



# IWGO 2024 Detailed Program

May 26, Sunday

15:30-19:30 Registration of Participants

15:30-17:15 Registration Process

17:30-19:30 Welcome Reception

May 27, Monday

08:15-08:45 Admissions

08:45-09:00 MoM1\_1 IWGO 2024 Opening Notes Oliver Bierwagen, Martin Albrecht, Roman Engel-Herbert

09:00-10:15 Bulk Growth Chair: tbd

- 09:00-09:25 MoM1\_2 (Invited)  
**Recent Status of Ga<sub>2</sub>O<sub>3</sub> Crystal Growth Development**  
Akito Kuramata  
*Novel Crystal Technology, Inc., Sayama, Saitama, Japan*
- 09:25-09:40 MoM1\_3 (Oral)  
**Crystal Growth and Planar Defects of β-Ga<sub>2</sub>O<sub>3</sub> Single Crystal**  
Wenxiang Mu\*, Jin Zhang, Pei Wang, Yang Li, Zhitai Jia, Xutang Tao  
*State Key Laboratory of Crystal Materials, Institute of Novel Semiconductors, Institute of Crystal Materials, Shandong University, China*
- 09:40-09:55 MoM1\_4 (Oral)  
**Growth of β-Ga<sub>2</sub>O<sub>3</sub> single crystals 2-4 inches in diameters by the vertical Bridgman (VB) technique**  
T. Taishi<sup>1</sup> and K. Hoshikawa  
*Faculty of Engineering, Shinshu University, Nagano, Japan*
- 09:55-10:10 MoM1\_5 (Oral)  
**Growth of 6-inch bulk β-Ga<sub>2</sub>O<sub>3</sub> single crystal by vertical Bridgman method**  
T. Igarashi<sup>1,\*</sup>, Y. Ueda, H. Yamaguchi<sup>1</sup>, K. Koshi<sup>2</sup>, R. Sakaguchi<sup>1</sup>, S. Watanabe<sup>1</sup>, S. Yamakoshi<sup>1</sup> and A. Kuramata<sup>1</sup>  
<sup>1</sup>*Novel Crystal Technology, Inc., Japan*  
<sup>2</sup>*National Institute of Advanced Industrial Science and Technology, Japan*
- 10:10-10:15 MoM1\_6 **Company Pitch by: Hangzhou Fujia Gallium technology Co. Ltd.**

10:15-10:45 Break with Refreshments

10:45-12:20 Vapor Phase Epitaxy Chair: tbd

10:45-11:30 MoM2\_1 (Keynote lecture)

**Advances of Homoepitaxial growth of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> by MOVPE**

Andreas Popp\*, Ta-Shun Chou, Saud Bin Anooz, Jana Rehm, Arub Akhtar, Zbigniew Galazka, Andreas Fiedler, Palvan Seyidov, Klaus Irmscher, Martin Albrecht

*Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany*

11:30-11:45 MoM2\_2 (Oral)

**Mitigating Step Flow Instabilities in MOVPE-Grown  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Films**

Ta-Shun Chou\*, Saud Bin Anooz, Jana Rehm, Arub Ahktar, Owen Ernst, Zbigniew Galazka, Palvan Seyidov, Wolfram Miller, Martin Albrecht, Andreas Fiedler and Andreas Popp

*Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany*

11:45-12:00 MoM2\_3 (Late News)

**Advancements in MOCVD Growth of High-Quality  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Films with Innovative Showerhead Technology**

Andrei Osinsky, William Brand, and Fikadu Alema

*Agnitron Technology, Inc, Chanhassen, MN 55317, U.S.A*

12:00:12:25 MoM2\_4 (Invited)

**Vapor-phase epitaxial growth of gallium-oxide using Ga halides as source gases**

Y. Kumagai<sup>1,\*</sup>, H. Murakami<sup>1</sup>, K. Sasaki<sup>1</sup>, A. Kuramata<sup>2</sup> and M. Higashiwaki<sup>3,4</sup>

<sup>1</sup>Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan <sup>2</sup>Novel Crystal Technology Inc., Japan <sup>3</sup>National Institute of Information and Communications Technology, Japan <sup>4</sup>Department of Physics and Electronics, Osaka Metropolitan University, Sakai, Osaka, Japan

12:25-12:30 MoM2\_4 Company Pitch by: LayTec

12:30-14:15 Lunch Break

14:15-15:55  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub>, Ga<sub>2</sub>O<sub>3</sub>/III-N, MBE

Chair: tbd

14:15-14:40 MoA1\_1 (Invited)

**MOVPE growth and properties of orthorhombic  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub>**

Roberto Fornari

*Dept. of Mathematical, Physical and Computer Sciences, University of Parma, Italy and CNR - Institute of Materials for Electronics and Magnetism, Parma, Italy*

14:40-14:55 MoA1\_2 (Oral)

**(Student) Molecular beam epitaxy of (001) $\kappa$ -Ga<sub>2</sub>O<sub>3</sub> thin films on  $\epsilon$ -GaFeO<sub>3</sub> substrates**

A. Sacchi<sup>1,\*</sup>, F. Mezzadri<sup>2,3</sup>, A. Ardenghi<sup>4</sup>, O. Bierwagen<sup>4</sup>, J. Lähnemann<sup>4</sup>, H. Tornatzky<sup>4</sup>, M. R. Wagner<sup>4,5</sup>, H. Nishinaka<sup>6</sup>, R. Fornari<sup>1,3</sup>, P. Mazzolini<sup>1,3</sup>

<sup>1</sup>Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy <sup>2</sup>Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Italy <sup>3</sup>IMEM-CNR, Parma, Italy <sup>4</sup>Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany <sup>5</sup>Technische Universität Berlin, Institute of Solid State Physics, Berlin, Germany and <sup>6</sup>Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Japan

14:55-15:10 MoA1\_3 (Oral)

**The Growth of Ga<sub>2</sub>O<sub>3</sub>-III-Nitrides by Molecular Beam Epitaxy**

J. P. McCandless<sup>1,2,\*</sup>, S. Raghuvansy<sup>2</sup>, M. Schowalter<sup>2</sup>, N. Krantz<sup>2</sup>, A. Karg<sup>2</sup>, D. G. Schlom<sup>1</sup>, H. G. Xing<sup>1</sup>, A. Rosenauer<sup>2</sup>, M. Eickhoff<sup>2</sup>, P. Vogt<sup>1,2</sup>, D. Jena<sup>1</sup>

<sup>1</sup>Cornell University, Ithaca, NY, USA and <sup>2</sup>University of Bremen, Bremen, Germany

- 15:10-15:25 MoA1\_4 (Oral)  
**(Student) Heteroepitaxial growth of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>(-201)/AlN(0001) and  $\epsilon/\kappa$ -Ga<sub>2</sub>O<sub>3</sub>(001)/AlN(0001) structures by molecular-beam epitaxy**  
 S. Raghuvansy<sup>1,\*</sup>, J. P. McCandless<sup>1,2</sup>, M. Schowalter<sup>1</sup>, A. Karg<sup>1</sup>, M. Alonso-Orts<sup>3</sup>, M. S. Williams<sup>1</sup>, D. G. Schlom<sup>4,5,6</sup>, A. Rosenauer<sup>1,3</sup>, D. Jena<sup>2,4,5</sup>, M. Eickhoff<sup>1,3</sup> and P. Vogt<sup>1,4</sup>  
<sup>1</sup>Institute of Solid-State Physics, Bremen University, Bremen, Germany <sup>2</sup>School of Electrical and Computer Engineering, Cornell University, Ithaca, New York, USA <sup>3</sup>MAPEX Center for Materials and Processes, University of Bremen, Bremen, Germany <sup>4</sup>Department of Material Science and Engineering, Cornell University, Ithaca, New York, USA <sup>5</sup>Kavli Institute at Cornell for Nanoscale Science, Cornell University, Ithaca, New York, USA and <sup>6</sup>Leibniz-Institut für Kristallzüchtung, Berlin, Germany
- 15:25-15:40 MoA1\_6 (Oral)  
**Molecular beam epitaxy of  $\epsilon/\kappa$ -Ga<sub>2</sub>O<sub>3</sub> using In as a surfactant**  
 A.Karg<sup>1,\*</sup>, A. Hinz<sup>1</sup>, M. Schowalter<sup>1</sup>, P. Vogt<sup>1</sup>, S.Figge<sup>1</sup>, A. Rosenauer<sup>1,2</sup>, M. Eickhoff<sup>1,2</sup>  
<sup>1</sup>Institute of Solid State Physics, University of Bremen, Germany and <sup>2</sup>MAPEX Center for Materials and Processes, University of Bremen, Germany
- 15:40-15:55 MoA1\_5 (Oral)  
**Molecular beam epitaxy of Al-Polar AlN(0001) on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>(-201)**  
 E. Monroy<sup>1,\*</sup>, H. Okuno<sup>2</sup>, H. Roussel<sup>3</sup>, J.-L. Rouvière<sup>2</sup>, A. Bujak<sup>3</sup>, A. Seguret<sup>1,3</sup>, P. Ferrandis<sup>4</sup>, and V. Consonni<sup>3</sup>  
<sup>1</sup>Univ. Grenoble-Alpes, CEA, Grenoble INP, IRIG, PHELIQS, Grenoble, France <sup>2</sup>Univ. Grenoble-Alpes, CEA, IRIG, MEM, Grenoble, France <sup>3</sup>Univ. Grenoble-Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France and <sup>4</sup>Univ. Grenoble-Alpes, CNRS, Grenoble INP, Institut Néel, Grenoble, France

15:55-16:25 Break with Refreshments

16:25-17:35 MBE, Polymorphism Chair: tbd

- 16:25-16:50 MoA2\_1 (Invited)  
**Growth of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> and  $\alpha$ -(Al<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> by Suboxide MBE at 1  $\mu$ m/hr**  
 D.G. Schlom<sup>1,2,3,\*</sup>  
<sup>1</sup>Department of Materials Science & Engineering, Cornell University, Ithaca, New York, USA <sup>2</sup>Kavli Institute at Cornell for Nanoscale Science, Ithaca, New York, USA and <sup>3</sup>Leibniz-Institut für Kristallzüchtung, Berlin, Germany
- 16:50-17:05 MoA2\_2 (Oral)  
**(Student) Surface and interface energies of  $\alpha$ -,  $\beta$ -, and  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub> under epitaxial strain induced by a sapphire substrate**  
 I.Bertoni<sup>1,\*</sup>, A. Ugolotti<sup>1</sup>, E. Scalise<sup>1</sup> and L. Miglio<sup>1</sup>  
<sup>1</sup>Department of Materials Science, Università degli Studi di Milano-Bicocca, Milano, Italy
- 17:05-17:20 MoA2\_3 (Oral)  
**Optical library of  $\alpha$ -,  $\beta$ -,  $\gamma$ - and  $\kappa$ - Ga<sub>2</sub>O<sub>3</sub> polymorphs: comparative study of emission and absorption properties**  
 Augustinas Galeckas<sup>1,\*</sup>, Ji-Hyeon Park<sup>2</sup>, Dae-Woo Jeon<sup>2</sup>, Halin Lee<sup>3</sup>, Won-Jae Lee<sup>3</sup>, Rui Zhu<sup>4,5</sup>, Zengxia Mei<sup>4,5</sup>, Alexander Azarov<sup>1</sup> and Andrej Kuznetsov<sup>1</sup>  
<sup>1</sup>University of Oslo, Department of Physics, Centre for Materials Science and Nanotechnology, Oslo, Norway <sup>2</sup>Korea Institute of Ceramic Engineering & Technology, Republic of Korea <sup>3</sup>Dong-Eui University, Department of Advanced Materials Engineering, Republic of Korea <sup>4</sup>Songshan Lake Materials Laboratory, Guangdong, P. R. China and <sup>5</sup>Institute of Physics, Chinese Academy of Sciences, Beijing, P. R. China
- 17:20-17:35 MoA2\_4 (Oral)  
**(Student) Comparative Study of Temperature-Dependent Bandgap Transitions in Ga<sub>2</sub>O<sub>3</sub> Polymorphs**  
 B. M. Janzen<sup>1,\*</sup>, N. Hajizadeh<sup>1</sup>, M. Meißner<sup>1</sup>, M. N. Marggraf<sup>1</sup>, C. V. Hartung<sup>1</sup>, A. Wüthrich<sup>1</sup>, N. Bernhardt<sup>1</sup>, F. Nippert<sup>1</sup>, Z. Galazka<sup>2</sup>, P. Mazzolini<sup>3,4</sup>, A. Sacchi<sup>3</sup>, Matteo Bosi<sup>4</sup>, Luca Seravalli<sup>4</sup>, R. Fornari<sup>3,4</sup>, C. Petersen<sup>5</sup>, H. von Wenckstern<sup>5</sup>, M. Grundmann<sup>5</sup>, A. Ardenghi<sup>6</sup>, O. Bierwagen<sup>6</sup>, T. Oshima<sup>7</sup>, T. Kato<sup>8</sup>, H. Nishinaka<sup>9</sup> and M. R. Wagner<sup>6,1</sup>  
<sup>1</sup>Technische Universität Berlin, Institute of Solid State Physics, Germany <sup>2</sup>Leibniz-Institut für Kristallzüchtung, Berlin, Germany <sup>3</sup>Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy <sup>4</sup>Universität Leipzig, Felix-Bloch-Institut für Festkörperphysik, Germany <sup>5</sup>Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany <sup>6</sup>Department of Electrical

17:35-19:30 Poster 1: bulk  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>, Polymorphs and  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub>, Growth mechanisms, Ga<sub>2</sub>O<sub>3</sub>/III-N

- MoP\_1 Temperature Gradient control of Gallium Oxide Crystal Growth via Edge-Defined Film-Fed Growing Method**  
Seong-Min Jeong<sup>1,\*</sup>, Woon-Hyeon Jeong<sup>1,2</sup>, Su-Min Choi<sup>3</sup>, Yun-Ji Shin<sup>1</sup>, Si-Young Bae<sup>1</sup>, Jin-Ki Kang<sup>4</sup>, Won-Jae Lee<sup>3</sup> and Se-Hun Kwon<sup>2</sup>  
<sup>1</sup>Semiconductor Materials Center, Korea Institute of Ceramic Engineering and Technology, Jinju, Gyeongsangnam-do, Republic of Korea  
<sup>2</sup>Department of Materials Science and Engineering, Pusan National University, Busan, Republic of Korea  
<sup>3</sup>Department of Advanced Materials Engineering, Dong-Eui University, Busan, Republic of Korea
- MoP\_2 (Student) Theoretical Consideration of Load Cell Weight Variation at Different Steps for Ga<sub>2</sub>O<sub>3</sub> Crystal Growth by EFG Method**  
Yun-Jin Kim<sup>1,2</sup>, Dong-Gu Kang<sup>1</sup>, Dong-hee Cho<sup>1</sup>, Min-ji Chae<sup>2</sup>, Sun-Yeong Seo<sup>2</sup>, Won-Jae Lee<sup>2</sup>, Jin-Ki Kang<sup>1\*</sup>  
<sup>1</sup>AXEL, Jinju-si, Korea  
<sup>2</sup>Department of Advanced Materials Engineering, Dong-Eui University, Busan, Korea
- MoP\_3 (Student) Characteristics of substrates with various crystal orientations obtained from a  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> single crystal grown by the EFG method**  
Min-Ji Chae<sup>1</sup>, Sun-Yeong Seo<sup>1</sup>, Hui-Yeon Jang<sup>1</sup>, Mi-Seon Park<sup>1</sup>, Kwang-Hee Jung<sup>1</sup>, Won-Jae Lee<sup>1,\*</sup>, Su-Min Choi<sup>2</sup>, Hyun-Woo Park<sup>2</sup>, Jin-Ki Kang<sup>2</sup>, Yun-Ji Shin<sup>3</sup>, Si-Young Bae<sup>3</sup>, Hae-Yong Lee<sup>4</sup>, Tae-Kyung Lee<sup>5</sup> and Hyoung-Jae Kim<sup>5</sup>  
<sup>1</sup>Department of Advanced Materials Engineering, Dong-Eui University, Busan, Korea  
<sup>2</sup>AXEL, Jinju-si, Korea  
<sup>3</sup>Korea Institute of Ceramic Engineering and Technology, Jinju-si, Korea  
<sup>4</sup>LumiGNtech Co, Ltd, Gwangmyeong-si, Gyeonggi-do, Korea and  
<sup>5</sup>Korea Institute of Industrial Technology, Sasang-gu, Busan, Korea
- MoP\_4 (Student) Sn/Fe-doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> single crystals growth by controlling temperature gradient in growth zone**  
Min-Ji Chae<sup>1</sup>, Sun-Yeong Seo<sup>1</sup>, Hui-Yeon Jang<sup>1</sup>, Mi-Seon Park<sup>1</sup>, Kwang-Hee Jung<sup>1</sup>, Won-Jae Lee<sup>1,\*</sup>, Su-Min Choi<sup>2</sup>, Hyun-Woo Park<sup>2</sup>, Jin-Ki Kang<sup>2</sup>, Yun-Ji Shin<sup>3</sup>, Si-Young Bae<sup>3</sup>, Hae-Yong Lee<sup>4</sup>, Tae-Kyung Lee<sup>5</sup> and Hyoung-Jae Kim<sup>5</sup>  
<sup>1</sup>Department of Advanced Materials Engineering, Dong-Eui University, Busan, Korea  
<sup>2</sup>AXEL, Jinju-si, Korea and  
<sup>3</sup>KITECH, Korea Institute of Industrial Technology, Busan, Korea
- MoP\_5 (Student) Modulating the bandgap of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> via alloying with In<sub>2</sub>O<sub>3</sub> in melt-grown crystals**  
Benjamin L. Dutton\*, John S. McCloy  
Institute of Materials Research, Washington State University, Pullman WA, USA
- MoP\_6 (Student) Studies on structural and optical properties of (100) orientation growth of cerium doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> single crystals**  
K.V. Akshita, S. Moorthy Babu\*  
Crystal Growth Centre, Anna University, Chennai, INDIA
- MoP\_7 Study of impurity contamination in gallium oxide crystal grown by floating zone method**  
Coralie Perrier<sup>1,3</sup>, Aboulaye Traoré<sup>2,3</sup>, Toshimitsu Ito<sup>4</sup>, Hitoshi Umezawa<sup>5</sup>, Etienne Gheeraert<sup>1,2,3</sup> and Philippe Ferrandis<sup>1,3,\*</sup>  
<sup>1</sup>Université Grenoble Alpes, CNRS, Grenoble INP, Institut Néel, Grenoble, France  
<sup>2</sup>Faculty of Pure and Applied Sciences, University of Tsukuba, Tsukuba, Japan  
<sup>3</sup>Japanese-French Laboratory for Semiconductor Physics and Technology J-F AST, CNRS, University Grenoble Alpes, Grenoble INP, University of Tsukuba, Japan  
<sup>4</sup>Electronics and Photonics Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan and  
<sup>5</sup>Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology (AIST), Osaka, Japan
- MoP\_8 Comprehensive Investigation of Structural Defects in Ga<sub>2</sub>O<sub>3</sub> Single Crystals Grown by EFG Method**  
Yun-Ji Shin<sup>1</sup>, Mee-Hi Choi<sup>1,2</sup>, Soon-Ku Hong<sup>3</sup>, Seong-Min Jeong<sup>1</sup>, and Si-Young Bae<sup>1,\*</sup>  
<sup>1</sup>Semiconductor Materials Center, Korea Institute of Ceramic Engineering and Technology, Jinju-si, Gyeongsangnam-do, Republic of Korea,  
<sup>2</sup>Department of Materials Science and Engineering Pusan National University, Busan, Republic of Korea and  
<sup>3</sup>Department of Materials Science and Engineering Chungnam National University, Daejeon, Republic of Korea
- MoP\_9 X-ray Topography Imaging of Defects in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> and Their Correlation to Laboratory X-ray Rocking Curves**  
M. E. Liao<sup>1,\*</sup>, K. Huynh<sup>1</sup>, Y. Wang<sup>1</sup> and M. S. Goorsky<sup>1</sup>  
<sup>1</sup>University of California Los Angeles, Los Angeles, California, USA

MoP\_10 (Student) **Simulation of multi-component target ablation: a novel combinatorial pulsed laser deposition technique**

A.Jörns<sup>1\*</sup>, H. von Wenckstern<sup>1</sup> and M. Grundmann<sup>1</sup>

<sup>1</sup>Leipzig University, Felix Bloch Institute for Solid State Physics, Leipzig, Germany

MoP\_11 **N<sub>2</sub>-diluted H<sub>2</sub> gas etching of (-102) β-Ga<sub>2</sub>O<sub>3</sub> under atmospheric pressure**

T. Oshima<sup>1,\*</sup>, R. Togashi<sup>2</sup> and Y. Oshima<sup>1</sup>

<sup>1</sup>National Institute for Materials Science, Tsukuba, Ibaraki, Japan and <sup>2</sup>Sophia University, Chiyoda, Tokyo, Japan

MoP\_12 **Influence of geometrical selection on the orientation of Ga<sub>2</sub>O<sub>3</sub> nanorod arrays grown by chemical bath deposition on SnO<sub>2</sub> layers**

N. Bašinová<sup>1</sup>, R. Yatskiv<sup>1</sup>, J. Grym<sup>1</sup>

<sup>1</sup>Institute of Photonics and Electronics of the CAS, Prague, Czech Republic

MoP\_13 (Student) **In-situ etching of Ga, Ge, and In layers in oxide MBE by O<sub>2</sub>-induced formation and evaporation of their volatile suboxide**

Wenshan Chen\*, Kingsley Egbo, and Oliver Bierwagen

Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin, Germany

MoP\_14 **Impact of temperature and film thickness on α- and β-phase formation in Ga<sub>2</sub>O<sub>3</sub> thin films on a-plane sapphire**

Edgars Butanovs<sup>1,\*</sup>, Martins Zubkins<sup>1</sup>, Edvards Strods<sup>1</sup>, Viktors Vibornijs<sup>1</sup>, Kevon Kadiwala<sup>1</sup>

<sup>1</sup>Institute of Solid State Physics, University of Latvia, Riga, Latvia and <sup>2</sup>Institute of Physics, University of Tartu, Tartu, Estonia

MoP\_15 **Thermodynamics of Ga<sub>2</sub>O<sub>3</sub> heteroepitaxy and MOCVD growth of β-Ga<sub>2</sub>O<sub>3</sub> on 4H-SiC**

Indraneel Sanyal\*, Arpit Nandi, David Cherns and Martin Kuball

Center of Device and Thermographic Reliability, University of Bristol, United Kingdom

MoP\_16 **Real-time Monitoring of Homo- and Heteroepitaxial Process for MOVPE-grown β-Ga<sub>2</sub>O<sub>3</sub> Films**

Ta-Shun Chou<sup>1</sup>, Saud Bin Anooz<sup>1</sup>, Jana Rehm<sup>1</sup>, Arub Ahktar<sup>1</sup>, Deshabrato Mukherjee<sup>2</sup>, Peter Petrik<sup>2</sup>, Zbigniew Galazka<sup>1</sup>, Marcello Binetti<sup>3</sup>, Christian Camus<sup>3</sup> and Andreas Popp<sup>1</sup>

<sup>1</sup>Leibniz-Institut für Kristallzüchtung Berlin, Germany <sup>2</sup>Institute for Technical Physics and Materials Science, Centre for Energy Research, Budapest, Hungary and <sup>3</sup>LayTec AG, Berlin, Germany

MoP\_17 (Student) **(-201) homoepitaxial β-Ga<sub>2</sub>O<sub>3</sub> thin films grown by metal organic chemical vapor deposition**

Yifan Li<sup>1</sup>, Rujun Sun<sup>1</sup>, Yachao Zhang<sup>1</sup>, Jing Ning<sup>1</sup>, Hong Zhou<sup>1</sup>, Qian Feng<sup>1</sup>, Chunfu Zhang<sup>1</sup>, Jincheng Zhang<sup>1</sup>, \* and Yue Hao<sup>1</sup>

<sup>1</sup>State Key Discipline Laboratory of Wide Band Gap Semiconductor Technology, School of Microelectronics, Xidian University, Xi'an, China

MoP\_18 **Towards synthesis of compositionally graded multi-component oxide thin films by CCS-PLD using multi-segmented targets**

J. M. Bredow<sup>1,\*</sup>, S. Vogt<sup>1</sup>, M. Grundmann<sup>1</sup> and H. von Wenckstern<sup>1</sup>

<sup>1</sup>University of Leipzig, Leipzig, Germany

MoP\_19 **Transport and thermal properties of β-Ga<sub>2</sub>O<sub>3</sub> films grown by liquid-injection MOCVD on sapphire and SiC substrates**

M. Ťapajna<sup>1,\*</sup>, F. Egyenes<sup>1</sup>, F. Hrubišák<sup>1</sup>, K. Hušeková<sup>1</sup>, E. Dobročka<sup>1</sup>, P. Nádaždy<sup>1</sup>, A. Rosová<sup>1</sup>, Z. Chi<sup>2</sup>, E. Chikoidze<sup>2</sup>, X. Zheng<sup>3</sup>, J. W. Pomeroy<sup>3</sup>, M. Kuball<sup>3</sup> and F. Guemann<sup>1</sup>

<sup>1</sup>Institute of Electrical Engineering SAS, Bratislava, Slovakia <sup>2</sup>GEMaC, Université Paris-Saclay, UVSQ-CNRS, Versailles, France and <sup>3</sup>CDTR, University of Bristol, Bristol, UK

MoP\_20 **Deposition of Ga<sub>2</sub>O<sub>3</sub> and ZnGa<sub>2</sub>O<sub>4</sub> thin films by liquid metal target sputtering**

M. Zubkins<sup>1,\*</sup>, V. Vibornijs<sup>1</sup>, E. Strods<sup>1</sup>, E. Butanovs<sup>1</sup>, L. Bikse<sup>1</sup>, M. Ottosson<sup>2</sup>, A. Hallén<sup>3</sup>, J. Purans<sup>1</sup>, A. Azens<sup>4</sup>

<sup>1</sup>Institute of Solid State Physics, Riga, Latvia <sup>2</sup>Angstrom Laboratory, Uppsala, Sweden <sup>3</sup>KTH Royal Institute of Technology, Kista-Stockholm, Sweden and <sup>4</sup>Agl Technologies Ltd, Riga, Latvia

**MoP\_21 Homoepitaxial HVPE layers on (100) and (-201)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> substrates**

P. Butenko<sup>1,\*</sup>, M. Boiko<sup>1</sup>, L. Guzilova<sup>1</sup>, B. Obidov<sup>1</sup>, A. Pechnikov<sup>1,2</sup>, M. Sharkov<sup>1</sup>, A. Zarichny<sup>1</sup> and V. Nikolaev<sup>1,2</sup>

<sup>1</sup>Ioffe Institute, St Petersburg, Russia <sup>2</sup>Perfect Crystals LLC, St Petersburg, Russia

**MoP\_22 Innovative growth of doped  $\beta$ -gallium oxide thin-films by Pulsed Electron Deposition**

F.Pattini<sup>1</sup>, F.Stancari<sup>2,\*</sup>, G. Spaggiari<sup>1,2</sup>, F.Mezzadri<sup>3</sup>, S. Rampino<sup>1</sup>, A.Parisini<sup>2</sup>, A.Baraldi<sup>2</sup>, M.Pavesi<sup>2</sup>, G. Trevisi<sup>1</sup>, A.Bosio<sup>2</sup> and R. Fornari<sup>2</sup>

<sup>1</sup>Institute of Materials for Electronics and Magnetism, CNR, Parma, Italy <sup>2</sup>Dept. of Mathematical, Physical and Computer Sciences, University of Parma, Parma, Italy <sup>3</sup>Dept. of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Parma, Italy

**MoP\_23 (Student) Epitaxial growth of Ga<sub>2</sub>O<sub>3</sub> thin films using pulsed-liquid injection MOCVD**

Marielena Velasco-Enriquez<sup>1,2\*</sup>, Isabelle Gelard<sup>1</sup>, Carmen Jimenez<sup>1</sup>, Herve Roussel<sup>1</sup>, Philippe Ferrandis<sup>2</sup>, Eirini Sarigiannidou<sup>1</sup> and Vincent Consonni<sup>1</sup>

<sup>1</sup>Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France and <sup>2</sup>Univ. Grenoble Alpes, CNRS, Grenoble INP, Institut Néel, Grenoble, France

**MoP\_24 (Student) Plasma assisted molecular beam epitaxial growth of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (100) thin films on MgO(100) Substrates**

S.F. Hibbert<sup>1,3\*</sup>, M.W. Allen<sup>2,3</sup> and R.J. Reeves<sup>1,3</sup>

<sup>1</sup>Department of Physical and Chemical Sciences, University of Canterbury, Christchurch, Canterbury, New Zealand <sup>2</sup>Department of Electrical and Computer Engineering, University of Canterbury, Christchurch, Canterbury, New Zealand <sup>3</sup>MacDiarmid Institute for Advanced Materials and Nanotechnology, University of Canterbury, Christchurch, New Zealand

**MoP\_25 Change of as-grown Surface morphology of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> epilayers on (001)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> substrates by HVPE**

Hae-Yong Lee<sup>1,\*</sup>, Tae-Won Seo<sup>1</sup>, Young Jun Choi<sup>1</sup>, Hae-Gon Oh<sup>1</sup>, Yoonsu Kim<sup>2</sup>, and Min Suk Oh<sup>2</sup>

<sup>1</sup>LumiGNtech Co., Ltd., Gwangmyeong, Gyeonggi-Do, Korea <sup>2</sup>Korea Electronics Technology Institute, Sengman, Gyeonggi-Do, Korea

**MoP\_26 Chemical Solution Deposition of Gallium Oxide Single Layer with High Thickness and Silver-Enhanced Crystal Quality**

X. Tang and X. Li

Advanced Semiconductor Laboratory, Electrical, and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia

**MoP\_27 (Student) Electronic and Thermal Advantages of Lattice Matched Nitride-Oxide HEMTs**

Modassir Anwer<sup>1,\*</sup> and Amit Verma<sup>1</sup>

<sup>1</sup>Department of Electrical Engineering, Indian Institute of Technology Kanpur, India

**MoP\_28 Ga<sub>2</sub>O<sub>3</sub>/GaN Heterostructure for deep UVC sensing and LED applications**

Ashutosh Kumar<sup>1</sup>, Sergiy Khartsev<sup>2</sup>, Edgars Butanovs<sup>3</sup>, Martin Berg<sup>1</sup>, Qin Wang<sup>1</sup>, Anders Hallén<sup>2</sup>, Anatolijs Sarakovskis<sup>3</sup>, Juris Purans<sup>3</sup>, Peter Ramvall<sup>1,\*</sup>

<sup>1</sup>RISE Research Institutes of Sweden, Lund, Sweden <sup>2</sup>KTH Royal Institute of Technology, Kista, Sweden and <sup>3</sup>Institute of Solid State Physics, University of Latvia, Riga, Latvia

**MoP\_29 (Student) Investigation of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>/III-N(III =Ga, Al) heterostructures grown by metal organic chemical vapor deposition**

Yifan Li<sup>1</sup>, Rujun Sun<sup>1</sup>, Yachao Zhang<sup>1</sup>, Jing Ning<sup>1</sup>, Hong Zhou<sup>1</sup>, Qian Feng<sup>1</sup>, Chunfu Zhang<sup>1</sup>, Jincheng Zhang<sup>1,\*</sup> and Yue Hao<sup>1</sup>

<sup>1</sup>State Key Discipline Laboratory of Wide Band Gap Semiconductor Technology, School of Microelectronics, Xidian University, Xi'an, China

**MoP\_30 (Student) Interface Engineering of Gallium Oxide Polymorphs**

Chan Woong Kim<sup>1</sup>, Ha Young Kang<sup>1</sup>, Yoonho Choi<sup>1</sup> and Roy Byung Kyu Chung<sup>1,\*</sup>

<sup>1</sup>Kyungpook National University, Daegu, South Korea

**MoP\_31 (Student) Comparative study of the optical properties of  $\alpha$ -,  $\beta$ -, and  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub>**

L. Penman<sup>1,\*</sup>, Z. Johnston<sup>1</sup>, Y. Oshima<sup>2</sup>, C. McAleese<sup>3</sup>, P. Mazzolini<sup>4,5</sup>, M. Bosi<sup>5</sup>, L. Seravalli<sup>5</sup>, R. Fornari<sup>4,5</sup> and F. Massabuau<sup>1</sup>

<sup>1</sup>Department of Physics, University of Strathclyde, Glasgow, UK <sup>2</sup>National Institute for Materials Science, Tsukuba, Japan <sup>3</sup>AIXTRON Ltd., Cambridge, UK <sup>4</sup>Department of Mathematical, Physical and Computer Sciences, University of Parma, Parma, Italy and <sup>5</sup>IMEM-CNR, Parma, Italy

**MoP\_32 Detailed investigations on the orientation-dependent optical properties of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> films**

Kishor Upadhyaya<sup>1</sup>, Hadeel Alamoudi<sup>1</sup>, Vijay Kumar Gudelli<sup>1</sup>, Fatimah Alreshidi<sup>1</sup>, Wojciech Ogieglo<sup>2</sup> and Iman Roqan<sup>1\*</sup>

<sup>1</sup>Physical Science and Engineering divisions, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia <sup>2</sup>Advanced Membranes and Porous Materials Center, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

**MoP\_33 Growth of Amorphous Ga<sub>2</sub>O<sub>3</sub> on Quartz Substrates by Mist Chemical Vapor Depositi**

Kazuyuki Uno

Department of Systems Engineering, Wakayama University, Wakayama, Japan

**MoP\_34 Computation of the concentration dependent structural properties of  $\epsilon/\kappa$ -(In,Ga)<sub>2</sub>O<sub>3</sub> and its application to the measurement of strain in heterostructures**

M. Schowalter<sup>1,\*</sup>, A. Karg<sup>1</sup>, C. Mahr<sup>1</sup>, M.Eickhoff<sup>1,2</sup> and A. Rosenauer<sup>1,2</sup>

<sup>1</sup>Institut für Festkörperphysik, Universität Bremen, Germany <sup>2</sup>MAPEX Center for Materials and Processes, Universität Bremen, Germany

**MoP\_35 (Student) Crystal Growth Dynamics of  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub> Thin Films on  $\epsilon$ -GaFeO<sub>3</sub> Substrates by Mist CVD**

M. Sugimoto<sup>1,\*</sup>, T. Ogawa<sup>1</sup>, O. Ueda<sup>2</sup>, H. Nishinaka<sup>3</sup>, and M. Yoshimoto<sup>3</sup>

<sup>1</sup>Department of Electronics, Kyoto Institute of Technology, Kyoto, Japan <sup>2</sup>Meiji Renewable Energy Laboratory, Meiji University, Kawasaki, Kanagawa, Japan and <sup>3</sup>Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Kyoto, Japan

**MoP\_36 (Student) Single-Phase and Single-Domain Formation of Orthorhombic Ga<sub>2</sub>O<sub>3</sub>: Influence of Dopants and Substrates**

Ha Young Kang<sup>1</sup>, Chan Woong Kim<sup>1</sup>, Yoonho Choi<sup>1</sup> and Roy Byung Kyu Chung<sup>1,\*</sup>

<sup>1</sup>School of Materials Science and Engineering, Kyungpook National University, Daegu, South Korea – Authors with equal contribution

**MoP\_37 (Student) Surface Acoustic Wave UVC Photodetectors based on  $\epsilon$ -phase Gallium Oxide**

Jiahong Luo, Chenhong Huang, Yujia Tu, Zimin Chen, Yanli Pei, Xing Lu\*, and Gang Wang

State Key Laboratory of Optoelectronic Materials and Technologies, School of Electronics and Information Technology, Sun Yat-sen University, Guangzhou, China

**MoP\_38 A combined EPR and electrical transport study of Si doped  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub>/Al<sub>2</sub>O<sub>3</sub> thin films**

H.J.von Bardeleben<sup>1</sup>, A.Parisini<sup>2</sup>, P.Mazzolini<sup>2</sup>, A.Bosio<sup>2</sup>, M.Bosi<sup>3</sup>, L.Seravalli<sup>3</sup>, R.Fornari<sup>2</sup>

<sup>1</sup>Institut des Nanosciences de Paris (INSP), Sorbonne Université, Paris, France <sup>2</sup>University of Parma, Dept. of Mathematical, Physical and Computer Sciences, Parma, Italy and <sup>3</sup>IMEM-CNR, Institute of Materials for Electronics and Magnetism, Parma, Italy

**MoP\_39 (Student) Red shift of the absorption onset in orthorhombic  $\kappa$ -(In<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> alloys**

E. Kluth<sup>1,\*</sup>, A. Karg<sup>2</sup>, M. Eickhoff<sup>2</sup>, R. Goldhahn<sup>1</sup> and M. Feneberg<sup>1</sup>

<sup>1</sup>Institut für Physik, Otto-von-Guericke-Universität Magdeburg, Germany and <sup>2</sup>Institut für Festkörperphysik, Universität Bremen, Germany

**MoP\_40 Defect structure and luminescence of micro-monocrystals  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub>**

O.F. Vyvenko<sup>1</sup>, S. V. Shapenkov<sup>1,2</sup>, E. V. Ubyivovk<sup>1</sup>, A. S. Bondarenko<sup>1</sup>, A.I. Pechnikov<sup>2</sup>, V. I. Nikolaev<sup>2</sup>

<sup>1</sup>St.Petersburg State University, St. Petersburg, Russia and <sup>2</sup>Ioffe Institute, St. Petersburg, Russia

**MoP\_41 Annealing effect on shallow and deep level defects in  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub> thin films**

P. Mazzolini<sup>1,2,\*</sup>, J.B. Varley<sup>3</sup>, A. Parisini<sup>1</sup>, A. Sacchi<sup>1</sup>, M. Pavesi<sup>1</sup>, A. Bosio<sup>1</sup>, M. Bosi<sup>2</sup>, L. Seravalli<sup>2</sup>, B.M. Janzen<sup>5</sup>, M.R. Wagner<sup>6,5</sup>, A. Ardenghi<sup>6</sup>, O. Bierwagen<sup>6</sup>, A. Falkenstein<sup>4</sup>, J. Kler<sup>4</sup>, R. A. De Souza<sup>4</sup>, M. Martin<sup>4</sup>, F. Mezzadri<sup>7,2</sup>, C. Borelli<sup>1</sup> and R. Fornari<sup>1,2</sup>

<sup>1</sup>Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy <sup>2</sup>IMEM-CNR, Parma, Italy <sup>3</sup>Lawrence Livermore National Laboratory, Livermore, United States <sup>4</sup>Institute of Physical Chemistry, RWTH Aachen University, Germany <sup>5</sup>Technische Universität Berlin, Institute of Solid State Physics, Berlin, Germany <sup>6</sup>Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany and <sup>7</sup>Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Italy

**MoP\_42 (Late News) Thermal stability of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> grown on c-plane sapphire by mist-chemical-vapor-deposition**

Hongliang Chang<sup>1</sup>, Seong-Ho Cho<sup>2</sup>, Yanqing Jia<sup>1</sup>, Bambar Davaasuren<sup>3</sup>, Abdullah Alquwayzani<sup>1</sup>, Si-Young Bae<sup>2,a</sup>, Tien Khee Ng<sup>1,b</sup> and Boon S. Ooi<sup>1,c</sup>

<sup>1</sup>Photonics Laboratory, Electrical and Computer Engineering, Division of Computer, Electrical and Mathematical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia <sup>2</sup>Imaging and Characterization Core

MoP\_43 (Late News) **The growth of  $\kappa$ -Ga<sub>2</sub>O<sub>3</sub> by oxide-molecular-beam-epitaxy for high-responsivity UVC Photodetector**

Yanqing Jia<sup>1</sup>, Hongliang Chang<sup>1</sup>, Tae-Yong Park<sup>1</sup>, Yara Banda<sup>1</sup>, Bassam AlQahtani<sup>1</sup>, Qingxiao Wang<sup>1</sup>, Tien Khee Ng<sup>1,a</sup> and Boon S. Ooi<sup>1,b</sup>

<sup>1</sup>King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

MoP\_44 (Late News, Student) **2-inch Bulk  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Single Crystals Grown by EFG Method with High Wafer Scale Quality**

Ganrong Feng<sup>1,2</sup>, Shan Li<sup>1,2,\*</sup> and Weihua Tang<sup>1,2,\*</sup>

<sup>1</sup>College of Integrated Circuit Science and Engineering, Nanjing University of Posts and Telecommunications, Nanjing, China, <sup>2</sup>Beijing GAO Semiconductor Co. Ltd., Beijing, China

MoP\_45 (Late News, Student) **Polarization Induced Electron Confinement by Dilute Boron Alloying in  $\epsilon$ -Ga<sub>2</sub>O<sub>3</sub> for High Electron Mobility Transistor**

Yan Wang<sup>1,\*</sup>, Chuang Zhang<sup>1</sup> and Chee Keong Tan<sup>1,\*</sup>

<sup>1</sup>Advanced Materials Thrust, Function Hub, The Hong Kong University of Science and Technology (Guangzhou), Guangzhou, Guangdong, China

MoP\_46 (Late News, Student) **NiO  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> p-n Heterojunctions Grown by the Low-cost, Vacuum-free Mist-CVD for Device Applications**

Zeyulin Zhang, Dinghe Liu, Yiru Yan, Qingwen Song\*, Dazheng Chen, Chunfu Zhang\*, Yuming Zhang, and Yue Ha

National Key Laboratory of Wide Bandgap Semiconductor Devices and Integrated Technology Xidian University. Xi'an, China

MoP\_47 (Late News, Student) **Crystal growth of gallium indium sesquioxide by using the MIST-CVD technique**

Carolina Fernández-Saiz<sup>1,\*</sup>, Carmen Martínez-Tomás<sup>1</sup>, Hiroyuki Nishinaka<sup>2</sup>, Vicente Muñoz-Sanjosé<sup>1</sup>

<sup>1</sup>Department of Applied Physics and Electromagnetism, University of Valencia, Burjassot, Spain and <sup>2</sup>Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Matsugasaki Sakyo-ku, Kyoto, Japan

MoP\_48 (Late News, Student) **Growth of Amorphous to Crystalline Gallium Oxide Thin Films Controlled by Suboxide Formation Using MOCVD**

Chuang Zhang<sup>1,\*</sup>, Jierui Xue<sup>1</sup>, Jiahe Cao<sup>1</sup>, Zhigao Xie<sup>1</sup>, Yimin Liao<sup>1</sup>, Yan Wang<sup>1</sup>, Hanzhao Song<sup>1</sup>, Andeng Qu<sup>1</sup>, Weihua Tang<sup>2</sup> and Chee-keong Tan<sup>1,2,\*</sup>

<sup>1</sup>Advanced Materials Thrust, Function Hub, Hong Kong University of Science and Technology (Guangzhou), Nansha, Guangzhou, China and <sup>2</sup>Innovation Center for Gallium Oxide Semiconductor (IC-GAO), College of Integrated Circuit Science and Engineering, Nanjing University of Posts and Telecommunications, Nanjing, China

MoP\_49 (Late News, Student) **Growth and characterization of period-4 transition metal doped single crystal  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

Maneesha Narayanan, Arumugam Thamizhavel, Arnab Bhattacharya\*

Tata Institute of Fundamental Research, Mumbai, India

MoP\_50 (Late News, Student) **Excellent Control over Si Doping in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (010) Films by Pulsed Laser Deposition**

Vishal Khandelwal, Yi Lu, Shibin Chandroth, Haicheng Cao, Xiao Tang, Xiaohang Li\*

Advanced Semiconductor Laboratory (ASL), Electrical and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology (KAUST), Thuwal, Kingdom of Saudi Arabia

MoP\_51 (Late News) **Controllable nitrogen doping in MOCVD Ga<sub>2</sub>O<sub>3</sub>**

Andrei Osinsky, William Brand, Fikadu Alema

Agnitron Technology Incorporated, Chanhausen, MN, USA

MoP\_52 (Late News) **First-principles approach to Ga<sub>2</sub>O<sub>3</sub>/Si and Ga<sub>2</sub>O<sub>3</sub>/3C-SiC interfaces**

A. Ugolotti<sup>1,\*</sup>, E. Scalise<sup>1</sup> and L. Miglio<sup>1</sup>

<sup>1</sup>Department of Materials Science, Università degli Studi di Milano-Bicocca, Milano, Italy



MoP\_53 (Late News) **3D modeling of EFG  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> crystal growth**

A. Smirnov,\* K. Nikiforova, and Y. Shustrov

*Semiconductor Technology Research d.o.o. Beograd, Belgrade, Serbia*

May 28, Tuesday

08:15-08:45 Admissions

08:45-10:10 Doping and Vacancies 1

Chair: tbd

08:45-09:30 TuM1\_1 (Keynote lecture)

**Controlling doping in Ga<sub>2</sub>O<sub>3</sub> and related alloys**

Chris G. Van de Walle

*University of California, Santa Barbara, California, USA*

09:30-09:55 TuM1\_2 (Invited Talk)

**(Student) Vacancy defects in Si doped  $\beta$ -(Al,Ga)<sub>2</sub>O<sub>3</sub>**

Iuliia Zhelezova<sup>1\*</sup>, Ilja Makkonen<sup>1</sup>, Zbigniew Galazka<sup>2</sup> and Filip Tuomisto<sup>1</sup>

<sup>1</sup>*Department of Physics and Helsinki Institute of Physics, University of Helsinki, Finland and* <sup>2</sup>*Leibniz-Institut für Kristallzüchtung, Berlin, Germany*

09:55-10:10 TuM1\_3 (Oral)

**Impact of Growth Conditions on Electronic Properties in Plasma-assisted MBE-grown  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

Brenton A. Noesges<sup>1,2,\*</sup>, Jian Li<sup>1,2</sup>, Yunjo Kim<sup>2</sup>, Adam T. Neal<sup>2</sup>, Shin Mou<sup>2</sup>, Thaddeus J. Ase<sup>2</sup>

<sup>1</sup>*Azimuth Corporation, Beavercreek, OH, USA* <sup>2</sup>*Air Force Research Laboratory, Materials and Manufacturing Directorate, WPAFB, OH, USA*

10:10-10:40 Break with Refreshments

10:40-12:30 Doping and Vacancies 2

Chair: tbd

10:40-10:55 TuM2\_1 (Oral)

**3d-Transition metals Co and Ni in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

Palvan Seyidov<sup>1,\*</sup>, Joel B. Varley<sup>2</sup>, Zbigniew Galazka<sup>1</sup>, Ta-Shun Chou<sup>1</sup>, Andreas Popp<sup>1</sup>, Martin Albrecht<sup>1</sup>, Klaus Irmischer<sup>1</sup> and Andreas Fiedler<sup>1</sup>

<sup>1</sup>*Leibniz-Institut für Kristallzüchtung, Berlin, Germany and* <sup>2</sup>*Lawrence Livermore National Laboratory, Livermore, California, USA*

10:55-11:10 TuM2\_2 (Oral)

**Zn diffusion and luminescence from Zn acceptors in Zn doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

Y.K. Hommedal<sup>1</sup>, Y.K. Frodason<sup>1</sup>, Augustinas Galeckas<sup>1</sup>, L. Vines<sup>1,\*</sup>, K.M. Johansen<sup>1</sup>

<sup>1</sup>*Centre for Materials Science and Nanotechnology/Dep. of Physics, University of Oslo, Oslo, Norway*

11:10-11:25 TuM2\_3 (Oral)

**(Student) Comprehensive Study of Ta Doped Gallium Oxide Single Crystals Grown by OFZ Technique: Crystal Quality Control and Electrical Characterization**

Sridharan Moorthy Babu<sup>1,\*</sup> and V L Ananthu Vijayan<sup>1</sup>

<sup>1</sup>*Crysatl Growth Centre, Anna University, Chennai, India*

11:25-11:50 TuM2\_4 (Invited Talk)

**Hybrid MBE for epitaxial growth of Si-doped (Al,Ga)<sub>2</sub>O<sub>3</sub> film**

Zhuoqun Wen<sup>1</sup>, Kamruzzaman Khan<sup>1</sup>, Elaheh Ahmadi<sup>\*</sup>

<sup>1</sup>*Department of Materials Science and Engineering, University of Michigan, Ann Arbor, USA*

<sup>2</sup>*Department of Electrical and Computer Engineering, University of California Los Angeles, USA*

11:50-12:05 TuM2\_5 (Oral)  
**(Student) Growth of Si-doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> thick layers by low-pressure hot-wall MOVPE using tetramethylsilane as a doping gas**  
J. Yoshinaga<sup>1,2,\*</sup>, H. Tozato<sup>1</sup>, T. Okuyama<sup>1</sup>, S. Sasaki<sup>3</sup>, G. Piao<sup>2</sup>, K. Ikenaga<sup>2</sup>, K. Shiina<sup>4</sup>, S. Koseki<sup>2</sup>, Y. Ban<sup>4</sup> and Y. Kumagai<sup>1,3</sup>  
<sup>1</sup>Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan <sup>2</sup>TAIYO NIPPON SANSO CORPORATION, Minato-ku, Tokyo, Japan <sup>3</sup>FLOuRISH Institute, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan and <sup>4</sup>TAIYO NIPPON SANSO CSE LTD., Kawasaki, Kanagawa, Japan

12:05-13:50 Lunch Break

13:50-15:40 Defects and  $\gamma$ -Ga<sub>2</sub>O<sub>3</sub> 1

Chair: tbd

13:50-14:15 TuA1\_1 (Invited)  
**(Student) Understanding Deactivation of Si Dopants in Implanted  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**  
Katie Gann<sup>1,\*</sup>, Cameron Gorsak<sup>1</sup>, Thaddeus Asel<sup>2</sup>, Brent Noesges<sup>2,3</sup>, Hari Nair<sup>1</sup> and Michael O. Thompson<sup>1</sup>  
<sup>1</sup>Department of Materials Science and Engineering, Cornell University, Ithaca, New York, USA <sup>2</sup>Air Force Research Laboratory, Wright-Patterson AFB, Ohio, USA <sup>3</sup>Azimuth Corporation, Beavercreek, Ohio, USA

14:15-14:30 TuA1\_2 (Oral)  
**Silicon location after its implantation into Ga<sub>2</sub>O<sub>3</sub> polymorphs studied by x-ray absorption spectroscopy**  
I.N. Demchenko<sup>1,\*</sup>, Y. Syryanyy<sup>1,2</sup>, A. Shokri<sup>1</sup>, Y. Melikhov<sup>3</sup>, A. Azarov<sup>4</sup> and A. Kuznetsov<sup>4</sup>  
<sup>1</sup>Institute of Plasma Physics and Laser Microfusion, Warsaw, Poland <sup>2</sup>Institute of Microelectronics and Optoelectronics, Warsaw University of Technology, Warsaw, Poland <sup>3</sup>Institute of Fundamental Technological Research Polish Academy of Sciences, Warsaw, Poland <sup>4</sup>University of Oslo, Department of Physics, Centre for Materials Science and Nanotechnology, Oslo, Norway

14:30-14:55 TuA1\_3 (Invited)  
**Disorder-induced ordering in gallium oxide polymorphs**  
Andrej Kuznetsov  
University of Oslo, Department of Physics, Oslo, Norway

14:55-15:10 TuA1\_4 (Oral)  
**Real Time In-Situ Observation of Vacancy Diffusion and Defect Evolution in Gallium Oxide Using Atomic Resolution Electron Microscopy**  
C. Chae<sup>1</sup>, K. Zhang<sup>2</sup>, V. Vangipuram<sup>2</sup>, H. Zhao<sup>2</sup> and J. Hwang<sup>1,\*</sup>  
<sup>1</sup>Department of Materials Science and Engineering, The Ohio State University, Columbus, OH, USA and <sup>2</sup>Department of Electrical and Computer Engineering, The Ohio State University, Columbus, OH, USA

15:10-15:25 TuA1\_5 (Oral)  
**Quantitative Study of Ga Interstitial Diffusion in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>: Insights from In Situ Transmission Electron Microscopy and First-Principles Calculations**  
Ming-Hsun Lee<sup>1</sup>, Robert Schewski<sup>2</sup>, Joel B. Varley<sup>3</sup>, Thilo Remmele<sup>2</sup>, Rebecca L. Peterson<sup>1</sup>, Martin Albrecht<sup>2,\*</sup>  
<sup>1</sup>Department of Materials Science and Engineering, University of Michigan, Ann Arbor, Michigan, United States <sup>2</sup>Leibniz-Institut für Kristallzüchtung, Berlin, Germany <sup>3</sup>Lawrence Livermore National Laboratory, Livermore, California, United States

15:25-15:40 TuA1\_6 (Late News)  
**Anisotropic Anion and Cation Diffusion in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**  
A. Falkenstein<sup>1</sup>, J. Kler<sup>1</sup>, P. Mazzolini<sup>2</sup>, A. Ardenghi<sup>3</sup>, O. Bierwagen<sup>3</sup>, B. Janzen<sup>4</sup>, M. Wagner<sup>4</sup>, N. Möller<sup>1</sup>, J. Arnold<sup>1</sup> and M. Martin<sup>1,\*</sup>  
<sup>1</sup>Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany <sup>2</sup>Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy <sup>3</sup>Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e.V., Berlin, Germany and <sup>4</sup>Institute of Solid State Physics, Technische Universität Berlin, Berlin, Germany

15:40-16:10 Break with Refreshments

16:10-16:35 TuA2\_1 (Invited)

**Tackling Disorder in  $\gamma$ -Ga<sub>2</sub>O<sub>3</sub>**

L. E. Ratcliff<sup>1,2,\*</sup>, T. Oshima<sup>3</sup>, F. Nippert<sup>4</sup>, B. M. Janzen<sup>4</sup>, E. Kluth<sup>5</sup>, R. Goldhahn<sup>5</sup>, M. Feneberg<sup>5</sup>, P. Mazzolini<sup>6</sup>, O. Bierwagen<sup>6</sup>, C. Wouters<sup>7</sup>, M. Nofal<sup>7</sup>, M. Albrecht<sup>7</sup>, J. E. N. Swallow<sup>8</sup>, L. A. H. Jones<sup>9</sup>, P. K. Thakar<sup>10</sup>, T. L. Lee<sup>10</sup>, C. Kalha<sup>11</sup>, C. Schlueter<sup>12</sup>, T. D. Veal<sup>9</sup>, J. B. Varley<sup>13</sup>, M. R. Wagner<sup>4</sup> and A. Regoutz<sup>11,\*</sup>

<sup>1</sup>University of Bristol, Bristol, UK <sup>2</sup>UiT The Arctic University of Norway, Tromsø, Norway <sup>3</sup>Saga University, Saga, Japan <sup>4</sup>Technische Universität Berlin, Berlin, Germany <sup>5</sup>Otto-von-Guericke-Universität Magdeburg, Magdeburg, Germany <sup>6</sup>Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany <sup>7</sup>Leibniz-Institut für Kristallzüchtung, Berlin, Germany <sup>8</sup>University of Oxford, Oxford, UK <sup>9</sup>University of Liverpool, Liverpool, UK <sup>10</sup>Diamond Light Source Ltd., Didcot, UK <sup>11</sup>University College London, London, UK <sup>12</sup>Deutsches Elektronen-Synchrotron DESY, Hamburg, German and <sup>13</sup>Lawrence Livermore National Laboratory, Livermore, USA

16:35-16:50 TuA2\_2 (Oral)

**Unraveling the Atomic Mechanism of the Disorder- Order Phase transition from  $\gamma$ -Ga<sub>2</sub>O<sub>3</sub> to  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

Charlotte Wouters<sup>1</sup>, Musbah Nofal<sup>1</sup>, Piero Mazzolini<sup>2</sup>, Jijun Zhang<sup>1</sup>, Thilo Remmele<sup>1</sup>, Albert Kwasniewski<sup>1</sup>, Oliver Bierwagen<sup>2</sup> and Martin Albrecht<sup>1</sup>

<sup>1</sup>Leibniz-Institut für Kristallzüchtung, Berlin, Germany <sup>2</sup>Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e.V., Berlin, Germany

16:50-17:05 TuA2\_3 (Oral)

**(Student) Atomic-resolution Imaging and Electron Energy Loss Spectroscopy of Ti/Au Ohmic Contacts to  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

N. Pieczulewski<sup>1,\*</sup>, K. Smith<sup>2</sup>, C. Gorsak<sup>1</sup>, A. Kalra<sup>3</sup>, H. Nair<sup>1</sup>, D. Jena<sup>1,4,5</sup>, H.G. Xing<sup>1,4,5</sup>, D. A. Muller<sup>2,5</sup>

<sup>1</sup>Department of Materials Science and Engineering, Cornell University, New York, USA <sup>2</sup>School of Applied and Engineering Physics, Cornell University, New York, USA <sup>3</sup>School of Chemical and Biomolecular Engineering, Cornell University, New York, USA <sup>4</sup>Department of Electrical and Computer Engineering, Cornell University, New York, USA <sup>5</sup>Kavli Institute at Cornell for Nanoscale Science, Cornell University, New York, USA

17:05-17:20 TuA2\_4 (Oral)

**Broad luminescence in single-crystalline ZnGa<sub>2</sub>O<sub>4</sub>**

Y. K. Frodason<sup>1,\*</sup>, A. Galeckas<sup>1</sup>, Z. Galazka<sup>2</sup>, L. Vines<sup>1</sup> and C. G. Van de Walle<sup>3</sup>

<sup>1</sup>Centre for Materials Science and Nanotechnology, University of Oslo, Oslo, Norway <sup>2</sup>Leibniz Institute for Crystal Growth, Berlin, Germany and <sup>3</sup>Materials Department, University of California, Santa Barbara, California, USA

**17:30-19:30 Poster 2: Doping,  $\gamma$ -Ga<sub>2</sub>O<sub>3</sub>, Characterization, Detectors, and Thermal properties**TuP\_1 **Perspectives of enhancing hole conductivity in GaAlO<sub>3</sub>/Ga<sub>2</sub>O<sub>3</sub> quantum wells**

T. Tchelidze<sup>1,\*</sup>, T. Gagnidze<sup>1</sup>, N. Basharuli<sup>1</sup> and L. Basharuli<sup>1</sup>

<sup>1</sup>Ivane Javakhsishvili Tbilisi State University, Tbilisi, Georgia

TuP\_2 **(Student) LPCVD Grown n-type Gallium Oxide films on c-plane Sapphire with tunable electron concentration using TEOS Precursor**

Modassir Anwer<sup>1</sup>, \* and Amit Verma<sup>1</sup>

<sup>1</sup>Department of Electrical Engineering, Indian Institute of Technology Kanpur, India

TuP\_3 **(Student) Carrier density control of Sb-doped rutile-type SnO<sub>2</sub> thin films and fabrication of a vertical Schottky barrier diode**

Y. Takahashi<sup>1,\*</sup>, H. Takane<sup>1</sup>, H. Izumi<sup>2</sup>, T. Wakamatsu<sup>1</sup>, Y. Isobe<sup>1</sup>, K. Kaneko<sup>3</sup> and K. Tanaka<sup>1</sup>

<sup>1</sup>Kyoto University, Kyoto, Kyoto, Japan <sup>2</sup>Hyogo Prefectural Institute of Technology, Kobe, Hyogo, Japan and <sup>3</sup>Ritsumeikan University, Kusatsu, Shiga, Japan

TuP\_4 **(Student) Investigation of structural and electrical properties of F-doped  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub>**

Yoonho Choi<sup>1</sup>, Chan Woong Kim<sup>1</sup>, Ha Young Kang<sup>1</sup> and Roy Byung Kyu Chung<sup>1,\*</sup>

<sup>1</sup>Kyungpook National University, Daegu, South Korea

- TuP\_5 **240GHz High Frequency EPR and ENDOR Studies of the VGa defect in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**  
H.J.von Bardeleben  
*Institut des NanoSciences de Paris (INSP), Sorbonne Université, Paris (France)*
- TuP\_6 **Structural Transformation in Ge Implanted  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>: Functionalization with Ge Nanoparticles leading to 'Emmental-type' Nano-architecture**  
J. Gracia-Fernández<sup>1,\*</sup>, S. B. Kjeldby<sup>1</sup>, L. J. Zeng<sup>2</sup>, E. Olsson<sup>2</sup>, L. Vines<sup>1</sup>, Ø. Prytz<sup>1</sup>  
<sup>1</sup>*Department of Physics/Centre for Materials Science and Nanotechnology, University of Oslo, Oslo, Norway and* <sup>2</sup>*Department of Physics, Chalmers University of Technology, Gothenburg, Sweden*
- TuP\_7 **Defect Compensation for Bi and N acceptors in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**  
Cuong Ton-That<sup>1,\*</sup>, Fatima Matar<sup>1</sup>, Curtis P. Irvine<sup>1</sup>, Amar Salih<sup>1</sup>, Karin Yamamura<sup>1</sup>, Ying-Li Shi<sup>2</sup>, Francis Chi-Chung Ling<sup>2</sup>, Matthew R. Phillips<sup>1</sup>  
<sup>1</sup>*School of Mathematical and Physical Science, University of Technology Sydney, Australia and* <sup>2</sup>*Department of Physics, The University of Hong Kong, China*
- TuP\_8 (Student) **Doping Studies of Ga<sub>2</sub>O<sub>3</sub> Thin Films Produced Using Sol-Gel Techniques**  
K.M. Wislang<sup>1,2,\*</sup>, R.J. Reeves<sup>2,3</sup>, R.M. Gazoni<sup>2,3</sup> and M.W. Allen<sup>1,2</sup>  
<sup>1</sup>*Electrical and Computer Engineering, University of Canterbury, Christchurch, New Zealand* <sup>2</sup>*The MacDiarmid Institute for Advanced Materials and Nanotechnology, New Zealand and* <sup>3</sup>*School of Physical and Chemical Sciences, University of Canterbury, Christchurch, Canterbury, New Zealand*
- TuP\_9 **Zirconium Doping of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> for device applications**  
S. Vogt<sup>1,\*</sup>, C. Petersen<sup>1</sup>, T. Schultz<sup>2,3</sup>, H. von Wenckstern<sup>1</sup>, N. Koch<sup>2,3</sup> and M. Grundmann<sup>1</sup>  
<sup>1</sup>*Universität Leipzig, Felix Bloch Institute for Solid State Physics, Semiconductor Physics Group, Leipzig, Germany* <sup>2</sup>*Humboldt Universität zu Berlin, Department of Physics, Supermolecular Systems, Berlin, Germany and* <sup>3</sup>*Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Solar Energy, Berlin, Germany*
- TuP\_10 **Positron annihilation spectroscopy of vacancy type defects in Ga<sub>2</sub>O<sub>3</sub>**  
Marc H. Weber<sup>1,2,\*</sup>, Corey Halverson<sup>1,2</sup> and John McCloy<sup>1</sup>  
<sup>1</sup>*Institute of Materials Research, Washington State University, Pullman, WA, USA and* <sup>2</sup>*Dept. of Physics and Astronomy, Washington State University, Pullman WA, USA*
- TuP\_11 **Two-dimensional electron (2DEG) and hole (2DHG) gases onto  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**  
Ekaterine Chikoidze<sup>1</sup>, David J Rogers<sup>2</sup>, Jacob Leach<sup>3</sup>, Zeyu Chi<sup>1</sup>, Hans Jürgen Von Bardeleben<sup>4</sup>, Anne-Marie Gonçalves<sup>5</sup>, Féréchteh Teherani<sup>2</sup>, Tamar Tchelidze<sup>6</sup>, Yves Dumont<sup>1</sup>, Amador Perez-Tomas<sup>7</sup>  
<sup>1</sup>*GEMaC, UVSQ – CNRS, Cedex, Versailles, France* <sup>2</sup>*Nanovation, Châteaufort, France* <sup>3</sup>*Kyma Technologies, Inc., Raleigh, USA* <sup>4</sup>*INSP, CNRS UMR, Sorbonne Université, Paris, France* <sup>5</sup>*ILV, UVSQ – CNRS, Cedex Versailles, France* <sup>6</sup>*Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia and* <sup>7</sup>*ICN2, CSIC BIST, Campus UAB, Bellaterra, Barcelona, Spain*
- TuP\_12 **Depth-dependent luminescence from implanted and annealed gallium oxide investigated by cross-sectional cathodoluminescence**  
S. B. Kjeldby<sup>1,\*</sup>, J. García-Fernández<sup>1</sup>, A. Galeckas<sup>1</sup>, Ø. Prytz<sup>1</sup>, L. Vines<sup>1</sup>  
<sup>1</sup>*Department of Physics and Centre for Materials Science and Nanotechnology, University of Oslo, Oslo, Norway*
- TuP\_13 (Student) **Effect of lithium diffusion in Ga<sub>2</sub>O<sub>3</sub> epitaxial thin films**  
A. Sacchi<sup>1,\*</sup>, M. Sidoli<sup>1</sup>, A. Ardenghi<sup>2</sup>, O. Bierwagen<sup>2</sup>, J. Kler<sup>3</sup>, A. Falkenstein<sup>3</sup>, R. De Souza<sup>3</sup>, M. Martin<sup>3</sup>, D. Spallek<sup>2</sup>, J. Lähnemann<sup>2</sup>, H. Tornatzky<sup>2</sup>, M. R. Wagner<sup>2,4</sup>, A. Parisini<sup>1</sup>, M. Pavesi<sup>1</sup>, M. Bosi<sup>5</sup>, L. Seravalli<sup>5</sup>, G. Spaggiari<sup>1,5</sup>, D. Bersani<sup>1</sup>, K. Mizohata<sup>6</sup>, F. Tuomisto<sup>6</sup>, G. Magnani<sup>1</sup>, D. Pontiroli<sup>1</sup>, M. Riccò<sup>1</sup>, F. Mezzadri<sup>7,5</sup>, S. Pasini<sup>1</sup>, A. Bosio<sup>1</sup>, R. Fornari<sup>1,5</sup>, P. Mazzolini<sup>1,5</sup>  
<sup>1</sup>*Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy* <sup>2</sup>*Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany* <sup>3</sup>*Institute of Physical Chemistry, RWTH Aachen University, Germany* <sup>4</sup>*Technische Universität Berlin, Institute of Solid State Physics, Berlin, Germany* <sup>5</sup>*IMEM-CNR, Parma, Italy* <sup>6</sup>*Department of Physics, University of Helsinki, Finland* <sup>7</sup>*Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Italy*
- TuP\_14 (Student) **Cr-implanted  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>: luminescence and nanomembrane fabrication**  
D. M. Esteves<sup>1,2,\*</sup>, M. C. Pedro<sup>1,2</sup>, D. R. Pereira<sup>1,2</sup>, A. L. Rodrigues<sup>3,4</sup>, S. Magalhães<sup>2</sup>, L. C. Alves<sup>3,4</sup>, L. F. Santos<sup>5</sup>, Z. Jia<sup>6</sup>, W. Mu<sup>6</sup>, M. I. Dias<sup>3,4</sup>, K. Lorenz<sup>1,2,4</sup> and M. Peres<sup>1,2,4</sup>  
<sup>1</sup>*INESC MN, Lisbon, Portugal* <sup>2</sup>*IFPN, Lisbon, Portugal* <sup>3</sup>*C2TN, Lisbon, Portugal* <sup>4</sup>*DECN, Instituto Superior Técnico, University of Lisbon, Lisbon, Portugal* <sup>5</sup>*CQE and DEQ, Instituto Superior Técnico, University of Lisbon, Lisbon, Portugal and* <sup>6</sup>*State Key Laboratory of Crystal Materials, Shandong University, Jinan, China*

- TuP\_15 (Student) **Probing Li-diffusion into Ga<sub>2</sub>O<sub>3</sub>-polymorphs by depth-resolved cathodoluminescence spectroscopy**  
 D. Spallek<sup>1,\*</sup>, A. Sacchi<sup>2</sup>, A. Ardenghi<sup>1</sup>, P. Mazzolini<sup>2</sup>, O. Bierwagen<sup>1</sup>, M. R. Wagner<sup>1</sup> and J. Lähnemann<sup>1</sup>  
<sup>1</sup>Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e.V., Berlin, Germany <sup>2</sup>Department of Mathematical, Physical and Computer Sciences, Università di Parma, Parma, Italy
- TuP\_16 **Tin Doping Induced High-Performance Ga<sub>2</sub>O<sub>3</sub> Photosensor Towards Neuromorphic Visual System**  
 P. Li<sup>1,\*</sup>, X. Shan<sup>1</sup>, J. G. Ma<sup>1</sup>, Y. Lin<sup>1</sup>, H. Y. Xu<sup>1</sup> and Y. C. Liu<sup>1</sup>  
<sup>1</sup>Key Laboratory for UV Light-Emitting Materials and Technology of Ministry of Education, Northeast Normal University, Changchun 130024, China
- TuP\_17 (Student) **Focused Ion Beam Induced Polymorph Conversion and Defect Analysis in Gallium Oxide**  
 Umutcan Bektas and Gregor Hlawacek  
 Helmholtz-Zentrum Dresden-Rossendorf, Dresden-Germany
- TuP\_18 **Constant photocurrent method to probe the sub-bandgap absorption in wide bandgap semiconductor films: the case of α-Ga<sub>2</sub>O<sub>3</sub>**  
 D. Nicol<sup>1</sup>, S. Reynolds<sup>2</sup>, J. Roberts<sup>3</sup>, J. Jarman<sup>4</sup>, P. Chalker<sup>3</sup> and F. Massabuau<sup>1,\*</sup>  
<sup>1</sup>University of Strathclyde, Glasgow, UK <sup>2</sup>University of Dundee, Dundee, UK <sup>3</sup>University of Liverpool, Liverpool, UK and <sup>4</sup>University of Cambridge, Cambridge, UK
- TuP\_19 **Surface photovoltage spectroscopy on β-Ga<sub>2</sub>O<sub>3</sub> epitaxial layers**  
 Th. Dittrich<sup>1,\*</sup>, A. Parisini<sup>2</sup>, M. Pavesi<sup>2</sup>, A. Baraldi<sup>2</sup>, A. Sacchi<sup>2</sup>, F. Mezzadri<sup>3</sup>, P. Mazzolini<sup>2</sup>, M. Bosi<sup>4</sup>, L. Seravalli<sup>4</sup>, A. Bosio<sup>2</sup>, R. Fornari<sup>2</sup>  
<sup>1</sup>Helmholtz Zentrum Berlin für Materialien und Energie GmbH, Berlin, Germany <sup>2</sup>University of Parma, Dept. SMFI, Parma, Italy <sup>3</sup>University of Parma, Dept. SCVSA, Parma, Italy and <sup>4</sup>IMEM-CNR, IMEM, Parma, Italy
- TuP\_20 (Student) **Optical properties of Ga<sub>2</sub>O<sub>3</sub> free-standing nanomembranes**  
 P. Pérez-Peinado<sup>1</sup>, \* D. Carrasco<sup>1</sup>, P. Alcázar<sup>1</sup>, J. Dolado<sup>2</sup>, G. Martínez-Criado<sup>2</sup>, F. Domínguez-Adame<sup>1</sup>, J. Quereda<sup>1</sup>, E. Nogales<sup>1</sup> and B. Méndez<sup>1</sup>  
<sup>1</sup>Universidad Complutense de Madrid, Departamento de Física de Materiales, Madrid, Spain and <sup>2</sup>European Synchrotron Radiation Facility - ESRF, Grenoble, France
- TuP\_21 **Identification of Defects in β-Ga<sub>2</sub>O<sub>3</sub> through Microscopy**  
 M.-Y. Kim<sup>1,2,3</sup>, A. J. Winchester<sup>1</sup>, O. Maimon<sup>1,2</sup>, D. Yang<sup>1</sup>, S.-M. Koo<sup>3</sup>, Q. Li<sup>1,2</sup>, S. Pookpanratana<sup>1,\*</sup>  
<sup>1</sup>National Institute of Standards and Technology, Gaithersburg, MD, USA <sup>2</sup>George Mason University, Fairfax, VA, USA and <sup>3</sup>Kwangwoon University, Seoul, Republic of Korea
- TuP\_23 **Origin of Surface Defects in Homoepitaxially Grown (010) β-Ga<sub>2</sub>O<sub>3</sub> films**  
 K. Huynh<sup>1</sup>, M. E. Liao<sup>2</sup>, M. J. Tadjer<sup>3</sup>, F. Alema<sup>4</sup>, J. Culbertson<sup>3</sup>, A. Jacobs<sup>1</sup>, J. S. Lundh<sup>2</sup>, H. Masten<sup>4</sup>, J. Gaskins<sup>5</sup>, J. Hite<sup>3</sup>, M. Mastro<sup>3</sup>, P. Hopkins<sup>5</sup>, A. Osinsky<sup>4</sup>, K. Hobart<sup>3</sup> and M. S. Goorsky<sup>1</sup>  
<sup>1</sup>Department Materials Science and Engineering, University of California Los Angeles, Los Angeles, California, USA <sup>2</sup>National Research Council Postdoctoral Fellow at U.S. Naval Research Laboratory <sup>3</sup>U.S. Naval Research Laboratory, SW, Washington, DC, USA <sup>4</sup>Agnitron Technology, Chanhassen, MN, USA <sup>5</sup>LaserThermal Inc., Charlottesville VA, USA
- TuP\_24 **Low-temperature gas sensing mechanism in β-Ga<sub>2</sub>O<sub>3</sub> nanostructures revealed by near-ambient pressure XPS**  
 R. Yatskiv<sup>1</sup>, M. Vorokhta<sup>2</sup>, N. Bašinová<sup>1</sup>, J. Grym<sup>1</sup>, T. N. Dinhova<sup>2</sup>, J. Maixner<sup>3</sup>  
<sup>1</sup>Institute of Photonics and Electronics of the CAS, Prague, Czech Republic
- TuP\_25 **Cr-doped Ga<sub>2</sub>O<sub>3</sub> luminescent microcavities with thermometric application: Study of ALD Bragg reflectors with respect to FIB DBR cavities**  
 M. Alonso-Orts<sup>1,2,\*</sup>, R. J. T. Neelissen<sup>1</sup>, D. Carrasco<sup>1,3</sup>, M. Schowalter<sup>1</sup>, A. Rosenauer<sup>1,2</sup>, E. Nogales<sup>3</sup>, B. Méndez<sup>3</sup> and M. Eickhoff<sup>1,2</sup>  
<sup>1</sup>Institute of Solid State Physics, University of Bremen, Bremen, Germany, <sup>2</sup>MAPEX Center for Materials and Processes, Universität Bremen, Bremen, Germany and <sup>3</sup>Departamento de Física de Materiales, Universidad Complutense de Madrid, Madrid, Spain
- TuP\_26 **Quasi van der Waals epitaxial Ga<sub>2</sub>O<sub>3</sub> based optoelectronic memristor for a deep ultraviolet optical pulse filtering system**

Jing Ning<sup>1,2,\*</sup>, Jingjing Huang<sup>1,2</sup>, Xinmeng Dong<sup>1,2</sup>, Tiantian Ma<sup>1,2</sup>, Jincheng Zhang<sup>1,2</sup> and Yue Hao<sup>1,2</sup>

<sup>1</sup>The State Key Discipline Laboratory of Wide Band Gap Semiconductor Technology, Xidian University, Xi'an, Shaanxi China and

<sup>2</sup>Shaanxi Joint Key Laboratory of Graphene, Xidian University, Xi'an, Shaanxi, China

**TuP\_27 Optical and electrical analyses of self-powered solar blind photodetector based on Solution Processed amorphous core-shell gallium oxide nanoparticles**

Iman S Roqan\*, and Somak Mitra

Physical Sciences and Engineering Division, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia

**TuP\_28 Significantly enhanced DUV self-powered photodetector based on Sn<sup>+</sup> ion implanted  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> with suppressed dark current via implantation process**

Kishor Upadhyayaa, Fatimah Alreshidia, Hadeel Alamoudia, D.M. Estevesb, M. Peresb, Katharina Lorenzb, Iman S. Roqana,\*

<sup>1</sup>Semiconductor and Material Spectroscopy (SMS) Group, King Abdullah University of Science and Technology (KAUST), Saudi Arabia and <sup>2</sup>Instituto Superior Técnico, Campus Tecnológico e Nuclear, Lisbon, Portugal

**TuP\_29 Study of optical cavities based on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>:Cr nanowires with synchrotron radiation**

Daniel Carrasco<sup>1</sup>, Jaime Dolado<sup>2</sup>, Paula Pérez-Peinado<sup>1</sup>, Manuel Alonso-Orts<sup>1,3</sup>, G. Martínez-Criado<sup>2</sup>, José María San Juan<sup>4</sup>, María Luisa Nó<sup>4</sup>, Emilio Nogales<sup>1,\*</sup> and Bianchi Méndez<sup>1</sup>

<sup>1</sup>Dpt. of Materials Physics, Faculty of Physics, Complutense University, Madrid, Spain <sup>2</sup>European Synchrotron Radiation Facility - ESRF, Grenoble, France <sup>3</sup>Institute of Solid State Physics, University of Bremen, Bremen, Germany and <sup>4</sup>Dpt. of Physics, Faculty of Science and Technology, Univ. Basque Country, Bilbao, Spain

**TuP\_30 Solar-Blind Ultraviolet Detection Properties of Ga<sub>2</sub>O<sub>3</sub>/ZnO Heterojunctions**

J. G. Ma<sup>1,\*</sup>, H. B. Wang<sup>1</sup>, P. Li<sup>1</sup> and Y. C. Liu<sup>1</sup>

<sup>1</sup>Key Laboratory for UV Light-Emitting Materials and Technology of Ministry of Education, Northeast Normal University, Changchun, China

**TuP\_31 Assessing the impact of defects on performances of Ga<sub>2</sub>O<sub>3</sub> photodetector via photoinduced current transient spectroscopy**

Rujun Sun<sup>1,2,\*</sup>, Yifan Li<sup>1,2</sup>, Ce Wang<sup>1,2</sup>, Hong Zhou<sup>1,2</sup>, Jingcheng Zhang<sup>1,2</sup>, Yue Hao<sup>1,2</sup>

<sup>1</sup>School of Microelectronics, Xidian University, Xi'an, Shaanxi, China and <sup>2</sup>National Key Laboratory of Wide Bandgap Semiconductor Devices and Integrated Technology, Xidian University, Xi'an, Shaanxi, China

**TuP\_32 (Student) (Ga, Fe)<sub>2</sub>O<sub>3</sub> alloy thin films grown on rh-ITO electrodes by mist CVD**

R. Kondo<sup>1,\*</sup>, K. Shimazoe<sup>1</sup>, H. Nishinaka<sup>2</sup> and M. Yoshimoto<sup>2</sup>

<sup>1</sup>Department of Electronics, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto, Japan and <sup>2</sup>Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto, Japan

**TuP\_33 (Student) Visible Light Driven Catalytic properties of Mesoporous  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>/g-C<sub>3</sub>N<sub>4</sub> Hybrid Nanostructures**

Raja Sakthivel, Sai Prasanna Meenakshisundaram and Moorthy Babu Sridharan\*

Crystal Growth Centre, Anna University, Chennai, Tamil Nadu, India

**TuP\_34 Self-powered photodetector based on the PEDOT:PSS/ $\kappa$ -Ga<sub>2</sub>O<sub>3</sub> organic-inorganic hybrid heterojunction**

F. Mattei<sup>1</sup>, A. Parisini<sup>1,\*</sup>, D. Spoltore<sup>1</sup>, G. Tarabella<sup>2</sup>, D. Vurro<sup>2</sup>, P. D'Angelo<sup>2</sup>, M. Pavesi<sup>1</sup>, A. Bosio<sup>1</sup>, P. Mazzolini<sup>1</sup>, M. Bosi<sup>2</sup>, L. Seravalli<sup>2</sup>, R. Fornari<sup>1</sup>

<sup>1</sup>University of Parma, Dept. of Mathematical, Physical and Computer Sciences, Parma, Italy and <sup>2</sup>IMEM-CNR, Institute of Materials for Electronics and Magnetism, Parma, Italy

**TuP\_35 Ag and Au plasmonic nanoparticles formed in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> thin films by ion implantation**

I. S. Gonçalves<sup>5</sup>, I. Freitas<sup>5</sup>, A.S. Sousa<sup>1,2,5</sup>, D. M. Esteves<sup>1,2,5</sup>, B. Ferreira<sup>1</sup>, R. Meirinho<sup>1</sup>, K. Lorenz<sup>1,2,4</sup> and M. Peres<sup>1,2,4,\*</sup>

<sup>1</sup>INESC MN, Lisbon, Portugal <sup>2</sup>IFPN, Lisbon, Portugal <sup>3</sup>C2TN, Lisbon, Portugal <sup>4</sup>DECN, Instituto Superior Técnico, University of Lisbon, Lisbon, Portugal <sup>5</sup>Instituto Superior Técnico, University of Lisbon, Lisbon, Portugal

- TuP\_36 **Graphene monolayer interlayer for ultrahigh Photoresponsivity of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky Barrier Deep Ultraviolet Photodiodes**  
 Madani Labeled<sup>1,2,\*</sup>, Bo-In Park<sup>3,4</sup>, Jekyung Kim<sup>3,4</sup>, Jang Hyeok Park<sup>1,2</sup>, Ji Young Min<sup>1,2</sup>, Hee Jae Hwang<sup>5</sup>, Jeehwan Kim<sup>3,4,\*</sup> and You Seung Rim<sup>1,2,\*</sup>  
<sup>1</sup>Department of Semiconductor Systems Engineering and Convergence Engineering for Intelligent Drone, Sejong University, Seoul, Republic of Korea <sup>2</sup>Institute of Semiconductor and System IC, Sejong University Seoul, Republic of Korea <sup>3</sup>Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA, USA <sup>4</sup>Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, MA, USA and <sup>5</sup>Biomaterials Research Center, Korea Institution of Science and Technology, Seoul, Republic of Korea
- TuP\_37  **$\beta$ -Ga<sub>2</sub>O<sub>3</sub> Based Solar-Blind Schottky diode Alpha Particle Detector**  
 Jing Di<sup>1</sup>, Hezhi Zhang<sup>1,\*</sup>, Man Hoi Wong<sup>2</sup>, Song Zhang<sup>3</sup>, Zengyin Dong<sup>3</sup>, Xiaochuan Xia<sup>1</sup>, Zhenzhong Zhang<sup>1</sup>, Hongwei Liang<sup>1</sup>  
<sup>1</sup>School of Microelectronics, Dalian University of Technology, Dalian, People's Republic of China <sup>2</sup>Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology, Hong Kong <sup>3</sup>The 46th Research Institute, China Electronics Technology Group Corporation, Tianjin, People's Republic of China
- TuP\_38 **Non-volatile optoelectronic memory and image-memory array based on amorphous Ga<sub>2</sub>O<sub>3</sub>**  
 Rui Zhu<sup>1,2</sup> and Huili Liang<sup>1,2</sup>, Shangfeng Liu<sup>1,3</sup>, Ye Yuan<sup>1</sup>, Augustinas Galeckas<sup>4</sup>, Xinqiang Wang<sup>1,4</sup>, Francis Chi-Chung Ling<sup>5</sup>, Andrej Kuznetsov<sup>4</sup>, Guangyu Zhang<sup>1,2</sup>, Zengxia Mei<sup>1,2\*</sup>  
<sup>1</sup>Songshan Lake Materials Laboratory, Dongguan, Guangdong, China <sup>2</sup>Institute of Physics, Chinese Academy of Sciences, Beijing, China <sup>3</sup>School of Physics, Peking University, Beijing, China <sup>4</sup>Department of Physics, University of Oslo, Oslo, Norway <sup>5</sup>Department of Physics, The University of Hong Kong, Hong Kong, China
- TuP\_39 **Investigation of the Prospects of Ga<sub>2</sub>O<sub>3</sub> based UVC Photodetectors for Remote Optical Fire Sensing and Localisation**  
 D. J. Rogers<sup>1,\*</sup>, V. E. Sandana<sup>1</sup>, P. Bove, F. H. Teherani and M. Razeghi<sup>2</sup>  
<sup>1</sup>Nanovation, Chateaufort, France <sup>2</sup>Center for Quantum Devices, ECE Department, Evanston, IL, USA
- TuP\_40 **Towards Realization of Large-Scale  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Composite Wafers**  
 M. E. Liao<sup>1,\*</sup>, K. Huynh<sup>2</sup>, N. Ravi<sup>2</sup>, K. Pan<sup>2</sup>, B. S. Carson<sup>2</sup>, L. Matto<sup>2</sup>, P. J. Shah<sup>1</sup> and M. S. Goorsky<sup>2</sup>  
<sup>1</sup>Apex Microdevices, West Chester, Ohio, USA and <sup>2</sup>University of California Los Angeles, Los Angeles, California, USA
- TuP\_41 (Student) **Demonstration of a p-Diamond/Ga<sub>2</sub>O<sub>3</sub> Heterojunction PN Diode**  
 Aditya K Bhat<sup>1</sup>, Mohamadali Malakoutian<sup>2</sup>, Kelly Woo<sup>2</sup>, Vanjari Sai Charan<sup>1</sup>, Matthew D Smith<sup>1</sup>, Srabanti Chowdhury<sup>2</sup> and Martin Kuball<sup>1,\*</sup>  
<sup>1</sup>HH Wills Physics Laboratory, University of Bristol, United Kingdom and <sup>2</sup>Department of Electrical Engineering, Stanford University, Stanford, CA, USA
- TuP\_42 **Progress towards cold ion-splitting of (010)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> using implanted Helium**  
 H. Masten<sup>1,\*</sup>, M. Liao<sup>1</sup>, J. S. Lundh<sup>1</sup>, A. Jacobs<sup>2</sup>, S. Mack<sup>2</sup>, K. Hobart<sup>2</sup> and M. Tadjer<sup>2</sup>  
<sup>1</sup>NRC Fellow residing at U.S Naval Research Laboratory, Washington, DC, USA and <sup>2</sup>U.S Naval Research Laboratory, Washington, DC, USA
- TuP\_43 (Student) **Anisotropic Charge, Thermal and Thermoelectric Transport in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> from First Principles**  
 S. Tillack<sup>1,\*</sup>, N. H. Protik<sup>1</sup>, and C. Draxl<sup>1</sup>  
<sup>1</sup>Humboldt-Universität zu Berlin and IRIS Adlershof, Berlin, Germany
- TuP\_44 (Late News) **Strategies of Enhancing Self-powered Photodetection Performances in Ga<sub>2</sub>O<sub>3</sub>-based Heterojunction Photodetectors**  
 Shan Li<sup>1,\*</sup> and Weihua Tang<sup>1,\*</sup>  
<sup>1</sup>College of Integrated Circuit Science and Engineering, University of Posts and Telecommunications, Nanjing, China
- TuP\_45 (Late News) **A metastable deep defect in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**  
 Amanda Langørgen<sup>1,\*</sup>, Ymir K. Frodason<sup>1</sup>, Ingvild J. T. Jensen<sup>2</sup> and Lasse Vines<sup>1</sup>  
<sup>1</sup>Centre for Materials Science and Nanotechnology, University of Oslo, Oslo, Norway <sup>2</sup>SINTEF, Forskningsveien 1, Oslo, Norway
- TuP\_46 (Late News) **Impact of ZnO alloying on electrical and optical properties of MgNiZnO alloy films prepared by RF magnetron sputtering**  
 T. Onuma<sup>1,\*</sup>, A. Ishikawa<sup>1</sup>, M. Murayama<sup>1</sup>, T. Akiba<sup>1</sup>, T. Yamaguchi<sup>1</sup>, K. Sasaki<sup>2</sup>, A. Kuramata<sup>2</sup> and T. Honda<sup>1</sup>



TuP\_47 (Late News) **On determination of temperature dependent capture coefficient of main deep-levels in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

A.A. Vasilev<sup>1,\*</sup>, A.I. Kochkova<sup>1</sup>, A.Y. Polyakov<sup>1</sup>, A.A. Romano<sup>1</sup>, N.R. Matros<sup>1</sup>, L.A. Alexanyan<sup>1</sup>, I.V. Shchemerov<sup>1</sup> and S.J. Pearton<sup>2</sup>

<sup>1</sup>National University of Science and Technology MISIS, Moscow, Russia <sup>2</sup>University of Florida, Gainesville, Florida, USA

TuP\_48 (Late News) **Cr-doped Ga<sub>2</sub>O<sub>3</sub> ALD-based microcavities with thermometric application**

M. Alonso-Orts<sup>1,2,\*</sup>, R. J. T. Neelissen<sup>1</sup>, D. Carrasco<sup>1,3</sup>, M. Schowalter<sup>1</sup>, A. Rosenauer<sup>1,2</sup>, E. Nogales<sup>3</sup>, B. Méndez<sup>3</sup> and M. Eickhoff<sup>1,2</sup>

<sup>1</sup>Institute of Solid State Physics, University of Bremen, Bremen, Germany <sup>2</sup>MAPEX Center for Materials and Processes, Universität Bremen, Bremen, Germany and <sup>3</sup>Departamento de Física de Materiales, Universidad Complutense de Madrid, Madrid, Spain

TuP\_49 (Late News, Student) **Effect of Al substitution on the electron-phonon interaction of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

Jayanta Bhattacharjee<sup>1,2,\*</sup> and S. D. Singh<sup>1,2</sup>

<sup>1</sup>Accelerator Physics & Synchrotrons Utilization Division, Raja Ramanna Centre for Advanced Technology, Indore, Madhya Pradesh, India and <sup>2</sup>Homi Bhabha National Institute, Anushkati Nagar, Mumbai, Maharashtra, India

TuP\_50 (Late News, Student) **Incorporating Ba as compensating acceptor into  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> by molecular beam epitaxy**

A. Ardenghi<sup>1,\*</sup>, P. Mazzolini<sup>2</sup>, J.B. Varley<sup>3</sup>, L. Vines<sup>4</sup>, J. Lähnemann<sup>1</sup> and O. Bierwagen<sup>1</sup>

<sup>1</sup>Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany <sup>2</sup>Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy <sup>3</sup>Lawrence Livermore National Laboratory, Livermore, United States and <sup>4</sup>Department of Physics, Oslo University, Oslo, Norway

TuP\_51 (Late News) **Electrical transport in undoped and carbon doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

N. H. Nickel\*, N. Mignani, and J. Rappich

Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin, Germany

TuP\_52 (Late News, Student) **No electron freezing out” in Si-doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (010) Films down to 2 K**

Vishal Khandelwal, Francesco Blanda, Manoj Kumar Rajbhar, Yi Lu, Xiao Tang, Xiaohang Li\*

Advanced Semiconductor Laboratory (ASL), Electrical and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology (KAUST), Thuwal, Kingdom of Saudi Arabia

TuP\_53 (Late News) **Ballistic phonon transport in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

Rüdiger Mitdank<sup>1</sup>, Robin Ahrling<sup>1</sup>, Andreas Popp<sup>3</sup>, Jana Rehm<sup>3</sup>, Arub Akhtar<sup>3</sup>, Zbigniew Galazka<sup>3</sup>, Saskia F. Fischer<sup>1,2</sup>

<sup>1</sup>Novel Materials Group, Humboldt-Universität zu Berlin, Berlin, Germany <sup>2</sup>CSMB, Humboldt-Universität zu Berlin, Berlin, Germany

<sup>3</sup>Leibniz Institut für Kristallzüchtung, Berlin, Germany

May 29, Wednesday

08:15-08:45 Admissions

08:45-10:25  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> alloys

Chair: tbd

08:45-09:00 WeM1\_1 (Oral)

**Molecular beam epitaxy of  $\beta$ -(In<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (010): compositional control, layer quality, anisotropic strain relaxation, and prospects for two-dimensional electron gas confinement**

P. Mazzolini<sup>1(a,\*)</sup>, C. Wouters<sup>2</sup>, M. Albrecht<sup>2</sup>, A. Falkenstein<sup>3</sup>, M. Martin<sup>3</sup>, P. Vogt<sup>4</sup>, O. Bierwagen<sup>1</sup>

<sup>1</sup>Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany <sup>2</sup>Leibniz-Institut für Kristallzüchtung, Berlin, Germany <sup>3</sup>Institute of Physical Chemistry, RWTH Aachen University, Germany and <sup>4</sup>Materials Department, University of California Santa Barbara, USA <sup>(a)</sup>Currently at: Department of Mathematical Physical and Computer Sciences, University of Parma, Italy

09:00-09:15 WeM1\_2 (Oral)

**(Student) Characterization of (100)  $\beta$ -(Sc<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub>/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> heterostructures grown by pulsed-laser deposition**

K. Koreishi<sup>1,\*</sup>, T. Soma<sup>1</sup>, H. Kumigashira<sup>2,3</sup> and A. Ohtomo<sup>1</sup>

<sup>1</sup>Dept. Chem. Sci. Eng., Tokyo Institute of Technology, Meguro, Tokyo, Japan and <sup>2</sup>IMRAM, Tohoku University, Sendai, Miyagi, Japan, <sup>3</sup>KEK-IMSS, Tsukuba, Ibaraki, Japan

09:15-09:30 WeM1\_3 (Oral)

**Thermodynamic analysis of (Al<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> growth by molecular beam epitaxy**

R. Togashi<sup>1,\*</sup>, M. Higashiwaki<sup>2,3</sup> and Y. Kumagai<sup>4</sup>

<sup>1</sup>Sophia University, Chiyoda, Tokyo, Japan <sup>2</sup>Osaka Metropolitan University, Sakai, Osaka, Japan <sup>3</sup>National Institute of Information and Communications Technology, Koganei, Tokyo, Japan and <sup>4</sup>Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan

09:30-09:45 WeM1\_4 (Late news, Student)

**The challenge to grow  $\beta$ -(Al<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> on off-oriented (100)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> and  $\beta$ -(Al<sub>y</sub>Ga<sub>1-y</sub>)<sub>2</sub>O<sub>3</sub> with y=0.1 - 0.2 by MOVPE**

Jana Rehm<sup>1,\*</sup>, Ta-Shun Chou<sup>1</sup>, Arub Akhtar<sup>1</sup>, Saud Bin-Anooz<sup>1</sup>, Andreas Fiedler<sup>1</sup>, Martin Schmidbauer<sup>1</sup>, Zbigniew Galazka<sup>1</sup> and Andreas Popp<sup>1</sup>

<sup>1</sup>Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany

09:45-10:00 WeM1\_5 (Oral)

**Physical properties of  $\beta$ -(Al<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> (x = 0 – 0.35) bulk single crystals grown by the Czochralski method**

Palvan Seyidov<sup>1</sup>, Zbigniew Galazka<sup>1</sup>, Jana Rehm<sup>1</sup>, Ta-Shun Chou<sup>1</sup>, Saud Bin Anooz<sup>1</sup>, Andreas Popp<sup>1</sup> and Andreas Fiedler<sup>1,\*</sup>

<sup>1</sup>Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany

10:00-10:30 Break with Refreshments

10:30-12:25 From  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> to  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>

Chair: tbd

10:30-10:55 WeM2\_1 (Invited)

**Selective Area Growth of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> on Sapphire Substrates by mist-CVD and its Thermal Stability**

R. Jinno\*

The University of Tokyo, Meguro-ku, Tokyo, Japan

- 10:55-11:10 WeM2\_2 (Oral)  
**(Student) Cathodoluminescence study of dislocations in ELOG  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub>**  
 M. Maruzane<sup>1</sup>, Y. Oshima<sup>2</sup>, O. Makydonska<sup>1</sup>, P. Edwards<sup>1</sup>, R. Martin<sup>1</sup> and F. Massabuau<sup>1</sup>  
<sup>1</sup>University of Strathclyde, Glasgow, UK. And <sup>2</sup>National Institute for Material Science, Tsukuba, Japan
- 11:10-11:25 WeM2\_3 (Oral)  
**Detection of dislocations in images of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub>-based corundum oxides using the computer vision YOLO algorithm**  
 G. T. Dang<sup>1,\*</sup>, T. Kawaharamura<sup>2</sup> and M. W. Allen<sup>1</sup>  
<sup>1</sup>MacDiarmid Institute for Advanced Materials and Nanotechnology, University of Canterbury, Christchurch, New Zealand and <sup>2</sup>School of Systems Engineering, Kochi University of Technology, Tosayamada, Kami, Kochi, Japan
- 11:25-11:40 WeM2\_4 (Late News)  
**Highly rectifying metal-semiconductor field-effect transistors on  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> with breakdown field of 1.36 MV/cm**  
 S. Vogt,\* D. Splith, P. Schlupp, C. Petersen, H. von Wenckstern, and M. Grundmann  
<sup>1</sup>Felix Bloch Institute for solid state physics, Leipzig, Saxony, Germany
- 11:40-11:55 WeM2\_5 (Oral)  
**The epitaxial strain and stress relationships in the  $\alpha$  and  $\beta$  phases of (Al,Ga)<sub>2</sub>O<sub>3</sub> and their effects onto phonon and electronic properties**  
 Mathias Schubert<sup>1,2</sup>, Rafal Korlacki<sup>1</sup>, Megan Stokey<sup>2</sup>, Alyssa Mock<sup>1,2</sup>, Vanya Darakchieva<sup>1,2</sup>  
<sup>1</sup>Department of Electrical and Computer Engineering, University of Nebraska-Lincoln, Lincoln, USA <sup>2</sup>Department of Electrical Engineering and Computer Science, Milwaukee School of Engineering, Milwaukee, USA <sup>3</sup>Department of Electrical and Computer Engineering, College of Engineering, Applied Science and Technology, Weber State University, Ogden, USA and <sup>4</sup>Solid State Physics and NanoLund, Lund University, Lund, Sweden
- 11:55-12:10 WeM2\_6 (oral)  
**Si doping of  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> grown by molecular beam epitaxy**  
 Hironori Okumura  
 Faculty of Pure and Applied Sciences, Tsukuba, Ibaraki, Japan

**12:10-14:10 Lunch & Poster 3: (Al,Ga)<sub>2</sub>O<sub>3</sub>, Alloys,  $\alpha$ -phase, Diodes, NiO/Ga<sub>2</sub>O<sub>3</sub>, MOSFETs**

- WeP\_1 **XPS study on composition and band structure of aluminum alloyed  $\beta$ -gallium oxide bulk crystals and thin films**  
 L. Schewe<sup>1,\*</sup>, J. Rehm<sup>2</sup>, M. C. Kao<sup>3</sup>, V. Vonk<sup>3</sup>, Z. Galazka<sup>2</sup>, S. B. Anooz<sup>2</sup>, A. Popp<sup>2</sup> and J. I. Flege<sup>1</sup>  
<sup>1</sup>Chair of Applied Physics and Semiconductor Spectroscopy, Brandenburgische Technische Universität Cottbus-Senftenberg, Cottbus, Brandenburg, Germany <sup>2</sup>Leibnitz-Institut für Kristallzüchtung, Berlin, Germany <sup>3</sup>CXNS-Center for X-Ray and Nano Science, Deutsches Elektronen-Synchrotron, Hamburg, Germany
- WeP\_2 (Student) **Synthesis & electrical characterization of Al-doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**  
 Valentine W. Muramba<sup>1,2,\*</sup>, Abdulraoof I. Ali<sup>1</sup>, Jacqueline M. Nel<sup>1</sup>  
<sup>1</sup>Department of Physics, University of Pretoria, Hatfield, South Africa and <sup>2</sup>Department of Mathematics & Physics, Technical University of Mombasa, Mombasa, Kenya
- WeP\_3 **Crack formation in strained  $\beta$ -(Al<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> films grown on (010)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> substrates**  
 K. Huynh<sup>1</sup>, M. E. Liao<sup>2</sup>, M. J. Tadjer<sup>3</sup>, J. S. Lundh<sup>2</sup>, K. Sasaki<sup>4</sup>, K. Konishi<sup>4</sup>, H. N. Masten<sup>2</sup>, J. K. Hite<sup>3</sup>, M. A. Mastro<sup>3</sup>, A. Kuramata<sup>4</sup>, K. D. Hobart<sup>3</sup> and M. S. Goorsky<sup>1</sup>  
<sup>1</sup>Department Materials Science and Engineering, University of California Los Angeles, Los Angeles, California, USA <sup>2</sup>National Research Council Postdoctoral Fellow at U.S. Naval Research Laboratory <sup>3</sup>Novel Crystal Technology, Inc., Saitama, Japan <sup>4</sup>U.S. Naval Research Laboratory, Washington, DC, USA
- WeP\_4 (Student) **Copper-tin-oxide: an amorphous, bipolar ternary oxide system with tunable optical and electrical properties**  
 A. Jörns<sup>1,\*</sup>, H. von Wenckstern<sup>1</sup> and M. Grundmann<sup>1</sup>  
<sup>1</sup>Leipzig University, Felix Bloch Institute for Solid State Physics, Leipzig, Sachsen, Germany

- WeP\_5 Combinatorial PLD Synthesis of  $(\text{In}_{1-x}\text{Ga}_x)_2\text{O}_3$  Thin Films: Structural, Morphological, and Optical Analysis for Transparent Conducting Oxides**  
 J. Gracia-Fernández<sup>1,\*</sup>, S. Montag<sup>2</sup>, D. Splith<sup>2</sup>, M. Kneiß<sup>2</sup>, M. Grundmann<sup>2</sup>, Ø. Prytz<sup>1</sup>, H. von Wenckstern<sup>1,2</sup>  
<sup>1</sup> Department of Physics/Centre for Materials Science and Nanotechnology, University of Oslo, Oslo, Norway and <sup>2</sup>Felix-Bloch-Institut für Festkörperphysik, Fakultät für Physik und Geowissenschaften, Universität Leipzig, Leipzig, Germany
- WeP\_6 (Student) Growth, faceting and thickness effects of MBE-grown  $\alpha\text{-Ga}_2\text{O}_3$  and  $\alpha\text{-(In}_x\text{Ga}_{1-x})_2\text{O}_3$  on m-plane  $\alpha\text{-Al}_2\text{O}_3$**   
 Martin S. Williams<sup>1,\*</sup>, Manuel Alonso-Orts<sup>1,2</sup>, Marco Schowalter<sup>1</sup>, Alexander Karg<sup>1</sup>, Sushma Raghuvansy<sup>1</sup>, Jon P. McCandless<sup>3</sup>, Debdeep Jena<sup>3,4,5</sup>, Andreas Rosenauer<sup>1,2</sup>, Martin Eickhoff<sup>1,2</sup> and Patrick Vogt<sup>1</sup>  
<sup>1</sup>Institute of Solid State Physics, University of Bremen, Bremen, Germany <sup>2</sup>MAPEX Center for Materials and Processes, University of Bremen, Bremen, Germany <sup>3</sup>School of Electrical and Computer Engineering, Cornell University, New York, United States of America <sup>4</sup>Department of Material Science and Engineering, Cornell University, New York, United States of America and <sup>5</sup>Kavli Institute at Cornell for Nanoscale Science, Cornell University, Ithaca, New York, United States of America
- WeP\_7 (Student) Growth and structural properties of PLD-grown ternary alloys of rhombohedral transition metal sesquioxides and  $\alpha\text{-Ga}_2\text{O}_3$**   
 C. Petersen<sup>1,\*</sup>, S. Vogt<sup>1</sup>, L. Köhnlein<sup>1</sup>, H. von Wenckstern<sup>1</sup>, and M. Grundmann<sup>1</sup>  
<sup>1</sup>Universität Leipzig, Felix Bloch Institute for Solid State Physics, Semiconductor Physics Group, Leipzig, Germany
- WeP\_8  $\alpha\text{-Ga}_2\text{O}_3$  and step-graded  $\alpha\text{-Ga}_2\text{O}_3/(\text{Al}_x\text{Ga}_{1-x})_2\text{O}_3$  on m-plane sapphire grown by oxide-molecular-beam-epitaxy**  
 Hongliang Chang<sup>1</sup>, Yanqing Jia<sup>1</sup>, Xu Zhang<sup>1</sup>, Mohamed Ben Hassine<sup>2</sup>, Dalaver H. Anjum<sup>3</sup>, Qingxiao Wang<sup>2</sup>, Abdullah Alquwayzani<sup>1</sup>, Tien Khee Ng<sup>1,a</sup> and Boon S. Ooi<sup>1,b</sup>  
<sup>1</sup>Photonics Laboratory, Electrical and Computer Engineering, Division of Computer, Electrical and Mathematical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia <sup>2</sup>Imaging and Characterization Core Lab, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia and <sup>3</sup>Department of Physics, Khalifa University, Abu Dhabi, United Arab Emirates
- WeP\_9 Growth of  $\alpha\text{-(Al,Ga)}_2\text{O}_3$  films lattice-matched to  $\alpha\text{-Cr}_2\text{O}_3$  by mist-CVD**  
 R. Jinno<sup>1,\*</sup>, T. Oshima<sup>2</sup>, Y. Oshima<sup>2</sup> and S. Fukatsu<sup>1</sup>  
<sup>1</sup>The University of Tokyo, Meguro-ku, Tokyo, Japan <sup>2</sup>National Institute for Materials Science, Tsukuba, Ibaraki, Japan
- WeP\_10 (Student) Structural characterization of threading dislocation in  $\alpha\text{-Ga}_2\text{O}_3$  on sapphire**  
 H. Takane<sup>1,1,\*</sup>, S. Konishi<sup>1</sup>, Y. Hayasaka<sup>2</sup>, R. Ota<sup>3</sup>, T. Wakamatsu<sup>1</sup>, and Y. Isobe<sup>1</sup>, K. Kaneko<sup>4</sup> and K. Tanaka<sup>1</sup>  
<sup>1</sup>Kyoto University, Kyoto, Kyoto Japan <sup>2</sup>Tohoku University, Sendai, Miyagi, Japan <sup>3</sup>Hokkaido University, Sapporo, Hokkaido, Japan <sup>4</sup>Ritsumeikan University, Kusatsu, Shiga, Japan
- WeP\_11 Atomic scale observation of threading dislocations in  $\alpha\text{-Ga}_2\text{O}_3$**   
 R. Mullen<sup>1</sup>, G. Divitini<sup>2</sup>, J. Roberts<sup>3</sup>, P. Chalker<sup>3</sup>, R. Oliver<sup>2</sup>, B. Hourahine<sup>1</sup> and F. Massabuau<sup>1,\*</sup>  
<sup>1</sup>Department of Physics, University of Strathclyde, Glasgow, UK <sup>2</sup>Department of Material Science and Metallurgy, University of Cambridge, Cambridge, UK and <sup>3</sup>School of Engineering, University of Liverpool, Liverpool, UK
- WeP\_12 Composition and strain of the  $\alpha$ -phase intermediate layer at the  $\text{Ga}_2\text{O}_3/\text{Al}_2\text{O}_3$  interface**  
 M. Schowalter<sup>1,\*</sup>, S. Raghuvansy<sup>1</sup>, A. Karg<sup>1</sup>, P. Vogt<sup>1</sup>, A. Rosenauer<sup>1,2</sup> and M. Eickhoff<sup>1,2</sup>  
<sup>1</sup>Institut für Festkörperphysik, Universität Bremen, Bremen, Germany AND <sup>2</sup>MAPEX Center for Materials and Processes, Universität Bremen, Bremen, Germany
- WeP\_13 (Student) Ge-doped  $\alpha\text{-Ga}_2\text{O}_3$  film with electron mobility of  $99\text{ cm}^2\text{V}^{-1}\text{s}^{-1}$**   
 T. Wakamatsu<sup>1,\*</sup>, H. Takane<sup>1</sup>, Y. Isobe<sup>1</sup>, K. Kaneko<sup>1,2</sup> and K. Tanaka<sup>1</sup>  
<sup>1</sup>Kyoto University, Kyoto, Kyoto, Japan and <sup>2</sup>Ritsumeikan University, Kusatsu, Shiga, Japan
- WeP\_14 (Student) Red shift and amplitude increase in the dielectric function of corundum-like  $\alpha\text{-(Ti}_x\text{Ga}_{1-x})_2\text{O}_3$**   
 E. Kluth<sup>1,\*</sup>, M. Fay<sup>2</sup>, C. Parmenter<sup>2</sup>, J. Roberts<sup>3</sup>, E. Smith<sup>2</sup>, C. Stoppiello<sup>2</sup>, F. Massabuau<sup>4</sup>, R. Goldhahn<sup>1</sup> and M. Feneberg<sup>1</sup>  
<sup>1</sup>Institut für Physik, Otto-von-Guericke-Universität Magdeburg, Germany <sup>2</sup>Nanoscale and Microscale Research Centre (nmRC), University of Nottingham, UK <sup>3</sup>School of Engineering, The University of Liverpool, UK and <sup>4</sup>Department of Physics, SUPA, University of Strathclyde, Glasgow, UK

- WeP\_17 (Student) **Simulation of Single-Event Burnout in Gallium Oxide Schottky Diodes Effected by Hole Self-trapping**  
 Song He, Jinyang Liu, Yuanjie Ding, Guangwei Xu\* and Shibing Long  
*University of Science and Technology of China, Hefei, Anhui, China*
- WeP\_18 (Student) **2.3kV High voltage  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> hetero-junction barrier Schottky diode with Von < 0.65V**  
 A. Hong Zhou<sup>1,\*</sup>, B. Chunxu Su<sup>1</sup>, C. Jincheng Zhang<sup>1</sup>, and D. Yue Hao<sup>1</sup>  
<sup>1</sup>*State Key Discipline Laboratory of Wide Band Gap Semiconductor Technology, School of Microelectronics, Xidian University, Xi'an, China*
- WeP\_19 (Student) **High Temperature Performance and Defects of Ga<sub>2</sub>O<sub>3</sub> Schottky Barrier Diodes with Mesa Structure**  
 M.-Y. Kim<sup>1,2</sup>, N. Hendricks<sup>4</sup>, N. Moser<sup>4</sup>, D. Yang<sup>3</sup>, S. Pookpanratana<sup>3</sup>, Q. Li<sup>2,3,\*</sup>, S.-M. Koo<sup>1,\*</sup>  
<sup>1</sup>*Kwangwoon University, Seoul, Republic of Korea* <sup>2</sup>*George Mason University, Fairfax, VA, USA* <sup>3</sup>*National Institute of Standards and Technology, Gaithersburg, MD, USA* and <sup>4</sup>*Air Force Research Laboratory, Sensors Directorate, Wright Patterson AFB, OH 45433*
- WeP\_20 (Student) **The Mo/Au anode  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Junction Barrier Schottky diode with a high P-FOM of 1.32GW/cm<sup>2</sup>**  
 Hong Zhou<sup>1,\*</sup>, Chunxu Su<sup>1</sup>, Jincheng Zhang<sup>1</sup> and Yue Hao<sup>1</sup>  
<sup>1</sup>*National Key Laboratory of Wide Bandgap Semiconductor Devices and Integrated Technology, School of Microelectronics, Xidian University, Xi'an, Shaanxi, China*
- WeP\_21 (Student) **Performance comparison of high- $\kappa$  bismuth zinc niobium oxide field plated and metal-insulator-semiconductor  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> vertical Schottky barrier diodes**  
 Pooja Sharma, and Saurabh Lodha\*  
*Department of Electrical Engineering, IIT Bombay, Mumbai, India*
- WeP\_22 (Student) **8.7 A/704 V  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky Barrier Diode Demonstrated by Low-Temperature O<sub>2</sub> Annealing and Mesa Termination**  
 Feihong Wu<sup>1</sup>, Zhao Han<sup>1</sup>, Weibing Hao<sup>1</sup>, Junpeng Wen<sup>1</sup>, Guangwei Xu<sup>1,\*</sup> and Shibing Long<sup>1</sup>  
<sup>1</sup>*School of Microelectronics, University of Science and Technology of China, Hefei, China*
- WeP\_23 **Realization of highly rectifying pn-heterojunctions on pulsed laser deposited  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> thin films**  
 P. Brokemeyer<sup>1</sup>, S. Vogt<sup>1,\*</sup>, C. Petersen<sup>1</sup>, H. von Wenckstern<sup>1</sup> and M. Grundmann<sup>1</sup>  
<sup>1</sup>*Universität Leipzig, Felix Bloch Institute for Solid State Physics, Semiconductor Physics Group, Leipzig, Germany*
- WeP\_24 (Student) **Investigation into the degradation mechanism of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> HVPE epitaxial layer induced by neutron irradiation and a recovery methodology**  
 Jinyang Liu, Guangwei Xu\* Xuanze Zhou, and Shibing Lon  
*University of Science and Technology of China, Hefei, Anhui, China*
- WeP\_25 (Student) **High performance PtO<sub>x</sub>-IGZO thin film Schottky barrier diodes with good negative bias stress stability**  
 Haoxin Li, Zhao Han, Guangwei Xu\* and Shibing Long  
*University of Science and Technology of China, Hefei, China*
- WeP\_26 (Student) **Investigation of electrical properties of unintentionally doped Ga<sub>2</sub>O<sub>3</sub> thin films grown by low-pressure hot-wall MOCVD**  
 J. Morihara<sup>1,\*</sup>, Z. Wang<sup>2</sup>, J. Yoshinaga<sup>3,4</sup>, S. Sato<sup>1</sup>, K. Eguchi<sup>1</sup>, Y. Kumagai<sup>3</sup> and M. Higashiwaki<sup>1,2,\*</sup>  
<sup>1</sup>*Department of Physics and Electronics, Osaka Metropolitan University, Sakai, Osaka, Japan* <sup>2</sup>*National Institute of Information and Communications Technology, Koganei, Tokyo, Japan* <sup>3</sup>*Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan* and <sup>4</sup>*TAIYO NIPPON SANSO CORPORATION, Minato-ku, Tokyo, Japan*
- WeP\_27 (Student) **Characterization of hole trapping in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky diode by electron beam induced current**  
 C. Perrier<sup>1,\*</sup>, H. Umezawa<sup>3</sup>, A. Traoré<sup>2,4</sup>, E. Gherraert<sup>1,2,4</sup> and P. Ferrandis<sup>1,4</sup>

<sup>1</sup>Université Grenoble Alpes, CNRS, Grenoble INP, Institut Néel, Grenoble, France, <sup>2</sup>Faculty of Pure and Applied Sciences, University of Tsukuba, Tsukuba, Ibaraki, Japan <sup>3</sup>Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology (AIST), Osaka, Japan and <sup>4</sup>Japanese-French Laboratory for Semiconductor Physics and Technology J-F AST, CNRS, University Grenoble Alpes, Grenoble INP, University of Tsukuba, Japan

**WeP\_28 (Student) Screening of contact metals for optimized performance of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> based Schottky Barrier Diodes**

Clemens Petersen<sup>1,\*</sup>, Sebastian Köpp<sup>1</sup>, Daniel Splith<sup>1</sup>, Holger von Wenckstern<sup>1</sup> and Marius Grundmann<sup>1</sup>

<sup>1</sup>University Leipzig, Felix-Bloch-Institute for Solid State Physics, Semiconductor Physics Group, Leipzig, Germany

**WeP\_29 (Student) Assessment of trapping phenomena in SnO/k-Ga<sub>2</sub>O<sub>3</sub> p/n heterojunction by photocurrent measurements**

P. Rajabi Kalvani<sup>1,\*</sup>, A. Parisini<sup>1,\*</sup>, M. Pavesi<sup>1</sup>, O. Bierwagen<sup>3</sup>, K. Egbo<sup>3</sup>, P. Mazzolini<sup>1,2</sup>, S. Vantaggio<sup>1</sup>, F. Mattei<sup>1</sup>, M. Bosi<sup>2</sup>, L. Seravalli<sup>2</sup> and R. Fornari<sup>1,2</sup>

<sup>1</sup>Department of Mathematical, Physical and Computer Sciences, University of Parma, Parma, Italy <sup>2</sup>IMEM-CNR, Institute of Materials for Electronics and Magnetism, Parma, Italy and <sup>3</sup>Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e. V., Berlin, Germany

**WeP\_30 (Student) Characteristics of Ga<sub>2</sub>O<sub>3</sub>/4H-SiC Heterojunction Diodes Fabricated by Aerosol Deposition**

Hyun-Woo Lee<sup>1</sup>, Ji-Soo Choi<sup>1</sup>, Min-Yeong Kim<sup>1</sup>, Soo-Young Moon<sup>1</sup>, Geon-Hee Lee<sup>1</sup> and Sang-Mo Koo<sup>1\*</sup>

<sup>1</sup>Department of Electronic Materials Engineering, Kwangjuon University, Seoul, Korea

**WeP\_31 Electrical Properties  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Based on Hetero-Junction Barrier Schottky Diode**

HanBit Kim\*, SangHun Kim, YuSup Jung, ByoungSup Ahn, TaeJun Park, JoonHui Park, TaiYoung Kang, SinSu Kyoung

Powercubesemi Inc., Seongnam-si, Gyeonggi-do, Korea

**WeP\_32 (Student) Schottky barrier height enhancement using non-stoichiometric ultrathin interlayer of AlO<sub>x</sub> in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky barrier diodes**

Prabhat Prajapati<sup>1</sup>, Siddhartha Suman<sup>1</sup> and Saurabh Lodha<sup>1\*</sup>

<sup>1</sup>Department of Electrical Engineering, Indian Institute of Technology Bombay, Mumbai, India

**WeP\_33 Effect of Si Implantation and RIE Etching on the Surface Band-bending, Barrier Potential and Contact Resistance to Ga<sub>2</sub>O<sub>3</sub>**

Miquel Vellvehí<sup>1</sup>, Edgars Butanovs<sup>2</sup>, Ekaterine Chikoidze<sup>3</sup>, Lauris Dimitroenco<sup>2</sup>, Xavier Perpiñá<sup>1</sup>, Xavier Jorda<sup>1</sup>, Yves Dumont<sup>3</sup>, Juris Purans<sup>2</sup>, Jose Rebollo<sup>1</sup>, Amador Perez-Tomas<sup>4</sup>

<sup>1</sup>Power Electronics Group, The Institute of Microelectronics of Barcelona (IMB-CNM-CSIC), Campus UAB, Bellaterra, Barcelona, Spain <sup>2</sup>Institute of Solid State Physics UL, Ķengaraga, Riga, Latvia <sup>3</sup>Groupe d'Etude de la Matière Condensée, Université Paris-Saclay GEMaC, UVSQ – CNRS, Cedex Versailles, France and <sup>4</sup>Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and the Barcelona Institute of Science and Technology, ICN2, CSIC BIST, Campus UAB, Bellaterra, Barcelona, Spain

**WeP\_34 (Student) Effects of oxygen reactive ion etching and nitrogen radical irradiation on temperature-dependent electrical properties of Ga<sub>2</sub>O<sub>3</sub> (010) Schottky barrier diodes**

S. Sato<sup>1,\*</sup>, A. Mineyama<sup>1</sup>, Z. Wang<sup>2</sup> and M. Higashiwaki<sup>1,2,\*</sup>

<sup>1</sup>Department of Physics and Electronics, Osaka Metropolitan University, Sakai, Osaka, Japan and <sup>2</sup>National Institute of Information and Communications Technology, Koganei, Tokyo, Japan

**WeP\_35 (Student) Fabrication of mesa-shaped high-aspect Ga<sub>2</sub>O<sub>3</sub>/Air DBR structures for optical integrated platform by HEATE method**

S. Sato<sup>1</sup>, T. Momma<sup>1</sup>, T. Aikawa<sup>1</sup> and A. Kikuchi<sup>1,2,3,\*</sup>

<sup>1</sup>Sophia University, <sup>2</sup>Sophia Photonics Research Center and <sup>3</sup>Sophia Semiconductor Research Institute, Chiyoda-ku, Tokyo, Japan

**WeP\_36 A staggered-gap band-alignment of p-CuAlO<sub>2</sub>/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Heterojunction Diode for Low Leakage and High Breakdown Voltage**

Chowdam Venkata Prasad, Madani Labeled, Jang Hyeok Park, You Seung Rim\*

Department of Semiconductor Systems Engineering and Convergence Engineering for Intelligent Drone, Sejong University, Seoul, Republic of Korea

**WeP\_37 (Student) Demonstration of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Junction Terminal Extension Diode with a Low Von of 0.61V and a 12A/550 V Handling Capabilities**

Yitao Feng, Hong Zhou<sup>1,\*</sup>, Jincheng Zhang<sup>1,\*</sup>, Chunxu Su<sup>1</sup> and Yue Hao<sup>1</sup>

<sup>1</sup>National Key Laboratory of Wide Bandgap Semiconductor Devices and Integrated Technology, School of Microelectronics, Xidian University, Xi'an, Shaanxi, China

**WeP\_38 (Student) Device engineering and parameter optimization for simulation of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>-/NiO<sub>x</sub> super junction devices for ultrawide bandgap electronics**

Jose Manuel Taboada Vasquez<sup>1</sup>, Glen Isaac Maciel Garcia<sup>1</sup>, Mritunjay Kumar<sup>1</sup>, Md. Hasan Raza Ansari<sup>3</sup>, Nazek El-Atab<sup>3</sup>, Biplab Sarkar<sup>2</sup> and Xiaohang Li<sup>1,\*</sup>

<sup>1</sup>Advanced Semiconductor Laboratory, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia <sup>2</sup>Department of Electronics and Communication Engineering, Indian Institute of Technology Roorkee, Uttarakhand, India and <sup>3</sup>SAMA Labs, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

**WeP\_39 (Student) Heteroepitaxial Growth of NiO thin films on (-201)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> by mist CVD**

G. Yasui<sup>1,\*</sup>, H. Nishinaka<sup>2</sup>, H. Miyake<sup>3,4</sup> and M. Yoshimoto<sup>2</sup>

<sup>1</sup>Department of Electronics, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto, Japan <sup>2</sup>Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology Matsugasaki, Sakyo-ku, Kyoto, Japan <sup>3</sup>Power Electronics R & D Div. 2, MIRISE Technologies Corporation, Aichi, Japan and <sup>4</sup>Kyoto Lab for a Greener Future, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto, Japan

**WeP\_40 Investigation of Post-Annealing on Self-Powered UV-C Photodetector Based on High-Performance p-NiO/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Heterojunction**

Taejun Park, Yusup Jung, Byoung Sup Ahn, Hanbit Kim, Sanghun Kim, Joon Hui Park, TaiYoung Kang, SinSu Kyoung\*  
Powercubesemi Inc., Seongnam-si, Gyeonggi-do, Korea

**WeP\_41 Enhancing  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Heterojunction Field-Effect Transistors with p-NiO Integration for Efficient Normally-Off Operation**

Hanbit Kim\*, Joon Hui Park, Sanghun Kim, Tajun Park, Byoung Sup Ahn, Yusup Jung, Taiyoung Kang, Sinsu Kyoung  
Powercubesemi Inc., Seongnam-si, Gyeonggi-do, Korea

**WeP\_42 Growth, characterization, and reliability of NiO thin films for Ga<sub>2</sub>O<sub>3</sub> heterojunction devices**

Aaron Adams<sup>1,2,\*</sup>, Nolan Hendricks<sup>1</sup>, Weisong Wang<sup>1,3</sup>, Piyush Shah<sup>1,2</sup>, Adam Geiger<sup>1,2</sup>, Kevin Leedy<sup>1</sup>, Andrew Green<sup>1</sup>

<sup>1</sup>Air Force Research Laboratory, Sensors Directorate, Wright-Patterson AFB, OH, USA <sup>2</sup>Apex Microdevices, West Chester OH, USA  
<sup>3</sup>Wright State University Electrical Engineering Department, Dayton, OH, USA

**WeP\_43 Investigation of the Prospects of n-Ga<sub>2</sub>O<sub>3</sub>/p-NiO Heterojunctions for Use in Power Electronics**

D. J. Rogers<sup>1,\*</sup>, V. E. Sandana<sup>1</sup>, P. Bove, F. H. Teherani and M. Razeghi<sup>2</sup>

<sup>1</sup>Nanovation, Chateaufort, France <sup>2</sup>Center for Quantum Devices, ECE Department, Evanston, IL, USA

**WeP\_44 (Student) Field Management strategies to minimize the BTBT assisted leakage current in NiO<sub>x</sub>/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> PN junction and PiN diodes**

Jose Manuel Taboada Vasquez<sup>1</sup>, Ankita Mukherjee<sup>2</sup>, Aasim Ashai<sup>2</sup>, Saravanan Yuvaraja<sup>1</sup>, Manoj Rajbhar<sup>1</sup>, Biplab Sarkar<sup>2</sup> and Xiaohang Li<sup>1</sup>

<sup>1</sup>Advanced Semiconductor Laboratory, Electrical and Computer Engineering program, CEMSE Division, King Abdullah University of Science and Technology, Thuwal Saudi Arabia and <sup>2</sup>Department of Electronics and Communication Engineering, Indian Institute of Technology Roorkee, Uttarakhand, India

**WeP\_45 (Student) Energy-Level Model for Designing Vertical  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Transistors with Quasi-Inversion Channel**

Jingbo Zhou, Xuanze Zhou, Qi Liu, Guangwei Xu\* and Shibing Long  
University of Science and Technology of China, Hefei, Anhui, China

**WeP\_46 (Student) Fixing Al<sub>2</sub>O<sub>3</sub>/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> interface states with low-temperature supercritical N<sub>2</sub>O fluid treatment**

Zhang Wen<sup>1,\*</sup>, Leidang Zhou<sup>1</sup> and Xiaoping Ouyang<sup>2</sup>

<sup>1</sup>Xi'an Jiaotong University, Xi'an, Shaanxi, China and <sup>2</sup>Northwest Institute of Nuclear Technology, Xi'an, Shaanxi, China

**WeP\_47  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> UMOSFET with Nitrogen-Ion Implantatio**

Xuanze Zhou<sup>1</sup>, Yongjian Ma<sup>1,2</sup>, Guangwei Xu<sup>1,\*</sup>, Xiaodong Zhang<sup>1,2</sup> and Shibing Long<sup>1</sup>

**WeP\_48 (Student) Resistive Switching Performance of Epitaxial and Sputter-Deposited  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Films on Ru(0001)**

A. Baunthiyal<sup>1</sup>, A. Karg<sup>1</sup>, M. Williams<sup>1</sup>, J.-O. Krispeneit<sup>1,2</sup>, N. Braud<sup>1</sup>, M. Schowalter<sup>1,2</sup>, T. Mehrtens<sup>1,2</sup>, M. Eickhoff<sup>1,2</sup>, A. Rosenauer<sup>1,2</sup> and J. Falta<sup>1,2</sup>

<sup>1</sup>Institute of Solid State Physics, University of Bremen, Bremen, Germany and <sup>2</sup>MAPEX Center of Material and Processes, University of Bremen, Bremen, Germany

**WeP\_49 (Student) MESFET based on Ge-doped  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> film grown by mist-CVD**

T. Wakamatsu<sup>1,\*</sup>, H. Takane<sup>1</sup>, Y. Isobe<sup>1</sup>, K. Kaneko<sup>1,2</sup> and K. Tanaka<sup>1</sup>

<sup>1</sup>Kyoto University, Kyoto, Kyoto, Japan and <sup>2</sup>Ritsumeikan University, Kusatsu, Shiga, Japan

**WeP\_50 Oxygen Flow Rates Impacted on Al<sub>2</sub>O<sub>3</sub> Gate Insulator for  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> MOSCAPs**

Hua-Mao Chen<sup>1,\*</sup>, Ka Hou Lam<sup>2</sup>, Chih-Hung Yen<sup>1</sup>, Sandy Huang<sup>1</sup>, Chih-Ming Lai<sup>1</sup>, Chin-Ya Tsai<sup>1</sup>, Shih-Chiang Shen<sup>1</sup>, Tian-Li Wu<sup>2</sup>

<sup>1</sup>Electronic and Optoelectronic System Research Laboratories, Industrial Technology Research Institute and <sup>2</sup>International College of Semiconductor Technology, National Yang Ming Chiao Tung University, Taiwan

**WeP\_51 Comparison of PECVD grown SiO<sub>2</sub> and SiN<sub>x</sub> passivation on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>: Formation of a GaN interlayer impairing device performance**

Palvan Seyidov<sup>1</sup>, Carl Peterson<sup>2</sup>, Owen Ernst<sup>1</sup>, Saurav Roy<sup>2</sup>, Arkka Bhattacharyya<sup>2</sup>, Zbigniew Galazka<sup>1</sup>, Sriram Krishnamoorthy<sup>2</sup> and Andreas Fiedler<sup>1,\*</sup>

<sup>1</sup>Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany <sup>2</sup>University of California, Santa Barbara, California, USA

**WeP\_52 A Schottky Source Approach for Normally-Off  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Transistors**

J. Yang<sup>1</sup> and M. H. Wong<sup>1,\*</sup>

<sup>1</sup>Electronic and Computer Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong

**WeP\_53 (Student) Heteroepitaxial  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Monolithic Bidirectional Switch**

Dhanu Chettri, Ganesh Mainali, Mritunjay Kumar, Xiao Tang and Xiaohang Li\*

Advanced Semiconductor Laboratory, Electrical and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology (KAUST), Thuwal 23955-6900, Kingdom of Saudi Arabia

**WeP\_54 Electrical Properties  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Based on Hetero-Junction Barrier Schottky Diode**

SangHun Kim, YuSup Jung, ByoungSup Ahn, HanBit Kim, TaeJun Park, JoonHui Park, TaiYoung Kang, SinSu Kyoung\*

Powercubesemi Inc., Seongnam-si, Gyeonggi-do, Korea

14:10-17:30 Excursions

17:30-20:00 Banquet



08:15-08:45 Admissions

08:45-10:10 Power Devices and Diodes

Chair: tbd

08:45-09:30 ThuM1\_1 (Keynote lecture)

**Progress in Ga<sub>2</sub>O<sub>3</sub> material and device technologies towards next-generation power and harsh-environment electronics**

M. Higashiwaki<sup>1,2,\*</sup>

<sup>1</sup>Department of Physics and Electronics, Osaka Metropolitan University, Sakai, Osaka, Japan and <sup>2</sup>National Institute of Information and Communications Technology (NICT), Koganei, Tokyo, Japan

09:30-09:45 ThuM1\_2 (Oral)

**(Student) Analytical Determination of Unipolar Diode Losses in Power Switching and Perspective for Ultra-Wide Bandgap Semiconductors**

Nolan Hendricks\*, Joshua Piel, Ahmad Islam, and Andrew Green

Air Force Research Laboratory, Sensors Directorate, WPAFB, OH, USA

09:45-10:10 ThuM1\_3 (Invited)

**Vertical  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Diodes for High-voltage and Harsh Radiation Application**

E. Farzana<sup>1,\*</sup>, N. Hendricks<sup>2</sup>, S. Roy<sup>2</sup>, A. Bhattacharyya<sup>2</sup>, S. Islam<sup>4</sup>, R. Cadena<sup>3</sup>, A. Senarath<sup>4</sup>, A. Sengupta<sup>3</sup>, E. Zhang<sup>3</sup>, D. Fleetwood<sup>3</sup>, R. Schrimpf<sup>3</sup>, S. Krishnamoorthy<sup>2</sup> and J. Speck<sup>2</sup>

<sup>1</sup>Department of Electrical and Computer Engineering, Iowa State University, Ames, IA, USA <sup>2</sup>Materials Department, University of California, Santa Barbara, Santa Barbara, CA, USA <sup>3</sup>Dept of ECE, <sup>4</sup>Interdisciplinary Material Science, Vanderbilt University, Nashville, TN, USA

10:10-10:40 Break with Refreshments

10:40-12:10 Diodes and High Voltage

Chair: tbd

10:40-10:55 ThuM2\_1 (Oral)

**(Student) Toward high blocking voltage  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky barrier diodes implementing self-aligned mesa termination and PtO<sub>x</sub> anode**

Zhao Han, Guangwei Xu\*, Xuanze Zhou, and Shibing Lon

University of Science and Technology of China, Hefei, China

10:55-11:10 ThuM2\_2 (Oral)

**High Voltage Breakdown Performance of IrO<sub>x</sub>/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky Contacts**

G.T. Dang\*, R.J. Reeves, and M.W. Allen

MacDiarmid Institute for Advanced Materials and Nanotechnology, University of Canterbury, Christchurch, New Zealand

11:10-11:25 ThuM2\_3 (Oral)

**(Student) Over 6 MV/cm and 60 A/cm<sup>2</sup> reverse current up to 200°C in ozone MBE IrO<sub>2</sub> and RuO<sub>2</sub> Schottky Diodes**

D. Saraswat<sup>1</sup>, B. Cromer<sup>2,\*</sup>, W. Li<sup>3</sup>, K. Nomoto<sup>2</sup>, F. VE Hensling<sup>2</sup>, K. Azizie<sup>2</sup>, H. P. Nair<sup>2</sup>, D. G. Schlom<sup>2</sup>, D. Jena<sup>2</sup>, H. G. Xing<sup>2</sup>

<sup>1</sup>Stanford University, Stanford, California, United States of America <sup>2</sup>Cornell University, Ithaca, New York, United States of America <sup>3</sup>Intel Corporation, San Francisco, California, United States of America

11:25-11:40 ThuM2\_4 (Oral)

**Vertical  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky barrier diodes with in situ Nitrogen co-doped epitaxial layer**

Hannah N. Master<sup>1,\*</sup>, Joseph A. Spencer<sup>2,3</sup>, James Spencer Lundh<sup>1</sup>, Michael Liao<sup>1</sup>, Alan G. Jacobs<sup>2</sup>, Kohei Sasaki<sup>4</sup>, Akito Kuramata<sup>4</sup>, Karl D. Hobart<sup>2</sup>, Marko J. Tadjer<sup>2</sup>

11:40-11:55 ThuM2\_5 (Oral)  
**(Student) Metal-First Non-Alloyed Schottky Contacts to N+(010)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> for Interface Quality and Minimal Surface Modification**

K. T. Smith<sup>1,\*</sup>, C. A. Gorsak<sup>2</sup>, D. Jena<sup>2,3,4</sup>, H. P. Nair<sup>2</sup> and H. G. Xing<sup>2,3,4</sup>

<sup>1</sup>School of Applied and Engineering Physics, Cornell University, Ithaca, NY, USA <sup>2</sup>Department of Materials Science and Engineering, Cornell University, Ithaca, NY, USA <sup>3</sup>School of Electrical and Computer Engineering, Cornell University, Ithaca, NY, USA <sup>4</sup>Kavli Institute at Cornell for Nanoscale Physics, Cornell University, Ithaca, NY, USA

11:55-12:10 ThuM2\_6 (Oral)  
**Over 1700V breakdown voltage  $\beta$ -type gallium oxide Schottky barrier diode**

Jun Arima<sup>1,\*</sup>, Minoru Fujita<sup>1</sup>, Katsumi Kawasaki<sup>1</sup>, Jun Hirabayashi<sup>1</sup>

<sup>1</sup>TDK Corporation, 2-15-7, Higashi-Ohwada, Ichikawa-shi, Chiba, Japan

## 12:10-14:00 Lunch Break

## 14:00-15:25 NiO/Ga<sub>2</sub>O<sub>3</sub> heterojunctions for Diodes Chair: tbd

14:00-14:25 ThuA1\_1 (Invited)  
**Pairing Ga<sub>2</sub>O<sub>3</sub> with p-NiO produces robust power diodes for harsh environment**

Feng Zhou<sup>1</sup>, Hehe Gong<sup>1</sup>, Ming Xiao<sup>2</sup>, Hai Lu<sup>1</sup>, Yuhao Zhang<sup>2,\*</sup> and Jiandong Ye<sup>1,\*</sup>

<sup>1</sup>School of Electronic Science and Engineering, Nanjing University, Nanjing, China and <sup>2</sup>Center for Power Electronics Systems, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA

14:25-14:40 ThuA1\_2 (Oral)  
**(Student) Surge Current Capability of Vertical  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Heterojunction Barrier Schottky Diode**

Weibing Hao<sup>1</sup>, Feihong Wu<sup>1</sup>, Guangwei Xu<sup>\*</sup>, Xuanze Zhou, and Shibing Long

University of Science and Technology of China, Hefei, Anhui, China

14:40-14:55 ThuA1\_3 (Oral)  
**(Student) Kilo Volt-class NiO/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Diodes with Sub-1 V Turn-On and Near-Unity Ideality Factor**

Advait Gilankar<sup>1,\*</sup>, Ahmad Islam<sup>2</sup>, Abishek Katta<sup>1</sup>, Nidhin Kurian Kalarickal<sup>1</sup>

<sup>1</sup>School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ, USA and <sup>2</sup>Air Force Research Laboratory, Sensors Directorate, Wright-Patterson Air Force Base, Dayton, Ohio, USA

14:55-15:10 ThuA1\_4 (Oral)  
**(Student) Low Von of 0.46 V Vertical W/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky Barrier Diodes Featuring Heterojunction Termination Extension with 1.2 kV Reverse Blocking**

Qiuyan Li, Junpeng Wen, Weibing Hao, Guangwei Xu<sup>\*</sup>, Shibing Long

University of Science and Technology of China, Hefei, China

15:10-15:25 ThuA1\_5 (Oral)  
**(Student) Stability testing of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> NiO Merged PiN Schottky diodes fabricated with plasma free Ga-flux etching and PtOx contacts**

Joseph A. Spencer<sup>1,2</sup>, Yuan Qin<sup>2</sup>, Alan G. Jacobs<sup>1</sup>, Neeraj Nepal<sup>1</sup>, Matthew Porter<sup>2</sup>, Boyan Wang<sup>2</sup>, Bixuan Wang<sup>2</sup>, Hannah M. Masten<sup>1</sup>, Karl D. Hobart<sup>1</sup>, Travis J. Anderson<sup>1</sup>, Akito Kurumata<sup>3</sup>, Yuhao Zhang<sup>2</sup> and Marko J. Tadjer<sup>1,\*</sup>

<sup>1</sup>Naval Research Laboratory, Washington, DC, USA <sup>2</sup>Virginia Tech – Center for Power Electronics Systems, Blacksburg, Virginia, USA and <sup>3</sup>Novel Crystal Technology, Inc., Sayama-shi, Saitama, Japan

## 15:25-16:00 Break with Refreshments

- 16:00-16:15 ThuA2\_1 (Oral)  
**(Student)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Field-Effect Rectifier with Low Turn-on Voltage**  
 Qi Liu<sup>1</sup>, Xuanze Zhou<sup>1,\*</sup>, Mengyuan Hua<sup>2</sup>, Guangwei Xu<sup>1</sup> and Shibing Long<sup>1</sup>  
<sup>1</sup>University of Science and Technology of China, Hefei, Anhui, China and <sup>2</sup>Southern University of Science and Technology, Shenzhen, Guangdong, China
- 16:15-16:30 ThuA2\_2 (Oral)  
**Structural characterization of homoepitaxial and NiO heteroepitaxial films, and selective-area-grown/etched structures on (-102)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> substrates**  
 T. Oshima<sup>1,\*</sup>, Y. Oshima<sup>1</sup> and S. Nakagomi<sup>2</sup>, Liga Ignatane<sup>1</sup>, Boris Polyakov<sup>1</sup>, Sergei Vlassov<sup>2</sup>, Juris Purans<sup>1</sup>  
<sup>1</sup>National Institute for Materials Science, Tsukuba, Ibaraki, Japan and <sup>2</sup>Ishinomaki Senshu University, Ishinomaki, Miyagi, Japan
- 16:30-16:55 ThuA2\_3 (Invited)  
**Recent advances in the process development of Gallium Oxide power transistors for high-voltage applications**  
 K. Tetzner<sup>1,\*</sup>, Z. Galazka<sup>2</sup>, A. Popp<sup>2</sup>, J. Würfl<sup>1</sup> and O. Hilt<sup>1</sup>  
<sup>1</sup>Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik (FBH), Berlin, Germany and <sup>2</sup>Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany
- 16:55-17:10 ThuA2\_4 (Oral)  
**Low-Resistance, Scaled Ga<sub>2</sub>O<sub>3</sub> MOSFETs with Regrown Ohmic Contacts**  
 D. M. Dryden<sup>1,\*</sup>, C. Gorsak<sup>2</sup>, D. Walker, Jr.<sup>1</sup>, N. Sepelak<sup>3</sup>, G. Hughes<sup>1</sup>, H. Nair<sup>2</sup>, A.J. Green<sup>1</sup>  
<sup>1</sup>Air Force Research Laboratory, Sensors Directorate, Wright-Patterson AFB, OH, USA <sup>2</sup>Cornell University, Department of Materials Science and Engineering, Ithaca, NY, USA and <sup>3</sup>KBR, Inc. Beavercreek, OH, USA
- 17:10-17:25 ThuA2\_5 (Oral)  
**Ga<sub>2</sub>O<sub>3</sub> FinFETs with on-axis (100)-plane Gate Sidewalls Fabricated on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (010) Substrates**  
 Z. Wang<sup>1,\*</sup>, S. Kumar<sup>1</sup>, T. Kamimura<sup>1</sup>, H. Murakami<sup>2</sup>, Y. Kumagai<sup>2</sup> and M. Higashiwaki<sup>1,3</sup>  
<sup>1</sup>National Institute of Information and Communications Technology, Koganei, Tokyo, Japan <sup>2</sup>Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan and <sup>3</sup>Department of Physics and Electronics, Osaka Metropolitan University, Sakai, Osaka, Japan
- 17:25-17:40 ThuA2\_6 (Oral)  
 **$\beta$ -Ga<sub>2</sub>O<sub>3</sub> MOSFETs on Highly Uniform 2'' Vertical Bridgman Substrates**  
 Kyle J. Liddy<sup>1,\*</sup>, Arkka Bhattacharyya<sup>2</sup>, Yuki Ueda<sup>3</sup>, Ahmad Islam<sup>1</sup>, Joshua J. Piel<sup>1</sup>, Kelson D. Chabak<sup>1</sup>, Takuya Igarashi<sup>3</sup>, Kimiyoshi Koshi<sup>3</sup>, Shigenobu Yamakoshi<sup>3</sup>, Kohei Sasaki<sup>3</sup>, Akito Kuramata<sup>3</sup>, Sriram Krishnamoorthy<sup>2</sup>, Andrew J. Green<sup>1</sup>  
<sup>1</sup>Air Force Research Laboratory, Sensors Directorate, WPAFB, OH, USA <sup>2</sup>University of California Santa Barbara, Materials Department, Santa Barbara, CA, USA and <sup>3</sup>Novel Crystal Technologies, Inc., 2-3-2 Hirose-dai, Syama-shi, Saitama, Japan

## 17:50-19:20 Rump Session

17:50-19:20 Industry perspective on Ga<sub>2</sub>O<sub>3</sub>

08:15-08:45 Admissions

08:45-10:40 Advanced Device Characterization / Thermal Properties Chair: tbd

08:45-09:10 FrM1\_1 (Invited)

**Photoluminescence Mapping of Defects in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

M.D. McCluskey<sup>1,2,\*</sup>, J. Huso<sup>2</sup>, C. Remple<sup>1</sup>, B.L. Dutton<sup>1</sup>, J.S. McCloy<sup>1</sup>, S. Rebollo<sup>3</sup>, S. Krishnamoorthy<sup>3</sup> and J.S. Speck<sup>3</sup>

<sup>1</sup>Washington State University, Pullman, WA, USA <sup>2</sup>Klar Scientific, Pullman, WA, USA AND <sup>3</sup>University of California, Santa Barbara, CA, USA

09:10-09:25 FrM1\_2 (Oral)

**Threshold Voltage Instability in Vertical  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> finFETs Investigated by Combined Electrical and Optical Techniques**

M. Fregolent<sup>1,\*</sup>, C. De Santi<sup>1</sup>, F. Piva<sup>1</sup>, W. Li<sup>2</sup>, K. Nomoto<sup>2</sup>, Z. Hu<sup>2</sup>, D. Jena<sup>2,3</sup>, H. G. Xing<sup>2,3</sup>, G. Meneghesso<sup>1</sup>, E. Zanoni<sup>1</sup> and M. Meneghini<sup>1</sup>

<sup>1</sup>Department of Information Engineering, University of Padova, Padova, Italy <sup>2</sup>School of Electrical and Computer Engineering, Cornell University, Ithaca, NY, USA and <sup>3</sup>Department of Materials Science and Engineering, Cornell University, Ithaca, NY, USA

09:25-09:40 FrM1\_3 (Oral)

**Application of synchrotron-radiation and laboratory X-ray imaging techniques for defect analysis of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> single crystals and power devices**

Y. Yao<sup>1</sup>, Y. Sugawara<sup>1</sup>, K. Sato<sup>1</sup>, Y. Ishikawa<sup>1</sup>, K. Sasaki<sup>2</sup>, Y. Yamashita<sup>2</sup>, D. Wakimoto<sup>2</sup>, H. Miyamoto<sup>2</sup> and A. Kuramata<sup>2</sup>

<sup>1</sup>Japan Fine Ceramics Center, 2-4-1 Mutsuno, Atsuta, Nagoya, Japan <sup>2</sup>Novel Crystal Technology, Inc., 2-3-1 Hirose-dai, Sayama, Saitama, Japan

09:40-09:55 FrM1\_4 (Oral)

**Thermoreflectance imaging of operating temperature rise in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> devices using sub-bandgap illumination**

James Spencer Lundh<sup>1,\*</sup>, Georges Pavlidis<sup>2</sup>, Kohei Sasaki<sup>3</sup>, Andrea Centrone<sup>4</sup>, Joseph A. Spencer<sup>5,6</sup>, Hannah N. Masten<sup>1</sup>, Marc Currie<sup>6</sup>, Alan G. Jacobs<sup>6</sup>, Keita Konishi<sup>3</sup>, Akito Kuramata<sup>3</sup>, Karl D. Hobart<sup>6</sup>, Travis J. Anderson<sup>6</sup>, and Marko J. Tadjer<sup>6</sup>

<sup>1</sup>National Research Council Postdoctoral Fellow, residing at U.S. Naval Research Laboratory <sup>2</sup>Department of Mechanical Engineering, University of Connecticut, Storrs, CT, USA <sup>3</sup>Novel Crystal Technology, Inc., 2-3-1, Hirose-dai, Sayama-Shi, Saitama, Japan <sup>4</sup>National Institute for Standards and Technology, 100 Bureau Dr, Gaithersburg, MD, USA <sup>5</sup>Center for Power Electronics Systems, Virginia Tech, Blacksburg, VA, USA and <sup>6</sup>U.S. Naval Research Laboratory, Overlook Ave. SW, Washington, DC, USA

09:55-10:10 FrM1\_5 (Oral)

**Method for Eliminating Thermal Expansion Anisotropy in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

M. E. Liao<sup>1,\*</sup>, M. J. Tadjer<sup>2</sup>, K. D. Hobart<sup>2</sup>, A. G. Jacobs<sup>2</sup>, and T. J. Anderson<sup>2</sup>

<sup>1</sup>National Research Council Postdoctoral Fellow at U.S. Naval Research Laboratory, Washington, DC, USA <sup>2</sup>U.S. Naval Research Laboratory, Washington, DC, USA

10:10-10:25 FrM1\_6 (Oral)

**Nanoscale origin of thermal conductivity anisotropy in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>**

M. R. Wagner<sup>1,2,\*</sup>, K. Xu<sup>3</sup>, S. Zhao<sup>4,5</sup>, Z. Galazka<sup>6</sup>, L. Sun-Min Choi<sup>2</sup>, M. Meißner<sup>1,2</sup>, A. Wüthrich<sup>2</sup>, R. Mincigrucchi<sup>7</sup>, L. Foglia<sup>7</sup>, D. Fainozzi<sup>7</sup>, F. Bencivenga<sup>7</sup>, P. Mazzolini<sup>8</sup>, K. Egbo<sup>1</sup>, A. Ardenghi<sup>1</sup>, Bierwagen<sup>1</sup>, R. Rurali<sup>3</sup>, M. Scheffler<sup>4,5</sup>, C. Carbogno<sup>4,5</sup>, B. Graczykowski<sup>9,10</sup>, J. S. Reparaz<sup>3</sup>

<sup>1</sup>Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany <sup>2</sup>Technische Universität Berlin, Institut für Festkörperphysik, Berlin, Germany <sup>3</sup>Institut de Ciència de Materials de Barcelona, ICMAB-CSIC, Bellaterra, Spain <sup>4</sup>The NOMAD Laboratory at the FHI of the Max-Planck-Gesellschaft, Germany <sup>5</sup>IRIS-Adlershof of the Humboldt-Universität Berlin, Germany <sup>6</sup>Leibniz Institute for Crystal Growth, Berlin, Germany <sup>7</sup>Elettra Sincrotrone Trieste S.C.p.A., Basovizza (TS), Italy <sup>8</sup>Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy <sup>9</sup>Max Planck Institute for Polymer Research, Mainz, Germany <sup>10</sup>Faculty of Physics, Adam Mickiewicz University, Poznan, Poland

10:25-10:40 FrM1\_7 (Oral)

**(Student) MOCVD-grown epitaxial thin films of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> on diamond**

Arpit Nandi<sup>1</sup>, Indraneel Sanyal<sup>1</sup>, David Cherns<sup>1</sup>, Ramandeep Mandia<sup>2</sup>, David J. Smith<sup>2</sup> and Martin Kuball<sup>1</sup>

<sup>1</sup>Center of Device and Thermographic Reliability, University of Bristol, United Kingdom, <sup>2</sup>Department of Physics, Arizona State University, Tempe, Arizona, United States of America

**10:40-11:10 Break with Refreshments**

**11:10-12:25 Detectors**

Chair: tbd

11:10-11:25 FrM2\_1 (Oral)

**Heteroepitaxial Growth of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> on Various Planes of Corundum Structured Indium Tin Oxide for Vertical UV-C Photodetectors**

K. Shimazoe<sup>1,\*</sup>, H. Nishinaka<sup>2</sup> and M. Yoshimoto<sup>2</sup>

<sup>1</sup>Department of Electronics, Kyoto Institute of Technology, Kyoto, Japan <sup>2</sup>Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Kyoto

11:25-11:40 FrM2\_2 (Oral)

**(Student) Robust Deep Ultraviolet Photodetectors based on Polycrystalline  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Film towards Wide Temperature Range Application**

Hong Huang<sup>1</sup>, Haoran Yin<sup>1</sup>, Zhiwei Wang<sup>1</sup>, Yilin Wang<sup>1</sup>, Haoyan Zhan<sup>1</sup>, Xiaolong Zhao<sup>1,\*</sup>, Xiaohu Hou<sup>1</sup> and Shibing Long<sup>1,\*</sup>

<sup>1</sup>School of Microelectronics, USTC, Hefei, China

11:40-11:55 FrM2\_3 (Oral)

**(Student) Polarity-reversible multi-band detector based on Ga<sub>2</sub>O<sub>3</sub> phototransistor**

Yanni Zou, Ziyuan Fu, Xiaolong Zhao\*, Xiaohu Hou, Xiao Feng, and Shibing Long\*

School of Microelectronics, USTC, Hefei, China

11:55-12:10 FrM2\_4 (Oral)

**(Student) Ultrasensitive and Stable X-ray Detector Based on High-Quality Ga<sub>2</sub>O<sub>3</sub> Film Grown by MOCVD**

Shunjie Yu, Mengfan Ding, Yan Liu, Xiaohu Hou\*, Xiaolong Zhao\*, Shibing Long\*

School of Microelectronics, USTC, Hefei, China

12:10-12:25 FrM2\_5 (Oral)

**(Student) Nano-second response Ga<sub>2</sub>O<sub>3</sub> HJD radiation detector and its single particle detection proper**

Silong Zhang<sup>1</sup>, Leidang Zhou<sup>2,a</sup>, Xing Lu<sup>3,b</sup>, Yuxin Deng<sup>3</sup>, Liang Chen<sup>4</sup>, Fangbao Wang<sup>4</sup> and Xiaoping Ouyang<sup>4</sup>

<sup>1</sup>School of Materials Science and Engineering, Xiangtan University, Xiangtan, China <sup>2</sup>School of Microelectronics, and State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, Xi'an, China <sup>3</sup>State Key Laboratory of Optoelectronic Materials and Technologies, School of Electronics and Information Technology, Sun Yat-sen University, Guangzhou, China and <sup>4</sup>Northwest Institute of Nuclear Technology, Xi'an, China

**12:25-14:15 Lunch Break**

**14:15-16:10 Rutile GeO<sub>2</sub> as novel ultrawide bandgap semiconductor**

Chair: tbd

14:15-14:40 FrA1\_1 (Invited)

**Rutile GeO<sub>2</sub> and GeSnO<sub>2</sub> Alloys: A New Family of UWBG Semiconductors**

Sieun Chae<sup>1</sup>, Hanjong Paik<sup>2</sup>, Kelsey Mengle<sup>1</sup>, Kyle Bushick<sup>1</sup>, Tiernan Baucom<sup>1</sup>, Amanda Wang<sup>1</sup>, Lucas Pressley<sup>3</sup>, Tyrel McQueen<sup>3</sup>, John Heron<sup>1</sup> and Emmanouil (Manos) Kioupakis<sup>1,\*</sup>

<sup>1</sup>Materials Science and Engineering, University of Michigan, Ann Arbor, Michigan, USA <sup>2</sup>Electrical and Computer Engineering, University of Oklahoma, Tulsa, Oklahoma, USA and <sup>3</sup>Chemistry, The Johns Hopkins University, Baltimore, Maryland, USA

- 14:40-15:05 FrA1\_2 (Invited)  
**(Student) Mobility in SnO<sub>2</sub> and GeO<sub>2</sub> from first principles**  
 Amanda Wang<sup>1,\*</sup>, Kyle Bushick<sup>1</sup>, Kelsey Mengle<sup>1</sup>, Sieun Chae<sup>1</sup>, Nick Pant<sup>1</sup>, Woncheol Lee<sup>1</sup>, Xiao Zhang<sup>1</sup>, Samuel Poncé<sup>2</sup>, Joshua Leveillee<sup>3</sup>, Feliciano Giustino<sup>3</sup> and Emmanouil Kioupakis<sup>1</sup>  
<sup>1</sup>University of Michigan, Ann Arbor, MI, USA <sup>2</sup>Université catholique de Louvain, Louvain-la-Neuve, Belgium and <sup>3</sup>The University of Texas at Austin, Austin, TX, USA
- 15:05-15:30 FrA1\_3 (Invited)  
**Bulk rutile-GeO<sub>2</sub> single crystals with extraordinary physical properties**  
 Z. Galazka<sup>1,\*</sup>, A. Fiedler<sup>1</sup>, M. Albrecht<sup>1</sup>, S. Ganschow<sup>1</sup>, S. Bin Anooz<sup>1</sup>, J. Zhang<sup>1</sup>, R. Blukis<sup>1</sup>, T. Schulz<sup>1</sup>, M. Pietsch<sup>1</sup>, K. Tetzner<sup>2</sup>, O. Bierwagen<sup>3</sup>, A. Kwasniewski<sup>1</sup>, A. Dittmar<sup>1</sup>, M. Suendermann<sup>1</sup>, T. Schroeder<sup>1,4</sup> and M. Bickermann<sup>1,5</sup>  
<sup>1</sup>Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany <sup>2</sup>Ferdinand-Braun-Institut für Höchstfrequenztechnologie (FBH), Berlin, Germany <sup>3</sup>Paul-Drude-Institut für Festkörperelektronik (PDI), Berlin, Germany <sup>4</sup>Humboldt-Universität zu Berlin, Institut für Physik, Berlin, Germany and <sup>5</sup>Technische Universität Berlin, Institut für Chemie, Berlin, Germany
- 15:30-15:55 FrA1\_4 (Invited)  
**(Student) Cation incorporation and reaction kinetics for the MBE growth and Ge-based etching of (Sn<sub>x</sub>Ge<sub>1-x</sub>)O<sub>2</sub> for 0 ≤ x ≤ 1**  
 Wenshan Chen<sup>1,\*</sup>, Kingsley Egbo<sup>1</sup>, Joe Kler<sup>2</sup>, Roger A. de Souza<sup>2</sup> and Oliver Bierwagen<sup>1</sup>  
<sup>1</sup>Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany and <sup>2</sup>Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany
- 15:55-16:10 FrA1\_5 (Late News)  
**Lattice dynamics in rutile GeO<sub>2</sub>**  
 H. Tomatzky<sup>1,\*</sup>, Z. Galazka<sup>2</sup>, O. Brandt<sup>1</sup>, O. Bierwagen<sup>1</sup>, M.E. Ramsteiner<sup>1</sup> and M.R.Wagner<sup>1,3</sup>  
<sup>1</sup>Paul-Drude-Institut, Berlin, Germany <sup>2</sup>Leibniz-Institut für Kristallzüchtung, Berlin, Germany and <sup>3</sup>Technische Universität Berlin, Berlin, Germany

## 16:10-16:30 Break with Refreshments

## 16:30-17:25 Late News

Chair: tbd

- 16:30-16:55 FrA2\_1 (Invited)  
**Electron transport studies in gallium oxide and aluminum-gallium-oxide alloys**  
 Uttam Singiseti\*, Ankit Sharma, Animesh Datta, Avinash Kumar  
 Electrical Engineering, University at Buffalo, Buffalo, NY, USA
- 16:55-17:10 FrA2\_2 (Late News)  
**Fast-switching β-Ga<sub>2</sub>O<sub>3</sub> double-implanted MOSFET fabricated on a 100-mm β-Ga<sub>2</sub>O<sub>3</sub> epitaxial wafer**  
 H. Miyamoto\*, D. Wakimoto, Y. Koishikawa, T. Kase, S. Kunori, K. Sasaki, and A. Kuramata  
 Novel Crystal Technology, Inc., Sayama, Saitama, Japan
- 17:10-17:25 FrA2\_3 (Late News)  
**(Student) 2 K Operation of Enhancement Mode β-Ga<sub>2</sub>O<sub>3</sub> Transistor and Logic Inverter**  
 Vishal Khandelwal, Glen Isaac Maciel Garcia, Mritunjay Kumar, Na Xiao, Francesco Blanda, Ganesh Mainali, Xiao Tang, Xiaohang Li\*  
 Advanced Semiconductor Laboratory (ASL), Electrical and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology (KAUST), Thuwal 23955-6900, Kingdom of Saudi Arabia

## 17:25-17:55 Awards and Closing

Chair:

- 17:25-17:40 **Award ceremony**
- 17:40-17:55 **Closing**