UK Semiconductors 2018 Technical Programme

This year's conference is being held in association with the TMD-UK 2018 meeting (5th July). We are pleased to welcome our four plenary speakers who will provide extended presentations on antimonide materials for infrared devices, methods for achieving low noise single quantum dot structures, wide-bandgap semiconductors for radiation detection, and novel device structures from stacking 2D van der Waals crystals. We are also proud to host the prize talk for the inaugural IOP Semiconductor Physics thesis prize, on hot carrier solar cells.

Plenary Lectures: ***Eric Tournié, Arne Ludwig, Anna Barnett, Amalia Patanè***

IOP Semiconductor Physics Group Thesis Prize Talk: ***James Dimmock***

Symposium A: Physics in Semiconductors

Symposium B: Optical Devices

Symposium C: Electronic Devices

Symposium D: Semiconductor Materials and Nanostructures

Symposium E: Mid-IR and THz Materials and Devices

Symposium F: Organic, Organic/Inorganic Hybrid Semiconductors and Perovskites

Symposium G: Wide-Gap Nitride Semiconductors

Symposium TMD: 2D Materials – incorporating the TMD-UK 2018 Meeting

Please note that sessions will take place in the Pennine and Peak lecture theatres on both days but the third parallel session will take place in the Norfolk 210 lecture theatre on Wednesday and the Owen 1028 lecture theatre on Thursday. See the venues section in the abstract book for more information.

Oral Presentations – Wednesday 4th July 2018

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
09:30	Registration and Refreshments, Atrium Level 2		
10:30	Plenary 1 **GaSb-based Materials and Devices: the IR toolbox** Eric Tournié IES, University of Montpellier, CNRS, 34000 Montpellier, France		
11:20	B-O-1 **Monolithic GaSb Quantum Rings (QR) on Silicon for Telecom Lasers via Aspect Ratio Trapping (ART) Technology** Hongchi Lei, Z. M. Jin, Chris Redman, S. Kafanov, P. D. Hodgson, M. Hayne, Y. Pashkin and Q. Zhuang Department of Physics, Lancaster University, Lancaster, LA1 4YB, UK	A-O-1 **Cross-calibration of GaAs deformation potentials and gradient-elastic tensors using GaAs/AlGaAs quantum dots** Evgeny A. Chekhovich[1], I. M. Griffiths[1], M. S. Skolnick[1], H. Huang[2], S. F. Covre da Silva[2], X. Yuan[2], A. Rastelli[2] [1]Department of Physics and Astronomy, University of Sheffield, Sheffield, S3 7RH, UK [2]Institute of Semiconductor and Solid State Physics, Johannes Kepler University Linz, Altenbergerstr. 69, 4040 Linz, Austria	E-O-1 **Mid-infrared surface plasmon polaritons in a novel highly doped semiconductor** Davide De Paola[1], M. Bomers[2,3], N. Balakrishnan[1], A. V. Velichko[1], O. Makarovsky[1], M. Capizzi[4], M. Kesaria[5], A. Krier[5], T. Taliercio[2,3], A. Patanè[1] [1]School of Physics and Astronomy, University of Nottingham, Nottingham NG7 2RD, UK [2]University of Montpellier, and [3]CNRS, IES, UMR 5214, F-34000 Montpellier, France [4]Dipartimento di Fisica, Sapienza Università di Roma, Piazzale A. Moro 2, 00185 Rome, Italy [5]Department of Physics, Lancaster University, Lancaster, LA1 4YB, UK
11:35	B-O-2 **1.3 µm InAs Quantum Dot Lasers Monolithically Grown on On-axis (001) Si Substrates** Zizhuo Liu[1], Mingchu Tang[1], Siming Chen[1], Mengya Liao[1], Jiang Wu[1], Mickael Martin[2], Thierry Baron[2], Alwyn Seeds[1], Huiyun Liu[1] [1]Department of Electronic and Electrical Engineering, University College London, Torrington Place, London, WC1E 7JE, UK [2]University of Grenoble Alpes, CNRS, CEA-LETI, MINATEC, LTM, F-38054 Grenoble, France	A-O-2 **Direct probing and manipulation of the nuclear spins in individual II-VI CdTe/ZnTe quantum dots** Gautham Ragunathan[1], J. Kobak[2], G. Gillard[1], W. Pacuski[2], M. S. Skolnick[1], E. A. Chekhovich[1] [1]Department of Physics and Astronomy, University of Sheffield, Sheffield, S3 7RH, UK [2]Institute of Experimental Physics, University of Warsaw, Hoża 69, Warsaw 00-681, Poland	E-O-2 **Mid infrared InAsSb resonant cavity light emitting diode (RCLED)** Furat A. Al-Saymari, A.P. Craig, Y. J. Noori, Q. Lu, A.R.J. Marshall, A. Krier Department of Physics, Lancaster University, Lancaster, LA1 4YB, UK

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
11:50	B-O-3 **Barrier Width Effects in InAsP/AlGaInP Quantum Dot Lasers** Craig P Allford[1], S.-J. Gillgrass[1], M. S. Al-Ghamdi[2], A. B. Krysa[3], S. Shutts[1], P. M. Smowton[1] [1]School of Physics and Astronomy, Cardiff University, Queen's Buildings, The Parade, Cardiff CF24 3AA, UK [2]Department of Physics, Faculty of Science, King Abdulaziz University, P.O. Box 80203, Jeddah 21589, Saudi Arabia [3]EPSRC National Epitaxy Facility, University of Sheffield, Sheffield S1 3JD, UK	A-O-3 **Model expressions for the spin-orbit interaction and phonon-mediated spin dynamics in quantum dots** Martin P. Vaughan, J. M. Rorison Department of Electrical and Electronic Engineering, University of Bristol, Bristol BS8 1UB, UK	E-O-3 **GaAsSb/GaAs Nanowires with Axial Heterostructures Grown on Si(111) via Self-Catalyzed Molecular Beam Epitaxy** Zhiming Jin[1], C. Woodhead[1], H. C. Lei[1], C. Redman[1], H. Alradhi[1], A. Sanchez[2], R. Young[1], Q. Zhuang[1] [1]Department of Physics, Lancaster University, Lancaster, LA1 4YB, UK [2]Department of Physics, University of Warwick, Coventry CV4 7AL, UK
12:05	B-O-4 **Object Orientated Monte-Carlo Model Incorporating Structural Analysis of State-of-the-Art Quantum Dot Lasers** Iain M. E. Butler[1,2], Wei Li[3], S. A. Sobhani[1], N. Babazadeh[1], I. M. Ross[3], K. Nishi[4], K. Takemasa[4], M. Sugawara[4], D. T. D. Childs[1], R. A. Hogg[1] [1]School of Engineering, University of Glasgow, Glasgow G12 8LT, UK [2]School of Mathematics and Physics, Queen's University Belfast, Belfast BT7 1NN, UK [3]Department of Electronic & Electrical Engineering, University of Sheffield, Sheffield, S1 3JD, UK [4]QD Laser Inc., Keihin Bldg. 1F, 1-1 Minamiwataridacho, Kawasaki-ku, Kawasaki, Kanagawa 210-0855, Japan	A-O-4 **Quantum non-linear optics with a quantum dot in a nano-photonic waveguide: Influence of the Fano effect on photon statistics** Dominic Hallett[1], A. P. Foster[1], D. Hurst[1], B. Royall[1], P. Kok[1], E. Clarke[2], I. E. Itskevich[3], M. S. Skolnick[1], L. R. Wilson[1] [1]Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK [2]Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK [3]School of Engineering and Computer Science, University of Hull, Hull HU6 7RX, UK	E-O-4 **Resonant cavity enhanced photodiodes in the midwave infrared** Adam P. Craig[1], F. Al-Saymari[1], M. Jain[2], T. Golding[2], G. Wicks[3], A. R. J. Marshall[1] [1]Physics Department, Lancaster University, Lancaster LA1 4YB, UK [2]Amethyst Research Ltd., Kelvin Campus, West of Scotland Science Park, Glasgow G20 0SP, UK [3]Amethyst Research, Inc., 123 Case Circle, Ardmore, Oklahoma 73401, USA
12:20	B-O-5 **Opto-electronic properties of GaAsBi/GaAs MQWs at high temperatures** Robert D. Richards, Faezah Harun, John P. R. David Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK	A-O-5 **Polarization effects in topological zigzag chains for photons** Charles E. Whittaker[1], E. Cancellieri[2], P. M. Walker[1], J. Arkinstall[2], B. Royall[1], L. E. Tapia Rodriguez[1], E. Clarke[3], H. Schomerus[2], M. S. Skolnick[1], D. N. Krizhanovskii1 [1]Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK [2]Department of Physics, Lancaster University, Lancaster LA1 4YB, UK [3]EPSRC National Epitaxy Facility, University of Sheffield, Sheffield S1 3JD, UK	E-O-5 **Monolithically Integrated Mid-IR Focal Plane Arrays on Semi-Insulating GaAs Substrates for Gas Imaging Applications** Vincenzo Pusino[1], Chengzhi Xie[1], Ata Khalid[2], Mohsin Aziz[3], Matthew J. Steer[1], David R. S. Cumming[1] [1]Electronics & Nanoscale Division, School of Engineering, University of Glasgow, Rankine Building, Oakfield Avenue, Glasgow G12 8LT, UK [2]Centre of Electronic Warfare, Information and Cyber, Cranfield University, Defence Academy of the UK, Shrivenham SN6 8LA, UK [3]Department of Physics and Astronomy, University of Southampton, Southampton, UK

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
12:35	Lunch, Exhibition and Poster Session for Symposia A, B, C, D, E, Atrium Level 2		
13:00	IOP Student Research Communication Competition Seminar Room 223		
14:00	Plenary 2 **Towards low noise semiconductor quantum dots** Arne Ludwig Lehrstuhl für Angewandte Festkörperphysik, Ruhr-Universität Bochum, 44780 Bochum, Germany		
14:50	B-O-6 **Investigation of GaInNAs and Cu(In,Ga)Se2 solar cells for space applications** C. R. Brown[1], V. R. Whiteside[1], B. Wang[2], T. Mou[2], K. Hossain[3], T. D. Golding[3], D. Poplavskyy[4], Ian R. Sellers[1] [1]Homer L. Dodge Department of Physics & Astronomy, University of Oklahoma, Norman, Oklahoma 73019, USA [2]School of Chemical, Biological and Materials Engineering, University of Oklahoma 73019, USA [3]Amethyst Research Inc., 123 Case Circle, Ardmore, Oklahoma 74614, USA [4]MiaSole Hi-Tech Corp., Santa Clara, California, 95051, USA	A-O-6 **Photoexcited muon spin spectroscopy: A new method for measuring excess carrier lifetime in bulk silicon** Koji Yokoyama[1], J. S. Lord[1], J. Miao[2,3], P. Murahari[2], A. J. Drew[2,3] [1]ISIS, STFC Rutherford Appleton Laboratory, Didcot, OX11 0QX, United Kingdom [2]School of Physics and Astronomy, Queen Mary University of London, Mile End, London E1 4NS, UK [3]College of Physical Science and Technology, Sichuan University, Chengdu, 610064, China	C-O-1 **Simulations of non-volatile and ultra-low-power resonant tunnelling NVRAM cells** Dominic Lane, O. Tizno, M. Hayne Department of Physics, Lancaster University, Lancaster LA1 4YB, UK
15:05	B-O-7 **Multiplexed Integrated Source in III-V Materials** Geraint Gough[1], Daryl M. Beggs[2], Jorge Barreto[1] [1]Centre for NSQI, University of Bristol, Tyndall Avenue, Avon, Bristol BS8 1FD, UK [2]School of Physics and Astronomy, Cardiff University, 5 The Parade, Cardiff CF24 3AA, UK	A-O-7 **Progress towards GaAs multiplexed single-electron pump arrays** Teng Yi[1], P. See[2], L. W. Smith[1], R. K. Puddy[1], J. P. Griffiths[1], I. Farrer[1], G. A. C. Jones[1], D. A. Ritchie[1], M. Kataoka[2], C. G. Smith[1], J. Waldie[1] [1]Cavendish Laboratory, University of Cambridge, J. J. Thomson Avenue, Cambridge CB3 0HE, UK [2]National Physical Laboratory, Hampton Road, Teddington, Middlesex TW11 0LW, UK	C-O-2 **Scaling and Optimisation of a 3-D Lateral Super-junction Multi-Gate Power MOSFET (SJ-MGFET) for sub-100V Applications** Olujide A. Adenekan, P. Holland, K. Kalna Nanoelectronic Devices Computational Group (NanoDeCo), College of Engineering, Swansea University Bay Campus, Swansea SA1 8EN, Wales, UK

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
15:20	B-O-8 **Simulation and Depth Profiling of Vertical-cavity Structures for Quantum and Classical Emitters at Telecoms Wavelengths** Tom J. Wilson[1], P. D. Hodgson[1], A. J. Robson[1,2], J. Counsell[3], M. Hayne[1,2] [1]Department of Physics, Lancaster University, Lancaster, LA1 4YB, UK [2]Lancaster Material Analysis, Lancaster University, Lancaster, LA1 4YB, UK [3]Kratos Analytical Ltd, Trafford Wharf Rd, Wharfside, Manchester, M17 1GP, UK	D-O-1 **Theory of the electronic structure of direct-gap $Ge_{1-x}(C,Sn)_x$ group-IV alloys** Christopher A. Broderick[1,2], Michael D. Dunne[1,2], Daniel S. P. Tanner[1,2], Edmond J. O'Halloran[1,3], Amy C. Kirwan[1,2], Stefan Schulz[1], Eoin P. O'Reilly[1,2] [1]Tyndall National Institute, Lee Maltings, Dyke Parade, Cork T12 R5CP, Ireland [2]Department of Physics, University College Cork, Cork T12 YN60, Ireland [3]Department of Chemistry, University College Cork, Cork T12 YN60, Ireland	C-O-3 **One-Volt InGaZnO Thin-Film Transistors Gated with Solution-Processed, Ultra-Thin Al_xO_y** Wensi Cai, Seonghyun Park, Jiawei Zhang, Joshua Wilson, Leszek Majewski, Aimin Song School of Electrical & Electronic Engineering, University of Manchester, Manchester M13 9PL, UK
15:35	B-O-9 **Mode Coupling and Analysis in Coupled Cavity Systems** Si Chen, H. Francis, C. H. Ho, K. J. Che, M. Hopkinson, C. Y. Jin Department of Electronic & Electrical Engineering, University of Sheffield, Sheffield S3 7HQ, UK	D-O-2 **Advances in electron transport in $InSb/Al_xIn_{1-x}Sb$ quantum wells: magnetoresistance measurements and transport lifetime modelling** Christopher J. McIndo[1], Laura A. Hanks[1,2], George V. Smith[1], Craig P. Allford[1,3], Shiyong Zhang[4], Edmund Clarke[4], Philip D. Buckle[1] [1]School of Physics and Astronomy, Cardiff University, UK [2]Physics Department, Lancaster University, UK [3]School of Engineering, University of Warwick, UK [4]EPSRC National Epitaxy Facility, University of Sheffield, UK	C-O-4 **Modelling and Characterization of Zero-Bias Asymmetrical Spacer Layer Tunnel (ASPAT) Diode Detectors** Omar S. Abdulwahid[1], S. G. Muttlak[1], J. Sexton[1], M. J. Kelly[2], M. Missous[1] [1]School of Electrical and Electronic Engineering, University of Manchester, UK [2]Department of Electrical Engineering, University of Cambridge, Cambridge, UK
15:50	B-O-10 **The Generation of an Optical Frequency Comb using a Photonic Crystal Cavity** Henry Francis, S. Chen, C. H. Ho, K. J. Che, M. Hopkinson, C. Y. Jin Department of Electronic & Electrical Engineering, University of Sheffield, Sheffield S3 7HQ, UK	D-O-3 **Determination of $Al_{0.2}Ga_{0.8}Sb/GaSb$ transport properties** Laura Hanks, Leonid Ponomarenko, Andrew R J Marshall, Manus Hayne Department of Physics, Lancaster University, Lancaster LA1 4YB, UK	C-O-5 **Physical Modelling, Empirical Modelling and Experimental Validation of Quantum Based Tunnel Diode RF Characteristic for THz Communications** Khairul Nabilah Zainul Ariffin, S. G. Muttlak, O. S. Abdulwahid, J. Sexton, M. Missous School of Electrical & Electronic Engineering, University of Manchester, Manchester, M13 9PL, UK
16:05	Refreshments and Exhibition, Atrium Level 2		

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
16:25	IOP Prize Talk **Generating and Exploiting Hot-Carriers in a Metallic Solar Cell** James A. R. Dimmock Sharp Laboratories of Europe Ltd., UK		
17:00	B-O-11 **Ultrasensitive NIR photon detectors based on QD-functionalised graphene** Oleg Makarovsky[1], Lyudmila Turyanska[1,2], Mark Greenaway[1,3], Laurence Eaves[1], Amalia Patané[1], Mark Fromhold[1], Samuel Lara-Avila[4], Sergey Kubatkin[4], Rositsa Yakimova[5], Nobuya Mori[6] [1]School of Physics and Astronomy, University of Nottingham, Nottingham NG7 2RD, UK [2]School of Chemistry, University of Lincoln LN6 7DL, UK [3]Department of Physics, Loughborough University, Loughborough LE11 3TU, UK [4]Chalmers University of Technology, Göteborg, S41296, Sweden [5]Department of Physics, Chemistry and Biology, Linkoping University, S58183, Sweden [6]Division of Electrical, Electronic and Information Engineering, Osaka University, Japan	D-O-4 (Invited) **III-V Nanowire Heterostructures on Silicon-on-Insulator for Silicon Photonics Applications** Diana L. Huffaker[1], Hyunseok Kim[2], Ting-Yuan Chang[2], Wook-Jae Lee[1] [1]Cardiff University, Cardiff CF24 3AA, UK [2]University of California, Los Angeles, Los Angeles, California 90095, USA	C-O-6 **A Superheterodyne Mixing Technique for Nano-Tesla Magnetometery using Quantum Well Hall Effect (QWHE) Sensors** James M. Watson, Chen-Wei Liang, James Sexton, Mohamed Missous School of Electrical & Electronic Engineering, University of Manchester, Manchester, M13 9PL, UK
17:15	B-O-12 **Dark Counts and Their Timing Statistics in AlGaAsSb Single Photon Avalanche Diodes** Salman Abdullah, S. J. Dimler, J. S. Ng, V. Shulyak, J. D. Petticrew, C. H. Tan Department of Electronic & Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK		C-O-7 **Application of Quantum Well Hall Effect Devices in Detecting Changes in Microstructure of Duplex Stainless Steel** Firew A. Biruu, M. Missous School of Electrical & Electronic Engineering, University of Manchester, Manchester, M13 9PL, UK

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
17:30	B-O-13 **Effects of carrier injection profile on avalanche noise characteristics** Lucas Pinel, C. H. Tan, J. S. Ng Department of Electronic & Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK	D-O-5 **Doping-Induced Growth of Pure Zinc-Blende GaAs(P) Core-Shell Nanowires with Highly-Regular Morphology** Yunyan Zhang[1], H. Aruni Fonseka[2], Zhiyuan Sun[3], Manfred Ramsteiner[4], Martin Aagesen[5], James Gott[2], Ana M. Sanchez[2], Lincoln J. Lauhon[3], Huiyun Liu[1] [1]Department of Electronic and Electrical Engineering, University College London, London WC1E 7JE, UK [2]Department of Physics, University of Warwick, Coventry CV4 7AL, UK [3]Department of Materials Science and Engineering, Northwestern University, 2220 Campus Drive, Evanston, Illinois 60208-3108, USA [4]Paul-Drude-Institut für Festkörperelektronik, Hausvogteiplatz 5–7, 10117 Berlin, Germany [5]Defence Research Center, Danish Defence Acquisition and Logistics Organization, Lautrupbjerg 1-5, 2750 Ballerup, Denmark	C-O-8 **A Galvanically-Isolated Four-Terminal Magnetic Sensor Compatible with CMOS processing** Steve Batcup[1], Nebojsa Jankovic[2], Petar Igic[1], Olga Kryvchenkova[1] [1]ESDC, College of Engineering Swansea University, Swansea, UK [2]Faculty of Electrical and Electronics Engineering, University of Nis, Serbia
17:45	B-O-14 **A low cost InGaAs-InP HBT-PIN Based Optoelectronic Integrated Circuit for up to 20Gb/s Optical Communication Systems** Saad G. Muttlak, J. Sexton, Mohamed Missous School of Electrical & Electronic Engineering, University of Manchester, Manchester, M13 9PL, UK	D-O-6 **Combination of III-V and IV Semiconductor Materials in Nanoscale via High-Quality Ge Shell Epitaxy on GaAs Nanowires** Haotian Zeng[1], Xuezhe Yu[1], H. Aruni Fonseka[2], James A. Gott[2], Mingchu Tang[1], Yunyan Zhang[1], Ana M. Sanchez[2], Huiyun Liu[1] [1]Department of Electronic and Electrical Engineering, University College London, London WC1E 7JE, UK [2]Department of Physics, University of Warwick, Coventry CV4 7AL, UK	
18:00	End of Session		
18:30	Conference Dinner Devonshire Cat 49 Wellington Street, Sheffield S1 4HG		

Oral Presentations – Thursday 5th July 2018

	Pennine Lecture Theatre	Peak Lecture Theatre	Owen 1028 Lecture Theatre
09:00	Registration and Refreshments, Atrium Level 2		
09:30	Plenary 3 **Advances in Wide Bandgap Compound Semiconductor Radiation Detectors** Anna Barnett Space Research Group, School of Engineering and Informatics, University of Sussex, Brighton BN1 9QT, UK		
10:15	Refreshments and Exhibition, Atrium Level 2		
10:45	Innovation-1 **EPSRC National Epitaxy Facility** Jon Heffernan EPSRC National Epitaxy Facility, University of Sheffield, Sheffield S1 3JD, UK	TMD-O-1 (Invited) **Integrated Chemical Vapour Deposition of Layered 2D Materials for Scalable Device Manufacturing** Stephan Hofmann Department of Engineering, University of Cambridge, Cambridge, UK	F-O-1 **Spectroscopy of high mobility heteroacene compounds** Oleksandra Korychenska[1], Jozra Garrido Velasco[2], Andrew Musser[2], Chloe Coulson[1], Alexander Auty[1], Anna Stradomska[3], Theo Keane[1], Ahmed Iraqi[1], Jenny Clark[2] [1]Department of Chemistry, University of Sheffield, Sheffield S3 7HF, UK 2Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK [3]School of Chemistry, University of Glasgow, Glasgow G12 8QQ, UK
11:00	Innovation-2 **Institute for Compound Semiconductors** Peter Smowton Institute for Compound Semiconductors, Cardiff University, Queen's Buildings, 5 The Parade, Roath, Cardiff, CF24 3AA, UK		F-O-2 **Low-dimensional nano-structures in non-stoichiometric mixed-halide perovskites** Benjamin Freestone[1], Giacomo Piana[2], Joel Smith[1], Orianna Ball[1], Rachel Kilbride[1], Andrew Parnell[1], Pavlos Lagoudakis[2], David G. Lidzey[1] [1]Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK. [2]Department of Physics and Astronomy, University of Southampton, Southampton SO17 1BJ, UK

	Pennine Lecture Theatre	Peak Lecture Theatre	Owen 1028 Lecture Theatre
11:15	Innovation-3 **Henry Royce Institute** Matthew Davis Henry Royce Institute, Faculty of Science and Engineering, University of Manchester, Alan Turing Building, Oxford Road, Manchester M13 9PL, UK	TMD-O-2 **Photo-oxidized HfS_2 – An embeddable and writable high-k dielectric for flexible Van der Waals nano-electronics** Namphung Peimyoo[1], Jake Mehew[1], Matt D. Barnes[1], Adolfo De Sanctis[1], Iddo Amit[1], Janire Escolar[1], Konstantinos Anastasiou[1], Ali Gholina[2], Aidan P Rooney[2], Sarah Haigh[2], Saverio Russo[1], Monica F. Craciun[1], Freddie Withers[1] [1]Centre for Graphene Science, College of Engineering, Mathematics and Physical Sciences, University of Exeter, Exeter EX4 4QF, UK [2]School of Materials, University of Manchester, Oxford Road, Manchester M13 9PL, UK	F-O-3 **Optical Properties of Blue-Green Quasi 2D-3D Perovskites** David G. Bossanyi[1,2], Andrew J. Pearson[1], Aditya Sadhanala[1] [1]Cavendish Laboratory, Department of Physics, University of Cambridge, JJ Thomson Avenue, Cambridge CB3 0HE, UK [2]Department of Physics and Astronomy, University of Sheffield, Hicks Building, Hounsfield Road, Sheffield, S3 7RH, UK
11:30	Innovation-4 **ManuGaN** Robert Martin	TMD-O-3 **Laser-irradiated 2D materials: from photodetectors to energy funnels** Adolfo De Sanctis Centre for Graphene Science and Quantum Systems and Nanomaterials Group, College of Engineering, Mathematics and Physical Sciences, University of Exeter, UK	F-O-4 **Scanning Probe Microscopy Investigations of Organic-Inorganic Halide Perovskites: Implications for Device Performance and Stability** Onkar Game, Michael Stringer, Claire Greenland, Joel Smith, Naoum Vaenas, David G. Lidzey Department of Physics and Astronomy, University of Sheffield, Hicks Building, Hounsfield Road, Sheffield, S3 7RH, UK
11:45	Innovation-5 **EPSRC Future Metrology Hub** Christian Young EPSRC Future Metrology Hub, Centre for Precision Technologies, HA3/21, University of Huddersfield, Huddersfield HD1 3DH, UK	TMD-O-4 **Band-structure engineering in alloy-based transition metal dichalcogenide van der Waals heterobilayers** Alessandro Catanzaro[1], Armando Genco[1], Daniel Gillard[1], Evgeny Alexeev[1], Lee Hague[2], Aleksey Kozikov[2], Kostya S. Novoselov[2], Alexander I. Tartakovskii[1] [1]Department of Physics and Astronomy, University of Sheffield, Sheffield, UK [2]School of Physics and Astronomy, University of Manchester, Manchester, UK	F-O-5 **Metal-atom distribution and its effects on carrier transport in organic semiconductors** Yoko Tomita[1,2], Kohei Kawabata[2], Takashi Nakayama[2] [1]Faculty of Engineering, Shibaura Institute of Technology, Japan [2]Department of Physics, Chiba University, Japan

	Pennine Lecture Theatre	Peak Lecture Theatre	Owen 1028 Lecture Theatre
12:00	Innovation-6 **EPSRC Future Photonics Hub** Speaker TBC	TMD-O-5 **Epitaxial growth of γ-InSe and α, β, and γ-In2Se3 on ε-GaSe** Nilanthy Balakrishnan[1,2], Elisabeth D. Steer[3], Emily F. Smith[3], Zakhar R. Kudrynskyi[1], Zakhar D. Kovalyuk[4], Laurence Eaves[1,2], Amalia Patanè[1], Peter H. Beton[1] [1]School of Physics and Astronomy, University of Nottingham, Nottingham, UK [2]School of Physics and Astronomy, University of Manchester, Manchester, UK [3]Nanoscale and Microscale Research Centre, University of Nottingham, Nottingham, UK [4]Institute for Problems of Materials Science, NAS of Ukraine, Chernivtsi, 58001 Ukraine	F-O-6 **Impact of traps in the performance of a Perovskite Solar Cell** Erith Davies, Khaled Ahmeda, Antonio Martinez College of Engineering, Swansea University, Swansea SA1 8EN, UK
12:15	Innovation-7 **Huawei UK** Speaker TBC Huawei UK, Ipswich Research Centre, Martlesham Heath, Ipswich, UK	TMD-O-6 **Infrared intersubband optics in few-layer films of transition-metal dichalcogenides** David A. Ruiz-Tijerina, M. Danovich, C. Yelgel, V. Zólyomi, V. I. Fal'ko National Graphene Institute, University of Manchester, UK	F-O-7 **Electron beam evaporation of tin oxide layer for scalable planar perovskite solar cells** Joel A. Smith[1], Onkar S. Game[1], Michael Wong-Stringer[1], David M. Coles[1], Melissa McCarthy[2], Benjamin G. Freestone[1], Claire Greenland[1], Thomas Routledge[1], Ian M. Povey[2], David G. Lidzey[1] [1]Department of Physics and Astronomy, University of Sheffield, Sheffield, S3 7RH, UK [2]Tyndall National Institute, Lee Maltings Complex, Dyke Parade, Cork, Ireland
12:30	Innovation-8 **IQE plc** Ben Stevens	TMD-O-7 **Direct electronic structure measurements of gated 2D transition metal dichalcogenide heterostructures** Natalie C. Teutsch[1], X. Xia[1], N. D. M. Hine[1], N. R. Wilson[1], P. V. Nguyen[2], X. Xu[2], D. H. Cobden[2], G. C. Constantinescu[3], A. Barinov[4] [1]University of Warwick, UK [2]University of Washington, USA [3]University of Cambridge, UK [4]Elettra Sincrotrone, Italy	F-O-8 **Development of Light emitting transistors for displays applications** Mujeeb Ullah Chaudhry Department of Engineering, Durham University, Durham, UK
12:45	Lunch, Exhibition and Poster Session for Symposia F, G, TMD-UK Atrium Level 2		
13:00	IOP Semiconductor Group AGM		

	Pennine Lecture Theatre	Peak Lecture Theatre	Owen 1028 Lecture Theatre
14:00	IOP Student Research Communication Competition Prizegiving		
14:05	Plenary 4 **From epitaxy to science and processing technologies of novel van der Waals crystals** Amalia Patanè School of Physics and Astronomy, University of Nottingham, Nottingham NG7 2RD,UK		
14:55	D-O-7 **Control of thermalisation losses in type-II InAs quantum wells: a route to practical hot carrier solar cells** H. Esmaielpour[1], V. R. Whiteside[1], H. P. Piyathilaka[2], S. Vijeyaragunathan[1], B. Wang[3], K. P. Roberts[4], T. D. Mishima[1], M. B. Santos[1], A. D. Bristow[2], Ian R. Sellers[1] [1]Department of Physics & Astronomy, University of Oklahoma, Norman, OK 73019, USA [2]Department of Physics & Astronomy, West Virginia University, Morgantown, WV 26501, USA [3]School of Chemical, University of Oklahoma, Norman, OK 73019, USA [4]Department of Chemistry and Biochemistry, University of Tulsa, Tulsa, OK 74104, USA	TMD-O-8 (Invited) **Towards strain tunable optoelectronic devices** Patricia Gant, Riccardo Frisenda, Andres Castellanos-Gomez Materials Science Factory, Instituto de Ciencia de Materiales de Madrid, 28049 Madrid, Spain	G-O-1 **Cathodoluminescence of deep-UV emitting AlN-based core-shell nanorods** Gunner Kusch[1], P. R. Edwards[1], P. M. Coulon[2], P. Chausse[2], P. A. Shields[2], R. W. Martin[1] [1]Department of Physics, SUPA, University of Strathclyde, Glasgow G4 0NG, UK [2]Department of Electrical & Electronic Engineering, University of Bath, Bath BA2 7AY, UK
15:10	D-O-8 **Thin Ge buffers for Integration of III-V Semiconductors on Silicon Substrates** Pamela Jurczak[1], Junjie Yang[1], Fan Cui[1], Luke Billiald[2], Richard Beanland[2], Ana M. Sanchez[2], Huiyun Liu[1] [1]Department of Electronic and Electrical Engineering, University College London, Torrington Place, London WC1E 7JE, UK [2]Department of Physics, University of Warwick, Coventry CV4 7AL, UK		G-O-2 **Carrier localization in GaN/AlGaN MQWs: Insights from theory and experiment** Abas A. Roble[1], S. K. Patra[2], S. Church[1], M. A. Leontiadou[1], P. Dawson[1], M. J. Kappers[3], R. A. Oliver[3], S. Schulz[2], D. M. Graham[1] [1]School of Physics and Astronomy & Photon Science Institute, University of Manchester, Manchester M13 9PL, UK [2]Tyndall National Institute, Cork, Ireland [3]Department of Material Science and Metallurgy, University of Cambridge, Cambridge CB3 0FS, UK

	Pennine Lecture Theatre	Peak Lecture Theatre	Owen 1028 Lecture Theatre
15:25	D-O-9 **Laser writing of the electronic activity of N- & H-atoms in InGaAs using near-field illumination** Manyak S. Sharma[1], D. M. Di Paola[2], N. Balakrishnan[2], M. Felici[1], M. Capizzi[1], A. Patanè[2], A.Polimeni[1] [1]Department of Physics, "La Sapienza" University of Rome, Rome, Italy [2]Department of Physics & Astronomy, University of Nottingham, Nottingham, UK	TMD-O-9 **Charge-tunable quantum dots in monolayer WSe_2** Mauro Brotons-Gisbert, Artur Branny, Santosh Kumar, Raphael Picard, Brian D. Gerardot Institute of Photonics and Quantum Sciences, SUPA, Heriot-Watt University, Edinburgh EH14 4AS, UK	G-O-3 **Combined Photomodulated Reflectivity and Photoluminescence as a method to measure total free carrier dynamics in InGaN quantum wells** Matthew P. Halsall[1], I. F. Crowe[1], M. J. Kappers[2], R. A. Oliver[2], C. J. Humphreys[2] [1]Photon Science Institute and School of Electrical and Electronic Engineering, University of Manchester, Manchester, UK [2]Department of Materials Science and Metallurgy, University of Cambridge, Cambridge, UK
15:40	D-O-10 **'Double' Displacement Talbot Lithography: a new approach for periodic nanostructure patterning in different semiconductor materials** Pierre J. P. Chausse, P.-M. Coulon, P. A. Shields Department of Electrical and Electronic Engineering, University of Bath, BA2 7AY, UK	TMD-O-10 **Fluorescence and Raman enhancement and strain-induced single-photon emitters in a monolayer semiconductor coupled to dielectric nanoantennas** Luca Sortino[1], P. G. Zotev[1], R. C. Schoeld[1], J. Cambiasso[2], S. Mignuzzi[2], S. A. Maier[2,3], R. Sapienza[2], A. I. Tartakovskii[1] [1]Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK [2]Department of Physics, Imperial College London, London SW7 2AZ, UK [3]Faculty of Physics, Ludwig-Maximilians-Universitat München, Munich, Germany	G-O-4 **Photon counting X-ray spectroscopy (4.95 keV to 21.17 keV) with AlInP** Grammatiki Lioliou[1], A. B. Krysa[2], A. M. Barnett[1] [1]Space Research Group, Sch. of Engineering and Informatics, University of Sussex, Falmer, Brighton BN1 9QT, UK [2]EPSRC National Epitaxy Facility, University of Sheffield, Mappin Street, Sheffield S1 3JD, UK
15:55	Refreshments, Atrium Level 2		
16:15	D-O-11 **Multi-beam Laser Interference Patterning of Semiconductors** Yunran Wang, C. Y. Jin, M. Hopkinson Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S3 7HQ, UK	TMD-O-11 **Fe-induced magnetism in van der Waals InSe semiconductor crystals** Mahabub Alam Bhuiyan[1], F. Moro[1], Z.R. Kudrynskyi[1], R. Puttock[2], O. Kazakova[2], O. Makarovsky[1], M. W. Fay[3], C. Parmenter[3], Z. D. Kovalyuk[4], A. J. Fielding[5], M. Kern[6], J. V. Slageren[6], A. Patanè[1] [1]School of Physics and Astronomy and [3]nmRC, University of Nottingham, UK [2]National Physical Laboratory, Teddington, UK [4]Institute for Problems of Materials Science, NAS of Ukraine, Chernivtsi, Ukraine [5]School of Chemistry and Photon Science Institute, University of Manchester, UK [6]Institut für Physikalische Chemie, Universität Stuttgart, Germany	G-O-5 **Growth of self-induced InGaN/GaN nanowires on multicrystalline silicon** Víctor J. Gómez[1], Diana L. Huffaker[1,2,3] [1]School of Engineering, Cardiff University, CF24 3AA, Cardiff, UK [2]School of Physics and Astronomy, Cardiff University, CF24 3AA, Cardiff, UK [3]Department of Electrical Engineering, University of California Los Angeles, Los Angeles, California 90095, USA

	Pennine Lecture Theatre	Peak Lecture Theatre	Owen 1028 Lecture Theatre
16:30	D-O-12 **Cascade capture to impurity centers with long-living excited states** Ekaterina E. Orlova, R. W. Kelsall Pollard Institute, School of Electronic and Electrical Engineering, University of Leeds, Leeds LS2 9JT, UK	TMD-O-12 **Valley polarisation enhancement and switching in monolayer semiconductor-ferromagnet Van der Waals heterostructures** Thomas P. Lyons[1], A. Misra[2], K. S. Novoselov[2], A. I. Tartakovskii[1] [1]University of Sheffield, UK [2]University of Manchester, UK	G-O-6 **Investigation of zinc blende GaN nucleation layers deposited on 3C-SiC/Si templates** Petr Vacek[1,2], Lok Yi Lee[2], Martin Fretrup[2], Menno J. Kappers[2], Rachel A. Oliver[2], David J. Wallis[2,3] [1]Institute of Physics of Materials, Academy of Sciences of the Czech Republic, Zizkova 22, 616 62 Brno, Czech Republic [2]Department of Materials Science and Metallurgy, University of Cambridge, 27 Charles Babbage Rd, Cambridge CB3 0FS, UK [3]Centre for High Frequency Engineering, Cardiff University, 5 The Parade, Newport, UK
16:45	D-O-13 **Reduction of bismuth segregation in GaAsBi/GaAs quantum wells** Pallavi Patil[1,3], Esperanza Luna[2], Fumitaro Ishikawa[3], Satoshi Shimomura[3] [1]EPSRC National Epitaxy Facility, University of Sheffield, Sheffield S3 7HQ, UK [2]Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e.V., D-10117, Berlin, Germany [3]Graduate School of Science and Engineering, Ehime University, Matsuyama, 790-8577, Japan	TMD-O-13 **Excitonic Effects in WS_2-Graphene Heterostructures** Cristina E. Giusca[1], Ivan Rungger[1], Vishal Panchal[1], Christos Melios[1], Zhong Lin[2,3], D. Kurt Gaskill[5], Mauricio Terrones[2,3,4], Olga Kazakova[1] [1]National Physical Laboratory, Hampton Road, Teddington TW11 0LW, UK [2]Department of Physics, [3]Center for 2-Dimensional and Layered Materials, and Center for Atomically Thin Multifunctional Coatings (ATOMIC), [4]Department of Materials Sciences and Engineering, Pennsylvania State University, University Park, Pennsylvania 16802, USA [5]U.S. Naval Research Laboratory, Washington, DC 20375, USA	G-O-7 **Diamond growth on GaN for thermal management in high power devices** Soumen Mandal[1], Evan Thomas[1], Callum Middleton[2], Laia Gines[1], James Griffiths[3], Menno Kappers[3], Rachel Oliver[3], David Wallis[3], Lucy Goff[4], Stephen Lynch[1], Martin Kuball[2], Oliver Williams[1] [1]School of Physics and Astronomy, Cardiff University, Cardiff, UK [2]Centre for Device Thermography and Reliability, Bristol University, Bristol, UK [3]Department of Materials Science and Metallurgy, University of Cambridge, Cambridge, UK [4]Department of Physics, University of Cambridge, Cambridge, UK
17:00		TMD-O-14 **Giant quantum Hall plateau in graphene coupled to an InSe van der Waals crystal** Zakhar R. Kudrynskyi[1], M. A. Bhuiyan[2], O. Makarovsky[1], J. D. G. Greener[1], E. E. Vdovin[1,2], Z. D. Kovalyuk[3], Y. Cao[4,5], A. Mishchenko[4], K. S. Novoselov[4], P. H. Beton[1], L. Eaves[1], A. Patanè[1] [1]School of Physics and Astronomy, University of Nottingham, UK [2]Institute of Microelectronics Technology & High Purity Materials, RAS, Russia [3]Institute for Problems of Materials Science, NAS of Ukraine, Chernivtsi, Ukraine [4]School of Physics and Astronomy, University of Manchester, UK [5]National Graphene Institute, University of Manchester, UK	G-O-8 **Characterization of GaN MagHEMTs for Current Monitoring in Power Applications** Bethan R. Thomas[1], S. Faramehr[1], S. Batcup[1], J. E. Evans[2], M. P. Elwin[2], P. Igić[1] [1]Electronic Systems Design Centre (ESDC), College of Engineering, Swansea University, Swansea SA1 8EN, UK [2]Centre for NanoHealth (CNH), College of Engineering, Swansea University, Swansea SA2 8PP, UK

	Pennine Lecture Theatre	Peak Lecture Theatre	Owen 1028 Lecture Theatre
17:15		TMD-O-15 **Tunable Rectification in graphene-MoS_2 Heterojunctions via Schottky Barrier Modulation** Hefu Huang, Jamie H. Warner Department of Materials, University of Oxford, Parks Road, Oxford, UK	G-O-9 **Atomic layer deposited α-Ga2O3 for solar-blind UV detectors** J. W. Roberts[1], O. Tesh[2], J. C. Jarman[2], D. N. Johnstone[2], J. Moloney[2], P. A. Midgley[2], P. R. Chalker[1], R. A. Oliver[2], Fabien C.-P. Massabuau[2] [1]School of Engineering, The University of Liverpool, Brownlow Hill, Liverpool L69 3GH, UK [2]Department of Materials Science and Metallurgy, University of Cambridge, 27 Charles Babbage Road, Cambridge CB3 0FS, UK
17:30		TMD-O-16 **Exciton hybridization in twisted two-dimensional van der Waals heterostructures** Evgeny M. Alexeev[1], D. A. Ruiz-Tijerina[2], M. Danovich[2], P. K. Nayak[3], S. Ahn[3], S. Pak[4], J. Lee[4], J. I. Sohn[4], K. S. Novoselov[2], H. S. Shin[3], V. I. Fal'ko[2], A. I. Tartakovskii[1] [1]Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK [2]National Graphene Institute, University of Manchester, Manchester M13 9PL, UK [3]Department of Energy Engineering and Department of Chemistry, Ulsan National Institute of Science and Technology (UNIST), 50 UNIST-gil, Ulsan 44919, Republic of Korea [4]Department of Engineering Science, University of Oxford, Oxford OX1 3PJ, UK	
17:45	Conference Close		

Poster Presentations – Wednesday 4th July, Atrium Level 2

Symposium A: Physics in Semiconductors

A-P-1

Investigation of electrical properties of Erbium-doped TiO_2 thin films prepared by sol-gel spin-on technique

Faisal S. Al mashary[1,2], Aniruddha Mondal[3], M. Henini[1,4]
[1]School of Physics and Astronomy, University of Nottingham, Nottingham, NG7 2RD, UK
[2]Department of Physics, College of Science, Qassim University, Buraydah, 14452, Saudi Arabia
[3]Department of Physics, National Institute of Technology Durgapur, Durgapur 713209, India
[4]UNESCO-UNISA Africa Chair in Nanoscience's/Nanotechnology Laboratories, College of Graduate Studies, University of South Africa (UNISA), Muckleneuk Ridge, P O Box 392, Pretoria, South Africa

A-P-2

Photon scattering in waveguide QED

David L. Hurst, Pieter Kok
Department of Physics and Astronomy, University of Sheffield, Hounsfield Road, Sheffield S3 7RH, UK

A-P-3

Modified Elliot-Yafet mechanism for spin relaxation in quantum wells

Martin P. Vaughan, J. M. Rorison
Department of Electrical and Electronic Engineering, University of Bristol, Bristol, BS8 1UB UK

A-P-4

Probing the hyperfine spin states of ion implanted Si:Bi

T. Peach[1], Juerong Li[1], S. Chick[1], M. Hughes[1], B. N. Murdin[1], Steve K. Clowes[1], K. P. Homewood[2], M. A. Lourenco[2], K. Saeedi[3], N. Stavrias[3]
[1]Department of Physics, University of Surrey, Guildford, Surrey, GU2 7XH, UK
[2]Department of Electrical and Electronic Engineering, University of Surrey, Guildford, Surrey, GU2 7XH, UK
[3]Radboud University, Institute for Molecules and Materials, FELIX Laboratory, Toernooiveld 7c, 6525 ED Nijmegen, The Netherlands

Symposium B: Optical Devices

B-P-1

Modelling, Fabrication and Characterization of Single-Mode GaAs-based 1x2 MMI splitter

Tahani Albiladi, D. Beggs, E. Le Boulbar, Z. Li, S. Shutts and P. M. Smowton
School of Physics and Astronomy, Cardiff University, Queen's Building, The Parade, Cardiff CF24 3AA, UK

B-P-2

Simulation of Avalanche Photo-Diodes (APDs) Integrated with Distributed Bragg Reflectors (DBRs) for Telecom and datacom applications

Andrew Hadfield, Mohamed Missous
School of Electrical & Electronic Engineering, the University of Manchester, Manchester, M13 9PL, UK

B-P-3

Avalanche Gain & Excess Noise Factor Model for InP Avalanche Photodiodes

Jon Petticrew, S. Dimler, and J. S. Ng
Department of Electronic & Electrical Engineering, University of Sheffield, Sheffield, UK

B-P-4

Breakdown voltages in $AlAs_{0.56}Sb_{0.44}$ avalanche photodiodes

Shiyu Xie[1], Xin Yi[2], Baolai Liang[3], Leh Woon Lim[2], Xinxin Zhou[2], Mukul C. Debnath[3], Chee Hing Tan[2], John. P. R. David[2], Diana L. Huffaker[1]
[1]School of Physics and Astronomy, Cardiff University, Cardiff CF24 3AA, UK
[2]Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK
[3]California NanoSystems Institute, University of California-Los Angeles, Los Angeles, CA 90095, USA

B-P-5

Implementation of an active temperature control technique to observe many body effects & lasing mode packet width evolution in GaAs/AlInGaAs quantum dot lasers

Hifsa Shahid[1,2], Z. Mehmood[1], K. Haider[2], S. N. Ali[2]
[1]Department of Electrical Engineering & Technology, University of Engineering & Technology Lahore (KSK campus), Punjab, Pakistan
[2]Department of Information Technology, University of Central Punjab, Pakistan

B-P-6

Employing Ultraviolet Portion of the Solar Spectrum for Green Energy Generation in Terrestrial Applications

Hifsa Shahid, Muhammad Salim Butt, Muhammad Adnan, Zeeshan Mahmood, Usman R. Saifullah
Department of Electrical Engineering & Technology, University of Engineering & Technology Lahore (KSK campus), Punjab, Pakistan

Symposium C: Electronic Devices

C-P-1

Quantum Transport with Finite Element Method

Zoltán Jéhn
Xiences GmbH, Nagyszolos Street 5. Budapest, Hungary

C-P-2

Impact of Frequency Regulation on IGBT Junction Temperature

Senthooran Balasubramaniam, Grazia Todeschini, Petar Igic
Swansea University, Swansea SA1 8EN, Wales, UK

Symposium D: Semiconductor Materials and Nanostructures

D-P-1

Earth-abundant $Cu_2ZnSn(S,Se)_4$ thin film solar cells made from nanoparticle inks

Xinya Xu, Stephen Campbell, Yongtao Qu, Vincent Barrioz, Guillaume Zoppi, Neil S. Beattie
Department of Mathematics, Physics and Electrical Engineering, Ellison Building, Northumbria University, Newcastle upon Tyne NE1 8ST, UK

D-P-2

Simulating the influence of acceleration voltage on back-scattered electrons and secondary electron emission yield in a scanning electron microscope (SEM) for doped GaAs specimens

Ran Guo, Thomas Walther
Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK

D-P-3

Efficiency limit of InAs/GaAs quantum dot solar cells by carrier trapping and recapturing

Im Sik Han[1], Mark Hopkinson[1], Jong Su Kim[2], Jun Oh Kim[3], Sam Kyu Noh[3], Sang Jun Lee[3], Chang-Lyoul Lee[4]
[1]Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK
[2]Department of Physics, Yeungnam University, Gyeongsan 38541, South Korea
[3]Division of Convergence Technology, Korea Research Institute of Standards and Science, Daejeon 305-340, South Korea
[4]Advanced Photonics Research Institute, Gwangju Institute of Science and Technology, Gwangju 500-712, South Korea

D-P-4

InAs Quantum Dots Grown on GaAs Substrate with InAlAs Metamorphic Buffer Emitting at 1.5μm

Keshuang Li[1], Mingchu Tang[1], Xingyou Chen[1,2], Jiang Wu[1], Huiyun Liu[1]
[1]Department of Electronic and Electrical Engineering, University College London, London WC1E 7JE UK
[2]State Key Laboratory of Functional Materials for Informatics, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, Shanghai, 200050, People's Republic of China

D-P-5

Band-gap Tunable Self-Catalyzed AlGaAs Nanowires Growth on Si Substrate via Molecular Beam Epitaxy

Xuezhe Yu[1], Haotian Zeng[1], H. Aruni Fonseka[2], James A. Gott[2], Ana M. Sanchez[2], Huiyun Liu[1]
[1]Department of Electronic and Electrical Engineering, University College London, London WC1E 7JE, UK
[2]Department of Physics, University of Warwick, Coventry CV4 7AL, UK

D-P-6

Electroluminescence study of GaAsBi devices of different growth conditions

Yuchen Liu[1], R. D. Richards[1], T. B. O. Rockett[1], F. Harun[1], Y. Gu[2], J. P. R. David[1]
[1]Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield, UK
[2]Shanghai Institute of Microsystem and Information Technology, Shanghai, China

D-P-7

MBE growth and characterisation of site-controlled InAs quantum dots for integration into scalable quantum circuits

Charlotte Ovenden[1], I. Farrer[1], M. N. Makhonin[2], B. Royall[2], A. Trapalis[1], P. W. Fry[1], J. Heffernan[1], M. S. Skolnick[2]
[1]Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK
[2]Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK

D-P-8

Increasing Lasing Wavelength with GaSb/$In_xGa_{1-x}As$ Quantum Rings in a Well (RWELL)

Christopher Redman, H. Lei, Z. M. Jin, P. D. Hodgson. M. Hayne, Q. Zhuang
Physics Department, Lancaster University, Lancaster LA1 4YB, UK

D-P-9

Experimental Extraction of the Bandgap for Al_4SiC_4

Simon Forster[1,2], J. Cañas[3], F. Lloret[3,4], M. Gutiérrez[3], D. Araujo[3], K. Kalna[1], D. Chaussende[2]
[1]College of Engineering, Swansea University, Swansea, UK
[2]Univ. Grenoble Alpes, CNRS, Grenoble INP*, SIMAP, 38000 Grenoble, France
[3]Dpto. Ciencia de los Materiales e I.M y Q.I. University of Cadiz, Spain
[4]Institute for Materials Research (IMO), Hasselt University, Wetenschapspark 1, B-3590 Diepenbeek, Belgium

Symposium E: Mid-IR and THz Materials and Devices

E-P-1

Influence of Annealing on the electrical characteristics of GaSbBi Schottky diodes

Zhongming Cao[1], Tim Veal[2], Mark Ashwin[3], Ian Sandall[1]
[1]Department of Electrical Engineering and Electronics, University of Liverpool, Brownlow Hill, Liverpool L69 3GJ, UK
[2]Department of Physics, University of Liverpool, Oliver Lodge, Oxford Street, Liverpool L69 7ZE, UK
[3]Department of Chemistry, University of Warwick, Gibbet Hill, Coventry CV4 7AL, UK

E-P-2

Quantum-Cascade Laser emission at 3.5 THz from dual diagonal feedhorns

Esam Zafar[1], O. Auriacombe[2], T. Rawlings[2], N. Brewster[2], M. L. Oldfield[2], Y. Han[1], L. H. Li[1], E. H. Linfield[1], A. G. Davies[1], P. Dean[1], B. N. Ellison[2], A. Valavanis[1]
[1]School of Electronic and Electrical Engineering, University of Leeds LS2 9JT, UK
[2]RAL Space Department, STFC, Harwell Oxford, Didcot OX11 0QX, UK

Poster Presentations – Thursday 5th July, Atrium Level 2

Symposium F: Organics, Organic/Inorganic Hybrids and Perovskites

F-P-1

Inverted Planar Perovskite Solar Cells with Hybrid Quantum Dot-PEDOT:PSS Hole-Transporting Layer

Christopher Bailey, Giacomo Piana and Pavlos Lagoudakis
Department of Physics and Astronomy, University of Southampton, Southampton SO17 1BJ, UK

F-P-2

High Performance Multi-Layer Encapsulation for Perovskite Photovoltaics

Michael Wong-Stringer[1], Onkar S. Game[1], Joel A. Smith[1], Thomas J. Routledge[1], Bakhet A. Alqurashy[2], Benjamin G. Freestone[1], Andrew J. Parnell[1], Vikas Kumar[3], Majed O. A. Alawad[4], Ahmed Iraqi[4], Cornelia Rodenburg[3], David G. Lidzey[1,5]
[1]Department of Physics & Astronomy, University of Sheffield, Hicks Building, Hounsfield Road, Sheffield S3 7RH, UK
[2]Department of Basic Science and Technology, Community Faculty, Taibah University, 30002 Al-Madina Al-Mounawara, Saudi Arabia
[3]Department of Materials Science and Engineering, University of Sheffield, Mappin St, Sheffield S1 3JD, UK
[4]Department of Chemistry, University of Sheffield, Brook Hill, Sheffield S3 7HF, UK
[5]Ossila Limited, Windsor Street, Sheffield S4 7WB, UK

F-P-3

Inorganic Perovskite Quantum Dot Light Emitting Diodes

Naoum Vaenas[1], F. Alotaibi[2], O. Game[1], T. Routledge[1], A. Iraqi[2], D. G. Lidzey[1]
[1]Department of Physics and Astronomy, University of Sheffield, Hicks Building, Sheffield S3 7RH, UK
[2]Department of Chemistry, University of Sheffield, The Dainton Building, Sheffield S3 7HF, UK

Symposium G: Wide bandgap semiconductors

G-P-1

The role of positive interface charge and the effect of GaN for enhancement mode GaN HEMT operation

Khald Ahmeda[1], B. Ubochi[1], M. H. Alqaysi[1], A. Al-Khalidi[2], E. Wasige[2], K. Kalna[1]
[1]Nanoelectronic Devices Computational Group, College of Engineering, Swansea University, Swansea, SA1 8EN, Wales, UK
[2]School of Engineering, University of Glasgow, Glasgow G12 8LP, Scotland, UK

G-P-2

GaN Dual-Drain Magnetic Sensor: effect of passivation layer and drain to drain contact resistance on device sensitivity

Nafiseh Badiei[1], Soroush Faramehr[1], Bethan Thomas[1], Jon Evans[2], Matt Elwin[2], Petar Igić[1]
[1]Electronic Systems Design Centre, School of Engineering, Swansea University, Swansea SA1 8EN, UK
[2]Centre for NanoHealth, Swansea University, Swansea SA2 8PP, UK

G-P-3

Optical Study of AlGaN/GaN heterostructures

Khue Tian Lai[1], J. E. Evans[2], P. Igic[1]
[1]Electronic Systems Design Centre, Energy Safety Research Institute, College of Engineering, Swansea University Bay Campus, Swansea, SA1 8EN, UK
[2]Centre for NanoHealth, Institute for Life Science 2, Swansea University, Singleton Park, Swansea, SA2 8PP, UK

G-P-4

Magnesium incorporation in n-CdTe to produce wide bandgap p-type CdTe:Mg window layers

Ashfaque E. Alam[1,2], A. A. Ojo[1], I. M. Dharmadasa[1]
[1]Materials and Engineering Research Institute (MERI), Sheffield Hallam University, Sheffield, S1 1WB, UK
[2]Department of Electronics and Telecommunication Engineering, University of Liberal Arts- Bangladesh (ULAB), Dhaka, Bangladesh

G-P-5

Scanning probe microscopy of III-Nitride nanostructures

N. Vargha[1], Fabien C.-P. Massabuau[1], R. Wang[2], M. J. Kappers[1], R. A. Oliver[1]
[1]Department of Materials Science and Metallurgy, University of Cambridge, 27 Charles Babbage Road, Cambridge CB3 0FS, UK
[2]Department of Engineering, University of Cambridge, 9 JJ Thompson Avenue, Cambridge CB3 0FA, UK

G-P-6

Non-destructive Imaging of Extend Defects in III-nitride Thin film Structures Using Electron Channelling Contrast Imaging

Aeshah Alasmari, G. Naresh-Kumar, M. Nouf-Allehiani, D. Thomson, E. Pascal, B. Hourahine, C. Trager-Cowan
Department of Physics, SUPA, University of Strathclyde, Glasgow G4 0NG, UK

G-P-7

Coincident Electron Channelling Contrast Imaging and Atomic Force Microscopy of Epitaxially Laterally Overgrown GaN

Aeshah Alasmari[1], G. Naresh-Kumar[1], T. O'Hanlon[2], R. A. Oliver[2], C. Trager-Cowan[1]
[1]Department of Physics, SUPA, University of Strathclyde, Glasgow G4 0NG, UK
[2]Department of Materials Science and Metallurgy, University of Cambridge, Cambridge CB3 0FS, UK

G-P-9

Robust, Quasi-2D Superconductivity in Epitaxial Indium Nitride: a III-V Semiconductor

Buddhadeb Pal[1], Bhanu P. Joshi[1], Himadri Chakraborti[1], Aditya K. Jain[1], Barun K. Barick[1], Kankat Ghosh[2], Swagata Bhunia[2], Apurba Laha[2], Subhabrata Dhar[2], Kantimay Das Gupta[1]
[1]Department of Physics, Indian Institute of Technology Bombay, Mumbai−400076, India
[2]Department of Electrical Engineering , Indian Institute of Technology Bombay , Mumbai−400076, India

Symposium TMD: 2D Materials (TMD-UK Meeting)

TMD-P-1

Nonlinear properties of exciton-polaritons with $MoSe_2$ monolayers in a tunable open access microcavity

Ruggero P. A. Emmanuele, M. Sich, A. Catanzaro, A. I. Tartakovskii, M. S. Skolnick, D. N. Krizhanovskii
Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK

TMD-P-2

Cavity polaritons in hBN-encapsulated $MoSe_2$ monolayers grown by chemical vapour deposition

Armando Genco[1], D. Gillard[1], T. P. Lyons[1], Seongjoon Ahn[2], Hyeon Suk Shin[2], A. I. Tartakovskii[1]
[1]Department of Physics and Astronomy, University of Sheffield, Sheffield, UK
[2]Ulsan National Institute of Science and Technology (UNIST), Ulsan, Republic of Korea

TMD-P-3

Band Structure Engineering in Mono- and Bi-layers of Molybdenum Tungsten Diselenide Semiconducting Alloys

Daniel Gillard, A. Catanzaro, A. Genco, A. I. Tartakovskii
Department of Physics and Astronomy, University of Sheffield, Sheffield, UK

TMD-P-4

Tunnel spectroscopy of localised quantum states in the barrier of graphene-hBN-graphene transistors

Mark T. Greenaway[1,2], E. E. Vdovin[1,5,6], D. Ghazaryan[3], A. Misra[3], A. Mishchenko[3], Y. Cao[4], Z. Wang[3], J. R. Wallbank[4], M. Holwill[4], S. V. Morozov[5,6], O. Makarovsky[1], T. M. Fromhold[1], A. Patanè[1], A. K. Geim[3,4], V. I. Fal'ko[4], K. S. Novoselov[3,4], L. Eaves[1]
[1]School of Physics and Astronomy, University of Nottingham, Nottingham NG7 2RD, UK
[2]Department of Physics, Loughborough University, Loughborough LE11 3TU, UK
[3]School of Physics and Astronomy, and [4]National Graphene Institute, University of Manchester, Manchester M13 9PL, UK
[5]IMT and HPM, RAS, Chernogolovka 142432, Russia
[6]"MISiS", 119049, Leninsky pr. 4, Moscow, Russia

TMD-P-5

Is strain unavoidable in monolayer graphene low-temperature transport measurements?

Gregor A. McQuade[1], A. S. Plaut[1], A. Usher[1], J. Martin[2]
[1]Department of Physics and Astronomy, Exeter University, Exeter EX4 4QL, UK
[2]Department of Physics, Centre for Advanced 2D Materials, National University of Singapore, Singapore 117546

TMD-P-6

Phonon interaction of colour centres in hexagonal boron nitride

Prince Khatri[1], A. J. Ramsay[2], I. J. Luxmoore[1]
[1]College of Engineering, Mathematics and Physical Sciences, University of Exeter, Exeter, UK
[2]Hitachi Cambridge Laboratory, J. J. Thomson Avenue, Cambridge, UK

TMD-P-7

High Detectivity and Transparent Photodetectors Enabled by Novel Few-Layer MoS_2/Glassy-Graphene Heterostructures

Hao Xu[1], Xiaoyu Han[2], Xiao Dai[3], Wei Liu[1,4], Jiang Wu[1], Juntong Zhu[3], Dongyoung Kim[1], Guifu Zou[3], Kimberley A. Sablon[5], Andrei Sergeev[5], Zhengxiao Guo[2], Huiyun Liu[1]
[1]Department of Electronic and Electrical Engineering, University College London, Torrington Place, London WC1E 7JE, UK
[2]Department of Chemistry, University College London, 20 Gordon St, Bloomsbury, London WC1H 0AJ, UK
[3]College of Physics, Optoelectronics and Energy and Collaborative Innovation Centre of Suzhou Nano Science and Technology, Soochow University, Suzhou 215006, China
[4]London Centre for Nanotechnology, University College London, London WC1H 0AH, UK
[5]United States Army Research Laboratory, 2800 Powder Mill Road, Adelphi, MD 20783-1197, USA

TMD-P-8

Exciton funneling and narrow linewidth emission in monolayer transition metal dichalcogenides

Panaiot G. Zotev[1], L. Sortino[1], J. Cambiasso[2], S. Mignuzzi[2], S. A. Maier[2,3], R. Sapienza[2], A.I. Tartakovskii[1]
[1]Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK
[2]The Blackett Laboratory, Department of Physics, Imperial College London, London SW7 2AZ, UK
[3]Chair in Hybrid Nanosystems, Nanoinstitute Munich, Faculty of Physics, Ludwig-Maximilians-Universitat Munchen, Munich, Germany

TMD-P-9

High-Mobility and High-Optical Quality Atomically Thin WS_2

Francesco Reale, Pawel Palczynski, Peter Sherrell, Mauro Och, Cecilia Mattev
Department of Materials, Imperial College, London, SW7 2AZ, UK

TMD-P-10

Electronic band structure of rhenium dichalcogenides

Surani M. Gunasekera, Daniel Wolverson, Lewis S. Hart, Marcin Mucha-Kruczynski
Centre for Nanoscience and Nanotechnology, Department of Physics, University of Bath, Bath BA2 7AY, UK

TMD-P-11

Progress towards Encapsulated Graphene Nanosensors for Magnetic Microscopy & Susceptometry

David Collomb[1], Penglei Li[1], Daniel Wolverson[1], Simon Bending[1], Ahmet Oral[2]
[1]Department of Physics, University of Bath, Bath BA2 7AY, UK
[2]Department of Physics, Middle East Technical University, 06800 Ankara, Turkey

TMD-P-12

Quasi-one dimensional valence band structure in monolayer rhenium diselenide, $ReSe_2$

Lewis S. Hart[1], James L. Webb[1], Daniel Wolverson[1], Chaoyu Chen[2], Jose Avila[2], Maria C. Asensio[2]
[1]Centre for Nanoscience and Nanotechnology, Department of Physics, University of Bath, Bath BA2 7AY, UK
[2]Synchrotron SOLEIL, Saint Aubin, and Université Paris-Saclay, BP 48 91192 Gif-sur-Yvette, France

TMD-P-13

Growth of monolayer Transition Metal Dichalcogenides by MBE

Akhil Rajan, K. Underwood, D. Biswas, M. D. Watson, F. Mazzola, O. J. Clark, M. McLaren, P. Wahl, P. King
SUPA, School of Physics and Astronomy, University of St Andrews, St Andrews, Fife KY16 9SS, UK

TMD-P-14

Integrating Molecular Monolayers with 2D Transition Metal Dichalcogenides for Ultrathin Opto-Electronics

Sapna Sinha, Jamie Warner
Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH, UK