

**Tuesday, March 19<sup>th</sup>, 2019**

**08:00 – 09:00**            **Registration**

**09:00 – 09:15**            **Welcome**

### **HgCdTe Detectors**

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. Mangin<sup>1</sup>, F. Rochette<sup>1</sup>, A. Even, M. Soria<sup>1</sup>, P. Bleuet<sup>1</sup>, J. Rothman<sup>1</sup>, and G. Ghibaudo<sup>2</sup>

<sup>1</sup>*Univ. Grenoble Alpes, CEA LETI, France*

<sup>2</sup>*Univ. Grenoble Alpes, CNRS, Grenoble-INP, IMEP-LAHC, 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, and 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, and M. Kopytko

*Military University of Technology, Institute of Applied Physics, Warsaw, Poland*

**10:45 – 11:15**            **Coffee Break**

### **Type-II Superlattice Detectors**

11:15 – 11:45    **2.1 Invited paper: Type-II superlattice infrared detectors**

D. Ting

*Jet Propulsion Laboratory, NASA, 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, and 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. Alchaar<sup>1</sup>, J.B. Rodriguez<sup>1</sup>, L. Höglund<sup>2</sup>, and P. Christol<sup>1</sup>

<sup>1</sup>*IES, Univ. Montpellier, CNRS, Montpellier, France*

<sup>2</sup>*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, and R. Rehm

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

**13:00 – 14:00**            **Lunch at badenova cafeteria**

14:00 – 15:30 **3 Poster Session & Coffee Break**

- 3.1 **Elastic modulus and hardness of MBE-grown  $\text{Hg}_{1-x}\text{Cd}_x\text{Se}$  films on Gasb (211)B substrates**  
Z.K. Zhang, W.W. Pan, W. Lei, and 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, and E. Costard  
*IRnova AB, Kista, Sweden*
- 3.3 **Long wavelength type-II InAs/GaSb superlattice with interface layers grown by migration-enhanced epitaxy**  
M. Delmas<sup>1</sup>, D. Kwan<sup>1</sup>, M. Debnath<sup>2</sup>, B. L. Liang<sup>2</sup>, and D. L. Huffaker<sup>1,2</sup>  
<sup>1</sup>*School of Physics and Astronomy, Cardiff University, UK*  
<sup>2</sup>*California NanoSystem Institute, Univ. of California, Los Angeles, USA*
- 3.4 **High-resolution mobility spectrum analysis of electronic transport in InAs/GaSb type-II superlattices**  
G. A. Umana-Membreno, N.D. Akhavan, J. Antoszewski, and 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, and 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, and 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. Müller<sup>1</sup>, J. Niemasz<sup>1</sup>, L. Kirste<sup>1</sup>, V. Daumer<sup>1</sup>, A. Janaszek<sup>2</sup>, J. Jureńczyk<sup>2</sup>, and R. Rehm<sup>1</sup>  
<sup>1</sup>*Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany*  
<sup>2</sup>*VIGO System S.A., Ożarów Mazowiecki, Poland*
- 3.8 **Status of HOT LWIR detectors based on  $\text{InAs}_{1-x}\text{Sb}_x$  material system at Vigo System S.A.**  
J. Jureńczyk<sup>1</sup>, Ł. Kubiszyn<sup>1</sup>, K. Michalczewski<sup>1</sup>, K. Lipski<sup>2</sup>, A. Ornoch<sup>1</sup>, and J. Piotrowski<sup>1</sup>  
<sup>1</sup>*VIGO System S.A., Ożarów, Poland*  
<sup>2</sup>*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, and 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<sup>1</sup>, U. Johannsen<sup>1</sup>, T. Pohl<sup>1</sup>, and L. Werner<sup>1</sup>  
<sup>1</sup>*Physikalisch-Technische Bundesanstalt (PTB), Berlin, Germany*
- 3.11 **Carbon nanotube based black coatings for IR applications**  
J. Bonitz<sup>1</sup>, M. Kini<sup>2</sup>, S.E. Schulz<sup>1,2</sup>, and S. Hermann<sup>1,2</sup>  
<sup>1</sup>*Fraunhofer Institute for Electronic Nano Systems ENAS, Chemnitz, Germany*  
<sup>2</sup>*Technische Universität Chemnitz, Center for Microtechnologies, Germany*
- 3.12 **15<sup>th</sup> 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. Härtelt<sup>1</sup>, D. Stothard<sup>2</sup>, S. Hugger<sup>1</sup>, Y. Flores<sup>1</sup>, A. Merten<sup>3</sup>, A. Dreyhaupt<sup>3</sup>, A. Polack<sup>2</sup>, C. Carson<sup>2</sup>, M. Warden<sup>2</sup>, and R. Ostendorf<sup>1</sup>  
<sup>1</sup>*Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany*  
<sup>2</sup>*Fraunhofer Centre for Applied Photonics FCAP, Glasgow, United Kingdom*  
<sup>3</sup>*Fraunhofer Institute for Photonic Microsystems IPMS, Dresden, Germany*
- 3.14 **Quasi-static MOEMS grating scanner for wavelength tuning of MIR external cavity quantum cascade lasers**  
A. Merten<sup>1</sup>, R. Schroedter<sup>1</sup>, A. Dreyhaupt<sup>1</sup>, T. Graßhoff<sup>1</sup>, C. Drabe<sup>1</sup>, M. Schwarzenberg<sup>1</sup>, S. Hugger<sup>2</sup>, C. Schilling<sup>2</sup>, M. Rattunde<sup>2</sup>, M. Härtelt<sup>2</sup>, J. Grahmann<sup>1</sup>, and R. Ostendorf<sup>2</sup>  
<sup>1</sup>*Fraunhofer Institute for Photonic Microsystems IPMS, Dresden, Germany*  
<sup>2</sup>*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. Grange<sup>1</sup>, M. Virgilio<sup>2</sup>, K. Wang<sup>3</sup>, T.-T. Lin<sup>3</sup>, L. Wang<sup>3</sup>, J. Yun<sup>3</sup>, W. Terashima<sup>3</sup>, H. Hirayama<sup>3</sup>, D. Stark<sup>4</sup>, G. Scaleri<sup>4</sup>, J. Faist<sup>4</sup>, L. Persichetti<sup>5</sup>, L. Di Gaspare<sup>5</sup>, M. De Seta<sup>5</sup>, M. Ortolani<sup>6</sup>, D.J. Paul<sup>7</sup>, G. Capellini<sup>8</sup>, Z. Jéhn<sup>1</sup>, and S. Birner<sup>1</sup>  
<sup>1</sup>*nextnano GmbH, Garching b. München, Germany*  
<sup>2</sup>*Dipartimento di Fisica "E. Fermi", Università di Pisa, Italy*  
<sup>3</sup>*THz Quantum Device Team, RIKEN Center for Advanced Photonics, Sendai, Japan*  
<sup>4</sup>*Institute for Quantum Electronics, ETH Zurich, Switzerland*  
<sup>5</sup>*Dipartimento di Scienze, Università di Roma Tre, Italy*  
<sup>6</sup>*Dipartimento di Fisica, Università di Roma "La Sapienza", Italy*  
<sup>7</sup>*School of Engineering, University of Glasgow, UK*  
<sup>8</sup>*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. Hartmann<sup>1</sup>, J. Manara<sup>2</sup>, M. Zipf<sup>2</sup>, T. Stark<sup>2</sup>, M. Arduini<sup>2</sup>, K. Knopp<sup>1</sup>, P. Lenski<sup>1</sup>, D. Ochs<sup>1</sup>, M. Zänglein<sup>1</sup>, E. Schreiber<sup>3</sup>, and F. Schmidt<sup>4</sup>  
<sup>1</sup>*University of Applied Science Würzburg, Schweinfurt, Germany*  
<sup>2</sup>*Bavarian Center for Applied Energy Research (ZAE Bayern), Würzburg, Germany*  
<sup>3</sup>*KE-Technologie GmbH, Stuttgart, Germany*  
<sup>4</sup>*Techno Team Bildverarbeitung GmbH, Illmenau, Germany*

## Detector Applications

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

**19:00 – 23:00**      **Conference dinner**  
**Restaurant VOLANTE, Kirchzarten**

Wednesday, March 20<sup>th</sup>, 2019

## Advanced Photon Detectors

- 09:15 – 09:45    **5.1 Invited paper: Single-photon avalanche detectors for quantum key distribution**  
H. Zbinden  
*Université de Genève, 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, and C. H. Tan  
*Department of Electrical and Electronic Engineering, University of Sheffield, United Kingdom*
- 10:05 – 10:25    **5.3 Thin-film photodetectors for NIR and SWIR image sensors with 0.13  $\mu\text{m}$  tech node CMOS read-out**  
E. Georgitzikis<sup>1,2</sup>, P. E. Malinowski<sup>1</sup>, J. Maes<sup>3</sup>, S. Gielen<sup>4</sup>, F. Frazzica<sup>1</sup>, Y. Li<sup>1</sup>, P. Boulenc<sup>1</sup>, J. Lee<sup>1</sup>, C. Cavaco<sup>1</sup>, S. Guerrieri<sup>1</sup>, Z. Hens<sup>3</sup>, P. Heremans<sup>1,2</sup>, and D. Cheyns<sup>1</sup>  
<sup>1</sup>*imec, Leuven, Belgium*  
<sup>2</sup>*KU Leuven, Belgium*  
<sup>3</sup>*Center for Nano- and Biophotonics, Ghent University, Belgium*  
<sup>4</sup>*Hasselt University – IMO, Belgium*
- 10:25 – 10:45    **5.4 Hot electron mechanisms in InSb photodiodes**  
C. Bonvalot<sup>1,2</sup>, F. Aniel<sup>2</sup>, and A. Nedelcu<sup>1</sup>  
<sup>1</sup>*SOFRADIR, Palaiseau, France*  
<sup>2</sup>*C2N Université Paris-Saclay, Palaiseau, France*

**10:45 – 11:15        Coffee Break**

## Interband Emitters

- 11:15 – 11:45    **6.1 Invited paper: Development of high brightness LED structures for the mid-infrared range**  
L. Qi  
*Lancaster University, UK*
- 11:45 – 12:05    **6.2 GaSb based diode laser pump sources**  
M.T. Kelemen<sup>1</sup> and J. Neukum<sup>2</sup>  
<sup>1</sup>*Coherent | DILAS GmbH, Freiburg, Germany*  
<sup>2</sup>*Coherent | DILAS GmbH, Mainz, Germany*
- 12:05 – 12:25    **6.3 Bismide based semiconductor alloys for near- and mid-infrared lasers**  
S. J. Sweeney and I. P. Marko  
*Advanced Technology Institute and Department of Physics, University of Surrey, United Kingdom*
- 12:25 – 12:45    **6.4 Mid-infrared interband cascade light emitting devices (ICLEDs) with enhanced light out-coupling efficiency**  
N. Schäfer<sup>1</sup>, J. Scheuermann<sup>1</sup>, R. Weih<sup>1</sup>, S. Höfling<sup>2</sup>, and J. Koeth<sup>1</sup>  
<sup>1</sup>*nanoplus GmbH, Gerbrunn, Germany*  
<sup>2</sup>*Technische Physik, Physikalisches Institut and Wilhelm-Conrad-Röntgen-Research Center for Complex Material Systems, Universität Würzburg, Germany*

**13:00 – 14:00**      **Lunch at badenova cafeteria**

## Cascade Lasers

- 14:00 – 14:30    **7.1 Invited paper: Interband cascade lasers**  
R.Q. Yang  
*University of Oklahoma, USA*
- 14:30 – 14:50    **7.2 Extended tuning DFBs and high power FPs quantum cascade lasers**  
S. Blaser<sup>1</sup>, T. Gresch<sup>1</sup>, R. Maulini<sup>1</sup>, N. Villa<sup>1</sup>, G. Strübi<sup>1</sup>, and A. Müller<sup>1</sup>  
<sup>1</sup>*Alpes Lasers SA, St-Blaise, Switzerland*
- 14:50 – 15:10    **7.3 Recent advances of hyper-spectral-imaging based on QCLs in microscopy**  
M. Godejohann<sup>1</sup> and L. Bromley<sup>2</sup>  
<sup>1</sup>*MG Optical Solutions Utting/Ammersee, Germany*  
<sup>2</sup>*Daylight Solutions, San Diego, USA*
- 15:10 – 15:30    **7.4 Advances of MOEMS-based external cavity QCLs**  
S. Hugger<sup>1</sup>, M. Haertelt<sup>1</sup>, L. Butschek<sup>1</sup>, C. Schilling<sup>1</sup>, P. Holl<sup>1</sup>, A. Merten<sup>2</sup>, M. Schwarzenberg<sup>2</sup>, A. Dreyhaupt<sup>2</sup>, J. Grahmann<sup>2</sup>, M. Rattunde<sup>1</sup>, and R. Ostendorf<sup>1</sup>  
<sup>1</sup>*Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany*  
<sup>2</sup>*Fraunhofer Institute for Photonic Microsystems IPMS, Dresden, Germany*

**15:30 – 16:00**      **Coffee Break**

## Photonic Sensing

- 16:00 – 16:30    **8.1 Invited paper: Recent advances in mid-IR trace gas sensing architectures**  
J. P. Waclawek  
*TU Wien, Austria*
- 16:30 – 16:50    **8.2 High-speed analysis of chemical processes using the IRis-F1 spectrometer based on quantum cascade laser frequency combs**  
P. Allmendinger, R. Horvath, P. Jouy, M. Mangold, M. Geiser, and A. Hugi  
*IRsweep AG, Stäfa, Switzerland*
- 16:50 – 17:10    **8.3 IR detection by nonlinear-optical upconversion for highly time-resolved MWIR spectroscopy**  
S. Wolf<sup>1</sup>, J. Kießling<sup>1</sup>, V. Weiser<sup>2</sup>, S. Knapp<sup>2</sup>, and F. Kühnemann<sup>1</sup>  
<sup>1</sup>*Fraunhofer Institute for Physical Measurement Techniques IPM, Freiburg, Germany*  
<sup>2</sup>*Fraunhofer Institute for Chemical Technology ICT, Pfinztal, Germany*
- 17:10 – 17:30    **8.4 Novel approach for the integration of photonic circuits with mid-IR detectors**  
A. Vasiliev<sup>1</sup>, F. Pavanello<sup>1</sup>, M. Muneeb<sup>1</sup>, J. Jurénczyk<sup>2</sup>, A. Janaszek<sup>2</sup>, M. Liebert<sup>2</sup>, and G. Roelkens<sup>1</sup>  
<sup>1</sup>*Photonics Research Group, Ghent University – imec and Center for Nano- and Biophotonics, Ghent, Belgium*  
<sup>2</sup>*VIGO System S.A., Ożarów, Poland*

**17:30 – 17:45**      **Closing remarks**