Program of MIOMD – IX

Monday, September 8th

8:30 – 8:40 Opening : Joachim Wagner, *Fraunhofer IAF, Freiburg*

Session 1: Diode Lasers	***Session chair: J. Meyer***	
08:40 – 09:10	G. Belenky, L. Shterengas, G. Kipshidze, T. Hosoda, and S. Suchalkin (**invited**) *State University of New York at Stony Brook, USA)* **CW operated type-I GaSb-based diode laser with wavelengths above 3 μm**	26
09:10 – 09:40	D. Huffaker (**invited**) *University of California, USA* **Growth of III-Sb diode lasers on GaAs and Si**	
09:40 – 10:00	T. Lehnhardt, M. Hümmer, K. Rössner, M. Müller, S. Höfling, and A. Forchel *Technische Physik, Physikalisches Institut, Universität Würzburg, Germany* **Continuous wave single mode operation of GaInAsSb/GaSb quantum well lasers emitting beyond 3 μm**	28
10:00 – 10:20	J.A. Gupta, P.J. Barrios, J. Lapointe, G.C. Aers, A. Bezinger, P. Waldron, and C. Storey *Institute for Microstructural Sciences, Canada* **Single-mode InGaAsSb/AlGaAsSb lasers for gas sensing**	30
10:20 – 10:40	**Coffee break**	
Session 2: QC Lasers I	***Session chair: A. Baranov***	
10:40 – 11:10	W.T. Masselink, M.P. Semtsiv, M. Wienold, M. Chashnikova, and I. Bayrakli (**invited**) *Humboldt University Berlin, Germany* **Short-wavelength InP-based QCLs**	33
11:10 – 11.30	A. Wittmann, A. Hugi, Y. Bonetti, M. Fischer, E. Gini, and J. Faist *Institute of Quantum Electronics, ETH Zürich, Switzerland* **High performance single-mode and broadly tunable quantum cascade laser sources**	34
11:30 – 11:50	S.Y. Zhang, D.G. Revin, J.W. Cockburn, M. Steer, K. Kennedy, A.B. Krysa, and M. Hopkinson *University of Sheffield, UK* **High performance ~3 μm strain balanced InGaAs-AlAsSb/InP quantum cascade lasers**	37
11:50 – 12:10	Y. Li, A. Li, L. Wei, H. Li, G. Xu, and Y. Zhang *State Key Laboratory of Functional Materials for Informatics, Shanghai, China* **Distributed feedback quantum cascade lasers operating at 420 K**	38
12:10 – 12:30	A. Bismuto, T. Gresch, and J. Faist *Institute for Quantum Electronics, Zürich, Switzerland* **Large cavity quantum cascade lasers with InP interstacks**	40
12:30 – 14:00	**L U N C H**	

Monday, September 8th

Session 3: Spectroscopic Sensing	*Session chair: F. Genty*	
14:00 – 14:30	E. Normand (**invited**) *Cascade Technologies, UK* **MIR spectroscopic sensing**	
14:30 – 14:50	F.K. Tittel, Y. Bakhirkin, R.F. Curl, A. Kosterev, R. Lewicki, D. Thomasz, S. So, and G. Wysocki *Rice Quantum Institute, Houston, USA* **Recent advances of infrared semiconductor laser based chemical sensing technologies**	42
14:50 – 15:10	F. Fuchs, B. Hinkov, Ch. Wild, Q.K. Yang, W. Bronner, K. Köhler, and J. Wagner *Fraunhofer-Institut IAF, Freiburg, Germany* **Quantum cascade lasers for imaging backscattering detection of explosives**	44
15:10 – 15:30	J. Hildenbrand, J. Herbst, C. Bühler, J. Wöllenstein, and A. Lambrecht *Fraunhofer-Institut IPM, Freiburg, Germany* **Explosive detection using mid-infrared transmission spectroscopy**	46

15:30 – 17:30 **Coffee break and Poster session**

Session 4: Detectors I	*Session chair: L. Wilson*	
17:30 – 18:00	R. Rehm (**invited**) *Fraunhofer-Institut IAF, Freiburg, Germany* **QWIP and superlattice dual-band and dual-color FPAs: state of the art and applications**	48
18:00 – 18:20	S. Krishna, E. Plis, H.S. Kim, G. Bishop, A. Khoshakhlagh, Y. Sharma, R. Dawson, A. Reisinger, and M. Sundaram *Center for High Technology Materials, University of New Mexico, USA* **Type-II strain layer superlattice focal plane arrays using an nBn design**	50
18:20 – 18:40	F. Felder, M. Rahim, M. Fill, M. Arnold, H. Zogg, N. Quack, S. Blunier, and J. Dual *Thin Film Physics Group, ETH Zürich, Switzerland* **Mid-infrared tunable resonant cavity enhanced detectors**	52
18:40 – 19:00	B.A. Matveev, A.L. Zakgeim, N.V. Zotova, N.D. Il'inskaya, S.A. Karandashev, M.A. Remennyy, N.M. Stus, and A.E. Cherniakov *Ioffe Physico-Technical Institute RAS, St. Petersburg, Russia* **InAs(Sb) backside illuminated photodiodes and LEDs with deep mesa**	54

19:00 **Discover Freiburg ☺**

Tuesday, September 9th

Session 5: Interband Lasers	*Session chair: A. Li*	
08:30 – 09:00	A. Monakhov (**invited**) *Ioffe Physico-Technical Institute RAS, St. Petersburg, Russia* **MIR whispering gallery mode lasers**	57
09:00 – 09:20	A.P. Astakhova, A.M. Monakhov, V.V. Sherstnev, E.A. Grebenshchikova, Y.P. Yakovlev, G. Boissier, R. Teissier, and A.N. Baranov *Physico-Technical Inst., Russian Academy of Sciences, St. Petersburg, Russia* **Experimental observation of whispering gallery modes in sector cylindrical lasers**	58
09:20 – 09:40	C.S. Kim, C.L. Canedy, W.W. Bewley, M. Kim, J.R. Lindle, J. Abell, I. Vurgaftman, and J.R. Meyer *Naval Research Laboratory, Washington, USA* **Above-room-temperature cw operation of interband cascade lasers**	60
09:40 – 10:00	L. Xue, S.R.J. Brueck, R. Kaspi, A.P. Ongstad, G.C. Dente *University of New Mexico, USA* **Tunable optically pumped mid-IR laser with chirped distributed-feedback grating**	62
10:00 – 10:20	A.P. Ongstad, R. Kaspi, G.C. Dente, and M.L. Tilton *Air Force Research Laboratory, Kirtland, USA* **Wavelength tuning limitations in optically pumped type-II antimonide lasers**	64
10:20 – 10:40	**Coffee break**	

Session 6: QC Lasers II	*Session chair: G. Belenky*	
10:40 – 11:10	O. Cathabard, J. Devenson, R. Teissier, and A.N. Baranov (**invited**) *IES, Université Montpellier 2, France* **InAs quantum cascade lasers**	67
11:10 – 11:30	I.P. Marko, A.R. Adams, S.J. Sweeney, R. Teissier, A.N. Baranov, and S. Tomic *Advanced Technology Institute, University of Surrey, UK* **Indirect carrier leakage in short-wavelength InAs/AlSb quantum cascade lasers**	68
11:30 – 11:50	A.J. Hoffman, M.D. Escarra, S.S. Howard, K.J. Franz, X.J. Wang, J.Y. Fan, and C. Gmachl *Princeton University, USA* **Strategies for improved wall-plug efficiency in quantum cascade lasers**	70
11:50 – 12:10	E. Mujagic, S. Schartner, L.K. Hoffmann, M. Austerer, W. Schrenk, A.M. Andrews, P. Klang, M.P. Semtsiv, W.T. Masselink, and G. Strasser *Institute of Solid State Electronics, Vienna University of Technology, Austria* **Second generation surface emitting distributed-feedback quantum cascade lasers**	72
12:10 – 12:30	G. Chen, C.G. Bethea, and R. Martini *Department of Physic and Engineering Physics, Stevens Institute of Technology, Hoboken, USA* **High speed all optical modulation of quantum cascade laser**	74
12:30 – 14:00	**L U N C H**	

Tuesday, September 9th

Session 7: Fibers and Applications		***Session chair: F. Tittel***
14:00 – 14:30	J.-L. Adam, V. Nazabal, J. Trolès, C. Boussard, L. Brilland, B. Bureau (**invited**) *Equipe Verres er Céramiques, Université de Rennes, France* **Mid-infrared glass optical fibers**	76
14:30 – 14:50	V. Artyushenko, G. Colquhoun, V. Lobachov, T. Sakharova, and D. Savitskij *Fibre Photonics Ltd., West Lothian, Scotland* **Mid IR-fiber optics for fiber spectroscopy systems**	78
14:50 – 15:10	P. Fuchs, J. Seufert, J. Koeth, J. Semmel, S. Höfling, and A. Forchel *Nanoplus GmbH, Gerbrunn, Germany* **Widely tunable quantum cascade lasers for sensing applications**	80
15:10 – 15:30	A. Garnache, M. Myara, L. Cerutti, A. Ouvrard, J.-P. Perez, A. Ducanchez, A. Laurain, A. Bouchier, and P. Signoret *Institut d'Electronique du Sud, Université Montpellier 2, France* **Single-frequency low-noise broadly-tunable extended-cavity VCSEL for gas analysis in the MIR**	82
15:30 – 15:50	B. Grouiez, B. Parvitte, N. Dumelie, L. Joly, and V. Zeninari *Groupe de Spectrom. Moléculaire et Atmoshérique, UMR CNRS, Reims, France* **Quantum cascade laser spectroscopy with intermediate-size pulses : application to NH_3 detection in the 10 µm region**	85
15:50 – 16:10	**Coffee break**	
Session 8: Detectors II		***Session chair: R. Rehm***
16:10 – 16:40	L. Wilson (**invited**) *Department of Physics and Astronomy, Univ. of Sheffield, UK* **Recent advances in quantum-dot-in-a-well infrared photodetectors**	
16:40 – 17:00	D. Hofstetter, F.R. Giorgetta, E. Baumann, M. Fischer, and J. Faist *University of Neuchâtel, Institute of Physics, Neuchâtel, Switzerland* **Quantum cascade detectors in the mid-infrared**	86
17:00 – 17:20	H. Schneider, S. Winnerl, H.C. Liu, O. Drachenko, M. Helm, and M. Walther *Institute of Ion-Beam Physics and Materials Research, Forschungszentrum Dresden Rossendorf, Germany* **Quadratic detection and autocorrelation measurements with two-photon quantum well infrared photodetectors**	88
17:20 – 17:40	A. Gomez, V. Berger, N.P. Laperne, and L.A. De Vaulchier *Laboratoire MPQ, Université de Paris, France* **Barrier breakdown in a quantum well infrared detector**	91
17:40 – 18:00	M.P. Mikhailova, I.A. Andreev, K.D. Moiseev, E.V. Ivonov, E.A. Grebenschikova, Y.u.P. Yakovlev, E. Hulicius, A. Hospodkova, J. Pangrac, K. Melichar, and T. Simecek *Ioffe Physico-Technical Institute RAS, St. Petersburg, Russia* **Mid-infrared photovoltaic detectors based on a type-II p-InAs/AlSb/InAsSb/ AlSb/p(n)-GaSb heterostructure with deep quantum wells at the interface**	93
19:30	**Departure for Conference Dinner**	
20:00	**Conference Dinner at the restaurant "Löwen" in Vörstetten**	

Wednesday, September 10th

Session 9: V(E)CSEL I	*Session chair: J. Wagner*	
08:30 – 09:00	A.C. Tropper (**invited**) *School of Physics and Astronomy, University of Southampton, UK* **Current status of vertical-external-cavity surface-emitting lasers**	95
09:00 – 09:30	S.W. Koch, C. Brückers, A. Thränhardt, J. Hader, and J.V. Moloney, (**invited**) *Department of Physics and Material Sciences Center,* *Philipps-University Marburg, Germany* **Microscopic modelling of long-wavelength laser materials and VECSELs**	96
09:30 – 10:00	G. Springholz (**invited**) *Institut of Semiconductor Physics, Johannes Kepler Universität Linz, Austria* **IV-VI VCSELs**	
10:00 – 10:30	**Coffee break**	
Session 10: V(E)CSEL II	*Session chair: A. Tropper*	
10:30 – 11:00	A. Bachmann[*1], K. Kashani-Shirazi, M.-C. Amann, F. Genty[*2], (**invited**) L. Cerutti, A. Ducanchez, P. Grech, and E. Tournié [*1] *Walter Schottky Institut, Garching, Germany,* [*2] *Université Montpellier 2, France* **Recent progress on electrically-pumped GaSb-based VCSELs emitting above 2 µm for sensing applications**	98
11:00 – 11:30	D. Burns[*1] and M. Rattunde[*2] (**invited**) [*1]*Institut of Photonics, University of Strathclyde, Glasgow, UK,* [*2]*Fraunhofer-Institut IAF, Freiburg, Germany* **High-power GaSb-based optically pumped semiconductor disk laser for the 2.X µm wavelength regime**	100
11:30 – 11:50	M. Rahim, F. Felder, M. Fill, D. Boye, M. Arnold, and H. Zogg *Thin Film Physics Group, ETH Zürich, Switzerland* **5 µm vertical external cavity surface emitting lasers grown on BaF_2 and Si substrates**	102
11:50 – 12:10	J.-M. Hopkins, A.J. Kemp, B. Rösener, N. Schulz, M. Rattunde, J. Wagner, and D. Burns *Institut of Photonics, University of Strathclyde, Glasgow, UK* **High-power, pulsed-pumped, 2.0 µm semiconductor disk laser**	104
12:10 – 12:30	B. Rösener, N. Schulz, M. Rattunde, R. Moser, C. Manz, K. Köhler, and J. Wagner *Fraunhofer-Institut IAF, Freiburg, Germany* **2.25 µm optically pumped semiconductor disk laser using multiple gain elements**	106
12:30 – 14:00	**L U N C H**	

Wednesday, September 10th

Session 11: Detectors and Emitters	*Session chair: G. Springholz*	
14:00 – 14:30	Y.G. Zhang, Y. Gu, Z.-B. Tian, K. Wang, Y.-l. Zheng, and A.-Z. Li (**invited**) *Shanghai Institute of Microsystems and Information Technology, Chinese Academy of Sciences, Shanghai, China* **2.4 ~ 2.7 µm metamorphic InGaAs photodetectors**	109
14:30 – 14:50	K.J. Franz, W.O. Charles, A.Shen, A.J. Hoffman, M.C. Tamargo, and C. Gmachl *Princeton University, New Jersey, USA* **Quantum cascade electroluminescence from a ZnCdSe/ZnCdMgSe on InP structure**	110
14:50 – 15:10	V.A. Solov`ev, P. J. Carrington, Q. Zhuang, A.A. Sitnikova, S.V. Ivanov, and A. Krier *Department of Physics, Lancaster University, Lancaster LA1 4YB, UK* **Room-temperature electroluminescence at 3.8 µm from InSb/InAs quantum dot light-emitting diodes**	112
15:10 – 15:30	M. Eibelhuber, T. Schwarzl, W. Heiss, G. Springholz *Institut of Semiconductor Physics, Johannes Kepler Universität Linz, Austria* **Optically pumped mid-infrared IV-VI microdisk lasers operating in continuous-wave at 5.3 µm**	114
15:30 – 15:50	J. Gilly, P. Friedmann, J. Schleife, R. Moritz, M. Rattunde, M. Haag, and M. Kelemen *m2k-laser GmbH, Freiburg, Germany* **High-power diode laser bars for the 1.85 to 2.25 µm wavelength range**	116
15:50 – 16:10	M. Eichhorn, M. Rattunde, and J. Wagner *French-German Research Institute ISL, Saint-Louis, France* **Pulsed GaSb-based laser diodes seeding 2 µm fiber amplifiers**	118
16:10-16:20	**C L O S I N G**	

Poster Session of MIOMD – IX

Monday, September 8th 15:30 – 17:30

Lasers and LEDs		
P1	**Y-coupled quantum cascade laser resonators** L.K. Hoffmann, C.A. Hurni, S. Schartner, E. Mujagic, W. Schrenk, A.M. Andrews, P. Klang, M.P. Semtsiv, W.T. Masselink, and G. Strasser *Institute for Solid State Electronincs, TU Vienna, Wien, Austria*	122
P2	**Grating-coupled mid-infrared external-cavity InGaAs/InAlAs/AlAs quantum-cascade lasers** I. Bayrakli, M.P. Semtsiv, M. Wienold, M. Hempel, and W.T. Masselink Humboldt University Berlin, Germany **Mid-infrared diode lasers based on pentanary GaInAsSbP alloys grown by LPE** M. Yin, A. Krier, P.J. Carrington, and N. Cook *Physics Department, Lancaster University, UK*	124
P3	**Impact of the injector doping on the performance of InGaAs-InAlAs/InP quantum cascade laser** M. Chashnikova, M Wienold, M. Hempel, M. Klinkmüller, M.P. Semtsiv, and T.W. Masselink *Department of Physics, Humboldt Universität Berlin, Germany*	126
P4	**Determination of thermal properties of mid infrared quantum cascade lasers** M. Wienold, M.P. Semtsiv, I. Bayrakli, W.T. Masselink, M. Ziegler, K. Kennedy, R. Hogg *Department of Physics, Humboldt Universität Berlin, Germany*	128
P5	**Thermal management of InAs/AlSb quantum cascade lasers** L. Wie, A-z. Li, Y.-g. Zhang, G.-Y. Xu *State Key Laboratory of Functional Materials for Informatics, Shanghai, China*	130
P6	**InAs/GaSb/InSb short-period superlattice diode lasers emitting near 3.3 μm at room temperature** A. Gasseng, L. Cerutti, A.N. Baranov, and E. Tournié *Université Montpellier 2, CNRS, Montpellier, France*	132
P7	**Compressively Strained InGaSb/InAlGaSb quantum well lasers** G.R. Nash, S.J.B. Przeslak, S.J. Smith, C.J. Storey, S.D. Coomber, L. Buckle, A.D. Andreev, A. Krier, M. Yin, P. Carrington, M.T. Emeny, and T. Ashley *QinetiQ, Worcestershire, UK*	134
P8	**Focused ion beam polishing of GaInSb/AlGaInSb strained MQW laser facets** S.J.B. Przeslak, J.R. Pugh, G.R. Nash, M.J. Cryan, J.G. Rarity, P.J. Heard, S.J. Smith, C.J. Storey, A.D. Andreev, S.D. Coomber, L. Buckle, M.T. Emeny, and T. Ashley *QinetiQ, Worcestershire, UK*	136
P9	**Mid-infrared diode lasers based on pentanary GaInAsSbP alloys grown by LPE** M. Yin, A. Krier, P.J. Carrington, and N. Cook *Physics Department, Lancaster University, UK*	139
P10	**Intracavity difference-frequency generation in butt-joint diode lasers** V.Ya. Aleshkin, A.A. Dubinov, V.I. Gavrilenko, K.V. Maremyanin, S.V. Morozov, A.A. Biryukov, S.M. Nekorkin, B.N. Zvonkov, and Vl.V. Kocharovsky *Institute of Physics of Microstructures RAS, Nizhny Novgorod, Russia*	140