



## SEMICONDUCTOR AND INTEGRATED OPTOELECTRONICS

CARDIFF, WALES, 18<sup>th</sup>-20<sup>st</sup> April 2011

SIOE '11

### PROVISIONAL PROGRAMME

#### MONDAY 18<sup>th</sup> April 2011

1800 Onwards REGISTRATION: Aberdare Hall

1900 Onwards DINNER : Aberdare Hall

#### TUESDAY 19<sup>th</sup> April 2011: Redwood Building, Cardiff University

##### 0830 Session 1: Growth, Materials and Quantum Dots

1. MID INFRARED PHOTOLUMINESCENCE FROM In-RICH InGaAsN MULTI QUANTUM WELLS GROWN BY MOLECULAR BEAM EPITAXY ON InP  
RA Wheatley, QD Zhuang and A Krier  
Physics Dept, Lancaster University, Lancaster, LA1 4YB, UK

##### 2. GROWTH AND CHARACTERISATION OF GaAs<sub>1-x</sub>Bi<sub>x</sub> FOR OPTO-ELECTRONIC APPLICATIONS

F. Bastiman<sup>1</sup>, A.R.Mohmad<sup>1,2</sup>, J.S. Ng<sup>1</sup>, S. J.Sweeney<sup>3</sup>, and J.P.R. David<sup>1</sup>

<sup>1</sup> Department of Electronic and Electrical Eng. University of Sheffield, S1 3JD, UK.

<sup>2</sup> Institute of Microengineering and Nanoelectron., National University of Malaysia,

<sup>3</sup> Advanced Technology Institute and Department of Physics, University of Surrey,

##### 3. BAND GAP - SPIN-ORBIT SPLITTING CROSS-OVER OBSERVED IN GaBiAs/GaAs LAYERS WITH HIGH BISMUTH CONCENTRATION

Z Batool<sup>a</sup>, A Rahman<sup>b</sup>, TJC Hosea<sup>a,c</sup>, N Hossain<sup>a</sup>, K Hild<sup>a</sup>, T Tiedje<sup>d</sup> and SJ Sweeney<sup>a</sup>

a) Advanced Technology Institute and Department of Physics, University of Surrey,

b) Department of Electronic and Electrical Engineering, University of Sheffield

c) now with: Ibnu Sina Institute for Fundamental Science Studies, University Teknologi Malaysia, Johor 81310, Malaysia

d) Department of Electrical and Computer Engineering, University of British Columbia, Vancouver, V6T 1Z4, Canada

4. *a*-Ge and *a*-Si AS DIELECTRIC MIRROR MATERIALS FOR LONG-WAVELENGTH OPTOELECTRONIC DEVICES: A COMPARATIVE STUDY  
S. Arafin, K. Klein, K. Vizbaras and M.-C. Amann  
Walter Schottky Institut, Technische Universität München, 85748 Garching, Germany
5. InP QUANTUM DOTS WITH STRAINED QUANTUM WELLS  
Stella N. Elliott,<sup>1</sup> Peter M Smowton<sup>1</sup> and Andrey B. Krysa<sup>2</sup>  
1. Cardiff School of Physics and Astronomy, Cardiff University, CF24 3AA, UK  
2. EPSRC National III-V Centre, University of Sheffield, S1 3JD UK
6. THE EFFECT OF p-DOPING ON BAND FILLING IN InAs QUANTUM DOT LASER STRUCTURES  
M. Hutchings, I. O'Driscoll, P. M. Smowton, P. Blood  
School of Physics and Astronomy, Cardiff University, CF24 3AA, UK
7. HIGH CARRIER DENSITY ANALYSIS OF 1.3 $\mu$ m QUANTUM DOT LASER GAIN AND SPONTANEOUS EMISSION  
H. Shahid\*, D.T.D. Childs, B.J. Stevens, R.A. Hogg  
Dept. of Electronic & Electrical Engineering, University of Sheffield,  
Centre for Nanoscience & Technology, Broad Lane, Sheffield, S3 7HQ, UK
8. DEEP ETCHED DISTRIBUTED BRAGG REFLECTOR (DBR) InP / AlGaInP QUANTUM DOT LASERS  
S. Shutts, G. Edwards, S.N. Elliott, P.M. Smowton  
School of Physics and Astronomy, Cardiff University, Cardiff CF24 3AA, UK.  
A.B. Krysa, EPSRC National III-V Centre, University of Sheffield, S1 3JD

## **1030 COFFEE**

### **1100 Session 2: Functional Devices**

9. COMPARISON OF MEASURED AND SIMULATED RESULTS FOR HIGH-PERFORMANCE SEMICONDUCTOR OPTICAL AMPLIFIERS  
M.R. Hall, I.D. Henning and M.J. Adams  
School of Computer Science and Electronic Engineering, University of Essex, Colchester,  
UK
10. LASER THRESHOLD CHARACTERISTICS IN OPTICALLY INJECTED VCSELS  
Abdulqader A. Qader, Sanjay Priyadarshi, Yanhua Hong and K. Alan Shore  
Bangor University, School of Electronic Engineering, LL57 1UT, Wales, UK
11. ELECTRO-OPTICALLY MODULATED VCSEL FOR RADIO OVER FIBRE APPLICATIONS UP TO 20 GHz  
Z. Qureshi<sup>1</sup>, M. J. Crisp<sup>1</sup>, J. D. Ingham<sup>1</sup>, R. V. Penty<sup>1</sup>, I. H. White<sup>1</sup>, N.N. Ledentsov<sup>2</sup>, J. A. Lott<sup>2</sup>

1. Photonic Systems Group, University of Cambridge, CB3 0FA,
2. VI Systems GmbH, Hardenbergstrasse 7, 10623 Berlin, Germany

12. COLLIDING PULSE MODE-LOCKED LASERS AS LIGHT SOURCES FOR SINGLE-SHOT HOLOGRAPHY

Doris Grosse<sup>1\*</sup>, Tobias Schlauch<sup>1</sup>, Jan C. Balzer<sup>1</sup>, Andreas Klehr<sup>2</sup>, Götz Erbert<sup>2</sup>, Günther Tränkle<sup>2</sup> and Martin R. Hofmann<sup>1</sup>

1 Chair for Photonics and Terahertz Technology, D-44780 Bochum, Germany

2 Ferdinand Braun Institute, Gustav-Kirchhoff-Str. 4, D-12489 Berlin, Germany

13. MESSAGE EXTRACTION IN DIODE LASER BASED OPTICAL CHAOS COMMUNICATIONS

S. Priyadarshi, I. Pierce, Y. Hong and K. A. Shore

Bangor University, School of Electronic Engineering, LL57 1UT, UK

14. CORRELATION DIMENSION DYNAMICS OF TWIN COUPLED DBR LASERS IN THE COUPLING/DETUNING PARAMETER SPACE

B. Cemlyn, D. Labukhin, I.D. Henning and M.J. Adams

School of Computer Science and Electronic Engineering, University of Essex, Colchester, UK

15. BANDWIDTH ENHANCED CHAOS IN VERTICAL-CAVITY SURFACE-EMITTING LASERS WITH OPTICAL INJECTION

Y. Hong, P. S. Spencer and K. A. Shore

Bangor University, School of Electronic Engineering, LL57 1UT, Wales, UK

**1300 LUNCH**

**1400 Session 3: SIOE Silver**

16. KEY NOTE PRESENTATION : Marking 25 meetings in the SIOE Series

25 YEARS OF STRAINED LAYER LASERS

A R Adams

Advanced Technology Institute, University of Surrey, Guildford, GU2 7XH, UK

17. OPTICAL GAIN IN GaInNAs AND GaInNAsSb QUANTUM WELLS

J W Ferguson, P Blood and P M Smowton

School of Physics and Astronomy, Cardiff University, CF24 3AA, UK

H Bae, T Sarmiento and J S Harris Jr

Solid State Photonics Laboratory, Stanford University, California 94305, USA

Nelson Tansu

Centre for Optical Technologies, Department of Electrical and Computer Engineering, Lehigh University, Bethlehem, Pennsylvania, 18015, USA.

Luke J Mawst

Reed Centre for Photonics, Department of Electrical and Computer Engineering, University of Wisconsin-Madison, Madison, Wisconsin 53706-1691, USA

18 LASING PROPERTIES OF HYBRID AlGaInAs-SILICON EVANESCENT LASERS

G. Read, N. Hossain, I. P. Marko, A. R. Adams and S. J. Sweeney  
Advanced Technology Institute, University of Surrey, GU2 7XH, UK  
J. E. Bowers  
University of California, Santa Barbara, Department of Electrical and Computer Engineering, CA 93106, USA

1530 TEA

1600 Session 4: Design and Theory

19. PHOTONIC DEVICE MODELING USING A FOURTH-ORDER NUMERICAL METHOD

Jacques Chi  
Université européenne de Bretagne, Ecole Nationale d'Ingénieurs de Brest, RESO CS73862 Cedex, France

20. OPTIMUM DESIGN OF MULTIMODE INTERFERENCE COUPLERS WITH FABRICATION TOLERANCES

Padraic Morrissey<sup>1,2</sup>, Dave Goulding<sup>1</sup>, Frank H. Peters<sup>1,2</sup>  
1. Physics Department, University College Cork, Cork, Ireland  
2. Tyndall National Institute, Lee Maltings, Cork City, Ireland

21. THEORETICAL MODEL FOR DICKE SUPERRADIANCE IN A SEMICONDUCTOR LASER

X. Guo, K.A. Williams, V.F. Olle, A. Wonfor, R.V. Penty, I.H. White  
Center for Photonic Systems, Electrical Engineering Division, Engineering Department, University of Cambridge, CB3 0FA, UK

22. PREDICTIVE MODEL OF CPO EFFECTS IN SOAS FOR MICROWAVE PHOTONICS LINK: SIGNAL, NON-LINEARITIES, AND INTENSITY NOISE.

Perrine Berger<sup>1,2</sup>, Jérôme Bourderionnet<sup>1</sup>, Fabien Bretenaker<sup>2</sup>, Daniel Dolfi<sup>1</sup>, Mehdi Alouini<sup>1,3</sup>

1 Thales Research&Technology, 1 av. Augustin Fresnel, Palaiseau, France  
2 Laboratoire Aimé Cotton, Bât. 505, Campus d'Orsay, Orsay, France  
3 Institut de Physique de Rennes, Bât. 11B, Campus de Beaulieu, Rennes, France

23. InGaAs-InAlAs SEMICONDUCTOR PHOTO-MIXERS AT LONG WAVELENGTH ILLUMINATION (1.55 $\mu$ m) FOR CONTINUOUS WAVE (CW) THz GENERATION AND DETECTION

I.Kostakis and M. Missous  
Microelectronics and Nanostructure Group, School of Electrical and Electronic Engineering, The University of Manchester, Sackville Street, Manchester M60 1QD, UK

24. MODE SELECTION IN MID-INFRARED GaInSb/AlGaInSb QUANTUM WELL LASER DIODES USING MODIFICATION OF THE EMITTING FACET

J.L. Stokes, G.R. Nash<sup>\*</sup>, S. J. B. Przeslak, J. R. Pugh, J. G. Rarity, E. D. Finlayson<sup>†</sup>, R. M. Jenkins<sup>†</sup> and M.J. Cryan

Centre for Communications Research, Department of Electronic and Electrical Engineering, University of Bristol, Bristol, BS8 1UB, UK

\* College of Engineering, Mathematics and Physical Sciences, University of Exeter, Exeter, EX4 4QF

†QinetiQ Malvern, WR14 3PS UK

25. CONTINUOUS-WAVE KGW RAMAN LASER INTRACAVITY-PUMPED BY AN InGaAs-BASED VECSEL

Daniele C. Parrotta, Walter Lubeigt, Alan J. Kemp, David Burns, Martin D. Dawson, and Jennifer E. Hastie

Institute of Photonics, University of Strathclyde, Wolfson Centre, 106 Rottenrow, Glasgow G4 0NW, UK

26. PHYSICAL PROPERTIES OF GaAs<sub>1-x</sub>Bi<sub>x</sub> LIGHT EMITTING DIODES

N. Hossain, I. P. Marko and S. J. Sweeney

Advanced Technology Institute and Department of Physics, University of Surrey, R. B. Lewis, D. A. Beaton, Xianfeng. Lu, T. Tiedje

Department of Electrical and Computer Engineering, University of Victoria,, Victoria, B.C., V8W 3P6, Canada

**2000 CONFERENCE DINNER**

**WEDNESDAY 20<sup>th</sup> April 2010**

**0900 Session 5: Integration**

27. ANALYSIS OF LOSSES IN GaN SLAB WAVEGUIDES FOR INTEGRATED PHOTONICS APPLICATIONS

E Engin<sup>1</sup>, NA Hueting<sup>1</sup>, A Md Zain<sup>1</sup>, T Schuller<sup>2</sup>, A Saura<sup>2</sup>, PJ Heard<sup>4</sup>, T Wang<sup>3</sup>, M Thompson<sup>1,2</sup>, M Kuball<sup>2</sup>, J O'Brien<sup>1,2</sup> and MJ Cryan<sup>1</sup>

University of Bristol, Dept of Electrical and Electron. Eng.<sup>1</sup>, School of Physics<sup>2</sup>, Interface Analysis Centre<sup>4</sup>

University of Sheffield, Dept of Electrical and Electronic Engineering<sup>3</sup>

28. OPTIMIZATION OF MULTIMODE INTERFEROMETER COUPLER/SPLITTER IN A DQPSK PHOTONIC TRANSMITTER INTEGRATED ON InP FOR HIGH TELECOM BITRATES.

David Carrara\*(1), Romain Berruée(2), Christophe Kazmierski(2), Abderrahim Ramdane(1,3)

(1) UMR 5157 SAMOVAR, CNRS, Telecom SudParis, 91011 Evry, France

(2) III – V Lab, Alcatel Lucent Bell Labs France, , 91460 Marcoussis, France

(3) Laboratoire de Photonique et de Nanostructures, CNRS, , 91460 Marcoussis, France

29. SEMICONDUCTOR FREE SURFACE EFFECTS ON CARRIER TRANSPORT FOR A PHOTONIC CRYSTAL MEMBRANE ALL-OPTICAL GATE

H.K Dias, J.J Lim, A.J. Phillips, E.C. Larkins

Photonic and Radio Frequency Engineering Group, Electrical Systems and Optics Division, University of Nottingham, Nottingham NG7 2RD

30. UNI-DIRECTIONAL SEMICONDUCTOR RING LASERS  
X. Cai<sup>1</sup>, Y. Ho<sup>1</sup>, G. Mezozi<sup>2</sup>, N. Tan<sup>1</sup>, M. Sorel<sup>2</sup>, S. Yu<sup>1</sup>  
1. Department of Electrical and Electronic Eng., University of Bristol, BS8 1TR, UK  
2. Department of Electrical and Electron.Eng., University of Glasgow, G12 8LT, UK

31. ELECTRICAL INJECTION LASING IN MONOLITHICALLY INTEGRATED Ga(NAsP)/(BGa)P QW LASERS ON SILICON  
N. Hossain, S. R. Jin and S. J. Sweeney  
Advanced Technology Institute and Department of Physics, University of Surrey,  
S. Liebich, P. Ludewig, M. Zimprich, K. Volz, B. Kunert and W. Stolz  
Material Sciences Center and Faculty of Physics, Philipps-Univ., Marburg, Germany  
\*) NAsP III/V GmbH, Am Knechtacker 19, 35041 Marburg, Germany

### 1030 COFFEE

#### 1100 Session 6: Detectors and PV

32. PERFORMANCE ENHANCEMENT FOR THIN-FILM AMORPHOUS/MICROCRYSTALLINE SI TANDEM SOLAR MODULES AT LOW-IRRADIANCE CONDITIONS  
Chin-Yi Tsai<sup>1</sup> and Chin-Yao Tsai<sup>2</sup>  
<sup>1</sup>Department of Applied Physics, National University of Kaohsiung, Taiwan  
<sup>2</sup> Auria Solar, Da-Ye 1<sup>st</sup> Rd 9, Sinshih, Tainan 74146, Taiwan
33. MANUFACTURE AND CHARACTERIZATION OF THIN-FILM POROUS SILICON (PSI) DIODE DEVICE STRUCTURING ON P<sub>PSi</sub>/N<sub>PSi</sub> JUNCTION  
Jia-Chuan Lin<sup>\*a</sup>, Meng-Kai Hsu<sup>a</sup>, Hsi-Ting Hou<sup>b</sup> and Kuo-Ming Huang<sup>c</sup>  
<sup>a</sup>Dept. of Electronics Eng., St. John's University, Taipei 25135, Taiwan, R.O.C.  
<sup>b</sup> Dept. of Electrical Eng., TamKang University, Taipei 25135, Taiwan, R.O.C.  
<sup>c</sup> Dept. of Elec. Eng. National TsingHua University, HsinChu 30013, Taiwan, R.O.C.
34. AVALANCHE GAIN CHARACTERISTICS IN AlAsSb  
I. C. Sandal, P. J. Kerr, S.Xie, J.Xie and C. H. Tan  
Department of Electronic and Electrical Engineering, University of Sheffield, S1 3JD
35. TYPE II GaSb/GaAs QUANTUM DOT STACKS WITH EXTENDED PHOTORESPONSE FOR EFFICIENT SOLAR CELLS GROWN BY MBE USING As-Sb EXCHANGE  
A.Mahajumia\*, Q. Zhuanga, P.J. Carringtona, J. R. Bothab, R. Aireyc, A M Sanchez and A.Krier  
(a) Physics Department, Lancaster University, Lancaster LA1 4YB, UK  
(b) Department of Physics, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa  
(c) National Centre for III-V Technologies, University of Sheffield, Sheffield, S1 3JD, UK  
(d) Department of Physics, University of Warwick, Coventry, CV4 7AL, UK

36. CHARACTERIZATIONS OF GaAs/AlGaAs SEPARATE ABSORPTION AND MULTIPLICATION (SAM) AVALANCHE PHOTODIODES FOR SOFT X-RAY DETECTION

Rajiv B. Gomes\*, Chee Hing Tan, John P. R. David, Yu Ling Goh and Jo Shien Ng  
Department of Electronic and Electrical Engineering, University of Sheffield Mappin Street, Sheffield S1 3JD, UK

37. EXCESS NOISE CHARACTERISTICS IN DILUTE NITRIDE GaInNaS PHOTODIODES

S. L. Tan, J. E. Green, W. M. Soong, M. J. Steer, S. Zhang, Y. L. Goh, J. S. Ng and J. P. R. David

Department of Electronic and Electrical Engineering, The University of Sheffield, Sir Frederick Mappin Building, Mappin Street, Sheffield S1 3JD, United Kingdom.  
I. P. Marko, J. Allam, S. J. Sweeney and A. R. Adams  
Advanced Technology Institute, Faculty of Engineering & Physical Sciences, University of Surrey, Guildford, Surrey GU2 7XH, United Kingdom

38.  $\text{AlAs}_{0.56}\text{Sb}_{0.44}$  AVALANCHE PHOTODIODE WITH WEAK TEMPERATURE DEPENDENCE

S. Xie, J. Xie, X. Zhou, P. J. Ker and C. H. Tan  
Department of Electronic and Elect. Eng., The University Of Sheffield, S1 3JD, UK

**1300 LUNCH**

**\* END OF CONFERENCE \***