



7th International Conference on Optics,
Photonics and Lasers

Conference Programme

15-17 May 2024

Palma de Mallorca (Balearic Islands), Spain



Message from Chairman

On behalf of Organizing Committee, I would like to welcome you to the 7th International Conference on Optics, Photonics and Lasers (OPAL' 2024), which will take place on 15-17 May 2024 in Palma de Mallorca, Mallorca (Balearic Islands), Spain.

The Series of annual OPAL conferences is a forum for presentation, discussion, exchange of information and latest research and development results in both theoretical and experimental research in optics, photonics and lasers, and their related fields. It brings together researchers, developers, and practitioners from diverse fields including international scientists and engineers from academia, research institutes and companies to present and discuss the latest results in the mentioned field.

The first OPAL' 2018 conference was held in Barcelona, Spain, the second OPAL' 2019 – in Amsterdam, The Netherlands, the third OPAL' 2020 conference – online, the fourth OPAL' 2021 – in Corfu, Greece, the fifth OPAL' 2022 – in Adeje, Tenerife (Canary Islands), Spain and the sixth OPAL' 2023 – in Funchal (Madeira Island), Portugal.

The conference is organized by the *International Frequency Sensor Association (IFSA)* – one of the major professional, non-profit association serving for industry and academy since 1999, with media partners: *Institute of Physics (IOP)*, (UK), *PhysicsWorld* (UK), *MDPI Applied Sciences* and *MDPI Photonics* open access journals (Switzerland), in technical cooperation with *IFSA Publishing S. L.* (Spain).

The previous OPAL conferences have attracted researchers and practitioners in the related fields, from around the world. The events are focusing any significant breakthrough and innovation in Optics, Photonics and Lasers, and its applications with broadest concept.

We trust that you will find OPAL' 2024 conference professionally rewarding and stimulating as well as enjoyable. Welcome to OPAL' 2024 !

Prof., Dr. Sergey Y. Yurish
OPAL' 2024 Conference Chairman

Conference Venue

The Conference will take place on 15-17 May 2024 in Melia Palma Marina Hotel, conference rooms Melia Meeting 10 and 11. Address: Avenida Gabriel Roca, 29, Mallorca – Palma.

Insurance and Liability

The conference organizers do not accept responsibility for any individual, medical, travel or personal insurance policies as necessary.

Registration

The Registration Desk is open in the Melia Palma Marina Hotel:

- Tuesday, 14 May, 20:00-21:30 (in the Welcome Cocktail area)
- Wednesday, 15 May, 8:45-18:00 (in the conference room *Melia Meeting 10*)
- Thursday, 16 May, 8:45-18:00 (in the conference room *Melia Meeting 10*)
- Friday, 17 May, from 8:45-12:00 (in the conference room *Melia Meeting 10*)

Language

The official language of the Conference is English. There will be no simultaneous interpretation.

Conference Identification Tag

The Organizing Committee request that you wear your identification tag (badge) at all times during the conference. Your conference identification tag will serve as your admission to all conference paper presentation sessions and social events.

Coffee/Tea Refreshment

Coffee/tea will be served in the Conference Room *Melia Meeting 10* at the times indicated in the programme.

Special Issues of journals

Selected and extended papers from the conference will be published in the special issue on '*Optic, Photonics & Lasers*' of open access *Sensors & Transducers* journal (ISSN: 2306-8515, e-ISSN 1726-5479) published in both: print and electronic formats, or in the special issue on '*Advances in Optics, Photonics and Lasers*' of MDPI *Applied Sciences* open access journal (ISSN: 2076-3417), or in the special issue on '*Photonic Integrated Circuits, Sensors and Instrumentation*' of MDPI *Photonics* open access journal (ISSN 2304-6732). Both MDPI open assess journals are in electronic format. All authors of selected papers will be invited to submit their extended papers into the appropriate journals.

'Advances in Optics' Book Series

The limited number of papers will be selected by the journal's Editorial Board to extend into book chapters for the 'Advances in Optics', Book Series, Vol. 7. This open access book volume will be published at the end of 2024. The first six volumes published in 2018-2022 have been accepted by all Optical Community with a great enthusiasm.

Organizing Committee

Chairman

Prof., Dr. Sergey Y. Yurish (*IFSA, Spain*)

Advisory Chairmen

Dr. Qiang Wu (*Northumbria University, Newcastle Upon Tyne, UK*)

Prof. Claude Phipps (*Photonic Associates, USA*)

Prof. Boris Mizaikoff (*Ulm University, Germany*)

Prof. George Semouchkin (*Michigan Technological University, USA*)

Prof. Sandeep Singh Sengar (*Cardiff Metropolitan University, UK*)

Dr. Aleksej Rodin (*State Research Institute Center for Physical Sciences and Technology, Lithuania*)

Dr. Vladyslav Usenko (*Palacky University Olomouc, Czech Republic*)

Conference and Publication Manager

Mrs. Tetyana Zakharchenko (*IFSA Publishing, S.L., Spain*)

Welcome Cocktail

14 May 2024, Tuesday (20:00-21:30), Melia Palma Marina Hotel. Do not miss this opportunity to say the first "hello" to attendees and committee members.

Gala Dinner

16 May 2024, Thursday (20:00-23:30). The Gala Dinner will take place in the Melia Palma Marina Hotel.

Best Paper Awards

MDPI Photonics and MDPI Applied Sciences Open Access journals have announced two Best Paper Awards (500.00 EUR each), which will be given to the authors of the best papers and presented at the OPAL' 2024 conference in oral.

Panel Discussion on 'Comparing Ablative and Pure Photon Propulsion', (16 May 2024, Thursday, 16:30 – 17:30)

Moderator: Dr. Claude Phipps,
Photonic Associates LLC, (Santa Fe, NM, USA)

Panelists:

1. Prof. Eniko Gyorgy,
Institut de Ciència de Materials de Barcelona (Barcelona, Spain)
2. Prof. Gediminas Raciukaitis,
Center for Physical Sciences and Technology, (Vilnius, Lithuania)

Conference's web site:

<http://www.opal-conference.com>

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Keynote Speakers



Prof., Dr. Claas Falldorf
*BIAS - Bremen Institut für angewandte
Strahltechnik, GmbH
Germany*

Beyond Lenses: Unlocking the Potential of Digital Holography for Optical Inspection

Abstract: Optical metrology serves as a cornerstone technology in modern industrial production, playing a crucial role in ensuring the quality and efficiency of products and processes. Currently, we see a trend towards the development of lensless imaging methods in optical metrology, which could lead to a significant departure from traditional lens-based approaches. This development is driven by the recognition of the inherent benefits offered by lensless imaging systems, including compactness, lightweight design, and enhanced flexibility.

In the realm of lensless imaging, digital holography has emerged as a strong contender, offering great advantages, such as compact sensor design, short acquisition times and enhanced depth of focus. Digital holography harnesses the principles of interference and diffraction to capture and reconstruct three-dimensional images of objects with high precision and fidelity. Furthermore, its ability to provide quantitative phase information makes it particularly well-suited for applications in biology and industrial inspection.

In this presentation, I will provide a comprehensive overview over the concept of digital holography with special emphasize on lensless microscopy and its potential for industrial inspection and biological imaging. I will showcase our recent advancements in high-resolution imaging and lensless white light interferometry and provide measurement examples from the fields of biology and wafer level inspection. Furthermore, I will discuss limitations and the future potential of the method, addressing questions surrounding the scalability and performance of lensless imaging systems and microscopes.

Short Biography Claas Falldorf holds a Ph.D. degree in physics and has over 15 years of expertise in coherent optics. He serves as the head of the Coherent Optics and Nanophotonics Group at the Bremer Institute für angewandte Strahltechnik (BIAS) in Bremen, Germany, and is lecturer at the University of Bremen. One of his primary objectives is to bridge the gap between the latest advancements in optical metrology research and their practical implementation in industry. He authored and coauthored more than 150 publications in areas such as optical metrology, light field synthesis, digital holography, and signal processing, and is co-author of the book *'Digital Holography and Wavefront Sensing'*, which is considered a standard work in the field of digital holography.



Prof., Dr. Walter Belardi

*Department of Engineering and Architecture,
University of Parma,
Italy*

Gas Filled Hollow Core Optical Fibers: Design, Properties and Applications

Abstract: Hollow core optical fibers can efficiently guide light in air, within an extended wavelength range. Their adoption as a passive means for optical transmission is of particular interest for short and long-haul optical communications. However, also filling them with gases of various chemical compositions reveal to be advantageous for several applications. Firstly, this can be exploited for building novel gas-based fiber laser sources in spectral domains, or with properties, inaccessible by using conventional optical fibers. Secondly, the presence of even extremely low hazardous gas concentrations within the central core of these hollow fibers can be detected. This can be exploited by building compact hollow core fiber-based sensor devices, by using various forms of optical detection techniques. Finally, gas-based hollow core fibers could be also exploited in the field of quantum information.

Short Biography:

Since his PhD studies, at the ORC, Southampton (UK), Prof. Belardi has cumulated over 20 years' experience in the field of Specialty Optical Fibers. After having worked at the University of Bath (UK) and at the ORC, he held an Excellence Research Chair in Photonics at the University of Lille, France. After 2020, he was also the General Coordinator of the European Project GADEIRE. He joined the University of Parma, Italy, in 2023. Prof. Belardi is one of the main pioneers in the field of hollow core antiresonant optical fibers, particularly with the very first theoretical conception, proposal, and fabrication, in 2013, of a novel structure of hollow core optical fiber, that became later the most important candidate for high-capacity data transmission with low latency and loss. Moreover, he has given major contributions to the development of simplified hollow core optical fibers for practical use in the mid-infrared spectral range.



Prof., Dr. Satyendra Kumar Mishra
*SRCOM, Centre Tecnològic de
Telecomunicacions de Catalunya,
Spain*

Investigation of Long-Haul 4×10 Gbps Optical Wireless Communication System

Abstract: In the previous two decades, optical wireless communication (OWC) has made significant progress and is now considered a promising candidate for long/short-transmission access in fifth-generation networks. This presentation investigates and designs a 40 Gbps bi-rate high-speed OWC. Based on results from the simulation, the system can provide an OWC range of up to 78-83 km when considering shot noise, thermal noise, geometrical losses, and additional losses into account. There is an acceptable bit error rate of 10^{-9} . The system offers faithful communication for a link attenuation of 1-1.85 dB/km over a 10 km range with a system attenuation of 1-1.85 dB/km. Furthermore, faithful transmission is improved by obtaining better eye patterns. This design also offers superior performance over traditional optical wireless communication designs in terms of data rate, maximum coverage, robustness, and ability to handle many users cost-effectively. Therefore, an OWC system will maintain a significant role as well as serve as the next rising star in the implementation of high-speed communication towards smart housing, intelligent transportation, smart cities, and intelligent society.

Short Biography:

Prof., Dr. Satyendra Kumar Mishra has got his PhD degree at IIT Delhi India in October 2015. Now he is working in the Space and Resilient Communications and Systems (SRCOM) Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Public Research Institute, Castelldefels, Barcelona, Spain. His research interests are quantum communication, quantum sensors, fiber and waveguide-based sensor, metasurface, OAM beam spectroscopy and optical communication. Prof. Mishra is also focused on the various technologies in the area of photonics, beamlines, etc. He has published 96 articles and conference papers, and got several awards. Prof. Satyendra Kumar Mishra is the Editorial Member in the American Chemical Society of Optics and Photonics Journal. He has given 14 invited talks in the Australia, India, Hong-Kong, Japan, Spain and the USA.

Programme at Glance

Time/Date (GMT+2)	15.05.2024 Wednesday	16.05.2024 Thursday	17.05.2024 Friday
	<i>Conference Room Melia Meeting 11</i>		
8:45-9:00	Registration	Registration	Registration
9:00-9:15	* Opening Session Sergey Y. Yurish	* Daily announcements	* Daily announcements
9:15-10:00	Keynote Speaker I Claas Falldorf <i>BIAS, GmbH (Germany)</i>	Keynote Speaker II Walter Belardi <i>University of Parma, (Italy)</i>	Keynote Speaker III Satyendra Kumar Mishra, SRCOM <i>(Spain)</i>
10:00-10:30	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>
10:30-12:30	Regular Session: Linear & Nonlinear Optics	Regular Session: Photonics, Nano & Micro Optics	Regular Session: Optical Computing, Communication and Quantum Information
12:30-13:30	<i>Lunch on your own</i>	<i>Lunch on your own</i>	<i>Lunch on your own</i>
13:30-14:00	<i>Invited Speaker II</i> V. Freilikher <i>Bar-Ilan University (Israel)</i>	<i>Invited Speaker I</i> H. J. Eichler <i>Technische Universität Berlin (Germany)</i>	<i>Invited Speaker III</i> A. Belosludtsev <i>FTMC (Lithuania)</i>
14:00-16:00	Regular Session: Optical Sensors, Systems and Materials	Regular Session: Lasers and Its Applications	<i>Poster Session & Farewell Cocktail (Conference Room Melia Meeting 10)</i>
16:00-16:30	<i>Coffee Break</i>	<i>Coffee Break</i>	* Closing Session (Conference Room Melia Meeting 11)
16:30-18:30	Regular Session: Applied Optics	<i>Panel Discussion on Comparing Ablative and Pure Photon Propulsion (16:30 – 17:30)</i>	-
18:30-20:00	-	-	
20:00-23:30	-	<i>Gala Dinner</i>	

* The must attend sessions.

Technical Conference Programme

Day 1

15 May 2024, Wednesday

Regular Session: Linear and Nonlinear Optics

Chairman: Prof., Dr. Claas Falldorf

BIAS - Bremen Institut für angewandte Strahltechnik, GmbH
(Germany)

- 1. Omnidirectional Panoramic Lens Applications**
Claudio Pernechele, Paolo Martini and Emanuele Simioni
(Italy)
- 2. Lensless Depth Discrimination Based on Speckle Contrast in Holographic Imaging**
Mostafa Agour, Claas Falldorf and Ralf B. Bregmann
(Germany)
- 3. Optimization of Reactive Ion Etching for Fabrication of Multilevel Silicon Fresnel Lenses**
A. Bouchouri, M. N. Akram, Per Ohlckers and Xuyuan Chen
(Norway)
- 4. Recent Advances in the Development of Few-cycle Mid-IR Laser Based on OPCPA and SRRS**
Augustinas Petrulėnas, Paulius Mackonis, Augustė Černekytė and Aleksej Rodin
(Lithuania)
- 5. Excitation of a Stimulated Rotational Raman Scattering Comb in a Hydrogen Cell**
Augustė Černekytė, Augustinas Petrulėnas, Paulius Mackonis and Aleksej Rodin
(Lithuania)
- 6. Synthesis, Growth and Theoretical Examination of Nonlinear Optical Attributes in L-threoninium p-toluenesulfonate Monohydrate (LTPTM) Single Crystals** (pre-recorded video)
Suminda Dalal and Mohammad Jane Alam (India)

Regular Session: Optical Sensors, Systems and Materials

Chairman: Prof. Dr. Hans Joachim Eichler

Technische Universität Berlin, Institute of Optics, Berlin, Germany

- 1. Controlling Light Transmission Through Disordered Media**
(Invited Presentation)
Valentin Freilikher (*Israel*)
- 2. Nonflammable Optical Rotary Encoder Potentially Suitable for EXplosive ATmospheres (ATEX)**
Víctor Llamas Martínez, Xavier Mateos Ferré, Pep Bruguera Pruna, Arcadi Castanyer Caballe and Josep Maria Serres Castanet
(*Spain*)
- 3. Self-reference Sensing Scheme by Mode Splitting in a Three-turn Microfiber Coil Resonator**
Feilin Zhang, Xiyuan Chen, Yulu Zhong, Qixuan Li and Mengmeng Sha
(*China*)
- 4. Myopia Detection from Retinal Fundus Image Using State-of-the-Art Convolutional Neural Network YOLOv8**
Nicola Rizzieri, Luca Dall'Asta and Maris Ozolinsh
(*Latvia, Italy*)
- 5. Lensless Microscopy Using a Virtual Imaging Approach**
André F. Müller, Ralf B. Bergmann and Claas Falldorf
(*Germany*)
- 6. Analysis of Structural, Electronic and Optical Performance of Inorganic Double Perovskites $\text{Rb}_2\text{AgAlZ}_6$ ($Z = \text{Br}, \text{I}$) for Energy Harvesting**
Taharh Zelai (*Saudi Arabia*)
- 7. Fabrication of High-responsivity Photodetectors with Self-Assembled DNA Functionalized Silver Nanowires and CdSe/ZnS Quantum Dots with Negative Photoconductivity**
Muzeyyen Savas, Zeynep Senel, Ahmet Faruk Yazıcı, Sema Karabel Öcal and Talha Erdem (*Turkey*)

Regular Session: Applied Optics

Chairman: Prof., Dr. Valentin Freilikher
Bar-Ilan University, Department of Physics, Ramat-Gan
(Israel)

- 1. Dazzler: 25 Years in Control of Light**
Raman Maksimenka and Hervé Josselin
(*France*)
- 2. LED Arrays as Versatile, Medium-power UV-C Sources for Relevant Applications in Biology and Health Care**
Paolo Di Lazzaro, Sarah Bollanti, Francesco Flora, Luca Mezi, Daniele Murra and Massimo Aquilini
(*Italy*)
- 3. Raman Spectroscopy of Tm-doped Lithium Niobate Crystals**
Edvard Kokanyan, Ninel Kokanyan, Narine Babajanyan and Marco Bazzan
(*Armenia, France, Italy*)
- 4. Artificial Vision for Zero Defect Textile Manufacturing**
Arcadi Castanyer Caballe, Víctor Llamas Martínez, Xavier Mateos Ferré, Xavier Plantà Torralba and Josep Maria Serres Planta
(*Spain*)
- 5. Opto-electronic AND Logical Gate Circuit Consisting of Integrated-optic Interferometer and Balanced Photodetector**
Koichi Takiguchi and Hironori Nishihara
(*Japan*)
- 6. Dynamics of Protein Reactions and Functions Using Pulsed-Laser Induced Grating**
Masahide Terazima and Yusuke Nakasone
(*Japan*)

Day 2
16 May 2024, Thursday

**Regular Session:
Photonics, Nano & Micro Optics**

Chairman: Prof., Dr. Walter Belardi

Depart. of Engineering and Architecture, University of Parma (Italy)

1. Electrostatically Tunable Terahertz-to-Visible Light Conversion in Graphene Metamaterials

Igor Ilyakov, Alexey Ponomaryov, David Saleta Reig, Conor Murphy, Jake Dudley Mehew, Thales V.A.G. de Oliveira, Gulloo Lal Prajapati, Atiqa Arshad, Jan-Christoph Deinert, Monica Felicia Craciun, Saverio Russo, Sergey Kovalev and Klaas-Jan Tielrooij
(*Germany, Spain, UK, The Netherlands*)

2. Integrated Photomixing for mm-Wave Carrier Generation

Nemanja Vokic and Dinka Milovancev
(*Austria*)

3. A Fully Packaged Photonic Integrated Sensor for Real-time Detection of Chemical Contaminants in Water Solutions

Francesca Bontempi, Veronica Toccafondo, Yisbel Marin, Francesca Gambineri, Giuliana Luminare and Philippe Velha
(*Italy*)

4. Wide-spectral Absorption of Femtosecond Laser Textured Germanium

Xiaolong Liu and Julius Halmela (*Finland*)

5. Photons in Two-Three-Four-Slit Interference Experiments
(pre-recorded video)

Dmitry Tsipenyuk, Valery Slobodyanin, Andrey Voropinov and Aleksandr Milanich
(*Russia*)

Regular Session: Lasers and Its Applications

Chairman: Dr. Alexandr Belosludtsev
Center for Physical Sciences and Technology, Lithuania

- 1. Blue kW Laser Systems by Spatial Multiplexing Single InGaN Diodes** (invited presentation)
Hansjoachim Eichler and Stephan Strohmaier
(Germany)
- 2. Laser Parameters for Laser Ablation and Photon Propulsion**
Claude Phipps (USA)
- 3. Active Q switched Tm:KluW laser by a Mechanical Optical Modulator**
Josep M. Serres Serres, Víctor Llamas Martínez, Arcadi Castanyer Caballe, Magdalena Aguiló Díaz, Francesc Díaz González and Xavier Mateos Ferré
(Spain)
- 4. Cryogenic Continuous Wave Microchip Yb:YCOB Laser**
Josep Maria Serres Serres, Adrian Alles Leal, Víctor Llamas Martínez, Arcadi Castanyer Caballe, Venkatesan Jambunathan, G.Z. Elabedine, Sami Slimi, Magdalena Aguiló Díaz, Francesc Díaz González, Martin Smrz, Tomas Mocek and Xavier Mateos Ferré
(Spain, Czech Republic)
- 5. Synthesis of Functional Carbon-based Hybrid Nanomaterials Through Intense Laser Radiation**
Angel Perez del Pino, Enikő György, Enric Bertran Serra, Roger Amade Rovira and Arevik Musheghyan Avetisyan
(Spain)
- 6. Laser Functionalization of Stainless Steel Surface Using MHz, GHz, and Biburst Modes**
Mantas Gaidys, Paulius Gečys and Mindaugas Gedvilas
(Lithuania)
- 7. High-energy Dual-channel Four-pass Phase-conjugated Nd:YAG Amplifier with SBS Pulse Compression for Interference Patterning**
Paulius Mackonis, Augustė Černeckytė, Augustinas Petrulėnas, Aleksej Rodin and Domantas Klumbys (Lithuania)

Day 3
17 May 2024, Friday

**Regular Session:
Optical Computing, Communication
and Quantum Information**

Chairman: Prof., Dr. Satyendra Kumar Mishra
SRCOM, Centre Technologic de Telecomunicacions de Catalunya, Spain

- 1. VIS-WDM Demultiplexer Employing Thin-Film Interference Filters**
Ulrich Fischer and Mladen Joncic
(*Germany*)
- 2. Fully Self-referenced Continuous-variable Quantum Communication**
Vladyslav Usenko
(*Czech Republic*)
- 3. Reverse-engineered Exact Control of Population Transfer in Lossy Nonlinear Three-state Systems**
Artur Ishkhanyan
(*Armenia*)
- 4. Possibility to Use Long-term Phosphorescence of the Cooled Organic Substances for Analog Optical Computing**
(pre-recorded video)
Dmitry Tsipenyuk, Valery Slobodyanin and Andrey Voropinov
(*Russia*)
- 5. Topological Effect of Single Stage Linear Cavity Fiber Laser on Lasing Performance (pre-recorded video)**
Rih Mohamed and Belloui Bouzid
(*Algeria*)

Poster Session

(Conference Room *Melia Meeting 10*):
17 May 2024 (14:00-16:00)

- 1. Research Progress on Key Technologies of Vehicle-mounted Night Vision Enhancement System**
Youpan Zhu, Jiatong Yu, Weiqi Jin, Yongkang Zhou, Aiping Sun, Lingling Zhou, Rongbin Ji and Yudong Zhang
(China)
- 2. G-layers of NV Centers in Nitrogen-rich Diamonds**
Ilja Fescenko, Florian Gahbauer and Marcis Auzinsh
(Latvia)
- 3. Ultrashort Pulse Bursts for Surface Laser Polishing**
Saulė Steponavičiūtė, Paulius Gečys, Gediminas Račiukaitis, Mindaugas Gedvilas and Andrius Žemaitis
(Lithuania)
- 4. WGM Resonator Based on a Microsphere in Cylindrical Air Cavity**
Dongning Wang
(China)
- 5. Design and Development of a Miniature Spectrometer for the Visible Wavelength Region**
Matthias Haupt, Sebastian Smarzyk and Katharina Strathmann
(Germany)
- 6. Surface Smoothing of Silicon by Femtosecond Laser Bursts**
Andrius Žemaitis, Paulius Gečys and Mindaugas Gedvilas
(Lithuania)
- 7. Atmospheric Simulation Chamber Study of the Interaction Between Ammonia and Nitric Oxide Using Laser Absorption Spectroscopy**
Nakwon Jeong, Aran Song, Soonho Song, Daehae Kim and Changyeop Lee
(South Korea)

8. An Experimental Study of OH Radicals Concentration Analysis via Removal of H₂O Interference in Flames Using Laser Absorption Spectroscopy

Jiyeon Park, Nakwon Jeong, Changkook Ryu, Miyeon Yoo and Changyeop Lee
(*South Korea*)

9. Simultaneous Measurement of Temperature and NO Concentration Using Overlapped Optical Absorption Signals from a Single Laser

Aran Song, Seungryoung Lee, Jungho Hwang, Miyeon Yoo and Changyeop Lee
(*South Korea*)

10. Reconstruction of Absorbance signals to measure CO Concentration in Optically Thick Conditions

Seungryoung Lee, Kanghyun Kim, Jungho Hwang, Daehae Kim and Changyeop Lee
(*South Korea*)

11. Measurement of OH Radical Concentration Distribution by Tomography Method Applied TDLAS at Irregular Shaped Premixed Flame Burner

Kanghyun Kim, Geunhui Ju, Miyeon Yoo and Changyeop Lee
(*South Korea*)

12. Wettability of fs-laser Produced Periodic Gold Nanostructures

Kernius Vilkevičius and Evaldas Stankevičius
(*Lithuania*)

13. Synergistic Characteristics of Gold and Silver in Laser-Generated Nanoparticles from Thin Films and on Various Substrates

Vita Petrikaitė and Evaldas Stankevičius
(*Lithuania*)

14. A Study on Quantitative OH Radical Concentration Measurement in Turbulent Flames Based on DAS

Geunhui Ju, Jiyeon Park, Jungho Hwang, Daehae Kim and Changyeop Lee
(*South Korea*)

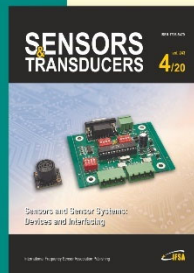
- 15. Plasmonic Gratings Resilience to the Immersion into Liquid Solutions**
Rodrigas Liudvinavičius and Evaldas Stankevičius
(*Lithuania*)
- 16. Gold Film Treatment Using a Tightly Focused Femtosecond Laser Beam**
Kernius Vilkevicius, Rodrigas Liudvinavicius, Kipras Cepaitis and Evaldas Stankevicius
(*Lithuania*)
- 17. Stabilization via Balanced Optical Cross Correlation Using Hollow Core Fibres**
Theodoros Angelides, Sam Gilmartin, Alexander Aiken, Pedro Oliveira, Marco Galimberti, Bo Shi, Francesco Poletti and Radan Slavik
(*UK*)
- 18. Economic Aspects and Technologies in the Development of Advanced Cost-Effective Few-Cycle sub-TW Class Mid-IR Lasers**
Aleksej M. Rodin, Augustinas Petrulėnas, Paulius Mackonis and Augustė Černeckytė
(*Lithuania*)
- 19. Optimizing Spectrum Allocation in Passive Optical Networks Using Integer Linear Programming and Optical Integrated Microring.**
Sergio Muñoz Tapasco, Andres Felipe Calvo Salcedo and José Alfredo Jaramillo Villegas
(*Colombia*)
- 20. Biological Threats Detection by Laser-induced Breakdown Spectroscopy (LIBS)**
Iliaria Petrigiani, Salvatore Almagusa, Alessandra Pasquo, Antonia Lai and Francesco Colao
(*Italy*)
- 21. Characterization and Classification of Different Types of Rice Sowing Through Raman Spectroscopy and Principal Components Analysis**
Salvatore Almagusa, Francesco Colao, Antonia Lai and Claudia Zoani
(*Italy*)

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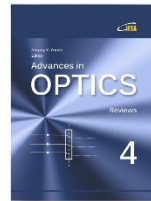
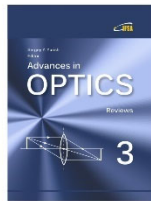
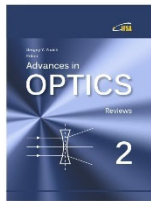
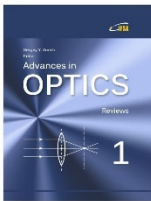
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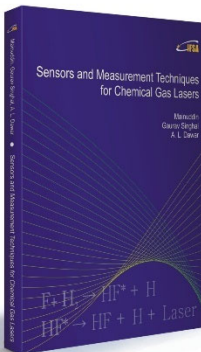
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Sensors and Measurement Techniques for Chemical Gas Lasers



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Sensing and measurement are the key technologies in the development of chemical gas lasers. These advanced technologies are required to acquire, analyze and transform data into information that is useful to enhance the performance and capabilities of these lasers systems.

The goal of this book is to enable scientists and technologists working in rather complex area of chemical lasers to achieve the best technical performances. Till now such topics have been covered scantily in open literature and that too in the research papers only.

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