

TUESDAY, MARCH 19, 2019

08:00 – 09:00 **Registration**

09:00 – 09:15 **Welcome**

HgCdTe DETECTORS

Session Chair: Martin Walther

- 09:15 – 09:45 **1.1 Invited Paper: HgCdTe detector technology at AIM**
H. Figgemeier
AIM Infrarot-Module GmbH, Heilbronn, Germany
- 09:45 – 10:05 **1.2 Correlation between electrical properties of CdTe passivation and p-on-n HgCdTe photodiodes performances**
L. Mangin¹, F. Rochette¹, A. Even, M. Soria¹, P. Bleuet¹, J. Rothman¹, G. Ghibaudo²
¹ *Univ. Grenoble Alpes, CEA LETI, Grenoble, France*
² *Univ. Grenoble Alpes, CNRS, Grenoble-INP, IMEP-LAHC, Grenoble, France*
- 10:05 – 10:25 **1.3 Feasibility of HgTe-CdTe superlattice absorber for VLWIR applications**
N.D. Akhavan, G.A. Umana-Membreno, R. Gu, J. Antoszewski, L. Faraone
The University of Western Australia, Crawley, Australia
- 10:25 – 10:45 **1.4 Type-II superlattice photodetectors versus HgCdTe photodiodes**
A. Rogalski, P. Martyniuk, M. Kopytko
Military University of Technology, Institute of Applied Physics, Warsaw, Poland
- 10:45 – 11:15 **Coffee Break**

TYPE-II SUPERLATTICE DETECTORS

Session Chair: Volker Daumer

- 11:15 – 11:45** **2.1 Invited Paper: Type-II superlattice infrared detectors**
D. Z. Ting, A. Soibel, A. Khoshakhlagh, S. A. Keo, Sir B. Rafol, E. M. Luong, A. M. Fisher,
C. J. Hill, B. J. Pepper, S. D. Gunapala
NASA Jet Propulsion Laboratory, Pasadena, USA
- 11:45 – 12:05** **2.2 MWIR and VLWIR type-II superlattices: FPA production and development at IRnova**
L. Höglund, S. Naureen, R. Ivanov, M. Pozzi, S. Almqvist, W. Diel, S. Smuk, E. Costard
IRnova AB, Kista, Sweden
- 12:05 – 12:25** **2.3 Characterization and performance analysis of InAs/GaSb T2SL photodetector for LWIR/VLWIR spectral domain**
R. Alchaar¹, J.B. Rodriguez¹, L. Höglund², P. Christol¹
¹ *IES, Univ. Montpellier, CNRS, Montpellier, France*
² *IRnova AB, Kista, Sweden*
- 12:25 – 12:45** **2.4 Type-II superlattice and InGaAs detector development at Fraunhofer IAF**
F. Rutz, R. Aidam, A. Bächle, V. Daumer, T. Hugger, V. Klinger, N. Kohn, W. Luppold,
R. Müller, J. Niemasz, T. Stadelmann, M. Wauro, A. Wörl, A. Zibold, R. Rehm
Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany
- 13:00 – 14:00** **Lunch at Badenova Cafeteria**

14:00 – 15:30 POSTER SESSION & COFFEE BREAK**3.1 Elastic modulus and hardness of MBE-grown Hg_{1-x}Cd_xSe films on Gasb (211)B substrates**Z.K. Zhang, W.W. Pan, W. Lei, L. Faraone*Dept. E. E. & C. Engineering, The University of Western Australia, Perth, Australia***3.2 LWIR QWIPs at IRnova for next generation polarimetric imaging**R. Ivanov, S. Smuk, S. Hellström, D. Evans, L. Höglund, E. Costard*IRnova AB, Kista, Sweden***3.3 Long wavelength type-II InAs/GaSb superlattice with interface layers grown by migration-enhanced epitaxy**M. Delmas¹, D. Kwan¹, M. Debnath², B. L. Liang², D. L. Huffaker^{1,2}¹ *School of Physics and Astronomy, Cardiff University, Cardiff, UK*² *California NanoSystem Institute, Univ. of California, Los Angeles, USA***3.4 High-resolution mobility spectrum analysis of electronic transport in InAs/GaAs type-II superlattices**G. A. Umana-Membreno, N.D. Akhavan, J. Antoszewski, L. Faraone*Dept. E. E. & C. Engineering, The University of Western Australia, Perth, Australia***3.5 Magnetotransport characterization of InAs/GaInSb superlattices for long wavelength photodetectors**M. Patrashin, N. Sekine, K. Akahane, A. Kasamatsu, I. Hosako*National Institute of Information and Communications Technology, Tokyo, Japan***3.6 Low-resistivity-contact-layer characterization in the context of magneto-transport measurements**J. Wróbel, A. Kowalewski, J. Boguski, P. Martyniuk*Institute of Applied Physics, Military University of Technology, Warsaw, Poland***3.7 InAs/GaSb type-II superlattices – an emerging material for thermoelectrically-cooled detectors for the longwave infrared**R. Müller¹, J. Niemasz¹, L. Kirste¹, V. Daumer¹, A. Janaszek², J. Jureńczyk², R. Rehm¹¹ *Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany*² *VIGO System S.A., Ożarów Mazowiecki, Poland***3.8 Status of HOT LWIR detectors based on InAs_{1-x}Sb_x material system at Vigo System S.A.**J. Jureńczyk¹, Ł. Kubiszyn¹, K. Michalczewski¹, K. Lipski², A. Ornoch¹, J. Piotrowski¹¹ *VIGO System S.A., Ożarów, Poland*² *Institute of Applied Physics, Military University of Technology, Warsaw, Poland*

3.9 Testbed for thermal imager characterization using an infrared scene projector

M. Koerber, D. Wegner, B. Schwarz, G. Ritt, S. Kessler, B. Eberle

Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB, Ettlingen, Germany

3.10 SI traceable measurement of the spectral responsivity of a thermopile detector in the mid infrared spectral range

P. Meindl, U. Johannsen, T. Pohl, L. Werner

Physikalisch-Technische Bundesanstalt (PTB), Berlin, Germany

3.11 Carbon nanotube based black coatings for IR applications

J. Bonitz¹, M. Kini², S.E. Schulz^{1,2}, S. Hermann^{1,2}

¹*Fraunhofer Institute for Electronic Nano Systems ENAS, Chemnitz, Germany*

²*Technische Universität Chemnitz, Center for Microtechnologies, Chemnitz, Germany*

3.12 15th International WORKshop on infrared technologies: Highlights and trends

J. Kunsch

Laser Components GmbH, Olching, Germany

3.13 Spectral and spatially scanning MIR laser for point of interest spectroscopy

M. Härtelt¹, D. Stothard², S. Hugger¹, Y. V. Flores¹, A. Merten³, A. Dreyhaupt³, A. Polack², C. Carson², M. Warden², R. Ostendorf¹

¹*Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany*

²*Fraunhofer Centre for Applied Photonics FCAP, Glasgow, United Kingdom*

³*Fraunhofer Institute for Photonic Microsystems IPMS, Dresden, Germany*

3.14 Quasi-static MOEMS-grating-scanner for wavelength tuning of MIR quantum-cascade-laser emission

A. Merten¹, R. Schroedter¹, A. Dreyhaupt¹, T. Graßhoff¹, C. Drabe¹, M. Schwarzenberg¹, S. Hugger², C. Schilling², M. Rattunde², M. Härtelt², J. Grahmann¹, R. Ostendorf²

¹*Fraunhofer Institute for Photonic Microsystems IPMS, Dresden, Germany*

²*Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany*

3.15 Prediction of novel quantum cascade devices using non-equilibrium Green's functions

T. Grange¹, M. Virgilio², K. Wang³, T.-T. Lin³, L. Wang³, J. Yun³, W. Terashima³, H. Hirayama³, D. Stark⁴, G. Scalari⁴, J. Faist⁴, L. Persichetti⁵, L. Di Gaspare⁵, M. De Seta⁵, M. Ortolani⁶, D.J. Paul⁷, G. Capellini⁸, Z. Jéhn¹, S. Birner¹

¹ *nextnano GmbH, Garching b. München, Germany*

² *Dipartimento di Fisica "E. Fermi", Università di Pisa, Pisa, Italy*

³ *THz Quantum Device Team, RIKEN Center for Advanced Photonics, Sendai, Japan*

⁴ *Institute for Quantum Electronics, ETH Zurich, Zurich, Switzerland*

⁵ *Dipartimento di Scienze, Università di Roma Tre, Rome, Italy*

⁶ *Dipartimento di Fisica, Università di Roma "La Sapienza", Rome, Italy*

⁷ *School of Engineering, University of Glasgow, Glasgow, UK*

⁸ *IHP - Leibniz-Institut für innovative Mikroelektronik, Frankfurt (Oder), Germany*

3.16 Experimental set-up for dynamic material investigation at high-temperatures for power engineering and additive manufacturing

J. Hartmann¹, J. Manara², M. Zipf², T. Stark², M. Arduini², K. Knopp¹, P. Lenski¹, D. Ochs¹, M. Zänglein¹, E. Schreiber³, F. Schmidt⁴

¹ *University of Applied Science Würzburg-Schweinfurt, Schweinfurt, Germany*

² *Bavarian Center for Applied Energy Research (ZAE Bayern), Würzburg, Germany*

³ *KE-Technologie GmbH, Stuttgart, Germany*

⁴ *Techno Team Bildverarbeitung GmbH, Illmenau, Germany*

DETECTOR APPLICATIONS

Session Chair: Frank Rutz

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| 15:30 – 16:00 | 4.1 Invited Paper: Infrared detectors for future civilian space applications
<i>O. Saint-Pé, M. Bréart de Boisanger</i>
<i>Airbus D&S SAS, Toulouse, France</i> |
| 16:00 – 16:20 | 4.2 IR FPA offset stability in the context of space-borne hyperspectral imaging
<i>H. Ceeh, B. König, C. Neumann, A. Neuzner, B. Sang</i>
<i>OHB System AG, Wessling, Germany</i> |
| 16:20 – 16:40 | 4.3 Colorimetry and multispectral imaging using four filter discrimination in the shortwave infrared
<i>M. Gerken, M. Schlemmer, T. Becker</i>
<i>HENSOLDT OPTRONICS GmbH, Oberkochen, Germany</i> |
| 16:40 – 17:00 | 4.4 Assessing night vision VIS/LWIR-fusion detection performance
<i>U. Adomeit</i>
<i>Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB, Ettlingen, Germany</i> |
| 19:00 | Conference Dinner
Restaurant VOLANTE, Kirchzarten |

WEDNESDAY, MARCH 20, 2019

ADVANCED PHOTON DETECTORS

Session Chair: Rolf Aidam

- 09:15 – 09:45** **5.1 Invited Paper: Single-photon detectors for quantum key distribution**
G. Boso, A. Boaron, D. Rusca, C. Vulliez, C. Autebert, M. Caloz, M. Perrenoud, G. Gras,
 F. Bussi eres, A. Martin, H. Zbinden
Group of Applied Physics, University of Geneva, Geneva, Switzerland
- 09:45 – 10:05** **5.2 Investigation of low energy Be implantation and annealing conditions in InAs avalanche photodiodes**
 L. Woon Lim, J. Petticrew, A. Krysa, J. S. Ng, C. H. Tan
Department of Electrical and Electronic Engineering, University of Sheffield, Sheffield, United Kingdom
- 10:05 – 10:25** **5.3 Thin-film photodetectors for NIR and SWIR image sensors with 0.13 μm tech node CMOS read-out**
E. Georgitzikis^{1,2}, P. E. Malinowski¹, J. Maes³, S. Gielen⁴, F. Frazzica¹, Y. Li¹, P. Boulenc¹,
 J. Lee¹, C. Cavaco¹, S. Guerrieri¹, Z. Hens³, P. Heremans^{1,2}, D. Cheyns¹
¹ imec, Leuven, Belgium
² KU Leuven, Leuven, Belgium
³ Center for Nano- and Biophotonics, Ghent University, Ghent, Belgium
⁴ Hasselt University – IMO, Diepenbeek, Belgium
- 10:25 – 10:45** **5.4 Hot electron mechanisms in InSb photodiodes**
C. Bonvalot^{1,2}, F. Aniel², A. Nedelcu¹
¹ SOFRADIR, Palaiseau, France
² C2N Universit  Paris-Saclay, Palaiseau, France
- 10:45 – 11:15** **Coffee Break**

INTERBAND EMITTERS

Session Chair: Marcel Rattunde

- 11:15 – 11:45** **6.1 Invited Paper: Development of high brightness LED structures for the mid-infrared range**
Q. Lu¹, F. Al-Saymari^{1,2}, E. Repiso¹, A. Marshall¹, C. Broderick^{3,4}, M. de la Mata⁵, R. Arkani^{3,4}, A. Craig¹, A. Noori¹, P. Carrington⁶, S. Molina⁵, E. O'Reilly^{3,4}, A. Krier¹
¹ *Physics Department, Lancaster University, Lancaster, United Kingdom*
² *Department of Physics, College of Education for Pure Science, Basra University, Basra, Iraq*
³ *Tyndall National Institute, Lee Maltings, Dyke Parade, Cork, Ireland*
⁴ *Department of Physics, University College Cork, Cork, Ireland*
⁵ *Facultad de Ciencias, IMEYMAT, Universidad de Cadiz, Cadiz, Spain*
⁶ *Department of Engineering, Lancaster University, Lancaster, United Kingdom*
- 11:45 – 12:05** **6.2 GaSb based diode laser pump sources**
M. T. Kelemen¹, J. Neukum²
¹ *Coherent | DILAS GmbH, Freiburg, Germany*
² *Coherent | DILAS GmbH, Mainz, Germany*
- 12:05 – 12:25** **6.3 Bismide based semiconductor alloys for near- and mid-infrared lasers**
S. J. Sweeney, I. P. Marko
Advanced Technology Institute and Department of Physics, University of Surrey, Guildford, United Kingdom
- 12:25 – 12:45** **6.4 Mid-infrared interband cascade light emitting devices (ICLEDs) with enhanced light out-coupling efficiency**
N. Schäfer¹, J. Scheuermann¹, R. Weih¹, S. Höfling², J. Koeth¹
¹ *nanoplus GmbH, Gerbrunn, Germany*
² *Technische Physik, Physikalisches Institut and Wilhelm-Conrad-Röntgen-Research Center for Complex Material Systems, Universität Würzburg, Würzburg, Germany*
- 13:00 – 14:00** **Lunch at Badenova Cafeteria**

CASCADE LASERS

Session Chair: Ralf Ostendorf

- 14:00 – 14:30** **7.1 Invited Paper: Interband cascade lasers**
R.Q. Yang
University of Oklahoma, Oklahoma, USA
- 14:30 – 14:50** **7.2 Extended tuning DFBs and high power FPs quantum cascade lasers**
S. Blaser, T. Gresch, R. Maulini, N. Villa, G. Strübi, A. Muller
Alpes Lasers SA, St-Blaise, Switzerland
- 14:50 – 15:10** **7.3 Recent advances of hyper-spectral-imaging based on QCLs in microscopy**
M. Godejohann¹, L. Bromley²
¹ *MG Optical Solutions GmbH, Utting/Ammersee, Germany*
² *Daylight Solutions, San Diego, USA*
- 15:10 – 15:30** **7.4 Advances of MOEMS-based external cavity QCLs**
S. Hugger¹, M. Härtelt¹, L. Butschek¹, C. Schilling¹, P. Holl¹, Q. K. Yang¹, R. Aidam¹,
R. Driad¹, A. Merten², M. Schwarzenberg², A. Dreyhaupt², J. Grahmann²,
M. Rattunde¹, R. Ostendorf¹
¹ *Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany*
² *Fraunhofer Institute for Photonic Microsystems IPMS, Dresden, Germany*
- 15:30 – 16:00** **Coffee Break**

PHOTONIC SENSING

Session Chair: Marko Härtelt

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| 16:00 – 16:30 | <p>8.1 Invited Paper: Recent advances in mid-IR trace gas sensing architectures
<u>J. P. Waclawek</u>, J. Hayden, S. Lindner, H. Moser, B. Lendl
<i>Institute of Chemical Technologies and Analytics, TU Wien, Vienna, Austria</i></p> |
| 16:30 – 16:50 | <p>8.2 High-speed analysis of chemical processes using the IRis-F1 spectrometer based on quantum cascade laser frequency combs
<u>P. Allmendinger</u>, R. Horvath, P. Jouy, M. Mangold, M. Geiser, A. Hugi
<i>IRsweep AG, Stäfa, Switzerland</i></p> |
| 16:50 – 17:10 | <p>8.3 IR detection by nonlinear-optical upconversion for highly time-resolved MWIR spectroscopy
<u>S. Wolf</u>¹, J. Kießling¹, V. Weiser², S. Knapp², F. Kühnemann¹
¹<i>Fraunhofer Institute for Physical Measurement Techniques IPM, Freiburg, Germany</i>
²<i>Fraunhofer Institute for Chemical Technology ICT, Pfinztal, Germany</i></p> |
| 17:10 – 17:30 | <p>8.4 Novel approach for the integration of photonic circuits with mid-IR detectors
<u>A. Vasiliev</u>¹, F. Pavanello¹, M. Muneeb¹, J. Jurénczyk², A. Janaszek², M. Liebert², G. Roelkens¹
¹<i>Photonics Research Group, Ghent University – imec and Center for Nano- and Biophotonics, Ghent, Belgium</i>
²<i>VIGO System S.A., Ożarów, Poland</i></p> |
| 17:30 – 17:45 | <p>Closing Remarks</p> |