

TECHNICAL  
PROGRAM  
- FINAL VERSION -

## NAMBE 2009 – Technical Program Schedule – McDonnell A02 (Oral Sessions)

August 9 – 12, 2009

	Sunday	Monday	Tuesday	Wednesday
Breakfast		<b>Breakfast I</b> <b>On-site registration</b> 7:30 – 8:30 a.m.	<b>Breakfast II</b> <b>On-site registration</b> 7:30 – 8:30 a.m.	<b>Breakfast III</b> <b>On-site registration</b> 7:30 – 8:30 a.m.
Early morning		<b>Technical session I</b> “OXIDES BY MBE”  <b>Chair: R. Droopad</b> 8:30 Welcome 8:35 <b>Plenary – D. Schlom</b> 9:15 O. Bierwagen 9:30 R.L. Chu 9:45 T. Watahiki 10:00 M. Y. Tsai	<b>Technical session V</b> “DEVICES 1”  <b>Chair: D. Wasserman</b> 8:30 Announcements 8:35 <b>Plenary – J. Faist</b> 9:15 J. Abell 9:30 E. Plis 9:45 H. Detz 10:00 W. O. Charles	<b>Technical session VIII</b> “NOVEL MATERIALS & DEVICE STRUCTURES” <b>Chair: T. Moustakas</b> 8:30 NAMBE 2010 8:35 <b>Plenary – W. de Heer</b> 9:15 J. C. Hackley 9:30 W. Braun 9:45 A. Hoffman 10:00 Y. D. Wu
Break		<b>Coffee break I</b> 10:15 – 10:45 a.m.	<b>Coffee break III</b> 10:15 – 10:45 a.m.	<b>Coffee break V</b> 10:15 – 10:45 a.m.
Late morning		<b>Technical session II</b> “LOW DIMENSIONAL STRUCTURES 1” <b>Chair: G. Wicks</b> 10:45 T. Buehl 11:00 Y.-L. Chang 11:15 P. J. Poole 11:30 C. T. Foxon 11:45 Y. Sharma 12:00 C. K. Gaspe	<b>Technical session VI</b> “DEVICES 2”  <b>Chair: A. Liu</b> 10:45 J. Chen 11:00 T. Hosoda 11:15 J. Gupta 11:30 M. A. Wistey 11:45 W. E. Hoke 12:00 V. Tokranov	<b>Technical session IX</b> “III-V MATERIALS & STRUCTURES” <b>Chair: I. Hernandez-Calderon</b> 10:45 M. C. Debnath 11:00 A. Freundlich 11:15 X. Lu 11:30 H. Lu 11:45 Y.-C. Chang 12:00 E. Luna
Lunch break		<b>Lunch I</b> 12:15 – 1:45 p.m.	<b>Lunch II</b> 12:15 – 1:45 p.m.	<b>Lunch III</b> 12:15 – 1:45 p.m.
Early afternoon		<b>Technical session III</b> “OXIDES & II-VI MATERIALS” <b>Chair: J. Gupta</b> 1:45 P. Chang 2:00 M. E. White 2:15 R. Kumaran 2:30 X. Zhang 2:45 Q. Zhang 3:00 G. Badano 3:15 M. Tamargo	<b>Technical session VII</b> “LATE NEWS” <b>Chair: A. Shen</b> 1:45 S. Nikishin 2:00 M. Hashimoto 2:15 D. Hoffman	<b>Poster session II</b>  1:45 – 3:00 p.m. Library
Break		<b>Coffee break II</b> 3:30 – 4:00 p.m.	<b>Coffee break IV</b> 2:45 – 3:15 p.m.	<b>Coffee break VI</b> 2:45 – 3:15 p.m.
Late afternoon	<b>On-site registration:</b> 3:00 – 5:00 p.m. Brush Gallery	<b>Technical session IV</b> “NITRIDES & DILUTE NITRIDES” <b>Chair: W. Hoke</b> 4:00 M. Mosely 4:15 T. D. Moustakas 4:30 S. V. Novikov 4:45 T. Sarmiento 5:00 A. Freundlich 5:15 S. P. Svensson 5:30 S. V. Novikov	<b>Poster session I</b>  2:45 – 4:00 p.m. Library	<b>Technical session X</b> “LOW DIMENSIONAL STRUCTURES 2” <b>Chair: M. Tamargo</b> 3:15 S. Schmult 3:30 M. K. Yakes 3:45 T. Sugaya 4:00 C.-C. Cheng 4:15 X. Qian 4:30 A. Bracker 4:45 W. Guo
Early evening	<b>Conference Reception</b> 5:00 – 7:00 p.m. Princeton Univ. Art Museum		<b>Grounds for Sculpture Exhibit</b> 5:00 – 6:30 p.m. Busses leave 4:30 p.m.	

Dinner		<b>Veeco User Meeting</b>	<b>Grounds for Sculpture</b> Conference Banquet 6:30 – 9:00 p.m.	
			<b>Poster Session I</b> Tuesday, August 11 3:00 – 4:15 p.m. <b>Library</b>	<b>Poster Session II</b> Wednesday, August 12 1:45 – 3:00 p.m. <b>Library</b>
			Z. Yang J. Kong L. Li Z. Zuo T. D. Lin J. K. Kassim C. C. Tseng G. R. Savich W. H. Lin S. Oktyabrsky S. R. Vangala Z. Cai Y. J. Lee M. Snyder S. E. Webster X. Gu M. O'Steen G. Cywinski T. Honda K. Umeno S. Bharatan X. J. Wang S. Wang J. C. Salcedo-Reyes B. Sun R. P. Champion W. E. Hoke K. G. Eyink Y. S. Kim (Late News) P.W. Huang (Late News)	C. Rajapaksha N. Faleev C. Soubervielle-Montalvo M. Breivik D. Donetsky D. Donetsky K.-Y. Ban S. K. Zhang S. K. Zhang C. Petz A. Torfi G. Garcia-Linan L. Zamora-Peredo A. Pulzara-Mora J. C. Gonzalez A. Alfaro-Martinez I. Kuskosky H. J. Haugan T. Mozume C. Liao S. P. Brenner L. He D. Vazquez-Cortes T. A. Nilsen S. W. Lin I. Martinez-Vells S. Hedge J. C. Gonzalez J. Nishinaga

## NAMBE 2009 TECHNICAL PROGRAM – FINAL

MONDAY, August 10, 2009

Session I Oxides by MBE (8:30 – 10:15 am)

R. Droopad – Chair

8:30 **Welcome**

8:35 **I.1 PLENARY – Growth of Multifunctional Oxides by MBE**

Darrell G. Schlom, Department of Materials Science and Engineering, Cornell University, Ithaca, NY, USA

9:15 **I.2 Plasma Assisted Molecular Beam Epitaxy Growth of In<sub>2</sub>O<sub>3</sub>(001) on Y-stabilized ZrO<sub>2</sub>(001): From Island Growth to Two-Dimensional Growth**

Oliver Bierwagen<sup>1</sup>, Mark E. White<sup>1</sup>, Min-Ying Tsai<sup>2</sup>, and James S. Speck<sup>1</sup>, 1) Materials and 2) Electrical and Computer Engineering Department, University of California, Santa Barbara CA, USA

9:30 **I.3\* High Quality Ga<sub>2</sub>O<sub>3</sub>(Gd<sub>2</sub>O<sub>3</sub>) on Ge (100) – Electrical and Chemical Characterizations**

R. L. Chu<sup>1</sup>, L. K. Chu<sup>1</sup>, M. L. Huang<sup>1</sup>, L. T. Tung<sup>1</sup>, T. D. Lin<sup>1</sup>, C. C. Chang<sup>1</sup>, J. Kwo<sup>2</sup>, M. Hong<sup>1</sup>, 1) Dept. of Materials Sci. and Eng., and 2) Dept. of Physics, National Tsing Hua University, Hsin Chu, Taiwan

9:45 **I.4 Epitaxial Growth and Structure of La, Gd and Lu Rare Earth Oxides on Si(111)**

Tatsuro Watahiki, Roman Shayduk, André Pröbldorf, Frank Grosse, Wolfgang Braun, Henning Riechert, Paul-Drude-Institut für Festkörperelektronik, Hausvogteiplatz 5-7, D-10117 Berlin, Germany

10:00 **I.5\* Heteroepitaxial and Homoepitaxial Growth of Gallium Oxide**

M. Y. Tsai<sup>1</sup>, M. E. White<sup>2</sup>, and J. S. Speck<sup>2</sup>, 1) Electrical and Computer Engineering and 2) Materials Department, University of California – Santa Barbara, Santa Barbara, CA, USA

10:15 **Coffee break**

\* Student Paper

**MONDAY, August 10, 2009**

**Session II Low Dimensional Structures – 1 (10:45 – 12:15 pm) G. Wicks – Chair**

- 10:45 **II.1\* Growth of Embedded ErAs Nanorods on (411)A and (411)B GaAs by Molecular Beam Epitaxy**  
Trevor Buehl, James LeBeau, Art Gossard, and Chris Palmstrøm, Materials Department, University of California, Santa Barbara California, Mike Scarpulla, Materials Science and Engineering Department, University of Utah, Salt Lake City, UT, USA
- 11:00 **II.2\* Molecular Beam Epitaxial Growth and Photoluminescence Properties of Homogeneous InN Nanowires on Si(111)**  
Y.-L. Chang, F. Li, and Z. Mi, Department of Electrical and Computer Engineering, McGill University, 3480 University Street, Montreal, Quebec H3A 2A7, Canada
- 11:15 **II.3 Growth and Modeling of Position and Diameter Controlled InP Nanowires Using Selective Area VLS**  
P.J. Poole, D. Dalacu, A. Kam, D.G. Austing, X. Wu, J. Lapointe, and G.C. Aers, Institute for Microstructural Sciences, National Research Council, Canada
- 11:30 **II.4 Geometrical factors in the Growth of GaN Nanorods by Plasma Assisted MBE**  
C.T. Foxon, <sup>1</sup> S. V. Novikov, <sup>1</sup> J. L. Hall, <sup>1</sup> R. P. Champion, <sup>2</sup> D. Cherns, <sup>2</sup> I Griffiths and S. Khongphetsak, <sup>2</sup> 1) School of Physics and Astronomy, University of Nottingham, Nottingham, UK, 2) Department of Physics, University of Bristol, Tyndall Avenue, Bristol, UK
- 11:45 **II.5 Investigation of Multi-Stack Quantum Dots-in-a-Double Well (DDWELL) Infrared Detectors**  
Y. Sharma, M.Kutty, R.Shenoi, S.Myers, J.Shao, E.Plis, S. Lee<sup>1</sup>, S.Noh<sup>1</sup>, and, S.Krishna, Center for High Technology Materials ECE Dept, University of New Mexico, Albuquerque, NM, USA, 1) Korea Research Institute of Standards and Science, Korea
- 12:00 **II.6\* InSb and In<sub>x</sub>Ga<sub>1-x</sub>As Quantum Wells Remotely Doped with Be**  
C.K. Gaspe, M. Edirisooriya, T.D. Mishima, A.R Dedigama, S.Q. Murphy, and M.B. Santos, Homer L. Dodge, Department of Physics and Astronomy, University of Oklahoma, Norman, OK, USA
- 12:15 **Lunch**

**MONDAY, August 10, 2009**

**Session III Oxides & II-VI Materials (1:45 – 3:30 pm)**

**J. Gupta – Chair**

- 1:45 **III.1\* MBE-HfAlO for Passivating InGaAs with 1 nm Capacitance Effective Thickness**  
P. Chang<sup>1</sup>, W. C. Lee<sup>1</sup>, M. L. Huang<sup>1</sup>, Y. J. Lee<sup>1</sup>, M. Hong<sup>1</sup>, and J. Kwo<sup>2</sup>, 1) Dept. of Materials Sci. and Eng., and 2) Dept. of Physics, Natl. Tsing Hua Univ., Hsin Chu, Taiwan
- 2:00 **III.2\* Antimony Doping of Tin Oxide by Plasma-Assisted Molecular Beam Epitaxy**  
M. E. White<sup>1</sup>, O. Bierwagen<sup>1</sup>, M. Y. Tsai<sup>2</sup>, and J. S. Speck<sup>1</sup>, 1) Materials and 2) Electrical and Computer Engineering, University of California, Santa Barbara, CA, USA
- 2:15 **III.3\* MBE-Grown Solid State Laser Crystals: New material Nd:Sapphire and Nd:YAG**  
R. Kumaran, T. Tiedje<sup>1</sup>, S. Penson, S.E. Webster, Advanced Materials and Process Engineering Laboratory, Department of Physics and Astronomy, 1) also Dept of Electrical and Computer Engineering, University of British Columbia, Vancouver, BC, Canada
- 2:30 **III.4\* Structural Characterization of ZnTe/GaSb Interface**  
X. Zhang<sup>1</sup>, S. Wang<sup>2</sup>, D. Ding<sup>2</sup>, X. Liu<sup>3</sup>, J. K. Furdyna<sup>3</sup>, D. J. Smith<sup>4</sup> and Y.-H. Zhang<sup>2</sup>, 1) School of Materials, Arizona State University, Tempe, AZ, USA, 2) Center for Nanophotonics and Department of Electrical Engineering, Arizona State University, Tempe, AZ, USA, 3) Department of Physics, University of Notre Dame, Notre Dame, IN, USA, 4) Department of Physics, Arizona State University, Tempe, AZ, USA
- 2:45 **III.5\* Control of Orientation of CdTe Epitaxial Layers Grown on GaAs by Molecular Beam Epitaxy and Study of CdTe Electron Spin Relaxation Times**  
Qiang Zhang,<sup>1,2</sup> William Charles,<sup>2,3</sup> Aidong Shen,<sup>2,3</sup> Carlos A. Meriles,<sup>1,2</sup> and Maria C. Tamargo,<sup>2,4</sup> 1) Department of Physics, 3) The Grove School of Engineering, 4) Department of Chemistry, The City College of New York, New York, NY, 2) The Graduate Center of the City University of New York, New York, NY, USA
- 3:00 **III.6 Growth of CdTe(211)B on Ge(211) by Molecular Beam Epitaxy: Status and Applications**  
G. Badano, X. Baudry, and I. C. Robin, CEA-LETI Minatec, 17, rue des Martyrs, 38054 Grenoble Cedex, France
- 3:15 **III.7 Molecular Beam Epitaxy Growth and Properties of type-II Quantum Dot Structures in Wide Bandgap II-VI Compounds**  
M. C. Tamargo,<sup>1</sup> A. Shen,<sup>2</sup> I. L. Kuskovsky,<sup>4</sup> Q. Zhang,<sup>3</sup> Y. Gong<sup>5</sup> and G. F. Neumark,<sup>5</sup> 1) Department of Chemistry, 2) Department of Electrical Engineering and 3) Department of Physics, The City College of New York, New York, NY, 4) Department of Physics, Queens College, Queens, NY, 5) Department of Applied Physics and Applied Mathematics, Columbia University, New York, NY, USA
- 3:30 **Coffee break**

**MONDAY, August 10, 2009**

**Session IV Nitrides & Dilute Nitrides (4:00 – 5:45 pm)**

**W. Hoke – Chair**

- 4:00 **IV.1\* Deeply Degenerate p-GaN Grown by Metal-Modulated Epitaxy**  
Michael Moseley<sup>1</sup>, Elaissa Trybus<sup>1</sup>, Walter Henderson<sup>1</sup>, Jaime Freitas<sup>2</sup> and W. Alan Doolittle<sup>1</sup> 1) School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, USA, 2) Naval Research Laboratories, Washington DC, USA
- 4:15 **IV.2 AlGaIn Quantum Wells Emitting Below 250 nm with Internal Quantum Efficiency as High as 50%**  
T. D. Moustakas and A. Bhattacharyya, Electrical and Computer Engineering, Boston University, Boston, MA, USA
- 4:30 **IV.3 Molecular Beam Epitaxy as a Method for the Growth of Free-Standing Zinc-Blende (cubic) GaN Layers and Substrates**  
S. V. Novikov, N. Zainal, A. V. Akimov, C. R. Staddon, A. J. Kent, C. T. Foxon, School of Physics, University of Nottingham, Nottingham NG7 2RD, UK
- 4:45 **IV.4\* Molecular Beam Epitaxial Growth of GaAs-based 1.53  $\mu\text{m}$  GaInNAsSb Vertical Cavity Surface Emitting Lasers**  
Tomas Sarmiento, Hopil Bae, Thomas D. O'Sullivan, and James S. Harris, Solid State and Photonics Laboratory. Stanford University. Stanford, CA, USA
- 5:00 **IV.5 Plasma-Assisted MBE Growth of Dilute Nitrogen Alloys of InSbN on InSb (001)**  
A. Freundlich, C. Rajapaksha, G. Radhakrishnan, A. Alemu, and A. Fotkatzikis, Photovoltaics and Nanostructures Laboratory, Center for Advanced Materials University of Houston, Houston TX, USA
- 5:15 **IV.6 Progress in Dilute-Nitride Compound Semiconductors for Long-Wavelength Infrared Detectors**  
Stefan P. Svensson<sup>1</sup>, Gregory Belenky<sup>2</sup>, Jerry Meyer<sup>3</sup> Leon Shterengas<sup>2</sup> and Igor Vugaftman<sup>3</sup>, 1) Army Research Laboratory, 2800 Powder Mill Rd, Adelphi, MD, 2) Department of Electrical and Computer Engineering, SUNY at Stony Brook, New York, 3) Naval Research Laboratory, Code 5613, Washington DC, USA
- 5:30 **IV.7 Molecular Beam Epitaxy of GaNAs Alloys with High As content for Potential Photoanode Applications in Hydrogen production**  
S. V. Novikov,<sup>1</sup> C. R. Staddon,<sup>1</sup> C. T. Foxon,<sup>1</sup> K. M. Yu,<sup>2</sup> R. Broesler,<sup>2</sup> J. Denlinger,<sup>3</sup> Z. Lilienthal-Weber,<sup>2</sup> and W. Walukiewicz,<sup>2</sup> School of Physics, 1) University of Nottingham, Nottingham NG7 2RD, UK, 2) Materials Sciences Division, Lawrence Berkeley Laboratory, 1 Cyclotron Road, Berkeley, CA, 3) Advanced Light Source, Lawrence Berkeley Laboratory, 1 Cyclotron Road, Berkeley, CA, USA

**TUESDAY, August 11, 2009**

**Session V Devices – 1 (8:30 – 10:15 am)**

**D. Wasserman – Chair**

8:30 **Announcements**

8:35 V.1 **PLENARY – Quantum Cascade Lasers: Applied Quantum Engineering**  
Jerome Faist, Institute for Quantum Electronics ETH – Zürich, Switzerland

9:15 V.2 **Molecular Beam Epitaxial Growth of Antimonide-Based Type-II Superlattices for Mid- and Long-Wave-Infrared Devices**  
J. Abell, C.L. Canedy, W. W. Bewley, C. S. Kim, M. Kim, J. G. Tischler, E. Jackson, J. R. Lindle, I. Vurgaftman, E. H. Aifer and J. R. Meyer, Codes 5613 and 6818, Naval Research Laboratory, Washington DC, USA

9:30 V.3 **MBE Growth and Characterization of Type-II InAs/GaSb Strained Layer Superlattices for Long-Infrared Detection**  
E. Plis, S. Myers, H.S Kim, A. Khoshakhlagh, N. Gautam, Y. D. Sharma and S. Krishna, Center for High Technology Materials, University of New Mexico, 1313 Goddard St SE, Albuquerque, NM 87106, S. J. Lee, S. K. Noh, Korea Research Institute Standards and Science (KRISS), 1 Doryongdong, Yuseong-gu, Daejeon 305-600, Rep. of Korea

9:45 V.4\* **Growth of the Al-free Material System InGaAs/GaAsSb for Optoelectronic Intersubband Devices**  
H. Detz<sup>1</sup>, P. Klang<sup>1</sup>, M. Nobile<sup>1</sup>, A.M. Andrews<sup>1</sup>, E. Mujagić<sup>1</sup>, S. Schartner<sup>1</sup>, W. Schrenk<sup>1</sup> and G. Strasser<sup>1,2</sup>, 1) Center for Micro and Nanostructures and Institute for Solid State Electronics, Vienna University of Technology, Floragasse 7, 1040 Vienna, Austria, 2) Departments of Electrical Engineering and Physics, University at Buffalo, 332 Bonner Hall, Buffalo, NY, USA

10:00 V.5\* **Growth of  $Zn_xCd_{(1-x)}Se/Zn_xCd_yMg_{(1-x-y)}Se/InP$  Quantum Cascade laser structures for emission in the 3 – 4  $\mu m$  range**  
W. O. Charles<sup>1</sup>, K. J. Franz<sup>2</sup>, Q. Zhang<sup>1</sup>, A. Shen<sup>1</sup>, C. Gmachl<sup>2</sup> and M. C. Tamargo<sup>1</sup>, 1) The City College of New York, CUNY, New York, NY, 2) Princeton University, Princeton, NJ, USA

10:15 **Coffee break**

**TUESDAY, August 11, 2009**

**Session VI Devices – 2 (10:45 – 12:15 pm)**

**A. Liu – Chair**

- 10:45 **VI.1 Molecular Beam Epitaxy Growth Optimization for High Performance Quantum Cascade lasers**  
Jianxin Chen, Yu Yao, Xue Huang and Claire Gmachl, Department of Electrical Engineering, Princeton University, Princeton, NJ, USA
- 11:00 **VI.2\* 3  $\mu\text{m}$  Type-I GaSb-based Diode Lasers Operating at Room Temperature in CW mode**  
Takashi Hosoda<sup>1</sup>, Gela Kipshidze<sup>1</sup>, Leon Shterengas<sup>1</sup>, David Westerfeld<sup>2</sup>, Sergey Suchalkin<sup>2</sup> and Gregory Belenky<sup>1</sup>, 1) State University of New York at Stony Brook, Stony Brook, NY, USA, 2) Power Photonic Corporation, Stony Brook, NY, USA
- 11:15 **VI.3 MBE Growth of GaSb-Based Laser Diodes with Emission Wavelength beyond 3 $\mu\text{m}$**   
J.A. Gupta, P.J. Barrios, G.C. Aers, P. Waldron, C. Storey, X.Wu and Z.R. Wasilewski, Institute for Microstructural Sciences, National Research Council of Canada, Ottawa, ON
- 11:30 **VI.4 Improved Regrowth of Self-Aligned Ohmic Contacts for III-V FETs**  
M. A. Wistey,<sup>1,2</sup> A. K. Baraskar,<sup>1</sup> U. Singiseti,<sup>1</sup> B. Shin<sup>3</sup>, E. Kim<sup>3</sup>, G. J. Burek,<sup>1</sup> P. C. McIntyre<sup>3</sup>, M. J. W. Rodwell<sup>1</sup>, A. C. Gossard<sup>2</sup>, 1) ECE and 2) Materials Departments, University of California, Santa Barbara, CA, 3) Materials Department, Stanford University, Stanford, CA, USA
- 11:45 **VI.5 MBE Growth and Properties of GaAs Pseudomorphic HEMTs on Silicon Composite Substrates**  
W.E. Hoke, T.D. Kennedy, J. LaRoche, A. Torabi, J. Bettencourt, P. Saledas, C.D. Lee, P.S. Lyman, and T.E. Kazior, Raytheon Company, Andover, MA, M.T. Bulsara and E.A. Fitzgerald, Massachusetts Institute of Technology, Cambridge, MA, D. Lubyshev and W.K. Liu, IQE Inc., Bethlehem, PA, USA
- 12:00 **VI.6 Scattering Mechanisms Due to In-Situ MBE-Grown HfO<sub>2</sub> Gate Oxide in InGaAs Quantum Well MOSFETs**  
V. Tokranov,<sup>1</sup> P. Nagaiah,<sup>1</sup> Koveshnikov,<sup>1,2</sup> R. Kambhampati,<sup>1</sup> R. Moore,<sup>1</sup> W.Tsai,<sup>2</sup> and S. Oktyabrsky<sup>1</sup>, 1) College of Nanoscale Science and Engineering, University at Albany-SUNY, Albany, NY, 2) Intel Corporation, Santa Clara, CA, USA
- 12:15 **Lunch**

**Session VII Late News Papers (1:45 – 2:45 pm)**

**A. Shen – Chair**

- 1:45 **VII.1 Large area high sensitivity AlN metal-semiconductor-metal photodetectors,**  
S. Nikishin, B. Borisov, M. Pandikunta, R. Dahal, J. Y. Lin, and H. X. Jiang, Department of Electrical and Computer Engineering and Nano Tech Center, Texas Tech University, Lubbock, TX 79409, M. Holtz, Department of Physics and Nano Tech Center, Texas Tech University, Lubbock, TX, USA
- 2:00 **VII.2 In-situ Compositional Analysis of Rare Earth Binary and Ternary, Oxides by Energy Dispersive X-ray Spectroscopy during MBE Growth**  
M. Hashimoto<sup>1</sup>, F. E. Arkun<sup>1</sup>, A. Jackson<sup>1,3</sup>, A. Clark<sup>2</sup>, R. Smith<sup>2</sup>, R. Sewell<sup>2</sup>, C. J. Palmstrøm<sup>1</sup>, 1)University of California Santa Barbara, Electrical and Computer Engineering, Santa Barbara, CA 93106, 2)Translucent Inc., 952 Commercial St. Palo Alto, CA 94303, 3) MBE Control Solutions, 6383 Calle Real Suite F, Goleta, CA USA
- 2:15 **VII.3 In-situ Reflectance Anisotropy Spectroscopy during growth of GaSb based lasers in MBE**  
D. Hoffmann<sup>1</sup>, H. Fouckhardt<sup>1</sup>, M. Borasio<sup>2</sup>, K. Haberland<sup>2</sup>, 1) University of Technology, Research Group Integrated Optoelectronics and Microoptics, Erwin-Schrödinger-Str. 46, Kaiserslautern, Germany, 2) LayTec GmbH, Helmholtzstr. 13-14, Berlin, Germany

2:30 **Coffee break**

**Poster Session I (3:00 – 4:15 pm)**

**TUESDAY, August 11, 2009**

**Poster Session I (3:00 – 4:15 pm)**

- P1.1. **\*Photoluminescence in Ga-doped ZnO Thin Films Grown by Plasma Assisted Molecular-Beam Epitaxy**  
Z. Yang,<sup>1</sup> D. C. Look,<sup>2</sup> and J. L. Liu<sup>1</sup>, 1) Quantum Structures Laboratory, Department of Electrical Engineering, University of California at Riverside, Riverside, CA, USA, 2) Semiconductor Research Center, Wright State University, Dayton, OH, USA
- P1.2. **\*Dominant Ultraviolet Light Emissions in ZnO Homojunction and Double Heterojunction Diodes by Molecular Beam Epitaxy**  
Jieying Kong, Lin Li, Zheng Yang, Mario Olmedo, and Jianlin Liu, Quantum Structures Laboratory, Department of Electrical Engineering, University of California at Riverside, Riverside, CA, USA
- P1.3. **\*Annealing Effect on CdZnO Thin Films Grown by Molecular-Beam Epitaxy**  
L. Li, Z. Yang, Z. Zuo, J. Y. Kong and J. L. Liu, Quantum Structures Laboratory, Department of Electrical Engineering, University of California, Riverside, CA, USA
- P1.4. **\*ZnO:Co and ZnO:Mn Diluted Magnetic Semiconductor Thin Films Grown by Molecular-Beam Epitaxy**  
Z. Zuo,<sup>1</sup> Z. Yang,<sup>1</sup> W. P. Beyermann,<sup>2</sup> J. L. Liu<sup>1</sup>, 1) Quantum Structures Laboratory, Department of Electrical Engineering, University of California at Riverside, Riverside, CA, USA, 2) Department of Physics and Astronomy, University of California at Riverside, Riverside, CA, USA
- P1.5. **\*RF Characteristics of Self-Aligned Inversion-Channel In<sub>0.53</sub>Ga<sub>0.47</sub>As MOSFETs Using MBE-Al<sub>2</sub>O<sub>3</sub>/Ga<sub>2</sub>O<sub>3</sub>(Gd<sub>2</sub>O<sub>3</sub>) Gate Dielectrics**  
T. D. Lin<sup>1</sup>, P. Chang<sup>1</sup>, H. C. Chiu<sup>1</sup>, J. Kwo<sup>2</sup>, S. Lin<sup>3</sup>, Shawn S. H. Hsu<sup>3</sup>, and M. Hong<sup>1</sup>, 1) Department of Materials Science and Engineering, 2) Department of Physics, and 3) Institute of Electronics Engineering, National Tsing Hua University, Hsinchu, Taiwan
- P1.6. **\*Heteroepitaxial Self-Assembly of Ge Quantum Dots on SrTiO<sub>3</sub>**  
J.K. Kassim and J.A. Floro, Department of Materials Science and Engineering, University of Virginia, 395 McCormick Rd, Charlottesville, VA, USA
- P1.7. **\*The Transition Mechanisms of InAs/GaAs Quantum-Dot Infrared Photodetectors with Different InAs Coverage**  
Chi-Che Tseng<sup>1</sup>, Tung-Hsun Chung<sup>1</sup>, Shu-Cheng Mai<sup>1</sup>, Kuang-Ping Chao<sup>1</sup>, Wei-Hsun Lin<sup>1</sup>, Shih-Yen Lin<sup>1,2</sup> and Meng-Chyi Wu<sup>1</sup>, 1) Department of Electrical Engineering, National Tsing-Hua University, 2) Research Center for Applied Sciences, Academia Sinica, Taiwan

- P1.8. **\*Suppression of Surface Leakage Currents Using MBE-Grown Unipolar Barriers**  
G. R. Savich, J. R. Pedrazzani, G. W. Wicks, The Institute of Optics, University of Rochester, Rochester, NY, USA
- P1.9. **\*InGaAs-Capped InAs/GaAs Quantum-Dot Infrared Photodetectors with 10.4  $\mu\text{m}$  Responses**  
Wei-Hsun Lin, Chi-Che Tseng, Kuang-Ping Chao, Shu-Chen Mai and Shih-Yen Lina), Research Center for Applied Sciences, Academia Sinica, Taiwan
- P1.10. **Concept of Feedback-Free High Frequency Loss-Modulation in a Detuned Duo-Cavity VCSEL**  
S. Oktyabrsky,<sup>1</sup> J. van Eerden,<sup>1</sup> M. Yakimov,<sup>1</sup> V. Tokranov,<sup>1</sup> A. Sergeev,<sup>1</sup> E. M. Mohammed,<sup>2</sup> and I. A. Young<sup>2</sup>, 1) College of Nanoscale Science and Engineering, University at Albany, Albany, NY, 2) Intel Corporation, Hillsboro, OR, USA
- P1.11. **Performance of Off-axis MBE Grown THz Quantum Cascade Lasers**  
Shivashankar R. Vangala, Xifeng Qian, Neelima Chandrayan, Dan Wasserman, and William D. Goodhue, Photonics Center, University of Massachusetts Lowell, Lowell, MA, Andriy A. Danylov, Robert H. Giles, and Jerry Waldman, Submillimeter-Wave Technology Laboratory, University of Massachusetts Lowell, Lowell, MA, W.E. Nixon, U.S. Army National Ground Intelligence Center (NGIC), 2055 Boulders Road, Charlottesville, VA, USA
- P1.12. **\*Molecular Beam Epitaxy Integration of Barium Hexaferrite on Wide Bandgap 6H-SiC**  
Zhuhua Cai, Trevor Goodrich, Bing Sun, Katherine Ziemer, Department of Chemical Engineering, Northeastern University, Boston, MA, USA
- P1.13. **\*Further Study of Epitaxial  $\text{Y}_2\text{O}_3$  films on Si (111) - Lattice Strain/Relaxation and In-Situ Depth Profiling**  
Y. J. Lee<sup>1</sup>, W. C. Lee<sup>1</sup>, M. L. Huang<sup>1</sup>, C. W. Nieh<sup>1</sup>, C.-H. Hsu<sup>2</sup>, J. Kwo<sup>3</sup>, and M. Hong<sup>1</sup>, 1) Dept. of Materials Science and Eng., National Tsing Hua University, Hsin Chu, Taiwan 30013, 2) National Synchrotron Radiation Research Center, Hsin Chu, Taiwan 30013, 3) Department of Physics, National Tsing Hua University, Hsin Chu, Taiwan
- P1.14. **The Growth and Characterization of Crystalline MgO Thin Films Deposited on 6H-SiC by Molecular Beam Epitaxy**  
Matthew Snyder<sup>1</sup>, Mark Fanton<sup>1</sup>, David Rearick<sup>1</sup>, Jeremy Acord<sup>1</sup>, Joshua Robinson<sup>1</sup>, Xiaojun Weng<sup>2</sup>; 1) Pennsylvania State University Electro-Optics Center; 2) Pennsylvania State University, Materials Research Institute, State College, PA, USA
- P1.15. **\*High Quality Yttrium Oxide Films Grown by Molecular Beam Epitaxy**  
S.E. Webster, R. Kumaran, S. Penson, T. Tiedje<sup>1</sup>, Advanced Materials and Process Engineering Laboratory, Department of Physics and Astronomy, 1) also Dept. of Electrical and Computer Engineering, University of British Columbia, 2355 East Mall, Vancouver, BC V6T 1Z4, Canada

- P1.16. **200-mm Wafer-Scale High Quality SrTiO<sub>3</sub> Grown by MBE**  
X.Gu, D. Lubyshev, J. Batzel, J. M. Fastenau, W. K. Liu, and R. Pelzel, IQE Inc., 119  
Technology Drive, Bethlehem, PA, USA, J. F. Magana, Q. Ma, and V. R. Rao, Intel Corporation,  
2200 Mission College Blvd, Santa Clara, CA , USA
- P1.17. **Investigation of Initial Nucleation Conditions on MBE-Grown SrTiO<sub>3</sub> Thin Films on Si (100) Substrates**  
M. O'Steen, T. Bird, G. Alexander, B. Catlin, and D. Gotthold, Process Integration Center,  
Veeco Instruments Inc., Saint Paul, MN, USA
- P1.18. **The Role of Indium Atoms in GaInN/AlInN Intersubband Heterostructures on GaN Substrates**  
G. Cywiński<sup>1</sup>, R. Kudrawiec<sup>2</sup>, M. Kryśko<sup>1</sup>, A. Feduniewicz-Żmuda<sup>1</sup>, M. Siekacz<sup>1</sup>, L. Nevou<sup>3</sup>, M.  
Tchernycheva<sup>3</sup>, F. H. Julien<sup>3</sup>, J. Misiewicz<sup>2</sup> and C. Skierbiszewski<sup>1</sup>, 1) Institute of High Pressure  
Physics, Polish Academy of Science, Sokołowska 29/37, 01-142 Warsaw, Poland, 2) Institute of  
Physics, Wrocław University of Technology, Wybrzeże Wyspiańskiego 27, 50-370 Wrocław,  
Poland, 3) Action OptoGaN, Institut d'Electronique Fondamentale, Université Paris-Sud, UMR  
8622 CNRS, 91405 Orsay Cedex, France
- P1.19. **Low-Temperature Growth of GaN on Al Substrates by Compound Source MBE**  
Tohru Honda, Satoru Taguchi, Masashi Sawadaishi and Taiga Goto, Department of Electrical  
Engineering and Electronics, Graduate School of Engineering, Kogakuin University, 2665-1  
Nakano-machi, Hachiohji, Tokyo 192-0015, Japan
- P1.20. **\*Growth and Luminescence Characterization of Dilute InPN alloys Grown by Solid Source Molecular Beam Epitaxy**  
K. Umeno<sup>1</sup>, Y. Furukawa<sup>1</sup>, N. Urakami<sup>1</sup>, S. Mitsuyoshi<sup>1</sup>, F. Ishikawa<sup>2</sup>, H. Yonezu<sup>1</sup>, A.  
Wakahara<sup>1</sup> and M. Kondow<sup>2</sup>, 1) Department of Electrical and Electronic Engineering, Toyohashi  
University of Technology, Aichi, Japan, 2) Graduate School of Engineering, Osaka University,  
Osaka, Japan
- P1.21. **\*Investigation of Band Offsets in GaAsSb(N)/GaAs Strained Epilayers using X-ray Photoelectron Spectroscopy and Photoluminescence**  
Sudhakar Bharatan, Shanthi Iyer and Jia Li, Department of Electrical and Computer Engineering,  
North Carolina A&T State University, Greensboro, NC, USA
- P1.22. **\*Growth of PbSe on ZnTe/GaAs(211)B by Molecular Beam Epitaxy**  
X.J. Wang<sup>1</sup>, Y.B. Hou<sup>1,2</sup>, Y.Chang<sup>1</sup>, C.R. Becker<sup>1</sup>, R.F.Klie<sup>1</sup> and S. Sivananthan<sup>1</sup>, 1)  
Microphysics Laboratory, Physics Department, University of Illinois at Chicago, 2) Physics  
Department and Quantum functional Semiconductor Research Center, Dongguk University3-26,  
Seoul 100-715, Korea

- P1.23. **Aluminum Doping in ZnSe<sub>x</sub>Te<sub>1-x</sub> Grown by Molecular Beam Epitaxy**  
S. Wang, D. Ding, R. Liu, C.-Z. Ning, and Y.-H. Zhang, Department of Electrical engineering & Center for Nanophotonics, Arizona State University, Tempe, AZ, X. Liu and J. K. Furdyna, Department of Physics, University of Notre Dame, Notre Dame, IN, USA
- P1.24. **Study of Cd Substitution by Zn during the Atomic Layer Epitaxy Growth of Alternate CdSe and ZnSe Monolayers**  
J.C. Salcedo-Reyes and I. Hernández-Calderón, Physics Department, CINVESTAV, Ave. IPN 2508, 07360 Mexico, DF, Mexico
- P1.25. **\*RHEED-TRAXS Development for Real Time, in-situ Stoichiometry Analysis and Growth Mechanism Study**  
Bing Sun, Martina List, Katherine Ziemer, Department of Chemical Engineering, Northeastern University, Boston, MA, USA
- P1.26. **Modulated Beam Mass Spectrometer Studies of a Mark V Veeco Cracker**  
R. P. Champion<sup>1</sup>, C. T. Foxon<sup>1</sup> and R. C. Bresnahan<sup>2</sup>, 1) School of Physics and Astronomy, University of Nottingham, Nottingham, UK, 2) Veeco Instruments Inc, 4900 Constellation Drive, St. Paul, MN, USA
- P1.27. **Short Wavelength Bandedge Thermometry During Molecular Beam Epitaxial Growth of GaN on SiC Substrates**  
W.E. Hoke<sup>1</sup>, D. Barlett<sup>2</sup>, T.D. Kennedy<sup>1</sup>, B. Wissman<sup>2</sup>, J.J. Mosca<sup>1</sup>, 1) Raytheon Company, Andover, MA, 2) K-Space Associates, Dexter, MI, USA
- P1.28. **A Study of the Driving Force for the Self Assembly of Heterojunction Quantum Dots (Zero-D Molecules) Using Finite Element Analysis**  
K. G. Eyink<sup>1</sup>, L. Grazulis<sup>2</sup>, M. Tyman<sup>4</sup>, and K. Mahalingam<sup>3</sup>, 1) AFRL/ RXPS, Wright Patterson AFB, OH, 2) University of Dayton, Dayton, OH, 3) UES, Dayton, OH, 4) Southwestern Ohio Council for Higher Education, Wright State University, Dayton, OH, USA
- P1.29 **Sr flux Stability Against Oxidation in Oxide-MBE Environment: Temperature, Geometry, and Pressure Dependence**, Y.S. Kim, Namrata Bansal, Carlos Chaparro, Heiko Gross, and Seongshik Oh, Department of Physics & Astronomy, The State University of New Jersey, 136 Frelinghuysen Rd, Piscataway, NJ, U.S.A.
- P1.30 **Vertical Magnetization Shift and Exchange Biasing of the Diluted Magnetic Semiconductor GaMnAs**, Po-Wei Huang, Chih-Yuan Cheng, Chen-Hsuan Yen, and Jin-Hua Huang, Department of Materials Science and Engineering, National Tsing Hua University, Hsinchu, Taiwan

**WEDNESDAY, August 12, 2009**

**Session VIII Novel Materials & Device Structures (8:30 – 10:15 am)**

**T. Moustakas – Chair**

- 8:30            **NAMBE 2010**
- 8:35    **VIII.1    PLENARY – Epitaxial Graphene: Designing a New Electronic Material**  
Walt de Heer, Georgia Institute of technology, Atlanta, GA, USA
- 9:15    **VIII.2    Graphitic Growth on Si(111) via Carbon Sublimation**  
J. C. Hackley, D. Ali, J. Di Pasquale III and C.J.K. Richardson, Laboratory for Physical Sciences, 8050 Greenmead Drive, College Park, MD, USA
- 9:30    **VIII.3    Epitaxial Growth and Structure of Ge-Sb-Te Phase Change Materials on GaSb**  
Wolfgang Braun, Roman Shayduk, Ferhat Katmis, Timur Flissikowski, Holger T. Grahn, Henning Riechert, Paul-Drude-Institut für Festkörperelektronik, Hausvogteiplatz 5-7, D-10117 Berlin, Germany
- 9:45    **VIII.4\*    Engineering the Effective Permittivity in Mid-Infrared Metamaterials Grown by Molecular Beam Epitaxy**  
Anthony J. Hoffman<sup>1</sup>, Jianxin Chen<sup>1</sup>, Matthew D. Escarra<sup>1</sup>, Sukosin Thongrattanasiri<sup>2</sup>, Nicholas A. Kuhta<sup>2</sup>, Evgenii E. Narimanov<sup>3</sup>, Viktor A. Podolskiy<sup>2</sup>, and Claire Gmachl<sup>1</sup>, 1) Princeton University, Department of Electrical Engineering, Princeton, NJ, 2) Oregon State University, Department of Physics, Corvallis, OR, 3) Purdue University, School of Electrical and Computer Engineering, West Lafayette, IN, USA
- 10:00    **VIII.5\*    Engineering of threshold voltages in MBE-grown Ga<sub>2</sub>O<sub>3</sub>(Gd<sub>2</sub>O<sub>3</sub>)/In<sub>0.2</sub>Ga<sub>0.8</sub>As**  
Y. D. Wu<sup>1</sup>, Y. C. Chang<sup>1</sup>, T. D. Lin<sup>1</sup>, T. H. Chiang<sup>1</sup>, J. Kwo<sup>2</sup>, W. Tsai<sup>3</sup>, and M. Hong<sup>1</sup>, 1) Dept. of Materials Sci. and Eng., 2) Dept. of Physics, National Tsing Hua Univ., Hsinchu 30013, Taiwan, and 3) Intel Corporation, SC1-05, 2200 Mission College Blvd., Santa Clara, CA, USA
- 10:15            **Coffee break**

**WEDNESDAY, August 12, 2009**

**Session IX III-V Materials & Structures (10:45 – 12:15 pm)**

**I. Hernandez-Calderon – Chair**

- 10:45 **IX.1 Molecular Beam Epitaxy of InSb Epilayers and Quantum Wells on Ge Substrates and Ge-On-Insulator Substrates**  
M. C. Debnath<sup>1</sup>, T. D. Mishima<sup>1</sup>, M. B. Santos<sup>1</sup>, K. Hossain<sup>2</sup>, and O. W. Holland<sup>2</sup>, 1) Department of Physics and Astronomy, University of Oklahoma, Norman, OK, 2) Amethyst Research, Inc., 1405 4th Ave NW, Suite # 345, Ardmore, OK, USA
- 11:00 **IX.2 MBE Grown Single Crystalline GaAs on Flexible Polycrystalline Metal Substrates**  
A. Freundlich<sup>1,2,3</sup>, G. Radhakrishnan<sup>1,2</sup>, C. Rajapaksha<sup>1,3</sup>, V. Selvamanickam<sup>4</sup>, S. Sunbandam<sup>5</sup>, A. Alemu<sup>1</sup> and I. Sear<sup>1,3</sup>, 1) Photovoltaic and Nanostructures Laboratories, Center for Advanced Materials 2) Electrical and Computer Engineering Department, 3) Physics Department, 4) Mechanical Engineering Department, University of Houston, Houston TX USA, 5) SuperPower Inc, Schenectady, NY, USA
- 11:15 **IX.3 Composition Dependence of Photoluminescence of GaAs<sub>1-x</sub>Bi<sub>x</sub> alloys**  
Xianfeng Lu, R. B. Lewis, D. A. Beaton, M. M. Shirazi, T. Tiedje, Advanced Materials and Process Engineering Laboratory (AMPEL), University of British Columbia, Vancouver, BC, V6T 1X7, Canada, Yong Zhang, Department of Electrical and Computer Engineering, University of North Carolina at Charlotte, Charlotte, NC, USA
- 11:30 **IX.4 MBE Approaches on High Performance Rare Earth-Based Nanocomposites for Thermoelectric Power Generation Applications**  
Hong Lu, Gehong Zeng, Je-Hyeong Bahk, John Bowers and Arthur Gossard, University of California, Santa Barbara, CA, USA
- 11:45 **IX.5 Wide-Dynamic-Range, Fast-Response CBr<sub>4</sub> Doping System for Molecular Beam Epitaxy**  
Yu-Chia Chang<sup>1</sup>, Yan Zheng<sup>1</sup>, John H. English<sup>2</sup>, Andrew W. Jackson<sup>1</sup>, and Larry A. Coldren<sup>1,2</sup>, 1) ECE Dept. and 2) Materials Dept., University of California, Santa Barbara, CA, USA
- 12:00 **IX.6 Novel Insight into the Interface Formation in Molecular Beam Epitaxial Grown Semiconductor Heterostructures**  
E. Luna, A. Guzmán and A. Trampert, Paul-Drude Institut für Festkörperelektronik, Hausvogteiplatz 5-7, 10117, Berlin, Germany

12:15 **Lunch**

**Poster Session II (1:45 – 3:00 pm)**

2:45 **Coffee break**

**WEDNESDAY, August 12, 2009**

**Poster Session II (1:45 – 3:00 pm)**

- P2.1. **\*Assessment of Growth Kinetics of Self Assembled Quantum Dots Using RHEED**  
C. Rajapaksha, and A. Freundlich, Photovoltaics and Nanostructures Laboratories, Center for Advanced Materials and Physics Department, University of Houston, #724 Science & Research 1, Houston, TX, USA
- P2.2. **Fundamental Aspects of the Creation and Structural Transformation of Crystalline Defects During Epitaxial Growth and Their Correlation with Physical Properties**  
N. Faleev, S. P. Bremner, University of Delaware, ECE Department, Newark, DE, USA
- P2.3. **\*Study of the crystalline quality of Al<sub>0.2</sub>Ga<sub>0.3</sub>In<sub>0.5</sub>P:Be films grown on GaAs by SSMBE**  
C. Soubervielle-Montalvo, D. Vázquez-Cortés, V.H. Méndez-García, Optical Communications Research Institute, (IICO), Universidad Autónoma de San Luis, Potosí, Av Karakorum 1470, Lomas 4<sup>a</sup> Sección, 78210 San Luis Potosí, S.L.P., Mexico
- P2.4. **Temperature Dependent Lattice Constant of Al<sub>0.90</sub>Ga<sub>0.10</sub>As<sub>y</sub>Sb<sub>1-y</sub>**  
M. Breivik<sup>1</sup>, T.A. Nilsen<sup>1</sup>, E. Selvig<sup>2</sup>, G. Myrvågnes<sup>1,3</sup> and B.O. Fimland<sup>1</sup>, 1) Department of Electronics and Telecommunications, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway, 2) Norwegian Defence Research Establishment, P.O. Box 25, NO-2027 Kjeller, Norway, 3) Integrated Optoelectronics AS, Østre Rosten 84G, NO-7475 Trondheim, Norway
- P2.5. **Characterization of the Potential Profile Across Type I InGaAsSb/AlGaAsSb/GaSb Laser Diode Heterostructures by Kelvin Probe measurements**  
Dmitri Donetsky, Leon Shterengas, Takashi Hosoda, Gela Kipshidze, Department of Electrical and Computer Engineering, SUNY at Stony Brook, NY, USA
- P2.6. **Carrier Lifetime Studies in Type II Strained Layers Superlattices for Infrared Detector Applications**  
Dmitri Donetsky<sup>1</sup>, Stefan P. Svensson<sup>2</sup>, David Westerfeld<sup>3</sup> and Gregory Belenky<sup>3</sup>, 1) Department of Electrical and Computer Engineering, SUNY at Stony Brook, NY, 2) US Army Research Laboratory, 2800 Powder Mill Rd, Adelphi. MD, 3) Department of Electrical and Computer Engineering, SUNY at Stony Brook, NY, and Power Photonic Corporation, Stony Brook, NY, USA
- P2.7. **\*Room Temperature Capacitance-Voltage Profile and Photoluminescence for Delta Doped In<sub>0.32</sub>Ga<sub>0.68</sub>As Single Quantum Well**  
K.-Y. Ban and C. B. Honsberg, Department of Electrical Engineering, Arizona State University, Tempe, AZ, USA, S.P. Bremner, Department of Electrical & Computer Engineering, University of Delaware, Newark, DE, USA

- P2.8. **Photoionization Cross Sections of Deep Centers in GaN/AlGaIn Multiple Quantum Wells**  
S. K. Zhang, W. B. Wang and R. R. Alfano, Institute for Ultrafast Spectroscopy and Lasers, and New York State Center for Advanced Technology for Ultrafast Photonic Materials and Applications, The City College of the City University of New York, 160 Convent Ave., New York, NY, A. Teke, L. He, S. Dogan, and H. Morkoç, Department of Electrical Engineering, Virginia Commonwealth University, 601 W. Main Street, Richmond, VA, USA
- P2.9. **Time-Resolved Photoluminescence of Strongly Coupled CdSe Quantum Dots**  
S. K. Zhang and X. Zhou, Physics Department, New York City College of Technology, CUNY, 300 Jay Street, Brooklyn, New York, W. B. Wang, B. B. Das, R. R. Alfano, Institute for Ultrafast Spectroscopy and Lasers, The City College of New York, 160 Convent Ave., New York, NY, Noemi Perez, H. Lu, A. Shen and M. C. Tamargo, Chemistry Department, The City College of New York, 160 Convent Ave., New York, NY, USA
- P2.10. **\*Surface Morphological Evolution during Low Temperature Ge Homoepitaxial Growth on Strained 2D and 3D Ge/Si (001) Films**  
C. Petz, J. Floro, D. Yang, and J. Levy, Department of Materials Science, University of Virginia, Charlottesville, VA, USA
- P2.11. **Effects of GaSb Substrate Orientation on the Growth of InSb Quantum Dots by Molecular Beam Epitaxy**  
A. Torfi, C. Pei, C.Y. Chou, and W. I. Wang, Department of Electrical Engineering, Columbia University, New York, NY, USA
- P2.12. **\*Self-Assembled Nanostructures of InAs grown on GaAs (631) Substrates**  
G. Garcia-Liñan<sup>1</sup>, E. Cruz-Hernández<sup>1</sup>, M. López-López<sup>2</sup>, L. Zamora-Peredo<sup>3</sup>, D. Vázquez-Cortes<sup>1</sup>, V.H. Méndez-García<sup>1</sup>, 1) Optical Communications Research Institute (IICO), Universidad Autónoma de San Luis Potosí, Av. Karakorum 1470, San Luis Potosí, S.L.P., México, 2) Physics Department, Centro de Investigación y de Estudios Avanzados del IPN, México D.F, México, 3) Universidad Politécnica de San Luis Potosí, Iturbide 140, Centro Histórico, San Luis Potosí, S.L.P., Mexico
- P2.13. **Photoreflectance and Photoluminescence of AlGaAs/GaAs Quantum Wire Superlattices on GaAs (631) High-Index Substrates**  
L. Zamora-Peredo<sup>1</sup>, M. Hernández-Sustaita<sup>1</sup>, G. García-Liñan<sup>2</sup>, V.H. Méndez-García<sup>2</sup>, J.S. Rojas-Ramirez<sup>3</sup>, R. Contreras-Guerrero<sup>3</sup>, E. Cruz-Hernández<sup>3</sup>, I. Martínez-Velis<sup>3</sup>, J. Hernández-Rosas<sup>3</sup>, S. Gallardo-Hernández<sup>3</sup>, M. Ramírez-López<sup>3</sup> y M. López-López<sup>3</sup>, 1) Universidad Politécnica de San Luis Potosí, Urbano Villalón 500, San Luis Potosí, S.L.P., México, 2) Optical Communications Research Institute, Universidad Autónoma de San Luis Potosí, Av. Karakorum 1470, San Luis Potosí, S.L.P., México, 3) Physics Department, Centro de Investigación y de Estudios Avanzados del IPN, Av. Instituto Politécnico Nacional 2508, México, D.F. Mexico

- P2.14. **Photoluminescence Study of InAs Quantum Dots with AlAs/GaAs Capping Barrier Layer**  
A. Pulzara-Mora<sup>1</sup>, V.H. Méndez-García<sup>2</sup>, J. Hernandez Rosas<sup>3</sup>, M. Ramirez Lopez<sup>3</sup>, and M. López-López<sup>3</sup>, 1) Laboratorio de Magnetismo y Materiales Avanzados. Universidad Nacional de Colombia Sede Manizales. Manizales, Colombia, 2) Instituto de Investigación en Comunicación Óptica, UASLP, Obregón 64, San Luis Potosí, SLP, México, 3) Physics Department, Centro de Investigación y Estudios Avanzados del IPN, México D.F, México
- P2.15. **Phase and Shape Transitions in Iron Silicide Nanodots Grown on Si (111)**  
J. C. González, M. I. N. da Silva, R. Magalhães-Paniago and A. G. de Oliveira, Departamento de Física, Instituto de Ciências Exatas, Universidade Federal de Minas, Gerais, Belo Horizonte, Brazil.
- P2.16. **Study of Potential Fluctuations Caused by Interface Mixing in CdSe/ZnSe Ultrathin Quantum Wells**  
A. Alfaro-Martínez and I. Hernández-Calderón, Physics Department, CINVESTAV, Ave. IPN 2508, Mexico, D.F., Mexico
- P2.17. **Photoluminescence and Magneto-Optical Studies of Stacked Type-II ZnTe/ZnSe Quantum Dots Grown by Migration Enhanced Epitaxy**  
Igor L. Kuskovsky<sup>1</sup>, Y. Gong<sup>2</sup>, G. F. Neumark<sup>2</sup>, M. C. Tamargo<sup>3</sup>, A. O. Govorov<sup>4</sup>, I. R. Sellers<sup>5</sup>, and B. D. McCombe<sup>5</sup>, 1) Queens College of CUNY, Flushing, NY; 2) Columbia University, New York, NY; 3) The City College of CUNY, New York, NY; 4) Ohio University, Athens, OH; 5) University at Buffalo SUNY, Buffalo, NY , USA
- P2.18. **(Abstract re-classified)**
- P2.19. **Control of Residual Background Carriers in Undoped Mid-Infrared InAs/GaSb Superlattices**  
H. J. Haugan<sup>1</sup>, S. Elhamri<sup>2</sup>, W. C. Mitchel<sup>1</sup>, B. Ullrich<sup>3</sup>, G. J. Brown<sup>1</sup>, and L. Grazulis<sup>1</sup>, 1) Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, USA, 2) Department of Physics, University of Dayton, OH, USA, 3) Department of Physics and Astronomy, Bowling Green State University, Bowling Green, OH, USA
- P2.20. **Molecular Beam Epitaxy and Characterization of InGaAs/AlAs/AlAsSb Coupled Double Quantum Wells with Extremely Thin Coupling Barriers**  
T. Mozume and S. Gozu, National Institute of Advanced Industrial Science and Technologies (AIST), 2-1 Tsukuba Central, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan
- P2.21. **\*Improving Hole Mobility in Strained InGaSb Quantum Well with Carbon Doping**  
Chichih Liao and K. Y. Cheng, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA

- P2.22. **Effect of Antimony on the Structural and Optical Properties of InAs Quantum Dots for Advanced Concept Solar Cell Applications**  
S. P. Bremner<sup>1</sup>, N. Faleev<sup>1</sup>, L. Nataraj<sup>1</sup>, S. Cloutier<sup>1</sup>, R. Opila<sup>2</sup>, 1) Department of Electrical and Computer Engineering, 2) Department of Materials Science and Engineering, University of Delaware, Newark DE, USA
- P2.23. **Improved Photoluminescence Efficiency of AlGaSb/GaSb Quantum Wells Grown on High Quality GaSb Metamorphic Buffer with GaAs Substrate by MBE**  
Lei He, Christopher J.K. Richardson, Laboratory for Physical Sciences, 8050 Greenmead Drive, College Park, MD, USA
- P2.24. **\*Optical Characterization of Al<sub>x</sub>Ga<sub>1-x</sub>As/GaAs Modulation Doped Heterostructures Grown under As<sub>2</sub> and As<sub>4</sub> Fluxes**  
D. Vázquez-Cortés<sup>1</sup>, L. Zamora-Peredo<sup>2</sup>, M. Lopez-Lopez<sup>3</sup>, R. Balderas-Navarro<sup>1</sup>, C. Soubervielle-Montalvo<sup>1</sup>, V.H. Méndez-García<sup>1</sup>, 1) Optical Communications Research Institute, Universidad Autónoma de San Luis Potosí, Av. Karakorum 1470, San Luis Potosí, S.L.P., Mexico, 2) Universidad Politécnica de San Luis Potosí, Urbano Villalón 500, San Luis Potosí, S.L.P., México, 3) Physics Department, Centro de Investigación y de Estudios Avanzados del IPN, Av. Instituto Politécnico Nacional 2508, México, D.F., Mexico
- P2.25. **\*Thermal Expansion of GaSb Measured by Temperature Dependent XRD**  
T. A. Nilsen, M. Breivik, G. Myrvågnes and B. O. Fimland, Department of Electronics and Telecommunications, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway
- P2.26. **\*Growth and Characterization of Single-Crystal Aluminum Thin Film on (100) GaAs Substrate**  
S.W. Lin, S.D. Lin, Y.M. Lin, M.C. Lo, J.H. Pan, J.Y. Wu, K.Y. Chen, T.L. Lin, M.R. Yeh, C.T. Liang, Department of Electronics Engineering, National Chiao Tung University, Hsinchu, Taiwan
- P2.27. **\*Micro Raman Study of (Ga,Mn)As/GaAs(001) Structures Grown by MBE**  
I. Martínez-Velis<sup>1</sup>, A. Pulzara-Mora<sup>2</sup>, J.S. Rojas Ramirez<sup>1</sup>, M. Ramirez-Lopez<sup>1</sup>, R. Contreras-Guerrero<sup>1</sup>, S. Gallardo-Hernandez<sup>3</sup>, Y. Kudriatsev<sup>3</sup>, J. Hernandez-Rosas<sup>1</sup>, and M. López-López<sup>1</sup>, 1) Physics Department, Centro de Investigación y Estudios Avanzados del IPN, México D.F, México, 2) Laboratorio de Magnetismo y Materiales Avanzados. Universidad Nacional de Colombia Sede Manizales. Manizales, Colombia, 3) Electrical Engineering Department, Centro de Investigación y Estudios Avanzados del IPN, México D.F., México
- P2.28. **\*MBE Growth and Characterization of Self Assembled MnAs Wires on HOPG**  
S. Hegde, E. Fraser, J. Kwon and H. Luo, Department of Physics, University at Buffalo, SUNY, Buffalo, NY, USA

**P2.29. Temperature Activated Interdiffusion in MBE Grown InAs Nanowires**

J. C. González<sup>1</sup>, R-Ribeiro Andrade<sup>1</sup>, A. Malachias<sup>2</sup> and A. G. de Oliveira, 1) Departamento de Física, Instituto de Ciências Exatas, Universidade Federal de Minas, Gerais, Belo Horizonte, Brazil, 2) Laboratório Nacional de Luz Síncrotron, Campinas, SP, Brazil

**P2.30. Structural Properties of C60-Multivalent Metal Composite Layers Grown by MBE**

Jiro Nishinaga, Takashi Hayashi, Kiyoshi Hishida, and Yoshiji Horikoshi, School of Science and Engineering, Waseda University, 3-4-1 Okubo, Shinjuku, Tokyo, Japan, and Kagami Memorial Laboratory for Materials Science and Technology, Waseda University, 2-8-26 Nishiwaseda, Shinjuku, Tokyo, Japan.

**WEDNESDAY, August 12, 2009**

**Session X Low Dimensional Structures – 2 (3:15 – 5:00 pm) M. Tamargo - Chair**

- 3:15 X.1 **Observation of the Strongly Correlated  $\nu_{\text{Total}} = 1$  State in Intrinsically Density-Matched Electron Bilayer Systems**  
S. Schmult, L. Tiemann, W. Dietsche and K. von Klitzing, Max-Planck-Institute for Solid State Research, Stuttgart, Germany
- 3:30 X.2 **Structural Control of InAs Lateral Quantum Dot Molecules Grown by Gallium Droplet Epitaxy**  
M.K. Yakes, A.S. Bracker, C.D. Cress, J.G. Tischler, A.R. Laracuate, Naval Research Laboratory, 4555 Overlook Ave., Washington, DC, USA
- 3:45 X.3 **InGaAs Quantum Dot Superlattice Grown on a GaAs (001) Substrate**  
T. Sugaya, T. Amano, M. Mori, and S. Niki, National Institute of Advanced Industrial Science and Technology (AIST), 1-1-1, Umezono, Tsukuba, Ibaraki 305-8568, Japan
- 4:00 X.4\* **Room Temperature Photoluminescence from Single Layer Site-Controlled InAs/GaAs Quantum Dots Defined by Nanoimprint Lithography**  
Chien-Chia Cheng, K. Meneou, and K. Y. Cheng, Department of Electrical and Computer Engineering, University of Illinois, Urbana-Champaign, Urbana, IL, USA
- 4:15 X.5\* **High-Optical-Quality Nanosphere Lithographically Formed InGaAs Quantum Dots Using MBE-Assisted GaAs Mass Transport and Overgrowth**  
Xifeng Qian, Shivashankar Vangala, Daniel Wasserman, William D. Goodhue, Photonics Center, University of Massachusetts Lowell, Lowell, MA, USA
- 4:30 X.6 **An MBE Growth Approach to Controlling Coupled States of InAs Artificial Molecules**  
Allan Bracker, M. Scheibner, D. Kim, M. Yakes, A. Greilich, E. A. Stinaff, M. F. Doty, and D. Gammon, Naval Research Laboratory, Washington, DC, USA
- 4:45 X.7\* **Light Emission Characteristics of Silicon-Based Rolled Up Micro(Nano)-Cavity with InAs /GaAs Quantum Dot Heterostructures**  
W. Guo<sup>1</sup>, P. Bhattacharya<sup>1</sup> and Z. Mi<sup>2</sup>, 1) Solid-State Electronics Laboratory, University of Michigan, Ann Arbor, MI, USA, 2) Department of Electrical and Computer Engineering, McGill University, Montreal, QC, H3A 2A7, Canada
- 5:00 **Closing**