



European Materials Research Society

Spring Meeting 2022

May 30 | June 3
Virtual Conference

SYMPOSIUM B

Ultra-doped semiconductors
by non-equilibrium processing for electronic,
photonic and spintronic applications

Symposium Organizers :

Deren YANG, Zhejiang University

Eric GARCIA HEMME, Universidad Complutense de Madrid

Meng-Ju (Renee) SHER, Wesleyan University

Shengqiang ZHOU, Helmholtz-Zentrum Dresden-Rossendorf

The papers will be published as a special issue
at Semiconductor Science and Technology (IOP)



Monday may 30

08:45 Welcome and Introduction to the Symposium

Hyperdoped Ge : Shengqiang Zhou

09:00 INV Sub-bandgap photorresponse at room temperature on extrinsic supersaturated Ge

B 1.1

David Pastor(1,2), Hemi H. Gandhi (1), Tuan T. Tran (3), Stephan Kalchmair(1), L. A. Smillie(3), Ruggero Milazzo(4), Sashini Senali Dissanayake(5), Naheed Ferdous(6), Jonathan Mailoa(7), Elif Ertekin(7), Meng-Ju Sher(5), Enrico Napolitani(4), Marco Loncar(1), J. S. Williams(3), M. J. Aziz(1), E. Mazur(1) (1) School of Engineering and Applied Sciences, Harvard University, Cambridge, Massachusetts 02138, USA (2) Department of Structure of Matter, Thermal Physics and Electronics, Universidad Complutense de Madrid, Plaza Ciencias 1, 28040 Madrid, Spain. (3) Department of Electronic Materials Engineering, Research School of Physics and Engineering, Australian National University, Canberra, ACT 0200, Australia (4) Dipartimento di Fisica e Astronomia, Università di Padova and CNR-IMM, Via Marzolo 8, I-35131 Padova, Italy (5) Department of Physics, Wesleyan University, Middletown, Connecticut 06459, USA (6) Department of Mechanical Science & Engineering, University of Illinois at Urbana-Champaign, Illinois 61820, USA (7) Robert Bosch LLC, Cambridge, Massachusetts 02138, USA

09:30 Recovery of Boron Activation and Epitaxial down in Heavily B-doped Ge Epilayers by In-situ CVD Doping

B 1.2

Wan-Hsuan Hsieh, Chun-Yi Cheng, Yi-Chun Liu, Chung-En Tsai, and C. W. Liu* Graduate Institute of Electronics Engineering, National Taiwan University, Taipei, Taiwan.

09:45 Charge-transport properties of hyperdoped n-type Ge

B 1.3

Mao Wang^{1,2*}, S. Prucnal², M. S. Shaikh^{2,3}, U. Kentsch, M. Helm and Shengqiang Zhou²
1 College of Physics and Electronic Engineering, Sichuan Normal University, Chengdu 610101, People's Republic of China 2 Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Bautzner Landstraße 400, 01328 Dresden, Germany 3 Technische Universität Dresden, 01062 Dresden, Germany

10:00 Hyperdoping germanium by Ion Implantation and Pulsed Laser Recrystallization

B 1.4

Caudevilla, D. (*,1), García-Hemme, E. (1), Pérez-Zenteno, F. (1), Algaidy, S. (1), Olea, J. (1), San Andrés, E. (1), García-Hernansanz, R. (1), del Prado, A. (1), Martíl, I. (1), Berencán, Y. (2), Pastor, D. (1). (1) Dpto. EMFTEL, Fac. CC. Físicas, Univ. Complutense de Madrid, 28040 Madrid, Spain. (2) Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Bautzner Landstr. 400, 01328 Dresden, Germany. * lead presenter (danicaud@ucm.es)

10:15 Electrical detection of light helicity using a chiral photodetector based on GaAsN

B 1.5

R. S. Joshya¹, H. Carrère¹, V. G. Ibarra-Sierra², J. C. Sandoval-Santana², V. K. Kalevich³, E. L. Ivchenko³, X. Marie¹, T. Amand¹, A. Kunold², A. Balocchi¹ 1 Université de Toulouse, INSA-CNRS-UPS LPCNO, 135 Avenue Rangueil 31077, Toulouse, France 2 Area de Física Teórica y Materia Condensada Universidad Autónoma Metropolitana Azcapotzalco Av. San Pablo 180, Col. Reynosa-Tamaulipas, 02200 Ciudad de México, México 3 Ioffe Physical-Technical Institute 194021, St. Petersburg, Russia

10:30 Discussion

10:45 Coffee

GeSn : Slawomir Prucnal

11:00 INV Highly doped GeSn for plasmonic applications

B 2.1

Inga A. Fischer
Experimental Physics and Functional Materials, BTU Cottbus-Senftenberg, 03046 Cottbus, Germany

11:30

The Influence of Femtosecond and Nanosecond Laser Radiation on Strain Relaxation of GeSn Epilayers

B 2.2

Pavels Onufrijevs¹, Patrik Ščajev², Tadas Malinauskas², Paulius Baronas², Sarunas Varnagiris³, Jonas Karosas⁴, Ramona Durena¹, Paulius Gečys⁴, Daniel Schwarz⁵, Michael Oehme⁵, Arturs Medvids¹, Gediminas Račiukaitis⁴, Joerg Schulze⁵
1 Institute of Technical Physics, Faculty of Materials Science and Applied Chemistry, Riga Technical University, P. Valdena 3/7, Riga, LV-1048, Latvia 2 Institute of Photonics and Nanotechnology, Vilnius University, Sauletekio av. 3, Vilnius 10257, Lithuania 3 Center for Hydrogen Energy Technologies, Lithuanian Energy Institute, Breslaujos 3, Kaunas 44403, Lithuania 4 Center for Physical Sciences and Technology, Department of Laser Technologies, Savanoriu ave. 231, Vilnius, LT-02300, Lithuania 5 Institute of Semiconductor Engineering (IHT), University of Stuttgart, Stuttgart, 70569, Germany

11:45

Substitutional 10% Sn incorporation in Ge by sputter deposition and pulsed laser melting

B 2.3

Enrico Di Russo(1,2,3), Francesco Sgarbossa(1,2), Pierpaolo Ranieri(1), Samba Ndiaye(4), Sébastien Duguay(4), François Vurpillot(4), Lorenzo Rigutti(4), Jean-Luc Rouvière(5), Vittorio Morandi(3), Davide De Salvador(1,2), Enrico Napolitani(1,2,6). (1) Dipartimento di Fisica e Astronomia, Università degli Studi di Padova, Via Marzolo 8, 35131 Padova, Italy. (2) INFN-LNL, viale dell'Università 2, 35020, Legnaro, Padova, Italy. (3) CNR-IMM, Via Gobetti 101, Bologna, 40129, Italy. (4) Normandie Univ., UNIROUEN, INSA Rouen, CNRS, Groupe de Physique des Matériaux, 76000 Rouen, France. (5) Univ. Grenoble Alpes, CEA, IRIG-MEM, 38000 Grenoble, France. (6) CNR-IMM, Via S. Sofia 64, 95123 Catania, Italy.

12:00

Discussion

12:15

Lunch

Optical hyperdoping and alloying : Eric Garcia Hemme

13:45

INV Hyperdoping and group IV alloy formation using pulsed laser melting

B 3.1

Jeffrey M. Warrander, Philippe K. Chow, Senali Dissanayake, Qi Lim, Gordon Gryzbowski, Bruce Claflin, Meng-Ju Sher³, Jim Williams
U.S. Army DEVCOM Armament Center-Benet Laboratories, Watervliet NY, 12189, Columbia University Nano Initiative, New York, NY 10027, Department of Physics, Wesleyan University, Middletown CT, 06459, Research School of Physics, Australian National University, Canberra, ACT 2601, Australia, U.S. Air Force Research Lab, Wright-Patterson AFB, Dayton OH, 45431

14:15

Femtosecond laser hyperdoping silicon photoelectric detector

B 3.2

Qiang Wu
Nankai University, China

14:30

Carrier recombination in black silicon fabricated by high repetition rate fs-laser

B 3.3

Xiaolong Liu*, Behrad Radfar, Toni P. Pasanen, Ville Vähänissi, Hele Savin
Department of Electronics and Nanoengineering, Aalto University, Tietotie 3, FI-02150 Espoo, Finland

14:45

Unravelling the optical properties of femtosecond laser hyperdoped silicon by analytical modeling of absorbance

B 3.4

Sören Schäfer (1), Patrick McKearney (1), Doris Mutschall (2), Simon Paulus (1), Stefan Kontermann (1)
(1) Hochschule Rhein-Main HSRM, Am Brückweg 26, 65428 Rüsselsheim, Germany, (2) InfraTec GmbH, Gostritzer Str. 61-63, 01217 Dresden, Germany

15:00

Discussion

15:15

Coffee

Advanced characterization techniques : Renee Sher

15:30

INV High mobility magnetic semiconductors based on pnictides

B 4.1

Hailong Wang, Qiqi Wei, Jialin Ma, Jianhua Zhao
1. State Key Laboratory of Superlattices and Microstructures, Institute of Semiconductors, Chinese Academy of Sciences, Beijing 100083, China 2. College of Materials Science and Opto-Electronic Technology, University of Chinese Academy of Sciences, Beijing 100049, China 3. CAS Center for Excellence in Topological Quantum Computation, University of Chinese Academy of Sciences, Beijing 100049, China

16:00	Measuring Electric and Magnetic fields and doping concentration by local Electron Diffraction Maps Jean-Luc Rouvière* (1), Kshipra Sharma (1), Djordje Dosenovic (1), Hanako Okuno (1), Arthur Avot (1,4), Lucas Bruas (2), Matthew Bryan (2), David Cooper (2), Bruno Da Silva (3), Zahra Momtaz (3), Martien Den Hertog (3), Alejandro Gomez Perez (4), Athanasios Galanis (4), Partha Pratim Das (4), Stavros Nicolopoulos (4) Victor Boureau (5) (1) Univ. Grenoble Alpes, CEA-Grenoble, IRIG-MEM-LEMMA, 38054 Grenoble France (2) Univ. Grenoble Alpes, CEA-Grenoble, LETI, MINATEC, 38054 Grenoble France (3) Univ. Grenoble Alpes, CNRS, Institut Néel, 38000 Grenoble, France (4) NanoMEGAS, Rue Émile Claus 49 bte 9, 1050 Brussels, Belgium (5) Interdisciplinary Center for Electron Microscopy (CIME) EPFL Lausanne 1015, Switzerland	B 4.2	Tuesday may 31	Transition metal hyperdoped silicon : David Pastor	
16:15	Atom Probe Tomography Applied to Hyperdoped Silicon Austin J. Akey[1], David C. Bell[1][2] [1] Center for Nanoscale Systems, Harvard University, Cambridge MA USA [2] Harvard John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge MA USA	B 4.3		INV Advantages and limitations of transition-metal hyperdoping of Si for near-to-mid infrared detection Jim S Williams Department of Materials Physics, Research School of Physics, Australian National University, Canberra, Australia.	B 5.1
16:30	Electron spin resonance characterization of silicon hyper-doped with Te125 A. Miele 1, F. Moro1, M. Wang2, S. Zhou2, and M. Fanciulli1 1. Department of Materials Science, University of Milano – Bicocca, Via Roberto Cozzi 55, 20125 Milan, Italy 2. Institute of Ion Beam Physics and Materials Research, Helmholtz-Zentrum Dresden-Rossendorf, Bautzner Landstrasse 400, 01328 Dresden, Germany	B 4.4		09:30 The role of Ag precipitates in Infrared Absorption Reduction of Ag-Hyperdoped Silicon Jiawei Fu, Xiaodong Qiu, Li Cheng, Xuegong Yu*, Deren Yang State Key Lab of Silicon Materials and School of Materials Science & Engineering, Zhejiang University, Hangzhou 310027, People's Republic of China.	B 5.2
16:45	Discussion			09:45 Carrier Lifetimes in Gold-Hyperdoped Silicon – Influence of Dopant Incorporation Methods and Concentration Profiles Sashini Senali Dissanayake (1), Nikki O. Pallat (1), Billy Yue (1), Philippe K. Chow (2), Shao Qi Lim (3), Yining Liu (4), Rhoen Fiutak (1), Jay Mathews (4), Jim S. Williams (3), Jeffrey M. Warrender (2) and Meng-Ju Sher (1) (1) Department of Physics, Wesleyan University, Middletown, CT 06459 USA, (2) U.S. Army Combat Capabilities Development Command - Armament Center, Watervliet, NY, 12189, USA, (3) Department of Electronic Materials Engineering, Research School of Physics and Engineering, Australian National University, Canberra, Australian Capital Territory, 0200, Australia, (4) A Department of Physics, University of Dayton, Dayton, Ohio 45469, USA	B 5.3
				10:00 An 18.6%-efficient titanium-hyperdoped silicon film tandem solar cell H.W. Yang, X. Deng, Y.J. Chen, Z.Q. Shi, C. Wen, and W.B. Yang State Key Laboratory of Environment-friendly Energy Materials, School of Science, Southwest University of Science and Technology, Mianyang 621010, China	B 5.4
				10:15 Inferring the recrystallization regimes of silicon supersaturated with titanium after Pulsed Laser Melting through Transmittance Montero, D.*, del Prado, A., Olea, J., González-Díaz, G., Pastor, D., García-Hemme, E., Caudevilla, D., Algaidy, S., Pérez-Zenteno, F., Duarte-Cano, S., García-Hernansanz, R., San Andrés, E., & Mártel, I. Dpto. Estructura de la Materia, Física Térmica y Electrónica, Universidad Complutense de Madrid, Fac. de CC. Físicas. Plaza de Ciencias 1, E-28040 Madrid, Spain	B 5.5
				10:30 Discussion	
				10:45 Coffee	
				Chalcogen hyperdoped silicon : Mao Wang	
				11:00 Active Sites of Te in Hyperdoped Si by Hard X-ray Photoelectron Kikuchi-Diffraction M. Hoesch1, M. Wang2, S. Zhou2, O. Fedchenko3, Ch. Schlüter1, D. Potorochin1,3, K. Medjanik4, S. Babenkov4, A. Ciobanu1, A. Winkelmann5, H.J. Elmers4 and G. Schönhense4 1DESY Photon Science, Hamburg, Germany, 2 Helmholtz-Zentrum Dresden-Rossendorf, Germany, 3TU Bergakademie Freiberg, Freiberg, Germany, 4JGU, Institut für Physik, Mainz, Germany, 5Academic Centre for Materials and Nanotechnology, AGH University of Science and Technology, Krakow, Poland	B 6.1
				11:15 Microscopic mechanisms driving the removal of electrical deactivation defects in Se ultra-doped silicon: an ab initio study Alberto Debernardi CNR-IMM, Unit of Agrate Brianza, via C. Olivetti 2, 20864 Agrate Brianza (MB), Italy	B 6.2
				11:30 Temperature-dependent charge carrier dynamics of tellurium-hyperdoped silicon KM Ashikur Rahman, S. Senali Dissanayake, Shao Qi Lim, Philippe Chow, Jeffrey Warrender, Jim S Williams, Meng-Ju Sher Department of Physics, Wesleyan University, Middletown, CT, United States- Department of Physics, Wesleyan University, Middletown, CT, United States- Research School of Physics, The Australian National University, Canberra, ACT, Australia-U.S. Army CCDC-Armament Center, Benet Labs Directorate, Watervliet, NY, United States-U.S. Army CCDC-Armament Center, Benet Labs Directorate, Watervliet, NY, United States-Research School of Physics, The Australian National University, Canberra, ACT, Australia-Department of Physics, Wesleyan University, Middletown, CT, United States	B 6.3

11:45	Fabrication of nitrogen hyperdoped silicon by non-equilibrium pulsed excimer laser processing J. W. Barkby(1), F. Moro(2), N. Kalfagiannis(1), D. C. Koutsogeorgis(1), M. Fanciulli(2) 1. Department of Physics and Mathematics, Nottingham Trent University, Clifton Campus, Nottingham, NG11 8NS, United Kingdom, 2. Department of Materials Science, University of Milano – Bicocca, Via Roberto Cozzi 55, 20125 Milan, Italy	B 6.4	16:30	MOVPE growth of cubic GaN on GaAs (110) substrate? Daldoul a, S. Othmani a,*, A. Mballo b, P. Vuong b, J.P. Salvestrini b,c, N. Chaaben a a Laboratoire de Recherche sur les Hétéro-Epitaxies et Applications, Faculté des Sciences de Monastir, 5019, Université de Monastir, Tunisia b International Research Lab Georgia Tech ? CNRS (IRL 2958), Georgia Tech Lorraine, 2 rue Marconi, 57070, Metz, France c School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, 30332, USA	B 8.4
12:00	Discussion		16:30	Transport mechanisms in hyperdoped silicon solar cells García-Hernansanz, R. *(1), Duarte-Cano, S. (1), Pérez-Zenteno, F. (1), Caudevilla, D. (1), Algaidy, S. (1), García-Hemme, E. (1), Olea, J. (1), Pastor, D. (1), del Prado, A. (1), San Andrés, E. (1), Mártil, I. (1), Ros, E. (2), Puigdollers, J. (2), Ortega, P. (2), Voz, C. (2), (1) Universidad Complutense de Madrid, Spain, (2) Universitat Politècnica de Catalunya, Spain	B 8.5
12:15	Lunch and Plenary		16:30	Optical and spin properties of low-dimensional nanostructures and organic/inorganic heterostructures D.G. Kvashnin, E.V. Sukhanova, Z.I. Popov Emanuel Institute of Biochemical Physics RAS	B 8.6
	Highly mismatched alloy : Roger Loo		16:30	Advances in amorphous and polycrystalline tin oxide thin films and their applications in electronic devices Avis, Christophe Jang, Jin Department of Information Display, and Advanced Display Research Center, Kyung Hee University, Seoul, Korea	B 8.7
15:00	INV Highly mismatched alloys as a new platform for mid-IR plasmonics Hassan Allami, Jacob J. Krich Department of Physics, University of Ottawa, Ottawa, ON, Canada	B 7.1	16:30	Magneto-optical probing of the magnetic and phase structures in InFeAs layers Gan'shina, E.A.(1), Kun'kova, Z.E.(2), *Pripechenkov, I.M.(1), Markin, Yu.V.(2) (1)Lomonosov Moscow State University, Russia, (2) Kotelnikov Institute of Radioengineering and Electronics, Fryazino Branch, Russia,	B 8.8
15:30	Mid-infrared plasmonics in heavily doped GaAs fabricated by ion implantation and pulsed laser annealing Juanmei Duan, Andrei Luferau, Glen Yen-Hsun Lin, Minghui Hong, Manfred. Helm, Shengqiang. Zhou, Slawomir. Prucnal Juanmei Duan, Andrei Luferau, Manfred. Helm, Shengqiang. Zhou, Slawomir. Prucnal Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Bautzner Landstrasse 400, D-01328 Dresden, Germany Manfred. Helm Technische Universität Dresden, D-01062 Dresden, Germany Glen Yen-Hsun Lin, Minghui Hong National Taiwan University, Hsinchu 30013, Taiwan	B 7.2	16:30	Phase evolution of Te-hyperdoped Si upon furnace annealing M. S. Shaikh, Mao Wang, R. Hübner, M. O. Liedke, M. Butterling, D. Solonenko, T. I. Madeira, Zichao Li, Yufang Xie, E. Hirschmann, A. Wagner, D. R. T. Zahn, M. Helm, Shengqiang Zhou Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Bautzner Landstrasse 400, 01328 Dresden, Germany Helmholtz-Zentrum Dresden-Rossendorf, Institute of Radiation Physics, Bautzner Landstrasse 400, 01328 Dresden, Germany Semiconductor Physics, Chemnitz University of Technology, 09126 Chemnitz, Germany Dresden University of Technology, 01062 Dresden, Germany	B 8.9
15:45	Lossless Plasmons in Highly Mismatched Alloys Hassan Allami(1), Jacob Krich(1,2) (1)Department of Physics, University of Ottawa, Canada (2)School of Electrical Engineering and Computer Science, University of Ottawa, Canada	B 7.3	16:30	Contact resistance of hyperdoped Si with deep-level impurities Yunxia Zhou1, Mao Wang1,2, M. S. Shaikh1,3, U. Kentsch1, M. Helm1,3 S. Prucnal1, and Shengqiang Zhou1 1 Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Bautzner Landstraße 400, 01328 Dresden, Germany 2 College of Physics and Electronic Engineering, Sichuan Normal University, Chengdu 610101, People's Republic of China 3 Technische Universität Dresden, 01062 Dresden, Germany	B 8.10
16:00	A Computational Search for n-Type Analogues of BiCuSeO Thermoelectrics Michael Y. Toriyama, G. Jeffrey Snyder, Prashun Gorai Northwestern University, Evanston, IL, USA, Northwestern University, Evanston, IL, USA, Colorado School of Mines, Golden, CO, USA.	B 7.4	16:30	Electronic transport properties of Si supersaturated with Ti and processed by rapid thermal annealing or pulsed-laser melting Olea, J.*, González-Díaz, G., Pastor, D., García-Hemme, E., Caudevilla, D., Algaidy, S., Pérez-Zenteno, F., Duarte-Cano, S., García-Hernansanz, R., del Prado, A., San Andrés, E., & Mártil, I. Dpto. Estructura de la Materia, Física Térmica y Electrónica, Universidad Complutense de Madrid, Fac. de CC. Físicas. Plaza de Ciencias 1, E-28040 Madrid, Spain * lead presenter (oleaariz@ucm.es)	B 8.11
16:15	Discussion		16:30	Ti supersaturated Si by microwave annealing processes Olea, J.* (1), González-Díaz, G. (1), Pastor, D. (1), García-Hemme, E. (1), Caudevilla, D. (1), Algaidy, S. (1), Pérez-Zenteno, F. (1), Duarte-Cano, S. (1), García-Hernansanz, R. (1), del Prado, A. (1), San Andrés, E. (1), & Mártil, I. (1) Yao-Jen Lee (2), Tzu-Chieh Hong (2), Tien-Sheng Chao (3) (1) Dpto. Estructura de la Materia, Física Térmica y Electrónica, Universidad Complutense de Madrid, Fac. de CC. Físicas. Plaza de Ciencias 1, E-28040 Madrid, Spain * lead presenter (oleaariz@ucm.es) (2) Taiwan Semiconductor Research Institute, Hsinchu, Taiwan. (3) Department of Electrophysics, National Chiao Tung University, Hsinchu, Taiwan	B 8.12
	: Jeffrey M. Warrender		16:30	High-throughput identification of point defects in SiC Joel Davidsson:Viktor Ivády:Rickard Armiento:Igor A. Abrikosov Linköping university, Linköping university, Max-Planck-Institut für Physik komplexer Systeme, Linköping university, Linköping university	B 8.13
16:30	Cation substitution effects on the structural and optoelectronic properties of inorganic halide perovskites Pablo SánchezPalencia (a,b), Gregorio García (a,b), Perla Wahnón (a,b) and Pablo Palacios (a,c) (a) Instituto de Energía Solar, ETSI Telecomunicación, Universidad Politécnica de Madrid, Av. Complutense,30, 28040 Madrid, Spain. (b) Departamento de Tecnología Fotónica y Bioingeniería, ETSI Telecomunicación, Universidad Politécnica de Madrid, Av. Complutense, 30, 28040 Madrid, Spain. (c) Departamento de Física aplicada a las Ingenierías Aeronáutica y Naval. ETSI Aeronáutica y del Espacio, Universidad Politécnica de Madrid, Pz. Cardenal Cisneros, 3, 28040 Madrid, Spain	B 8.1			
16:30	Plasmonic Hyper-doped Semiconductors for Infrared Q-switched lasing Rang Li, Shengqiang Zhou, Feng Chen Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Dresden, 01314, Germany Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Dresden, 01314, Germany School of Physics, State Key Laboratory of Crystal Materials, Shandong University, Jinan, 250100, China	B 8.2			
16:30	Efficient electronic transport calculations via Rode's iterative algorithm Anup Kumar Mandia, Bhaskaran Muralidharan, Seung-Cheol Lee, Satadeep Bhattacharjee Department of Electrical Engineering, Indian Institute of Technology Bombay, Powai., Mumbai 400076, India, Department of Electrical Engineering, Indian Institute of Technology Bombay, Powai., Mumbai 400076, India, Indo-Korea Science and Technology Center, Bangalore 560065, India, Indo-Korea Science and Technology Center, Bangalore 560065, India	B 8.3			

16:30	On-chip monolithic integration of all-silicon elementary photonic building blocks in the optical telecommunication band Caudevilla, D. *(1,2), Fowley, C. (2), Sakthikumar, S. (3), Hollenbach, M. (2,3), Prucnal, S. (2), Catuneanu, M. (3), Helm, M. (2,3), Zhou, S. (2), Astakhov, G.V. (2), Jamshidi, K. (3), Pastor, D. (1), Garcia-Hemme, E. (1), Berencén, Y. (2). (1) Dpto. EMFTEL, Fac. CC. Fisicas, Univ. Complutense de Madrid, 28040 Madrid, Spain. (2) Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Bautzner Landstr. 400, 01328 Dresden, Germany. (3) Technische Universität Dresden, 01062, Dresden, Germany.	B 8.14
16:30	Silicon based IR absorber with hyperbolic metamaterial formed by selective laser annealing A.I. Mukhammad* (1), V.O. Nalivaiko (1), G.D. Ivlev (1), O.Yu. Nalivaiko (2) & P.I. Gaiduk (1) (1) Belarusian State University, Minsk, Belarus, (2) JSC «Integral», Minsk, Belarus	B 8.15
16:30	Fabrication and optical properties of Eu doped β-Ga₂O₃ nanoformations Dumitru Untila ^{1,2} , Igor Evtodiev ^{1,3} , Iuliana Caraman ³ , Veaceslav Sprincean ¹ , Nicolae Spalatu ⁴ ¹ Moldova State University, A. Mateevici, 60, MD-2009, Chisinau, Republic of Moldova ² Technical University of Moldova, Stefan cel Mare si Sfint bd., 168, MD-2004, Chisinau, Republic of Moldova ³ University of European Political and Economical Studies "Constantin Stere", Stefan cel Mare si Sfint bd., 200, MD-2004, Chisinau, Moldova ⁴ Tallinn University of Technology, Department of Material and Environmental Technology, Ehitajate tee, 5, EE-19086 Tallinn, Estonia	B 8.16
16:30	Laser-induced nanostructuring in SiGe(Sn) alloy layers for Si/SiC heteroepitaxy P.I.Gaiduk Department of Physical Electronic and Nanotechnology, Belarusian State University, Nezavisimosti 4, Minsk, 220030, Belarus	B 8.17

Wednesday june 1

Future devices : Santanu Ghosh

09:00	INV Ultra-highly Doped Si and SiGe for Future Nanosheet CMOS Devices Roger Loo ¹ , Clement Porret ¹ , Erik Rosseel ¹ , Andriy Hikavyy ¹ , Gianluca Rengo ^{1,2,3} , Rami Khazaka ⁴ , Brendan Marozas ⁴ , Wonjong Kim ⁴ , André Vantomme ² , and Robert Langer ¹ ¹ Imec vzw, Kapeldreef 75, 3001 Leuven, Belgium, ² Quantum Solid State Physics, KU Leuven, Celestijnenlaan 200D, 3001 Leuven, Belgium, ³ Fonds Wetenschappelijk Onderzoek (FWO) - Vlaanderen, Egmontstraat 5, 1000 Brussels, Belgium, ⁴ ASM Belgium NV, Kapeldreef 75, 3001 Leuven, Belgium	B 9.1
09:30	Ultra-doped superconducting Si:B layers Léonard Desvignes* (1), Francesca Chiodi (1), Géraldine Hallais (1), Gilles Patriarche (1), Dominique Débarre (1), François Lefloch (2) (1) Centre de Nanosciences et de Nanotechnologies, CNRS, Université Paris-Saclay, C2N Palaiseau, 91120 Palaiseau, France (2) Université Grenoble Alpes, CEA-PHELIQS/LaTEQS, F-38000 Grenoble, France	B 9.2
09:45	Superconducting silicon microwave resonators R. Delagrange [1], D. Flanigan [2], P. Bonnet [1], N. Brochu [1], D. Débarre [1], H. le Sueur [2,3] and F. Chiodi [1] [1] Centre de Nanosciences et de Nanotechnologies (C2N), CNRS, Univ. Paris Sud, Université Paris-Saclay, 91120 Palaiseau, France [2] Quantronics group, SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, 91191 Gif-sur-Yvette, France [3] IJCLab, Univ. Paris-Sud, CNRS/IN2P3, Université Paris-Saclay, 91405 Orsay, France	B 9.3
10:00	Proximity-induced superconductivity in all-silicon superconductor /normal-metal junctions Obaid Adami, Leonard Desvignes, François LEFLOCH, Dominique DEBARRE and Francesca CHIODI Centre de Nanosciences et de Nanotechnologies, CNRS, Université Paris-Sud, Université Paris-Saclay, C2N Orsay, 91405 Orsay Cedex, France	B 9.4
10:15	Study of thermal relaxation mechanisms in CVD monocrystalline boron-doped diamond films by noise thermometry Kolbatova, A.(1,2), Titova, N. *(2), Baeva E.(1,2), Semenov, A.(2), Goltzman, G.(1,2), Eon, D.(3), Bustarret, E.(3), Khrapai, V.(1,4) (1) National Research University Higher School of Economics, Russia, (2) Moscow Pedagogical State University, Russia, (3) Univ. Grenoble Alpes, CNRS, Institut Néel, France, (4) Institute Solid State Physics RAS, Russia * lead presenter	B 9.5
10:30	Discussion	
10:45	Coffee	
Doping nanocrystals : Qiang Wu		
11:00	INV Doped silicon nanocrystals: synthesis, properties and devices Xiaodong Pi State Key Laboratory of Silicon Materials and School of Materials Science and Engineering, Zhejiang University, Hangzhou, 310027, China. Hangzhou Innovation Center, Zhejiang University, Hangzhou, 311200, China.	B 10.1
11:30	Plasmonic properties of highly phosphorus-doped Si nanocrystals obtained in SiO/SiO₂ multilayers Alaa E. Giba (1,2), A. Valdenaire (1), X. Devaux (1), M. Stoffel (1), A. Bouché (1), J.M. Pouirol (3), C. Bonafos (3), S. Guehairiae (4), Talbot (4), M. Vergnat (1) & H. Rinnert* (1) (1) Université de Lorraine, CNRS, Institut Jean Lamour, F-54000 Nancy, France (2) National Institute of Laser Enhanced Sciences, Cairo University, Giza 12613, Egypt (3) CEMES-CNRS, Université de Toulouse, Toulouse, France (4) Normandie Univ., UNIROUEN, INSA Rouen, CNRS, Groupe de Physique des Matériaux, 76000 Rouen, France	B 10.2

- 11:45** **High Phosphorous Doping of Silicon Nanocrystals Embedded in SiO₂: location and concentration of dopant at the atomic scale** **B 10.3**
 E. Talbot¹, S. Guehairia¹, R. Demoulin¹, P. Pareige¹, D. Mathiot², M. Stofell³, X. Devaux³, H. Rinnert³, W. Chen⁴, D. Li⁵, K. Chen⁵
¹-Normandie Univ, UNIROUEN, INSA Rouen, CNRS, Groupe de Physique des Matériaux, 76000 Rouen, France ²-ICube Laboratory, Université de Strasbourg and CNRS, B.P. 20, 67037 Strasbourg cedex, France ³-Université de Lorraine, UMR CNRS 7198, Institut Jean Lamour, BP 70239, 54506 Vandœuvre-lès-Nancy, France ⁴-School of Physical Science and Technology, Ningbo University, Ningbo, 315211, China ⁵-School of Electronic Science and Engineering, National Laboratory of Solid State Microstructures, Collaborative Innovation Center of Advanced Microstructures, Jiangsu Provincial Key Laboratory of Advanced Photonic and Electronic Materials, Nanjing University, Nanjing 210000, China
- 12:00** **Discussion**
- 12:15** **Lunch and Plenary**
- Defect engineering : Jacob Krich**
- 15:00** **INV Dissolution of dopant-vacancy clusters in semiconductors** **B 11.1**
 Slawomir Prucnal
 Institute of Ion Beam Physics and Materials Research, Helmholtz-Zentrum Dresden-Rossendorf Bautzner Landstraße 400, D-01328 Dresden, Germany
- 15:30** **Room Temperature Ferromagnetism in doped and pure Zinc oxide and Gallium nitride Films** **B 11.2**
 Santanu Ghosh¹, Preetam Singh¹, PushpSen Satyarthi¹, Pankaj Srivastava¹ and Shengqiang Zhou²
¹ Nanostech Laboratory, Department of Physics, Indian Institute of Technology Delhi, New Delhi-110016, India ² Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Bautzner Landstr. 400, 01328 Dresden, Germany
- 15:45** **Strain induced high hole activation in p-AlGaN and its application in high performance UVC-LED** **B 11.3**
 Ye Yuan¹, Shangfeng Liu^{1,2} and Xinqiang Wang^{1,2}
¹. Songshan Lake Materials Laboratory, Dongguan Guangdong 523808, P. R. China
². State Key Laboratory of Artificial Microstructure and Mesoscopic Physics School of Physics, Nano-Optoelectronics Frontier Center of Ministry of Education, Peking University, Beijing 100871, P. R. China
- 16:00** **Charting properties in the compositional and configurational space of spinel nitride solid solutions via machine learning** **B 11.4**
 Pablo Sánchez-Palencia (a,b), Said Hamad (c), Pablo Palacios (a,d), Ricardo Grau-Crespo (e), Keith T. Butler (f)
 (a) Instituto de Energía Solar, ETSI Telecomunicación, Universidad Politécnica de Madrid, Av. Complutense 30, 28040 Madrid, Spain, (b) Departamento de Tecnología Fotónica y Bioingeniería, ETSI Telecomunicación, Universidad Politécnica de Madrid, Av. Complutense 30, 28040 Madrid, Spain, (c) Department of Physical, Chemical and Natural Systems, Universidad Pablo de Olavide, 41013 Seville, Spain, (d) Departamento de Física aplicada a las Ingenierías Aeronáutica y Naval, ETSI Aeronáutica y del Espacio, Universidad Politécnica de Madrid, Pz. Cardenal Cisneros 3, 28040 Madrid, Spain, (e) Department of Chemistry, University of Reading, Reading RG6 6DX, United Kingdom, (f) SciML, Scientific Computing Department, Rutherford Appleton Laboratory, Harwell OX11 0QX, United Kingdom
- 16:15** **Ferromagnetic hybrid nanowires for zero-field topological superconductivity** **B 11.5**
 Yu Liu, Saulius Vaitiekėnas, Sara Martí-Sánchez, Charles M. Marcus, Jordi Arbiol, Kathryn A. Moler, Peter Krogstrup
 Yu Liu, Saulius Vaitiekėnas, Charles M. Marcus, Peter Krogstrup: Center for Quantum Devices, Niels Bohr Institute, University of Copenhagen, 2100 Copenhagen, Denmark. Sara Martí-Sánchez, Jordi Arbiol: Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and BIST, Campus UAB, Bellaterra, 08193 Barcelona, Catalonia, Spain. Kathryn A. Moler: Department of Physics, Stanford University, Stanford, California 94305, USA.
- 16:30** **Discussion and Closing**
- 17:00** **Discussion: symposium B for future EMRS?**
- 18:00** **E-MRS EU-40 Materials Prize & MRS Mid-Career Researcher Award Presentations**