

# PROCEEDINGS OF SPIE

## ***Optical Sensing and Detection IV***

**Francis Berghmans**

**Anna G. Mignani**

*Editors*

**3–7 April 2016**

**Brussels, Belgium**

Sponsored by

SPIE

Cosponsored by

B-PHOT—Brussels Photonics Team (Belgium)

Research Foundation Flanders (Belgium)

Visit Brussels (Belgium)

Cooperating Organisations

Photonics 21 (Germany)

EOS—European Optical Society (Germany)

KTN—the Knowledge Transfer Network (United Kingdom)

Graphene Flagship (Belgium)

Photonics Public Private Partnership (Belgium)

Published by

SPIE

**Volume 9899**

Proceedings of SPIE 0277-786X, V. 9899

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Optical Sensing and Detection IV, edited by Francis Berghmans, Anna G. Mignani, Proc. of SPIE  
Vol. 9899, 989901 · © 2016 SPIE · CCC code: 0277-786X/16/\$18 · doi: 10.1117/12.2244523

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at [SPIEDigitalLibrary.org](http://SPIEDigitalLibrary.org).

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Optical Sensing and Detection IV*, edited by Francis Berghmans, Anna G. Mignani, Proceedings of SPIE Vol. 9899 (SPIE, Bellingham, WA, 2016) Six-digit Article CID Number.

ISSN: 0277-786X  
ISSN: 1996-756X (electronic)  
ISBN: 9781510601444

Published by

**SPIE**  
P.O. Box 10, Bellingham, Washington 98227-0010 USA  
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445  
[SPIE.org](http://SPIE.org)

Copyright © 2016, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at [copyright.com](http://copyright.com). Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/16/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.



[SPIEDigitalLibrary.org](http://SPIEDigitalLibrary.org)

---

**Paper Numbering:** Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a six-digit CID article numbering system structured as follows:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

# Contents

ix	Authors
xiii	Conference Committee

---

## SESSION 1 GEOMETRIC AND DYNAMOMETRIC SENSORS

---

- 9899 03 **Spatial filtering velocimetry for real-time out-of-plane displacement measurements**  
[9899-2]
- 9899 05 **Comparison of LASER and LED illumination for fiber optic fringe projection** [9899-4]
- 9899 06 **High-accuracy absolute distance measurement with a mode-resolved optical frequency comb** [9899-5]
- 9899 07 **Frequency comb-based depth imaging assisted by a low-coherence optical interferometer** [9899-6]

---

## SESSION 2 DETECTOR AND IMAGER TECHNOLOGY AND PHYSICS I

---

- 9899 08 **Near-infrared photodetectors based on PbS colloidal quantum dots (Invited Paper)**  
[9899-7]

---

## SESSION 3 DETECTOR AND IMAGER TECHNOLOGY AND PHYSICS II

---

- 9899 0B **Seven channel wavelength demultiplexer using a tandem a:SiC-H/a:Si-H photo sensor**  
[9899-10]
- 9899 0C **A logarithmic low dark current CMOS pixel** [9899-11]
- 9899 0D **LinoSPAD: a time-resolved 256×1 CMOS SPAD line sensor system featuring 64 FPGA-based TDC channels running at up to 8.5 giga-events per second** [9899-12]
- 9899 0E **Pixel-level continuous-time incremental sigma-delta A/D converter for THz sensors**  
[9899-13]

---

## SESSION 4 DETECTOR AND IMAGER TECHNOLOGY AND PHYSICS III

---

- 9899 0F **Added transmission capacity in VLC systems using white RGB based LEDs and WDM devices** [9899-14]
- 9899 0G **MUSIC: an 8 channel readout ASIC for SiPM arrays** [9899-15]

9899 0I **Fast and low noise optical receiver using Si APD for cloud-aerosol LIDAR** [9899-17]

9899 0J **Quantum filtering theory and the reduction of dark count, dark current and optical crosstalk in optical detectors** [9899-18]

---

**SESSION 5 MID-INFRARED SPECTROSCOPY**

---

9899 0K **Application of supercontinuum radiation for mid-infrared spectroscopy (Invited Paper)** [9899-19]

9899 0L **Method for enhanced infrared spectroscopy of molecules with nanorod arrays** [9899-20]

9899 0M **Sensitive detection of methane at 3.3  $\mu\text{m}$  using an integrating sphere and interband cascade laser** [9899-21]

9899 0O **Electron beam irradiation of materials and components to be used in mid-IR spectroscopy** [9899-23]

---

**SESSION 6 SPECTROSCOPY AND APPLICATIONS I**

---

9899 0P **Hyperspectral imaging and its applications (Invited Paper)** [9899-24]

9899 0Q **Standoff detection of gases using infrared laser spectroscopy** [9899-25]

9899 0R **Laser-induced breakdown spectroscopy for the remote detection of explosives at level of fingerprints** [9899-27]

9899 0S **Innovative quartz enhanced photoacoustic sensors for trace gas detection** [9899-28]

9899 0T **A simple configuration for static Fourier transform infrared spectrometers (Best Student Paper Award)** [9899-29]

---

**SESSION 7 SPECTROSCOPY AND APPLICATIONS II**

---

9899 0U **Investigation of stratigraphic mapping in paintings using micro-Raman spectroscopy** [9899-30]

9899 0W **Non-destructive testing of composite materials using terahertz time-domain spectroscopy** [9899-32]

9899 0X **One- and two-photon induced fluorescence spectroscopy enabling the detection of localized aflatoxin contamination in individual maize kernels** [9899-33]

9899 0Y **The influence of additional water content towards the spectroscopy and physicochemical properties of genus *Apis* and stingless bee honey** [9899-34]

---

**SESSION 8    OPTICAL FIBRE-BASED SENSORS I**

---

- 9899 0Z **Enabling technologies for fiber optic sensing (Invited Paper)** [9899-35]
- 9899 11 **Strain sensing with femtosecond inscribed FBGs in perfluorinated polymer optical fibers** [9899-37]
- 9899 12 **Determination of the magnetic field induced circular birefringence using the Mueller matrix of FBGs** [9899-38]
- 9899 13 **Modelling and simulation of a fibre Bragg grating strain sensor based on a magnetostrictive actuator principle** [9899-39]

---

**SESSION 9    OPTICAL FIBRE-BASED SENSORS II**

---

- 9899 15 **Cost-effective FBG interrogation combined with cepstral-based signal processing for railway traffic monitoring** [9899-41]
- 9899 16 **High sensitivity refractive index sensor based on large-angle tilted fiber grating with carbon nanotube deposition** [9899-42]
- 9899 17 **Formaldehyde sensing with plasmonic near-infrared optical fiber grating sensors** [9899-43]

---

**SESSION 10    OPTICAL FIBRE-BASED SENSORS III**

---

- 9899 18 **Zinc oxide coated optical fiber long period gratings for sensing of volatile organic compounds** [9899-44]
- 9899 1B **Hydrogel coated fiber Bragg grating based chromium sensor** [9899-47]

---

**SESSION 11    OPTICAL FIBRE-BASED SENSORS IV**

---

- 9899 1C **High temperature measurements in irradiated environment using Raman fiber optics distributed temperature sensing** [9899-48]
- 9899 1D **A novel structure optical fiber radiation dosimeter for radiotherapy applications** [9899-49]
- 9899 1E **Strain tuneable whispering gallery mode resonators in the estimation of the elasto-optic parameters of soft materials** [9899-50]
- 9899 1F **Recycling optical fibers for sensing** [9899-51]
- 9899 1G **Multiplexed refractive index-based sensing using optical fiber micro-cavities** [9899-52]
- 9899 1H **High temperature fiber sensor using the interference effect within a suspended core microstructured optical fiber** [9899-53]

---

**SESSION 12    RESONANT STRUCTURE-BASED SENSORS**

---

- 9899 1I **Resonant spatial tracking using nanostructured resonant waveguide grating for multispectral sensing by imaging [9899-54]**
- 9899 1J **Optimizing detection limits of optical resonator based sensors by optimization of real-time measurements of resonators response [9899-55]**
- 9899 1L **Application of optical whispering gallery mode resonators for rotation sensing [9899-57]**

---

**SESSION 13    SENSORS FOR MATERIAL CHARACTERISATION**

---

- 9899 1M **Transmission optical coherence tomography sensing [9899-58]**
- 9899 1N **Two-dimensional damage mapping of a glass-epoxy composite test sample by optical transmission analysis [9899-59]**
- 9899 1O **Using linear polarization for sensing and monitoring nanoparticle purity [9899-60]**
- 9899 1P **Optical sensing of peroxide using ceria nanoparticles via fluorescence quenching technique [9899-61]**

---

**SESSION 14    MOLECULAR SENSORS AND BIOSENSORS**

---

- 9899 1R **Highly sensitive detection using microring resonator and nanopores [9899-64]**
- 9899 1S **Biosensors based on Si<sub>3</sub>N<sub>4</sub> asymmetric Mach-Zehnder interferometers [9899-65]**
- 9899 1T **Strong interaction of molecular vibrational overtones with near-guided surface plasmon polariton [9899-66]**

---

**POSTER SESSION**

---

- 9899 1W **Registration of infrared and visual images based on phase grouping and mutual information of gradient orientation [9899-71]**
- 9899 1X **Optical instrumentation systems for environmental and structural health monitoring based on the molecular condensation nuclei (MCN) detector [9899-72]**
- 9899 1Y **Autocollimation sensor for measuring the deformations of objects and modules containing environmentally hazardous substances [9899-74]**
- 9899 1Z **Design of liquid temperature sensor based on bending loss phenomenon of plastic optic fiber and electro-optic effect of Mach-Zehnder interferometer [9899-75]**
- 9899 20 **An interferometric vibration sensor based on a four-core optical fiber [9899-76]**

- 9899 21 **Dual POF and prism sensor for liquid concentration measurement based on hysteresis area** [9899-77]
- 9899 22 **Laser diode Doppler velocimeter with 3-beams and self-mixing effect enabling 3-dimensional velocity measurement** [9899-78]
- 9899 23 **Novel multichannel surface plasmon resonance photonic crystal fiber biosensor** [9899-79]
- 9899 28 **Design and verification of the miniature optical system for small object surface profile fast scanning** [9899-84]
- 9899 2A **Laser intensity modulated real time monitoring cell growth sensor for bioprocess applications** [9899-86]
- 9899 2B **Numerical analysis of a 3D optical sensor based on single mode fibre to multi-mode interference graphene design** [9899-87]
- 9899 2C **Investigation of creating possibilities of multi-channel optical system with discrete angular field** [9899-88]
- 9899 2E **Fiber Bragg grating-based wavelength modulation spectroscopy technique for trace gas sensing** [9899-90]
- 9899 2F **Inverse Abel transform algorithms to determine the radial profile of the photoelastic coefficient of glass optical fibers** [9899-91]
- 9899 2G **Distribution of polarization sensitivity on the arbitrarily oriented matrix photodetectors** [9899-92]
- 9899 2H **Objective for corona discharge monitoring** [9899-93]
- 9899 2I **Fiber Bragg gratings embedded inside glued laminated timbers: an overview and evaluation** [9899-94]
- 9899 2J **Mode-mode fiber interferometer with impact localization ability** [9899-95]
- 9899 2M **Recognition of pharmaceuticals with compact mini-Raman-spectrometer and automated pattern recognition algorithms** [9899-98]
- 9899 2N **Phase retrieval from multiple binary masks generated speckle patterns** [9899-99]
- 9899 2P **Fiber optic humidity sensing with few layers molybdenum disulfide** [9899-102]
- 9899 2Q **Development and investigation of MOEMS type displacement-pressure sensor for biological information monitoring** [9899-103]
- 9899 2R **Average power meter for laser radiation** [9899-104]
- 9899 2S **Coreless side polished fiber as ultra-sensitive refractive index sensor** [9899-105]
- 9899 2T **Spectral analysis of bacanora (agave-derived liquor) by using FT-Raman spectroscopy** [9899-106]

- 9899 2U **Search a methane hydrate in the Arctic with photonics methods** [9899-107]
- 9899 2V **Specifics of signal generation in receivers based on thermoelastic effect at multiple impulse exposure** [9899-108]
- 9899 2W **Fast and cheap prototyping of nonstandard optical components for sensing speckle dynamics** [9899-109]
- 9899 2X **Multiphysical simulations of passive ring cavities** [9899-110]
- 9899 2Y **Dynamic angle-measurement system for direction determining** [9899-111]
- 9899 2Z **Detection of bacteria using bacteriophage with hollow gold nanostructures immobilized fiber optic sensor** [9899-112]
- 9899 30 **Fiber optic interferometer as a security element** [9899-113]
- 9899 33 **Experimental and theoretical investigation of the effect of laser parameters on laser ablation and laser-induced plasma formation** [9899-116]
- 9899 34 **System of the optic-electronic sensors for control position of the radio telescope elements** [9899-117]

# Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

- |                                    |                                 |
|------------------------------------|---------------------------------|
| Acheroy, Sophie, 2F                | Chen, Dong, 1W                  |
| Aladov, Andrei V., 1X              | Chen, Zhe, 2P, 2S               |
| Alberto, Nélia, 1F                 | Chen, Ziyin, 1D                 |
| Alcaraz de la Osa, Rodrigo, 1O     | Chernomyrdin, Nikita V., 0W     |
| AlmaViva, S., 0R                   | Chertov, Alexandr N., 2C        |
| Alrayk, Yassmin K. A., 23          | Chi, Sheng, 28                  |
| Aluculesei, Alina, 1E              | Chivanov, Alexey N., 2H         |
| André, Paulo, 1F                   | Choubey, Bhaskar, 0C            |
| André, Ricardo M., 1G              | Ciobanu, Savu-Sorin, 33         |
| Antunes, Paulo, 1F                 | Coelho, L., 18                  |
| Apostolidis, Georgios K., 0U       | Colace, L., 08                  |
| Arif, Raz N., 16                   | Collin, Stéphane, 0L            |
| Babu, P. Ravindra, 2A              | Conti Nibali, Valeria, 2M       |
| Badmos, Abdulyezir A., 16          | Costa, J., 0F                   |
| Baranov, Yuri P., 2H               | Crăciun, Gabriela, 0O           |
| Barata, M., 0B                     | Cubik, Jakub, 30                |
| Bardou, Nathalie, 0L               | Curticapean, Dan, 2T            |
| Barreda, Ángela I., 1O             | Davin, Tanguy, 1N               |
| Bartelt, Hartmut, 1G               | Davis, N. M., 0M                |
| Bartholmai, M., 13                 | Davoli, Federico, 0T            |
| Basedau, F., 13                    | Debliquy, Marc, 17              |
| Beauvois, Gwendal, 1C              | De Dominicis, L., 0R            |
| Beck, U., 13                       | De Iacovo, A., 08               |
| Bednarek, Lukas, 30                | Dellith, Jan, 1G                |
| Benisty, Henri, 11                 | Denisov, Victor M., 2G          |
| Berghmans, Francis, 2F             | Descamps, Frédéric, 12          |
| Bette, Sébastien, 12               | Devi, V. Rama, 2A               |
| Bhattacharya, Nandini, 06          | Di Florio, Giuseppe, 2M         |
| Bienstman, P., 1R                  | Dinakar, D., 2A                 |
| Bijster, J. G., 1M                 | Dmitrieva, A. D., 1L            |
| Blairon, Sylvain, 1C               | Domingues, Fátima, 1F           |
| Bokhman, E. D., 2Y                 | Dong, Huazhuo, 2S               |
| Boldo, Didier, 1C                  | Dong, Lei, 0S                   |
| Bonifazi, G., 0P                   | Dupuy, J., 15                   |
| Bougot-Robin, Kristelle, 1I, 1R    | Duval, Hervé, 1C                |
| Brandstetter, Markus, 0K           | Ebendorff-Heidepriem, Heike, 1H |
| Brenner, Carsten, 2M               | Edel, J. B., 1R                 |
| Brunetti, Alessandro Michel, 0C    | El Deeb, Walid S., 23           |
| Bruschini, Claudio, 0D             | Elizarov, Valentin, 2U          |
| Burri, Samuel, 0D                  | Esen, Cemal, 2M                 |
| Cao, Wenbin, 1I                    | Fajkus, Marcel, 30              |
| Carrel, Frédéric, 1C               | Falke, Floris H., 1S            |
| Caucheteur, Christophe, 12, 15, 17 | Farnan, Martin, 0Z              |
| Caussanel, Matthieu, 1C            | Fernández, Gerard, 0G           |
| Cekas, Elingas, 2Q                 | Filatov, Yuri V., 1L, 2X, 2Y    |
| Chalyan, Tatevik, 1S               | Foglia, S., 08                  |
| Chapalo, Ivan, 2J                  | Francis, D., 0M                 |
| Charbon, Edoardo, 0D               | Fujikawa, Chiemi, 22            |
| Chauvin, David, 1J                 | Fytas, George, 1E               |

- Gaballah, S., 1P  
 Gandolfi, Davide, 1S  
 Gascón, David, 0G  
 Gasmi, Khaled, 0I  
 Gavdush, Arseniy A., 0W  
 Geernaert, Thomas, 2F  
 Giglio, Marilena, 0S  
 Gobi, K. Vengatajalabathy, 1B  
 Gökbüyük, Belkis, 20  
 Gómez, Sergio, 0G  
 Gong, Hai, 2N  
 Gong, X., 13  
 González, Francisco, 1O  
 González-Vila, Á., 17  
 Gorbunova, Elena V., 2C  
 Graciani, Ricardo, 0G  
 Grafen, Markus, 2M  
 Grieu, Stéphane, 1C  
 Grishkanich, Aleksandr S., 2U  
 Guan, Heyuan, 2P  
 Guan, Junwen, 2S  
 Guider, Romain, 1S  
 Haïdar, Riad, 0L  
 Halkare, Pallavi, 2Z  
 Hameed, Mohamed Farhat O., 23  
 Hanson, S. G., 2W  
 Havenith, Martina, 2M  
 Hayasaki, Yoshio, 07  
 Heideman, René G., 1S  
 Henke, Erich, 2M  
 Hoang, Van Phong, 1Y  
 Hodgkinson, J., 0M  
 Hofmann, D., 13  
 Hofmann, Martin R., 2M  
 Homulle, Harald, 0D  
 Hoste, J. W., 1R  
 Hu, Po-Chi, 28  
 Hu, Yaosheng, 1D  
 Huang, Jen-Yu, 28  
 Hunsinger, Jean-Jacques, 1N  
 Ibrahim, Selwan K., 0Z  
 Inci, M. Naci, 20  
 Ishanin, Gennady G., 2R, 2V  
 Ivanov, P. A., 2Y  
 Jafri, Zubir M., 2B  
 Jähme, Hendrik, 2M  
 Jakobsen, M. L., 03, 2W  
 Jan, Chia-Ming, 28  
 Janusas, Giedrius, 2Q  
 Jaworski, Piotr, 0Q  
 Kalkman, J., 1M  
 Kalli, K., 11  
 Karabacak, Devrez M., 0Z  
 Karabchevsky, Alina, 1T  
 Karagiannis, Georgios Th., 0U  
 Kaschcheev, Sergey, 2U  
 Kästner, Markus, 05  
 Katelevsky, Vadim Ya., 1X  
 Khatib, Moustafa, 0E  
 Kilgus, Jakob, 0K  
 Kinet, Damien, 12, 15  
 Köppe, E., 13  
 Kondabagil, Kiran, 2Z  
 Konyakhin, Igor A., 1Y, 34  
 Korotaev, Valery V., 2G, 2H  
 Kotov, Oleg, 2J  
 Kouroussis, G., 15  
 Krebber, K., 11  
 Kühn, Jan, 2W  
 Kukaev, Alexander S., 2X  
 Kumar, Santosh, 1Z  
 Kuptsov, Vladimir D., 1X  
 Lacraz, A., 11  
 Laffont, Guillaume, 1C  
 Lahem, D., 17  
 Lai, Ti-Yu, 28  
 Lainé, Frédéric, 1C  
 Lazic, V., 0R  
 Le Thomas, N., 1R  
 Lebuffe, Stéphane, 1N  
 Lecomte, Pierre, 1C  
 Ledoux-Rak, Isabelle, 1J  
 Lee, Shu-Sheng, 28  
 Lešundák, Adam, 06  
 Lewis, Elfed, 1D  
 Li, Dongquan, 2P  
 Li, Jicheng, 1W  
 Li, Shunbo, 1I  
 Louro, P., 0B, 0F  
 Lu, Huihui, 2P, 2S  
 Luo, Yunhan, 2P, 2S  
 M., Sai Shankar, 1B, 21  
 M., Satyanarayana, 1B  
 Ma, Yu, 1D  
 Mail, Mohd Hafiz, 0Y  
 Mak, Andrey, 2U  
 Malinauskas, Karolis, 2Q  
 Malishev, Alexey V., 1Y  
 Mănilă, Elena, 0O  
 Maraev, Anton A., 2R, 2V  
 Marques, Carlos, 1F  
 Martinek, Radek, 30  
 Martins de Almeida, José Manuel Marques, 18  
 Matthias, Steffen, 05  
 Maunika, T., 2A  
 Mauricio, Joan, 0G  
 Mégret, P., 17  
 Menicucci, I., 0R  
 Merken, Patrick, 2F  
 Meulebroeck, W., 0X  
 Mihai, Laura, 0O  
 Mikami, Osamu, 22  
 Milenko, Karolina, 1E  
 Moeyaert, V., 15  
 Monro, Tanya M., 1H  
 Moreno, Fernando, 1O  
 Moselund, Peter M., 0K  
 Mukherji, Soumyo, 2Z  
 Müller, Petra, 0K  
 Mutter, Kussay N., 2B

- Nedoma, Jan, 30  
 Nguyen, Chi Thanh, 1J  
 Nguyen, Linh V., 1H  
 Nikodem, Michał, 0Q  
 Nikonovich, Maxim Y., 0W  
 Novak, Martin, 30  
 Nuvoli, M., 0R  
 Obayya, S. S. A., 23  
 Obrezkov, Andrey V., 2H  
 Olesen, A. S., 03, 2W  
 Omar, Ahmad Fairuz, 0Y  
 Ortega Clavero, Valentin, 2T  
 Ostasevicius, Vytautas, 2Q  
 Ostendorf, Andreas, 2M  
 Ottevaere, Heidi, 2F  
 Özcan, Meriç, 0T  
 P. V. N., Kishore, 1B, 21, 2A  
 Palevicius, Arvydas, 2Q  
 Palucci, A., 0R  
 Pasquardini, Laura, 1S  
 Patimisco, Pietro, 0S  
 Pavesi, Lorenzo, 1S  
 Pavlov, P. A., 2Y  
 Pedersen, H. C., 2W  
 Pederzolli, Cecilia, 1S  
 Perenzoni, Matteo, 0E  
 Petrochenko, Andrey, 34  
 Pham, Quang Duc, 07  
 Pisarev, Viktor N., 2H  
 Pissadakis, Stavros, 1E  
 Pistilli, M., 0R  
 Polyakov, Vadim, 2U  
 Pozzi, Paolo, 2N  
 Punjabi, Nirmal, 2Z  
 Putha, Kishore, 1B, 21, 2A  
 Qin, Zhuang, 1D  
 Raeymaekers, S., 0X  
 Reithmeier, Eduard, 05  
 Repin, Vladislav A., 2C  
 Rodionov, Andrey Yu., 2H  
 Roy, Sourabh, 2I  
 Rozhin, Alex, 16  
 Ryzhova, Victoria A., 2G  
 Sahre, M., 13  
 Saiz, José M., 1O  
 Samir, E., 1P  
 Sampaolo, Angelo, 0S  
 Samson, Armien John, 0J  
 Sanchez, David, 0G  
 Santos, J. L., 18  
 Sanuy, Andreu, 0G  
 Sanz, Juan M., 1O  
 Sardari, Behzad, 0T  
 Scamarcio, Gaetano, 0S  
 Schreuder, Eric, 1S  
 Schröder, Werner, 2T  
 Schukar, M., 11  
 Schukar, V., 13  
 Scopa, L., 08  
 Seenii, Azman, 0Y  
 Serio, Bruno, 1N  
 Serranti, S., 0P  
 Shaalan, A. A., 23  
 Shaikh, Nishath Ashfak, 21  
 Shalabney, Atef, 1T  
 Shalymov, Egor V., 1L, 2X  
 Shehata, N., 1P  
 Shevnina, Elena I., 2R, 2V  
 Sidorov, Igor, 2U  
 Silva, V., 0B, 0F  
 Singer, Johannes M., 0Z  
 Smeesters, L., 0X  
 Soetebier, Jens, 2M  
 Soloviev, Oleg, 2N  
 Soujanya, P., 2A  
 Spagnolo, Vincenzo, 0S  
 Sporea, Adelina, 0O  
 Sporea, Dan, 0O, 33  
 Srinivasan, Balaji, 2E  
 Stachowiak, Dorota, 0Q  
 Stajanca, P., 11  
 Stancalié, Andrei, 33  
 Stepashkin, Ivan, 34  
 Stubager, J., 2W  
 Sun, Qizhen, 16  
 Sun, Weimin, 1D  
 Swaminathan, S., 1Z  
 Taillade, Frédéric, 1C  
 Tan, Kok Chooi, 0Y, 2B  
 Tardieu, Clément, 0L  
 Tatam, R. P., 0M  
 Thienpont, Hugo, 0X, 2F  
 Tittel, Frank K., 0S  
 Tiwari, Shivani, 2E  
 Trull, A. K., 1M  
 Trushkina, Anna V., 2G  
 Valyukhov, Vladimir P., 1X  
 van den Berg, Steven A., 06  
 van der Horst, J., 1M  
 van Eldik, Sjoerd, 06  
 Vasa, Nilesh J., 2E  
 Vasinek, Vladimir, 30  
 Vcelak, J., 2I  
 Vdovin, Gleb, 2N  
 Velebil, L., 2I  
 Venediktov, Vladimir Yu, 1L, 2X  
 Verhaegen, Michel, 2N  
 Verlinden, O., 15  
 Videen, Gorden, 1O  
 Viegas, D., 18  
 Vieira, M., 0B, 0F  
 Vieira, M. A., 0B, 0F  
 Vincent, Grégory, 0L  
 Voigt, Dirk, 06  
 Wangchuk, Jigme, 2Z  
 Warren-Smith, Stephen C., 1G, 1H  
 Weber, Andreas, 2T  
 Wen, Weijia, 1I  
 Westphal, A., 13  
 Wu, Zhuoqi, 2P, 2S

Yahaya, Ommi Kalsom Mardziah, 0Y  
Yakovlev, Egor V., 0W  
Yan, Zhijun, 16  
Yang, Guopeng, 1W  
Yang, Weiping, 1W  
Yu, Jianhui, 2P, 2S  
Yura, H. T., 03  
Yurchenko, Stanislav O., 0W  
Zaneti, Manuela, 1S  
Zavodny, Petr, 30  
Zaytsev, Kirill I., 0W  
Zboril, Ondrej, 30  
Zelený, R., 2I  
Zhang, Daxin, 1D  
Zhang, Jun, 2P, 2S  
Zhang, Junxi, 16  
Zhang, Lin, 16  
Zhang, Zhilong, 1W  
Zhao, Wenhui, 1D  
Zhevlikov, Aleksandr, 2U  
Zotov, Arsen K., 0W

# Conference Committee

## Symposium Chairs

**Francis Berghmans**, Vrije Universiteit Brussel (Belgium)  
**Jürgen Popp**, Leibniz-Institut für Photonische Technologien e.V.  
(Germany)  
**Ronan Burgess**, European Commission (Belgium)  
**Peter Hartmann**, SCHOTT AG (Germany)

### *Honorary Symposium Chair*

**Hugo Thienpont**, Vrije Universiteit Brussel (Belgium)

## Conference Chairs

**Francis Berghmans**, Vrije Universiteit Brussel (Belgium)  
**Anna G. Mignani**, Istituto di Fisica Applicata Nello Carrara (Italy)

## Conference Programme Committee

**Francesco Baldini**, Istituto di Fisica Applicata Nello Carrara (Italy)  
**Hartmut Bartelt**, Institut für Photonische Technologien e.V. (Germany)  
**Brian Culshaw**, University of Strathclyde (United Kingdom)  
**Thomas Geernaert**, Vrije Universiteit Brussel (Belgium)  
**Roger M. Groves**, Technische Universiteit Delft (Netherlands)  
**Jane Hodgkinson**, Cranfield University (United Kingdom)  
**Jiri Homola**, Institute of Photonics and Electronics of the ASCR, v.v.i.  
(Czech Republic)  
**Leszek Roman Jaroszewicz**, Military University of Technology (Poland)  
**Elfed Lewis**, University of Limerick (Ireland)  
**Alexis Mendez**, MCH Engineering LLC (United States)  
**Luc Thevenaz**, Ecole Polytechnique Fédérale de Lausanne  
(Switzerland)  
**Moshe Tur**, Tel Aviv University (Israel)  
**Waclaw Urbanczyk**, Wroclaw University of Technology (Poland)  
**Jan Van Roosbroeck**, FBGS International (Belgium)  
**David J. Webb**, Aston University (United Kingdom)  
**Libo Yuan**, Harbin Engineering University (China)

## Session Chairs

## Geometric and Dynamometric Sensors **Francis Berghmans**, Vrije Universiteit Brussel (Belgium)

Mid-Infrared Spectroscopy

**Anna G. Mignani**, Istituto di Fisica Applicata Nello Carrara (Italy)

Detector and Imager Technology and Physics III

**Thomas Geernaert**, Vrije Universiteit Brussel (Belgium)

Spectroscopy and Applications I

**Anna G. Mignani**, Istituto di Fisica Applicata Nello Carrara (Italy)

Spectroscopy and Applications II

**Anna G. Mignani**, Istituto di Fisica Applicata Nello Carrara (Italy)

Optical Fibre-based Sensors I

**Thomas Geernaert**, Vrije Universiteit Brussel (Belgium)

Optical Fibre-based Sensors II

**Thomas Geernaert**, Vrije Universiteit Brussel (Belgium)

Optical Fibre-based Sensors III

**Christophe Caucheteur**, Université de Mons (Belgium)

Optical Fibre-based Sensors IV

**Christophe Caucheteur**, Université de Mons (Belgium)

Resonant Structure-based Sensors

**Thomas Geernaert**, Vrije Universiteit Brussel (Belgium)

Sensors for Material Characterisation

**Francis Berghmans**, Vrije Universiteit Brussel (Belgium)

Molecular Sensors and Biosensors

**Francis Berghmans**, Vrije Universiteit Brussel (Belgium)