizuki Ono,<sup>4</sup> Kanta Kudo,<sup>4</sup> Takeyoshi Onuma,<sup>4</sup> Tohru Honda,<sup>4</sup> and Shizuo Fujita<sup>2,3</sup>

<sup>1</sup>Engineering Education Research Center, Kyoto University, Japan, <sup>2</sup>Department of Electronic Science and Engineering, Kyoto University, Japan, <sup>3</sup>Photonics and Electronics Science and Engineering Center, Kyoto University, Japan, <sup>4</sup>Department of Applied Physics, School of Advanced Engineering, Graduate School of Engineering, Kogakuin University, Japan

TuP-H-3 (Poster)

### **Synthesis and characterization of AlTiO films by mist-CVD**

Zenji Yatabe,<sup>\*,1</sup> Koshi Nishiyama,<sup>1</sup> Takaaki Tsuda,<sup>1</sup> Kazuki Nishimura,<sup>1</sup> and Yusui Nakamura<sup>1,2</sup>

<sup>1</sup>Kumamoto University, Japan, <sup>2</sup>Kumamoto Phoenix, Japan

TuP-H-4 (Poster)

### **Sol-gel synthesis of highly transparent and conducting Cadmium Oxide**

Cheuk Kai Gary Kwok,<sup>\*,1</sup> Chao Ping Liu,<sup>2</sup> and Kin Man Yu<sup>1,3</sup>

<sup>1</sup>Department of Physics, City University of Hong Kong, Hong Kong, <sup>2</sup>Department of Physics, College of Science, Shantou University, China, <sup>3</sup>Department of Materials Science and Engineering, City University of Hong Kong, Hong Kong

TuP-H-5 (Poster)

### **Effect of Buffer Layer on Improvement of SnO<sub>2</sub> Thin Film on Sapphire Substrate Formed by Mist Chemical Vapor Deposition**

Thant Zin Win,<sup>\*,1</sup> Takumi Furukawa,<sup>1</sup> Yudai Tanaka,<sup>1</sup> Koshi Okita,<sup>1</sup> Koji Sue,<sup>2</sup> Zenji Yatabe,<sup>1,3</sup> and Yusui Nakamura<sup>1,4,5</sup>

<sup>1</sup>GSST, Kumamoto University, Japan, <sup>2</sup>Faculty of Engineering, Kumamoto University, Japan, <sup>3</sup>POIE, Kumamoto University, Japan, <sup>4</sup>FAST, Kumamoto University, Japan, <sup>5</sup>Kumamoto Phoenix, Japan

TuP-H-6 (Poster)

### **Characterization of amorphous aluminium oxide thin films synthesized by mist-CVD**

Zenji Yatabe,<sup>\*,1</sup> Koshi Nishiyama,<sup>1</sup> Takaaki Tsuda,<sup>1</sup> Kazuki Nishimura,<sup>1</sup> and Yusui Nakamura<sup>1,2</sup>

<sup>1</sup>Kumamoto University, Japan, <sup>2</sup>Kumamoto Phoenix, Japan

TuP-H-7 (Poster)

### **Rectified Schottky diodes that use low-cost carbon paste/InGaZnO junctions**

Chia-Ling Wu, Fu-Fan Hsu, and Chun-Ying Huang<sup>\*</sup>

Department of Applied Materials and Optoelectronics Engineering, National Chi Nan University, Taiwan

TuP-J-1 (Poster)

**Influence of contact resistances on high-mobility top-gate organic transistors based on didodecylbenzothienobenzothiophene**Shion Tazuhara,\*<sup>1</sup> Tomoya Aiba,<sup>1</sup> Takashi Nagase,<sup>1,2</sup> Takashi Kobayashi,<sup>1,2</sup> Yuichi Sadamitsu,<sup>3</sup> and Hiroyoshi Naito<sup>1,2</sup><sup>1</sup>Department of Physics and Electronics, Osaka Prefecture University, Japan, <sup>2</sup>The Research Institute for Molecular Electronic Devices, Osaka Prefecture University, Japan, <sup>3</sup>R&D Planning Division, Nippon Kayaku Co., Ltd., Japan

TuP-J-2 (Poster)

**Thin-Film Transistors Based on Copper Phthalocyanine Deposited on a Gate Dielectric Rubbed with Poly(tetrafluoroethylene)**

Shotaro Watanabe, Yoshinari Kimura, Yoshiaki Hattori, and Masatoshi Kitamura\*

Department of Electrical and Electronic Engineering, Kobe University, Japan

TuP-J-3 (Poster)

**Device characteristics of solution-processed molecular floating-gate transistor memories based on ambipolar polymer semiconductors**Miho Higashinakaya,\*<sup>1</sup> Hayato Abe,<sup>1</sup> Takashi Nagase,<sup>1,2</sup> Takashi Kobayashi,<sup>1,2</sup> and Hiroyoshi Naito<sup>1,2</sup><sup>1</sup>Department of Physics and Electronics, Osaka Prefecture University, Japan, <sup>2</sup>The Research Institute for Molecular Electronic Devices, Osaka Prefecture University, Japan

TuP-J-4 (Poster)

**Voltage and Frequency Dependence of Capacitance Characteristics in Organic MOS Capacitors**

Yoshinari Kimura,\* Yoshiaki Hattori, and Masatoshi Kitamura

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

TuP-J-5 (Poster)

**Organic Light-Emitting Diode Composed of an Oligomer Crystal Emission Layer**

Takeshi Yamao,\* Koki Nishimura, Yuhi Inada, and Shu Hotta

Faculty of Materials Science and Engineering, Kyoto Institute of Technology, Japan

TuP-J-6 (Poster)

**Optical Characterization of Co-doped Single Crystal Organic Semiconductor with Emissive and Assist Dopants**Kosuke Watanabe,\*<sup>1</sup> Keita Takeuchi,<sup>1</sup> Ryogo Abe,<sup>1</sup> Asuka Suzuki,<sup>1</sup> and Akihiko Kikuchi<sup>1,2</sup><sup>1</sup>Department of Engineering and Applied Sciences, Sophia University, Japan, <sup>2</sup>Sophia Nanotechnology Center, Japan

TuP-J-7 (Poster)

**Strong Light-Matter Coupling and Photoluminescence Properties of 2D and quasi-2D Perovskite Microcavities**Shuai Zhang,<sup>1</sup> Limeng Ni,<sup>2</sup> Akshay Rao,<sup>2</sup> and Kenichi Yamashita\*<sup>1</sup><sup>1</sup>Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Japan, <sup>2</sup>Cavendish Laboratory, University of Cambridge, United Kingdom

TuP-J-8 (Poster)

**Fabrication of CH<sub>3</sub>NH<sub>3</sub>PbBr<sub>3</sub> Based Perovskite Single Crystal Arrays by Spin-coating Method Using Hydrophobic Patterned Substrate**Ryogo Abe,\*<sup>1</sup> Keita Takeuchi,<sup>1</sup> Asuka Suzuki,<sup>1</sup> Kosuke Watanabe,<sup>1</sup> and Akihiko Kikuchi<sup>1,2</sup><sup>1</sup>Department of Engineering and Applied Sciences, Sophia University, Japan, <sup>2</sup>Sophia Nanotechnology Center, Japan

TuP-J-9 (Poster) - Late News -

### Temperature dependence of the intersystem crossing rate in thermally activated delayed fluorescence emitters

Takashi Kobayashi,<sup>\*,1,2</sup> Daisuke Kawase,<sup>1</sup> Akitsugu Niwa,<sup>1</sup> Atsumi Kayamyō,<sup>1</sup> Takashi Nagase,<sup>1,2</sup> Kenichi Goushi,<sup>3,4</sup> Chihaya Adachi,<sup>3,4</sup> and Hiroyoshi Naito<sup>1,2</sup>

<sup>1</sup>Department of Physics and Electronics, Osaka Prefecture University, Japan, <sup>2</sup>The Research Institute for Molecular Electronic Devices, Osaka Prefecture University, Japan, <sup>3</sup>Center for Organic Photonics and Electronics Research, Kyushu University, Japan, <sup>4</sup>Japan Science and Technology Agency, ERATO, Adachi Molecular Exciton Engineering Project, Japan

TuP-SS1-1 (Poster)

### First Principles Study on Electronic Structures of $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> and $\alpha$ -Ir<sub>2</sub>O<sub>2</sub>

Kazuyuki Uno,<sup>\*</sup> Taichi Nakamura, and Ichiro Tanaka

Department of Systems Engineering, Wakayama University, Japan

TuP-SS1-2 (Poster)

### Effect of growth variables on properties of gallium oxide thin films grown by sputtering

Vijay Balaso Patil,<sup>\*,1</sup> Byung-Teak Lee,<sup>1</sup> and Sang-Hun Jong<sup>2</sup>

<sup>1</sup>Photonic and electronic thin film laboratory, Chonnam national university, Gwangju, Republic of Korea, <sup>2</sup>Gwangju Center, Korea Basic Science Institute, Gwangju, Republic of Korea

TuP-SS1-4 (Poster)

### Highly rectifying contacts on (In,Ga)<sub>2</sub>O<sub>3</sub> thin films grown by PLD

Daniel Splith,<sup>\*</sup> Anna Hassa, Peter Schlupp, Holger von Wenckstern, and Marius Grundmann

Felix Bloch Institute for Solid State Physics, Universität Leipzig, Germany

TuP-SS1-5 (Poster)

### Influence of post-annealing on properties of $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> epilayer grown by halide vapor phase epitaxy

Hoki Son, Ye-Ji Choi, Yong-Ho Ra, Young-Jin Lee, Jin-Ho Kim, Sun Woog Kim, Tae-Young Lim, Jonghee Hwang, and Dae-Woo Jeon<sup>\*</sup>

Korea Institute of Ceramic Engineering & Technology, Republic of Korea

TuP-SS1-6 (Poster)

### Deep-Level Defect Investigation of Si-Doped $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Homoepitaxial Films Grown by Halide Vapor Phase Epitaxy

Yoshitaka Nakano<sup>\*</sup> and Akira Toyotome

Department of Electrical & Electronic Engineering, Chubu University, Japan

TuP-SS1-7 (Poster)

### Growth of Ga<sub>2</sub>(O,S)<sub>3</sub> Alloy Films on YSZ Substrates by Mist Chemical Vapor Deposition

Kazuaki Akaiwa,<sup>\*,1</sup> Tsubasa Hiroe,<sup>1</sup> Moe Nagano,<sup>1</sup> Tomoki Abe,<sup>1</sup> Motohisa Kado,<sup>2</sup> and Kunio Ichino<sup>1</sup>

<sup>1</sup>Department of Information and Electronics, Tottori University, Japan, <sup>2</sup>Toyota Motor Corporation, Japan

TuP-SS1-8 (Poster)

### Electrical and structural properties of Sn-doped $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> thin films grown by mist chemical vapor deposition

Shuhei Mochizuki,<sup>\*</sup> Tomohiro Yamaguchi, Kenichiro Rikitake, Takeyoshi Onuma, and Tohru Honda

Department of Applied Physics, Kogakuin University, Japan



TuP-SS1-9 (Poster)

### Synthesis of $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> thin films on Au nanoparticles dispersed on sapphire substrates for epitaxial lateral overgrowth

Kentaro Kaneko,<sup>\*1,2,3</sup> Yasuhisa Masuda,<sup>2</sup> and Shizuo Fujita<sup>2,3</sup>

<sup>1</sup>Engineering Education Research Center, Kyoto University, Japan, <sup>2</sup>Department of Electronic Science and Engineering, Kyoto University, Japan, <sup>3</sup>Photonics and Electronics Science and Engineering Center, Kyoto University, Japan

TuP-SS1-10 (Poster)

### The Thermal Stability of $\epsilon$ -Ga<sub>2</sub>O<sub>3</sub> Thin Films Grown on (111) 3C-SiC Template Substrates

Masatoshi Koyama,<sup>\*</sup> Toyokazu Kaneko, Sodai Fujiwara, Toshihiko Maemoto, and Shigehiko Sasa  
Nanomaterials and Microdevices Research Center, Osaka Institute of Technology, Japan

TuP-SS1-12 (Poster)

### Sputtering Ambient Effects on Functionality of Al-doped Gallium Oxide Films for Deep-Ultraviolet Detectors

Po-Wei Chen, Shiau-Yuan Huang, Chao-Chun Wang, Po-Wen Hsiao, Shuo-Huang Yuan, and Dong-Sing Wu<sup>\*</sup>  
Department of Materials Science and Engineering, National Chung Hsing University, Taiwan

TuP-SS1-13 (Poster)

### Solar Blind Ga<sub>2</sub>O<sub>3</sub>-Based Ultraviolet-C Photodetectors

Ching-Ting Lee<sup>\*,1,2</sup> and Hsin-Ying Lee<sup>2</sup>

<sup>1</sup>Department of Electrical Engineering, Yuan Ze University, Taiwan, <sup>2</sup>Department of Photonics, National Cheng Kung University, Taiwan

TuP-SS2-1 (Poster)

### The growth of boron nitride on poly-crystalline Ni by plasma-assisted molecular beam epitaxy

Wei-Cyuan Huang,<sup>1</sup> Chia-Wei Huang,<sup>1</sup> Sheng-Chung Chen,<sup>\*,1</sup> Ing-Sung Yu,<sup>1</sup> Hui Li,<sup>2</sup> and Hung-Hsiang Cheng<sup>2</sup>

<sup>1</sup>Department of Material Science and Engineering, National Dong Hwa University, Taiwan, <sup>2</sup>Center for Condensed Matter Sciences, National Taiwan University, Taiwan

TuP-SS2-2 (Poster)

### Reflectivity of hexagonal Boron-Nitride in deep UV

Christine ELIAS

Laboratoire Charles Coulomb, France

TuP-SS2-3 (Poster)

### CVD Growth of BN Thin Films using B<sub>2</sub>H<sub>6</sub>

Hisashi Yamada,<sup>\*,1</sup> Sho Inotsume,<sup>1,2</sup> Naoto Kumagai,<sup>1</sup> Toshikazu Yamada,<sup>1</sup> and Mituaki Shimizu<sup>1,2</sup>

<sup>1</sup>GaN-OIL, National Institute of Advanced Industrial Science and Technology, Japan, <sup>2</sup>Nagoya University, Japan

TuP-SS2-4 (Poster)

### Micro-photoluminescence imaging of hexagonal boron nitride crystal in the UV range

Thomas Pelini,<sup>\*,1</sup> Anaïs Dreau,<sup>1</sup> Christine Elias,<sup>1</sup> Pierre Valvin,<sup>1</sup> Guillaume Cassabois,<sup>1</sup> Bernard Gil,<sup>1</sup> Vincent Jacques,<sup>1</sup> Jiahua Li,<sup>2</sup> and James H. Edgar<sup>2</sup>

<sup>1</sup>Laboratoire Charles Coulomb UMR 5221 CNRS-UM, France, <sup>2</sup>Tim Taylor Department of Chemical Engineering, Kansas State University, United States of America

## May 22 (Wed)

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**WeA1 GaN and Related Technologies II** Room A 08:30-10:00

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Chair: Daigo Kikuta and Masamichi Akazawa

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WeA1-1 (Invited) 08:30 - 09:00

**MOS interface control for GaN power transistors**

Tamotsu Hashizume

*RCIQE, Hokkaido University and IMASS, Nagoya University, Japan*

WeA1-3 (Invited) 09:00 - 09:30

**Vacancy-type defects in GaN-based power device structure - defect characterization in ion implanted GaN and Al<sub>2</sub>O<sub>3</sub>/GaN -**

Akira Uedono,<sup>\*1</sup> Werner Egger,<sup>2</sup> Christoph Hugenschmidt,<sup>3</sup> and Shoji Ishibashi<sup>4</sup>

<sup>1</sup>*Division of Applied Physics, Faculty of Pure and Applied Science, University of Tsukuba, Japan,* <sup>2</sup>*Universität der Bundeswehr München, Institut für Angewandte Physik und Messtechnik, Germany,* <sup>3</sup>*Physics Department E21 and Heinz Maier-Leibnitz Zentrum, Technische Universität München, Germany,* <sup>4</sup>*CD-FMat, AIST, Japan*

WeA1-5 (Oral) 09:30 - 09:45

**Electronic structure analysis of core structures of threading dislocations in GaN**

Takashi Nakano,<sup>\*1</sup> Kenta Chokawa,<sup>1</sup> Masaaki Araidai,<sup>1,2</sup> Kenji Shiraishi,<sup>1,2</sup> Atsushi Oshiyama,<sup>2</sup> Akira Kusaba,<sup>3</sup> Yoshihiro Kangawa,<sup>2,4</sup> Atsushi Tanaka,<sup>2</sup> Yoshio Honda,<sup>1,2</sup> and Hiroshi Amano<sup>1,2</sup>

<sup>1</sup>*Graduate School of Engineering, Nagoya University, Japan,* <sup>2</sup>*Institute of Materials and Systems for Sustainability, Nagoya University, Japan,* <sup>3</sup>*Graduate School of Engineering, Kyushu University, Japan,* <sup>4</sup>*Research Institute for Applied Mechanics Kyushu University, Japan*

WeA1-6 (Oral) 09:45 - 10:00

**Effects of Ga-OH Bond at Initial GaN Surface on Electrical Characteristics of SiO<sub>2</sub>/GaN Interface**

Mutsunori Uenuma,<sup>\*</sup> Ryota Ando, Masaaki Furukawa, Yasuaki Ishikawa, and Yukiharu Uraoka

*Nara Institute of Science and Technology, Japan*

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**WeB1 Photovoltaic and LED** Room B 08:30-10:00

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Chair: Takeyoshi Sugaya and Hideki Yagi

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WeB1-1 (Invited) 08:30 - 09:00

**Smart Stack Technology for III-V/Si Multi-Junction Solar Cells**

Hidenori Mizuno

*Fukushima Renewable Energy Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan*

WeB1-3 (Oral) 09:00 - 09:15

**Electron selective contact for high efficiency core-shell nanowire solar cell**

Vidur Raj,<sup>\*1</sup> Kaushal Vora,<sup>2</sup> Lily Li,<sup>2</sup> Lan Fu,<sup>1</sup> Hark Hoe Tan,<sup>1</sup> and Chennupati Jagadish<sup>1</sup>

<sup>1</sup>*Electronic Materials Engineering, ANU, Australia,* <sup>2</sup>*Australian National Fabrication Facility, ANU, Australia*

WeB1-4 (Oral) 09:15 - 09:30

### Effects of MOVPE growth parameters on high speed grown InGaP PV

Hassanet Sodaabnlu,<sup>\*1</sup> Akinori Ubukata,<sup>2</sup> Kentaroh Watanabe,<sup>1</sup> Takeyoshi Sugaya,<sup>3</sup> Yoshiaki Nakano,<sup>4</sup> and Masakazu Sugiyama<sup>1,4</sup>

<sup>1</sup>Research Center for Advanced Science and Technology, The University of Tokyo, Japan, <sup>2</sup>Tsukuba Laboratories, Taiyo Nippon Sanso, Japan, <sup>3</sup>National Institute of Advanced Industrial Science and Technology (AIST), Japan, <sup>4</sup>Department of Electrical Engineering & Information System, School of Engineering, The University of Tokyo, Japan

WeB1-5 (Oral) 09:30 - 09:45

### High Responsivity and Low Dark Current Ultraviolet Photodetectors Using p-GaN/AlGaN/GaN Heterostructure

Qifeng Lyu,<sup>\*</sup> Huaxing Jiang, Xing Lu, and Kei May LAU

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

WeB1-6 (Oral) 09:45 - 10:00

### 2Gps OFDM Visible Light Communication using Light-emitting Diodes with Photonic Crystals

Szu-Yu Pan,<sup>\*1</sup> Zi-Xuan You,<sup>1</sup> Tung-Ching Lin,<sup>1</sup> and Jian-Jang Huang<sup>1,2</sup>

<sup>1</sup>Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan, <sup>2</sup>Department of Electrical Engineering, National Taiwan University, Taiwan

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## WeC1 Nanowire Devices

Room C 08:30-10:00

Chair: Jesper Wallentin and Kenichi Kawaguchi

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WeC1-1 (Oral) - Late News - 08:30 - 08:45

### Gate tunable energy gap and negative magnetoresistance of InAs/GaSb core/shell nanowires

Zhencun Pan,<sup>\*1</sup> Shaoyun Huang,<sup>1</sup> Yifeng Zhou,<sup>1</sup> Dong Pan,<sup>2</sup> Jianhua Zhao,<sup>2</sup> and Hongqi Xu<sup>1</sup>

<sup>1</sup>Beijing Key Laboratory of Quantum Devices, Key laboratory for the Physics and Chemistry of Nanodevices, and Department of Electronics, Peking University, China, <sup>2</sup>State Key Laboratory of Superlattices and Microstructures, Institute of Semiconductors, Chinese Academy of Sciences, China

WeC1-2 (Invited) 08:45 - 09:15

### Low-Threshold Vertical Lasing from InP Nanowire Embedded in Cat's Eye Antenna

Fangfang Ren,<sup>\*1</sup> Weizong Xu,<sup>1</sup> Jiandong Ye,<sup>1</sup> Hark Hoe Tan,<sup>2</sup> and Chennupati Jagadish<sup>2</sup>

<sup>1</sup>School of Electronic Science and Engineering, Nanjing University, China, <sup>2</sup>EME, RSPE, The Australian National University, Australia

WeC1-4 (Oral) 09:15 - 09:30

### Telecom-band lasing nanowires at room temperature

Guoqiang Zhang,<sup>\*1,2</sup> Masato Takiguchi,<sup>1,2</sup> Kouta Tateno,<sup>1,2</sup> Takehiko Tawara,<sup>1,2</sup> Masaya Notomi,<sup>1,2</sup> and Hideki Gotoh<sup>1</sup>

<sup>1</sup>NTT Basic Research Laboratories, NTT Corporation, Japan, <sup>2</sup>NTT Nanophotonics Center, NTT Corporation, Japan

WeC1-5 (Oral) 09:30 - 09:45

### n-doped InGaP Nanowire Shells in Core-Shell pn-junctions

Lisa Liborius,<sup>\*1</sup> Jan Bieniek,<sup>1</sup> Andreas Nägelein,<sup>2</sup> Franz-Josef Tegude,<sup>1</sup> Artur Poloczec,<sup>1</sup> and Nils Weimann<sup>1</sup>

<sup>1</sup>Department of Components for High Frequency Electronics, University of Duisburg-Essen, Germany, <sup>2</sup>Fundamentals of Energy Materials, Technical University Ilmenau, Germany

WeC1-6 (Oral)

09:45 - 10:00

**Growth of GaAs/GaNAs/GaAs Core-Multishell Nanowires Lasing at 1 $\mu$ m**Mitsuki Yukimune,<sup>\*</sup>1 Ryo Fujiwara,<sup>1</sup> Fumitaro Ishikawa,<sup>1</sup> Shula Chen,<sup>2</sup> Weimin M. Chen,<sup>2</sup> and Irina A. Buyanova<sup>2</sup><sup>1</sup>Graduate School of Science and Engineering, Ehime University, Japan, <sup>2</sup>Department of Physics, Chemistry and Biology, Linköping University, Sweden**WeD1 Quantum Dots and Coherent Dynamics**

Room D 08:30-10:00

*Chair: Akira Oiwa and Makoto Kohda*

WeD1-1 (Invited)

08:30 - 09:00

**Coherent control of a GaAs quantum dot spin qubit operated in a feedback loop**

Takashi Nakajima

RIKEN CEMS, Japan

WeD1-3 (Oral)

09:00 - 09:15

**Towards quantum teleportation with quantum-dot spin qubits**Yohei Kojima,<sup>\*</sup>1,2 Takashi Nakajima,<sup>1</sup> Akito Noiri,<sup>1</sup> Jun Yoneda,<sup>1</sup> Tomohiro Otsuka,<sup>1,3</sup> Kenta Takeda,<sup>1</sup> Sen Li,<sup>1</sup> Stephen D. Bartlett,<sup>4</sup> Arne Ludwig,<sup>5</sup> Andreas Dirk Wieck,<sup>5</sup> and Seigo Tarucha<sup>1,2</sup><sup>1</sup>CEMS, RIKEN, Japan, <sup>2</sup>Department of Applied Physics, University of Tokyo, Japan, <sup>3</sup>RIEC, University of Tohoku, Japan,<sup>4</sup>Centre for Engineered Quantum system, University of Sydney, Australia, <sup>5</sup>Lehrstuhl für Angewandte Festkörperphysik, Ruhr-Univ. Bochum, Germany

WeD1-4 (Oral)

09:15 - 09:30

**Breakdown of Pauli spin blockade by phonon irradiation in a GaAs double quantum dot**Sadashige Matsuo,<sup>\*</sup>1,2 Kazuyuki Kuroyama,<sup>1</sup> Jo Muramoto,<sup>1</sup> Sascha R. Valentin,<sup>3</sup> Arne Ludwig,<sup>3</sup> Andreas D. Wieck,<sup>3</sup> Yasuhiro Tokura,<sup>4</sup> and Seigo Tarucha<sup>1,5</sup><sup>1</sup>University of Tokyo, Japan, <sup>2</sup>JST PRESTO, Japan, <sup>3</sup>Ruhr University, Germany, <sup>4</sup>University of Tsukuba, Japan, <sup>5</sup>Riken, Japan

WeD1-5 (Oral)

09:30 - 09:45

**Evaluation of Rabi frequency and coherence time in the hyperfine structure of <sup>167</sup>Er<sup>3+</sup> in Y<sub>2</sub>SiO<sub>5</sub> through coherent transients**Masaya Hiraishi,<sup>\*</sup>1,2 Mark IJspeert,<sup>1</sup> Takehiko Tawara,<sup>1,2,3</sup> Satoru Adachi,<sup>4</sup> Hiroo Omi,<sup>1,3</sup> and Hideki Gotoh<sup>1</sup><sup>1</sup>NTT Basic Research Laboratories, Japan, <sup>2</sup>Tokyo University of Science, Japan, <sup>3</sup>NTT Nanophotonics Center, Japan,<sup>4</sup>Hokkaido University, Japan

WeD1-6 (Oral)

09:45 - 10:00

**Parametric photons from confined polariton condensates driven by acoustic fields**Alexander Sergeevich Kuznetsov,<sup>\*</sup> Klaus Biermann, and Paulo Ventura Santos

Paul-Drude-Institut für Festkörperelektronik, Germany

**WeE1 Organic Devices**

Room E 08:30-10:00

*Chair: Yoshiaki Hattori and Masakazu Nakamura*

WeE1-1 (Invited)

08:30 - 09:00

**Ultraflexible Biosignal Amplifier Based on Organic Thin-Film Transistors**Takafumi Uemura,<sup>\*</sup>1,2 and Tsuyoshi Sekitani<sup>1,2</sup><sup>1</sup>The Institute of Scientific and Industrial Research, Osaka University, Japan, <sup>2</sup>PhotoBIO-OIL, AIST, Japan

WeE1-3 (Oral) 09:00 - 09:15

### Organic Sensor Array Distributed in Flexible and Curved Surface

Masatoshi Sakai,<sup>\*,1</sup> Yuichi Miyai,<sup>1</sup> Yugo Okada,<sup>2</sup> Yuichi Sadamitsu,<sup>3</sup> Yuta Hashimoto,<sup>3</sup> Nozomi Onodera,<sup>3</sup> and Kazuhiro Kudo<sup>1</sup>

<sup>1</sup>Department of Electrical and Electronic Engineering, Chiba University, Japan, <sup>2</sup>Center for Frontier Science, Chiba University, Japan, <sup>3</sup>Center for Innovative Research and Development Group Nippon Kayaku Co., Ltd., Japan

WeE1-4 (Oral) 09:15 - 09:30

### Long-term stability of organic physically unclonable function for IoE security

Kazunori Kuribara,<sup>\*</sup> Taiki Nobeshima, Atsushi Takei, Takehito Kozasa, Sei Uemura, and Manabu Yoshida

Flexible Electronics Research Center, AIST, Japan

WeE1-5 (Oral) 09:30 - 09:45

### Enhanced performance of solution-processable organic floating-gate transistor memories using binary small molecules dispersed polymer storage layers

Hayato Abe,<sup>1</sup> Takashi Nagase,<sup>\*,1,2</sup> Miho Higashinakaya,<sup>1</sup> Takashi Kobayashi,<sup>1,2</sup> and Hiroyoshi Naito<sup>1,2</sup>

<sup>1</sup>Department of Physics and Electronics, Osaka Prefecture University, Japan, <sup>2</sup>The Research Institute for Molecular Electronic Devices, Osaka Prefecture University, Japan

WeE1-6 (Oral) 09:45 - 10:00

### Top-gated organic light emitting transistors based on the device fabrication without intermixing of poly(methyl methacrylate) gate dielectric

Hirotake Kajii,<sup>\*</sup> Takayuki Mashimo, and Masahiko Kondow

Graduate School of Engineering, Osaka University, Japan

Coffee Break

10:00 - 10:30

## WeA2 GaN and Related Technologies III

Room A 10:30-12:00

Chair: Martin Kuball and Edward Chang

WeA2-1 (Invited) 10:30 - 11:00

### Processing of GaN vertical devices: Static Induction Transistors

Srabanti Chowdhury<sup>\*</sup> and Jaeyi Chun

Department of Electrical Engineering, Stanford University, United States of America

WeA2-3 (Oral) 11:00 - 11:15

### The Effect of Tetramethylammonium Hydroxide Treatment on Photoelectrochemical Etched Gallium Nitride Trench Structures

Fumimasa Horikiri,<sup>\*,1</sup> Hiroshi Ohta,<sup>2</sup> Naomi Asai,<sup>2</sup> Yoshinobu Narita,<sup>1</sup> and Takehiro Yoshida<sup>1</sup>

<sup>1</sup>SCIOCS, Japan, <sup>2</sup>Hosei University, Japan

WeA2-4 (Oral) 11:15 - 11:30

### Performance Limits of 2H-GaN Vertical Superjunction Schottky rectifiers, MOSFETs and HEMTs

Xiang Zhou<sup>\*</sup> and T. Paul Chow

Rensselaer Polytechnic Institute, United States of America

WeA2-5 (Oral) 11:30 - 11:45

### Demonstration of a Fully-Vertical GaN MOSFET on Si

Debaleen Biswas,\* Naoki Torii, Keiji Yamamoto, and Takashi Egawa

Research Center for Nano Devices and Advanced Materials, Nagoya Institute of Technology, Japan

WeA2-6 (Oral) 11:45 - 12:00

### High performance Fully-vertical GaN-on-Si power MOSFETs

Riyaz Mohammed Abdul Khadar,\* Chao Liu, Reza Soleimanzadeh, and Elison Matioli

Power and Wide-band-gap Electronics Research Laboratory, École Polytechnique Fédérale de Lausanne, Switzerland

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WeB2 Mid Infrared Photonics Room B 10:30-12:00

Chair: Takahiko Shindo and Mitsuru Takenaka

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WeB2-1 (Oral) 10:30 - 10:45

### Toward MIR VCSELs operating in CW at RT

Daniel Andres DIAZ THOMAS,\*<sup>1</sup> Oleksandr STEPANENKO,<sup>2</sup> Thomas BATTE,<sup>3</sup> Michael BAHRIZ,<sup>1</sup> Stéphane CALVEZ,<sup>2</sup> Cyril PARANTHOEN,<sup>3</sup> Eric TOURNIE,<sup>1</sup> Guilhem ALMUNEAU,<sup>2</sup> Christophe LEVALLOIS,<sup>3</sup> Alexei BARANOV,<sup>1</sup> and Laurent CERUTTI<sup>1</sup>

<sup>1</sup>IES, University of Montpellier, CNRS, 34000 Montpellier, France, <sup>2</sup>CNRS, LAAS, 31400 Toulouse, France, <sup>3</sup>University of Rennes, INSA, CNRS, Institut FOTON, 35000 Rennes, France

WeB2-2 (Oral) 10:45 - 11:00

### Resonant-Cavity Infrared Detector (RCID) with Very Thin Absorber

Chadwick L. Canedy,\*<sup>1</sup> William W. Bewley,<sup>1</sup> Charles D. Merritt,<sup>1</sup> Chul Soo Kim,<sup>1</sup> Mijin Kim,<sup>2</sup> Stephanie Tomasulo,<sup>1</sup> Michael V. Warren,<sup>3</sup> Eric M. Jackson,<sup>1</sup> Jill A. Nolde,<sup>1</sup> Chaffra A. Affouda,<sup>1</sup> Edward H. Aifer,<sup>1</sup> Igor Vurgaftman,<sup>1</sup> and Jerry R. Meyer<sup>1</sup>

<sup>1</sup>Naval Research Laboratory, United States of America, <sup>2</sup>KeyW Corporation, United States of America, <sup>3</sup>ASEE Postdoctoral Associate Residing at NRL, United States of America

WeB2-3 (Oral) 11:00 - 11:15

### High detectivity AlInSb mid-infrared photodiode sensors with dislocation filter layers for gas sensing application

Hiromi Fujita,\* Osamu Morohara, Hirotaka Geka, Yoshiki Sakurai, Daiki Yasuda, Mitsuhiro Nakayama, Koichiro Ueno, Yoshihiko Shibata, and Naohiro Kuze

Compound Semiconductor Development Dept., R&D Center, Asahi Kasei Microdevices Corporation, Japan

WeB2-4 (Oral) 11:15 - 11:30

### Investigation of type-II superlattices InAs/InAsSb photoconductor system by 8×8 k·p model and application of localization landscape theory for transport

Yuh-Renn Wu,<sup>1,2</sup> Tsung-Yin Tsai,\*<sup>1</sup> Chaohsin Wu,<sup>1</sup> Krystian Michalczewski,<sup>3</sup> and Piotr Martyniuk<sup>3</sup>

<sup>1</sup>Graduate Institute of Photonics and Optoelectronics and Department of Electrical Engineering, National Taiwan University, Taiwan, <sup>2</sup>Electronic and Optoelectronic System Research Laboratories, Industrial Technology Research Institute, Hsinchu, Taiwan, <sup>3</sup>Institute of Applied Physics, Military University of Technology, Poland

WeB2-5 (Oral) 11:30 - 11:45

### Short/mid-wave two-band type II InAs/GaSb superlattice infrared heterojunction photo-transistor

Wenjun Huang,<sup>1</sup> Jianliang Huang,<sup>1,2</sup> Yanhua Zhang,<sup>1,2</sup> Chengcheng Zhao,<sup>1</sup> Biying Nie,<sup>1</sup> Yulian Cao,<sup>1,2</sup> and Wenquan Ma\*<sup>1,2</sup>

<sup>1</sup>Institute of Semiconductors, Chinese Academy of Sciences, China, <sup>2</sup>The Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, China

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**WeC2 Fabrication of Nanostructures**

Room C 10:30-12:00

*Chair: Fangfang Ren and Takuo Sasaki*

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WeC2-1 (Invited)

10:30 - 11:00

**Nanoscale Transfer Printing for the Heterogeneous Integration of Semiconductor Nanowire Lasers**Antonio Hurtado,\*<sup>1</sup> Dimitars Jevtics,<sup>1</sup> Benoit Guilhabert,<sup>1</sup> Joshua Robertson,<sup>1</sup> John McPhillimy,<sup>1</sup> Michael Strain,<sup>1</sup> Hoe Tan,<sup>2</sup> Chennupati Jagadish,<sup>2</sup> and Martin Dawson<sup>1</sup><sup>1</sup>University of Strathclyde, United Kingdom, <sup>2</sup>Australian National University, Australia

WeC2-3 (Oral)

11:00 - 11:15

**Enhanced optical properties of InP nanowires by conformal polymer coating**

Tuomas Haggren,\* Maria Kim, Nicklas Anttu, Vladislav Khayrudinov, Henrik Mantynen, and Harri Lipsanen

*Department of Electronics and Nanoengineering, Aalto University, Finland*

WeC2-4 (Oral)

11:15 - 11:30

**Vapor-Solid Selective Area Molecular Beam Epitaxy and N-Type Doping of Catalyst-Free GaAs:Si Nanowires on Silicon**

Daniel Ruhstorfer,\* Simon Mejia, Hubert Riedl, Jonathan James Finley, and Gregor Koblmüller

*Walter Schottky Institute & Physics Dept., TU Munich, Germany*

WeC2-5 (Oral)

11:30 - 11:45

**Control of the energy transfer between Tm<sup>3+</sup> and Yb<sup>3+</sup> ions in ZnO nanowires for photovoltaic applications**

Jun Tatebayashi,\* Tokuhito Nakajima, Masao Mishina, Dolf Timmerman, Shuhei Ichikawa, and Yasufumi Fujiwara

*Osaka University, Japan*

WeC2-6 (Oral)

11:45 - 12:00

**Room temperature single photon emission from planar GaN/AlN quantum dot samples grown by MBE**

Gordon Callsen,\* Sebastian Tamariz, and Nicolas Grandjean

*Institute of Physics, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland*

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**WeD2 Spin Transport and Dynamics**

Room D 10:30-12:00

*Chair: Shingo Katsumoto and Shinobu Ohya*

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WeD2-1 (Invited)

10:30 - 11:00

**Universal nuclear focusing of confined electron spins**Sergej Markmann,<sup>1</sup> Christian Reichl,<sup>2</sup> Werner Wegscheider,<sup>2</sup> and Gian Salis\*<sup>1</sup><sup>1</sup>IBM Research-Zurich, Switzerland, <sup>2</sup>ETH Zurich, Switzerland

WeD2-3 (Oral)

11:00 - 11:15

**Modulation of Nuclear Quadrupole Effect by a Longitudinal Magnetic Field in Transverse Nuclear Field Formation**Sota Yamamoto,\*<sup>1</sup> Takuya Arakawa,<sup>2</sup> Ryosuke Matsusaki,<sup>1</sup> Reina Kaji,<sup>1</sup> and Satoru Adachi<sup>1</sup><sup>1</sup>Division of Applied Physics, Graduate School of Engineering, Hokkaido University, Japan, <sup>2</sup>Department of Applied Physics, School of Engineering, Hokkaido University, Japan

WeD2-4 (Oral) 11:15 - 11:30

### Resistively detected-NMR in triple-gate quantum point contact: magnetic field dependence

Annisa Noorhidayati,<sup>\*</sup><sup>1</sup> Mohammad Hamzah Fauzi,<sup>2</sup> Shunta Maeda,<sup>1</sup> Ken Sato,<sup>1</sup> Katsumi Nagase,<sup>1</sup> and Yoshiro Hirayama<sup>1,2,3</sup>  
<sup>1</sup>Department of Physics, Graduate School of Science, Tohoku University, Japan, <sup>2</sup>CSRN Tohoku University, Japan, <sup>3</sup>CSIS (Core Research Cluster) Tohoku University, Japan

WeD2-5 (Oral) 11:30 - 11:45

### Ballistic spin locking in a two-dimensional Rashba system

Makoto Kohda,<sup>\*</sup><sup>1,2,3</sup> Takanori Okayasu,<sup>1</sup> and Junsaku Nitta<sup>1,2,3</sup>  
<sup>1</sup>Department of Materials Science, Tohoku University, Japan, <sup>2</sup>Center for Spintronics Research Network, Tohoku University, Japan, <sup>3</sup>Center for Science and Innovation in Spintronics (Core Research Cluster), Tohoku University, Japan

WeD2-6 (Oral) 11:45 - 12:00

### Gate-controlled proximity magnetoresistance in an InAs / (Ga,Fe)Sb quantum well heterostructure

Kosuke Takiguchi,<sup>\*</sup><sup>1</sup> Le Duc Anh,<sup>1,2</sup> Takahiro Chiba,<sup>3</sup> Tomohiro Koyama,<sup>4</sup> Daichi Chiba,<sup>4</sup> and Masaaki Tanaka<sup>1,5</sup>  
<sup>1</sup>Department of Electrical Engineering and Information Systems, The University of Tokyo, Japan, <sup>2</sup>Institute of Engineering Innovation, The University of Tokyo, Japan, <sup>3</sup>National Institute of Technology, Fukushima College, Japan, <sup>4</sup>Department of Applied Physics, The University of Tokyo, Japan, <sup>5</sup>Center for Spintronics Research Network, The University of Tokyo, Japan

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WeE2 THz Devices Room E 10:30-12:00

Chair: Martin Dvorak and Issei Watanabe

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WeE2-1 (Invited) 10:30 - 11:00

### THz Frequency HEMTs: Future Trends and Applications

Arnulf Leuther,<sup>\*</sup><sup>1</sup> Thomas Merkle,<sup>1</sup> Rainer Weber,<sup>1</sup> Rainer Sommer,<sup>2</sup> and Axel Tessmann<sup>1</sup>  
<sup>1</sup>Fraunhofer IAF, Germany, <sup>2</sup>Fraunhofer FHR, Germany

WeE2-3 (Oral) 11:00 - 11:15

### Fabrication of Resonant-Tunneling-Diode Terahertz Oscillators Using Rectangular Cavity Resonators and Bow-Tie Antennas for High Output Powers

Hiroki Tanaka,<sup>\*</sup><sup>1</sup> Kazunori Kobayashi,<sup>2</sup> Ryunosuke Izumi,<sup>2</sup> Safumi Suzuki,<sup>2</sup> and Masahiro Asada<sup>1</sup>  
<sup>1</sup>Institute of Innovative Research, Tokyo Institute of Technology, Japan, <sup>2</sup>Department of Electrical and Electronic Engineering, Tokyo Institute of Technology, Japan

WeE2-4 (Oral) 11:15 - 11:30

### Optical-to-Millimeter-Wave Carrier Frequency Down-Conversion by UTC-PD-Integrated HEMT

Yuya Omori,<sup>1,2</sup> Tomotaka Hosotani,<sup>1,2</sup> Taiichi Otsuji,<sup>1,2</sup> Katsumi Iwatsuki,<sup>2</sup> and Akira Satou<sup>\*,1,2</sup>  
<sup>1</sup>Research Institute of Electrical Communication, Tohoku University, Japan, <sup>2</sup>Research Organization of Electrical Communication, Tohoku University, Japan

WeE2-5 (Invited) 11:30 - 12:00

### High-Performance In<sub>0.53</sub>Ga<sub>0.47</sub>As FinFETs for logic and RF Applications

Edward Yi Chang,<sup>\*</sup> Ho Quang Luc, and Chin Yueh Lin  
 National Chiao Tung University, Taiwan

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Excursion

12:30 - 18:45



Banquet	19:00 - 21:00
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DRAFT

## May 23 (Thu)

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ThA1 Growth of Nanostructures and Quantum-Effect Devices Room A  
08:30-10:30

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Chair: Fumitaro Ishikawa and Philipp Staudinger

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ThA1-1 (Invited) 08:30 - 09:00

**Graphene Stabilized Two-Dimensional Crystals**

Zakaria Al Balushi

*Materials Science and Engineering, University of California, Berkeley, United States of America*

ThA1-3 (Oral) 09:00 - 09:15

**Heteroepitaxial growth of InGaAs/InP/InAlAs/InP core-multishell nanowires on Si for a complementary tunnel FETs**

Katsuhiro Tomioka,\* Akinobu Yoshida, and Hironori Gamo

*Graduate School of Information Science and Technology and Research Center for Integrated Quantum Electronics (RCIQE), Hokkaido Univ., Japan*

ThA1-4 (Oral) 09:15 - 09:30

**Demonstration of InAs nanowire vertical transistors**

Hironori Gamo,\* Junichi Motohisa, and Katsuhiro Tomioka

*Graduate School of IST and RCIQE, Hokkaido University, Japan*

ThA1-5 (Oral) 09:30 - 09:45

**Room-Temperature Electrically Pumped InP-based 1.3 $\mu$ m Quantum Dot Laser on on-axis (001) Silicon**

Wei LUO,\*<sup>1</sup> Ying XUE,<sup>1</sup> Bei SHI,<sup>2</sup> Si ZHU,<sup>1</sup> and KeiMay LAU<sup>1</sup>

<sup>1</sup>*Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology, Hong Kong,*

<sup>2</sup>*Department of Electrical and Computer Engineering, University of California Santa Barbara, United States of America*

ThA1-6 (Oral) 09:45 - 10:00

**Blue (In,Ga)N Light-Emitting Diodes with Buried  $n^+$ - $p^+$  Tunnel Junctions by Plasma-Assisted Molecular Beam Epitaxy**

YongJin Cho,\*<sup>1</sup> Shyam Bharadwaj,<sup>1</sup> Zongyang Hu,<sup>1</sup> Kazuki Nomoto,<sup>1</sup> Uwe Jahn,<sup>2</sup> Huili Grace Xing,<sup>1,3</sup> and Debdeep Jena<sup>1,3</sup>

<sup>1</sup>*School of Electrical and Computer Engineering, Cornell University, United States of America,* <sup>2</sup>*Paul-Drude-Institut für Festkörperelektronik, Germany,* <sup>3</sup>*Department of Materials Science and Engineering and Kavli Institute for Nanoscale Science, Cornell University, United States of America*

ThA1-7 (Oral) 10:00 - 10:15

**Sub-50 kHz Linewidth 1.55  $\mu$ m Quantum Dot Distributed Feedback Lasers**

Annette Becker,<sup>1</sup> Tali Septon,<sup>2</sup> Sutapa Gosh,<sup>2</sup> Gal Shtendel,<sup>2</sup> Vitalii Sichkovskiy,<sup>1</sup> Florian Schnabel,<sup>1</sup> Anna Sengül,<sup>1</sup> Marko Bjelica,<sup>3</sup> Bernd Witzigmann,<sup>3</sup> Gadi Eisenstein,<sup>2</sup> and Johann Peter Reithmaier\*<sup>1</sup>

<sup>1</sup>*Technische Physik, Institute of Nanostructure Technologies and Analytics, CINSaT, University of Kassel, Germany,* <sup>2</sup>*Electrical Engineering Department and Russell Barrie Nanotechnology Institute, Technion - Israel Institute of Technology, Israel,*

<sup>3</sup>*Computational Electronics and Photonics Group, CINSaT, University of Kassel, Germany*

ThA1-8 (Oral)

10:15 - 10:30

**Quantum entangled photon emitting diodes based on GaAs quantum dots on (111)A: Robustness against increasing temperature**Neul Ha,\* Takaaki Mano, Takashi Kuroda, and Kazuaki Sakoda  
*National Institute for Materials Science (NIMS), Japan*

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**ThB1 Novel Photonics**

Room B 08:30-10:30

*Chair: Takashi Asano and Mitsuru Takenaka*

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ThB1-1 (Invited)

08:30 - 09:00

**Transfer printing of III-V devices for silicon photonics**Brian Corbett,\* Ruggero Loi, Lei Liu, Brendan Roycroft, and James O'Callaghan  
*Tyndall National Institute, University College Cork, Ireland*

ThB1-3 (Oral)

09:00 - 09:15

**Photonic-crystal Lasers with Extremely Short Embedded Active-regions**Takuma Tsurugaya,\*<sup>1</sup> Koji Takeda,<sup>1,3</sup> Takuro Fujii,<sup>1,3</sup> Eiichi Kuramochi,<sup>2,3</sup> Akihiko Shinya,<sup>2,3</sup> Masaya Notomi,<sup>2,3</sup> Takaaki Kakitsuka,<sup>1,3</sup> Hiroshi Fukuda,<sup>1,3</sup> and Shinji Matsuo<sup>1,3</sup><sup>1</sup>*NTT Device Technology Labs., NTT Corporation, Japan,* <sup>2</sup>*NTT Basic Research Labs., NTT Corporation, Japan,* <sup>3</sup>*NTT Nanophotonics Center, NTT Corporation, Japan*

ThB1-4 (Oral)

09:15 - 09:30

**Tuning Lasing Emission towards Long Wavelengths in GaAs-(In,Al)GaAs Core-Multishell Nanowires on Silicon**Thomas Stettner,<sup>1</sup> Paul Schmiedeke,<sup>1</sup> Andreas Thurn,<sup>1</sup> Markus Doeblinger,<sup>2</sup> Jochen Bissinger,<sup>1</sup> Daniel Ruhstorfer,<sup>1</sup> Jonathan J. Finley,<sup>1</sup> and Gregor Koblmüller\*<sup>1</sup><sup>1</sup>*Walter Schottky Institute and Physics Department, Technical University of Munich, Germany,* <sup>2</sup>*Department of Chemistry, Ludwig Maximilians University Munich, Germany*

ThB1-5 (Oral)

09:30 - 09:45

**Investigation of second harmonic generation efficiency in ultrahigh-Q SiC photonic crystal nanocavities**Heungjoon Kim,\*<sup>1,2</sup> Takashi Asano,<sup>1</sup> Bong-Shik Song,<sup>1,2</sup> and Susumu Noda<sup>1</sup><sup>1</sup>*Department of Electronic Science and Engineering, Kyoto University, Japan,* <sup>2</sup>*Department of Electrical and Computer Engineering, Sungkyunkwan University, Republic of Korea*

ThB1-6 (Oral)

09:45 - 10:00

**Buried tunnel junction current injection for InP-based nanomembrane photonic crystal surface emitting lasers on Silicon**Carl Reuterskiöld Hedlund,\*<sup>1</sup> Shi-Chia Liu,<sup>2</sup> Deyin Zhao,<sup>2</sup> Weidong Zhou,<sup>2</sup> and Mattias Hammar<sup>1</sup><sup>1</sup>*Department of Electronics, Royal Institute of Technology, Electrum 229, 164 40 Kista, Sweden, Sweden,* <sup>2</sup>*Department of Electrical Engineering, University of Texas at Arlington, TX 76019, USA, United States of America*

ThB1-7 (Oral)

10:00 - 10:15

**Horn-Shaped Metal-Clad Modulator Coupled to InP Waveguide**

Yuguang Wang,\* Mitsuhiro Watanabe, Yi Xiao, Takuo Tanemura, and Yoshiaki Nakano

*Department of Electrical Engineering and Information Systems, School of Engineering, The University of Tokyo, Japan*

ThB1-8 (Oral)

10:15 - 10:30

**Topological edge state laser using a photonic crystal nanocavity array**Changhyun Han,<sup>\*1,2</sup> Myungjae Lee,<sup>1,2</sup> Minsu Kang,<sup>1,2</sup> and Heonsu Jeon<sup>1,2,3</sup><sup>1</sup>Department of Physics and Astronomy, Seoul National University, Republic of Korea, <sup>2</sup>Inter-University Semiconductor Research Centre, Seoul National University, Republic of Korea, <sup>3</sup>Institute of Applied Physics, Seoul National University, Republic of Korea**ThC1 Oxides: Doping**

Room C 08:30-10:30

Chair: Farida Selim and Chih-Chung Yang

ThC1-1 (Invited)

08:30 - 09:00

**Zinc Oxide Grown by ALD - from Heavily n-type to p-type Material**Elzbieta Guziewicz,<sup>\*</sup> Ewa Przedziecka, and Tomasz A Krajewski

Institute of Physics, Polish Academy of Sciences, Poland

ThC1-3 (Oral)

09:00 - 09:15

**Development of Carrier Concentration and Its Effects on the Electrical Stability of Al-doped ZnO Transparent Electrode in Harsh Environment**Fahmi Machda,<sup>\*</sup> Takaya Ogawa, Hideyuki Okumura, and Keiichi N. Ishihara

Graduate School of Energy Science, Kyoto University, Japan

ThC1-4 (Oral)

09:15 - 09:30

**Transparent Ni<sub>x</sub>Cd<sub>1-x</sub>O<sub>1+δ</sub> alloy thin films with bipolar conductivity**Chao Ping LIU,<sup>\*1,2</sup> Kingsley O. Ebgo,<sup>2</sup> Chun Yuen Ho,<sup>2</sup> Wlodek Walukiewicz,<sup>3</sup> and Kin Man Yu<sup>2,4</sup><sup>1</sup>Department of Physics, Shantou University, China, <sup>2</sup>Department of Physics, City University of Hong Kong, Hong Kong, <sup>3</sup>Materials Sciences Division, Lawrence Berkeley National Laboratory, United States of America, <sup>4</sup>Department of Materials Science and Engineering, City University of Hong Kong, Hong Kong

ThC1-5 (Oral)

09:30 - 09:45

**Demonstration of Low-Resistive P-Type Cu<sub>4</sub>O<sub>3</sub> Thin Films by Radio Frequency Sputtering for Low-Cost Thin Film Solar Cells**Md Abdul Majed Patwary,<sup>\*1</sup> Katsuhiko Saito,<sup>1</sup> Qixin Guo,<sup>1</sup> Tooru Tanaka,<sup>1</sup> Kin Man Yu,<sup>2,3</sup> and Wlodek Walukiewicz<sup>3,4</sup><sup>1</sup>Saga University, Saga, Japan, <sup>2</sup>City University of Hong Kong, Kowloon, Hong Kong, <sup>3</sup>Lawrence Berkeley National Laboratory, Berkeley, CA, United States of America, <sup>4</sup>University of California, Berkeley, CA, United States of America

ThC1-6 (Oral)

09:45 - 10:00

**Crystal Structures and Surface Plasmon Properties of GaZnO Nanostructures**Yu-Feng Yao,<sup>1</sup> Keng-Ping Chou,<sup>1</sup> Chi-Chung Chen,<sup>1</sup> Charng-Gan Tu,<sup>1</sup> Tsai-Pei Li,<sup>2</sup> Yung-Chen Cheng,<sup>2</sup> Wen-Yen Chang,<sup>1</sup> Yao-Tseng Wang,<sup>1</sup> Wai Fong Tse,<sup>1</sup> Yean-Woei Kiang,<sup>1</sup> and Chih-Chung (C. C.) Yang<sup>\*1</sup><sup>1</sup>National Taiwan University, Taiwan, <sup>2</sup>National University of Tainan, Taiwan

ThC1-7 (Oral)

10:00 - 10:15

**IGZO Thin Film Transistors for Monitoring Biotin-Protein Biochemical Interactions**Chun-Ho Chou,<sup>\*1</sup> Nian-Ting Wu,<sup>1</sup> Bo-Shun Jiang,<sup>1</sup> and Jian-Jang Huang<sup>1,2</sup><sup>1</sup>Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan, <sup>2</sup>Department of Electrical Engineering, National Taiwan University, Taiwan

ThC1-8 (Oral) 10:15 - 10:30  
**Suppressing Interdiffusion of Si in Er-doped CeO<sub>2</sub> / Si(111) and Its Impact on the Optical Property**

Tomohiro Inaba,\*<sup>1</sup> Xuejun Xu,<sup>1</sup> Takehiko Tawara,<sup>1,2</sup> Hiroo Omi,<sup>1,2</sup> Hideki Yamamoto,<sup>1</sup> and Hedeki Gotoh<sup>1</sup>  
<sup>1</sup>NTT Basic Research Laboratories, Japan, <sup>2</sup>NTT Nanophotonics Center, Japan

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ThD1 GaN and Related Technologies IV Room D 08:30-10:30

*Chair: Michał Boćkowski and Fumimasa Horikiri*

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ThD1-1 (Invited) 08:30 - 09:00

**GaN Substrates of the Highest Structural Quality**

Tomasz Sochacki  
*Institute of High Pressure Physics Polish Academy of Sciences, Poland*

ThD1-3 (Oral) 09:00 - 09:15

**Growth of high-quality >10 μm-thick GaN-on-Si with low-dislocation density in the order of 10<sup>7</sup> /cm<sup>2</sup>**

Toshiki Hikosaka,\* Jumpei Tajima, Hajime Nago, Toshiyuki Oka, and Shinya Nunoue  
*Corporate Research and Development Center, Toshiba Corporation, Japan*

ThD1-4 (Oral) 09:15 - 09:30

**Low resistive and low dislocation GaN wafer produced by OVPE method**

Junichi Takino,\*<sup>1,2</sup> Tomoaki Sumi,<sup>1</sup> Yoshio Okayama,<sup>1,2</sup> Masaki Nobuoka,<sup>1</sup> Akira Kitamoto,<sup>2</sup> Masayuki Imanishi,<sup>2</sup> Masashi Yoshimura,<sup>2</sup> and Yusuke Mori<sup>2</sup>  
<sup>1</sup>Panasonic Corporation, Japan, <sup>2</sup>Graduate school of engineering, Osaka University, Japan

ThD1-5 (Oral) 09:30 - 09:45

**Hydride vapor phase epitaxy reactor for bulk GaN growth**

Vladislav Voronenkov,\*<sup>1,2</sup> Natalia Bochkareva,<sup>2</sup> Ruslan Gorbunov,<sup>1,2</sup> Andrey Zubrilov,<sup>1,2</sup> Viktor Kogotkov,<sup>1</sup> Philippe Latyshev,<sup>1</sup> Yuri Lelikov,<sup>1,2</sup> Andrey Leonidov,<sup>1</sup> and Yuri Shreter<sup>1,2</sup>  
<sup>1</sup>TRINITRI-Technology LLC, Russia, <sup>2</sup>Ioffe Institute, Russia

ThD1-6 (Oral) 09:45 - 10:00

**In<sub>x</sub>Ga<sub>1-x</sub>N Alloys Grown by Plasma-Assisted Molecular Beam Epitaxy (PAMBE) with Growth Rates Up to 1.3 μm/hr**

Kelsey F. Jorgensen\* and James S. Speck  
*Materials Department, University of California, Santa Barbara, United States of America*

ThD1-7 (Oral) 10:00 - 10:15

**Growth of high-quality GaN single crystals using the Flux-Film-Coated Na flux LPE (FFC-LPE) method.**

Fumio Kawamura\* and Takashi Taniguchi  
*National Institute for Materials Science, Japan*

ThD1-8 (Oral) 10:15 - 10:30

**Growth and characterization of quaternary AlGaInN epitaxial films with alloy compositions around lattice-matched to GaN**

Hiroki Harada,\*<sup>1</sup> Makoto Miyoshi,<sup>1</sup> Takashi Egawa,<sup>1</sup> and Tetsuya Takeuchi<sup>2</sup>  
<sup>1</sup>Nagoya Institute of Technology, Japan, <sup>2</sup>Meijo university, Japan

**ThE1 Organic and Perovskite materials**

Room E 08:30-10:30

*Chair: Takafumi Uemura and Takashi Nagase*

ThE1-3 (Invited)

09:00 - 09:30

**Liquid Crystals as Polycrystalline Materials for Organic Thin Film Transistors**

Hiroaki Iino

*Imaging Science and Engineering Research Center, Tokyo Institute of Technology, Japan*

ThE1-5 (Oral)

09:30 - 09:45

**Nucleation and shape of 2D islands of DPh-DNTT thin-films prepared by vacuum evaporation**

Yoshiaki Hattori,\* Yoshinari Kimura, and Masatoshi Kitamura

*Kobe University, Japan*

ThE1-6 (Oral)

09:45 - 10:00

**Investigation of 1,8-Diiodooctane (DIO) Additive Effect on Carrier Transport in Bulk Heterojunction Organic Solar Cell by EFISHG**Ibrahim Alrougy\*,<sup>1,2</sup> Dai Taguchi,<sup>1</sup> and Takaaki Manaka<sup>1</sup>*<sup>1</sup>Tokyo Institute of Technology, Japan, <sup>2</sup>King Abdulaziz City for Science and Technology (KACST), Saudi Arabia*

ThE1-7 (Oral)

10:00 - 10:15

**Visualization of Carrier Transport in Organic-Inorganic Perovskite Field-Effect Transistor by Electric- Field-Induced Optical Second-Harmonic Generation (EFISHG)**

Lei Lei Yin Win,\* Dai Taguchi, and Takaaki Manaka

*Department of Electrical and Electronic Engineering, Tokyo Institute of Technology, Japan*

ThE1-8 (Oral)

10:15 - 10:30

**Composition tunable inorganic Lead Halide Perovskites microstructures synthesized by single and two-step chemical vapor deposition methods**Mohammad Kamal Hossain\*,<sup>1,2</sup> Pengfei Guo,<sup>3</sup> Johnny C. Ho,<sup>4</sup> and Kin Man Yu<sup>1,4</sup>*<sup>1</sup>Department of Physics, City University of Hong Kong, Hong Kong, <sup>2</sup>Department of Physics, Comilla University, Bangladesh,**<sup>3</sup>Key Laboratory of Microelectronic and Energy of Henan Province School of Physics and Electronic Engineering, Xinyang Normal University, China, <sup>4</sup>Department of Materials Science and Engineering, City University of Hong Kong, Hong Kong*

Coffee Break

10:30 - 11:00

**ThA2 Advanced Epitaxial Growth Techniques of III-V Materials**

Room A

11:00-12:30

*Chair: Takashi Suemasu and Zakaria Y. Al Balushi*

ThA2-1 (Oral)

11:00 - 11:15

**Crystal Phase Tuning in Planar Films of III-V Semiconductors**Philipp Staudinger\*,<sup>1</sup> Nicolas Tappy,<sup>2</sup> Svenja Mauthe,<sup>1</sup> Kirsten Moselund,<sup>1</sup> Anna Fontcuberta i Morral,<sup>2,3</sup> and Heinz Schmid<sup>1</sup>*<sup>1</sup>IBM Research Zurich, Switzerland, <sup>2</sup>Laboratoire des Matériaux Semiconducteurs, Institute of Materials, School of Engineering, EPFL, Switzerland, <sup>3</sup>Institute of Physics, School of Basic Sciences, EPFL, Switzerland*

ThA2-2 (Oral)

11:15 - 11:30

**Selective-area MOVPE growth of multi- $\lambda$  InGaAlAs-based MQWs on patterned InP-on-insulator substrate**Takuro Fujii,\* Tomonari Sato, Koji Takeda, Takaaki Kakitsuka, and Shinji Matsuo  
*NTT Device Technology labs, Japan*

ThA2-3 (Oral)

11:30 - 11:45

**Direct Heteroepitaxy of Orientation-Patterned GaP on GaAs by Hydride Vapour Phase Epitaxy for Quasi-Phase-Matching Applications**Axel Strömberg,\*<sup>1</sup> Giriprasanth Omanakuttan,<sup>1</sup> Pooja Vardhini Natesan,<sup>1</sup> Tajkia Syeed Tofa,<sup>1</sup> Arnaud Grisard,<sup>2</sup> Bruno Gerard,<sup>3</sup> Hoon Jang,<sup>1</sup> Valdas Pasiskevicius,<sup>1</sup> Fredrik Laurell,<sup>1</sup> Sebastian Lourdudoss,<sup>1</sup> and Yan-Ting Sun<sup>1</sup>  
<sup>1</sup>*Department of Applied Physics, Royal Institute of Technology-KTH, Sweden,* <sup>2</sup>*Thales Research & Technology (TRT), France,* <sup>3</sup>*III-V Lab, France*

ThA2-4 (Oral)

11:45 - 12:00

**Strained layer superlattices for dislocation reduction in III-V on V-groove patterned (001) silicon**Bei Shi,\*<sup>1</sup> Lei Wang,<sup>1</sup> Aidan Taylor,<sup>2</sup> Simone Suran Brunelli,<sup>1</sup> and Jonathan Klamkin<sup>1</sup>  
<sup>1</sup>*Department of Electrical and Computer Engineering, University of California Santa Barbara, United States of America,* <sup>2</sup>*Materials Department, University of California Santa Barbara, United States of America*

ThA2-5 (Oral)

12:00 - 12:15

**High-quality Epitaxial Growth of AlGaInAs-based Active Structures on a Directly-Bonded InPoSi Substrate**Claire Besancon,\*<sup>1,3</sup> Jean Decobert,<sup>1</sup> Jean-Pierre Le Goec,<sup>1</sup> Nicolas Vaissiere,<sup>1</sup> Cecilia Dupre,<sup>2</sup> Viviane Muffato,<sup>2</sup> Frank Fournel,<sup>2</sup> Christophe Jany,<sup>2</sup> Franck Bassani,<sup>3</sup> Sylvain David,<sup>3</sup> and Thierry Baron<sup>3</sup>  
<sup>1</sup>*III-V Lab, a joint lab of 'Nokia Bell Labs', 'Thales Research and Technology' and CEA LETI, France,* <sup>2</sup>*Univ. Grenoble Alpes, CEA, LETI, France,* <sup>3</sup>*Univ. Grenoble Alpes; CNRS, CEA/Leti Minatec, LTM, France*

ThA2-6 (Oral)

12:15 - 12:30

**Template-assisted selective epitaxy for III-V vertical nanowires on Si tandem solar cells**Noelia Vico Trivino,\*<sup>1</sup> Philipp Staudinger,<sup>1</sup> Nicolas Bologna,<sup>1,2</sup> Heike Riel,<sup>1</sup> Kirsten Moselund,<sup>1</sup> and Heinz Schmid<sup>1</sup>  
<sup>1</sup>*IBM Research-Zurich, Switzerland,* <sup>2</sup>*Electron Microscopy Center, Empa, Switzerland*

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**ThB2 Photodetectors**

Room B 11:00-12:30

*Chair: Patrick Runge and Yasumasa Kawakita*

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ThB2-1 (Invited)

11:00 - 11:30

**High-speed Avalanche Photodiodes based on III-V Compounds for Optical Communications**Masahiro Nada,\*<sup>1</sup> Fumito Nakajima,<sup>2</sup> Toshihide Yoshimatsu,<sup>1</sup> Hideaki Matsuzaki,<sup>2</sup> and Kimikazu Sano<sup>1</sup>  
<sup>1</sup>*NTT Device Innovation Center, Japan,* <sup>2</sup>*NTT Device Technology Labs., Japan*

ThB2-3 (Oral)

11:30 - 11:45

**Polarization Diverse Photodetector Chip Based on Waveguide Integrated MQW and Bulk Photodiodes**Tobias Beckerwerth, Shahram Keyvaninia, Marko Gruner, Patrick Runge,\* and Martin Schell  
*Fraunhofer Heinrich-Hertz-Institute, Germany*

ThB2-4 (Oral)

11:45 - 12:00

**Transition Metal Doped InGaAs Photoconductors for THz Detectors**Steffen Breuer,\*<sup>1</sup> Robert B. Kohlhaas,<sup>1</sup> Simon Nellen,<sup>1</sup> Lars Liebermeister,<sup>1</sup> Björn Globisch,<sup>1</sup> Martin Schell,<sup>1</sup> Mykhaylo P. Semtsiv,<sup>2</sup> and W. Ted Masselink<sup>2</sup><sup>1</sup>Fraunhofer HHI, Berlin, Germany, <sup>2</sup>Humboldt University Berlin, Department of Physics, Germany

ThB2-5 (Oral)

12:00 - 12:15

**Large ionization coefficient ratio in AlAs<0.56>Sb<0.44> avalanche photodiode**Diana L. Huffaker,\*<sup>1</sup> Shiyu Xie,<sup>1</sup> Xin Yi,<sup>3</sup> Baolai Liang,<sup>2</sup> Leh Woon Lim,<sup>3</sup> Chee Hing Tan,<sup>3</sup> and John P. David<sup>3</sup><sup>1</sup>Cardiff University, United Kingdom, <sup>2</sup>University of California-Los Angeles, United States of America, <sup>3</sup>University of Sheffield, United Kingdom

ThB2-6 (Oral)

12:15 - 12:30

**Limitations to Power Conversion Efficiency of InP Based Uni-traveling-carrier Photodiodes Due to Space Charge Resistance**Brandon J. Isaac,\*<sup>1</sup> Yuan Liu,<sup>2</sup> Sergio Pinna,<sup>2</sup> and Jonathan Klamkin<sup>2</sup><sup>1</sup>Materials Department, University of California Santa Barbara, United States of America, <sup>2</sup>Electrical and Computer Engineering Department, University of California Santa Barbara, United States of America

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**ThC2 GaN Power Devices and Characterization**

Room C 11:00-12:30

*Chair: Masaaki Kuzuhara and Akio Wakejima*

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ThC2-1 (Invited)

11:00 - 11:30

**The Commercialization of GaN Power Devices: Value Proposition, Manufacturing, and Reliability**Thomas Detzel,\*<sup>1</sup> Alain Charles,<sup>2</sup> Gerald Deboy,<sup>1</sup> Oliver Haeberlen,<sup>1</sup> and Timothy McDonald<sup>2</sup><sup>1</sup>Infineon Technologies Austria AG, Austria, <sup>2</sup>Infineon Technologies Americas Corp, United States of America

ThC2-3 (Oral)

11:30 - 11:45

**Novel Slanted Field Plate Technology for GaN HEMTs by Grayscale Lithography on Flowable Oxide**

Taifang Wang,\* Luca Nela, Jun Ma, and Elison Matioli

*Ecole polytechnique federale de Lausanne (EPFL), Switzerland*

ThC2-4 (Oral)

11:45 - 12:00

**Experimental Verification of Substrate Bias Effect on the Gate Charge for GaN HEMTs**

Wen Yang and Jiann-Shiun Yuan\*

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

ThC2-5 (Oral)

12:00 - 12:15

**Experimental Determination of Hole Impact Ionization Coefficient and Saturation Velocity in GaN**Dong Ji,\*<sup>1</sup> Burcu Ercan,<sup>1</sup> and Srabanti Chowdhury<sup>1,2</sup><sup>1</sup>Department of Electrical and Computer Engineering, University of California, Davis, United States of America, <sup>2</sup>Department of Electrical Engineering, Stanford University, United States of America

ThC2-6 (Oral)

12:15 - 12:30

**Experimental Demonstration of Avalanche Noise in GaN PN Junctions Grown on Native GaN Substrates**

Lina Cao,\* Jingshan Wang, Hansheng Ye, and Patrick Fay

*Department of Electrical Engineering, University of Notre Dame, United States of America*



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Closing and Student Award Ceremony

Room A 12:30-13:30

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