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Pavel Tománek
Dagmar Senderáková
Petr Páta
Editors

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The CID Number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages.

Contents

ix	<i>Authors</i>
xiii	<i>Conference Committees</i>
xvii	<i>Introduction</i>
xix	<i>Welcome Address</i>
xxi	<i>SPIE Best Student Presentation Award</i>
xxiii	<i>CSSF Young Scientist Award</i>

LASERS IN INDUSTRY

9450 02	HiLASE Project: high intensity lasers for industrial and scientific applications (Invited Paper) [9450-81]
9450 03	Opto-mechanical design of vacuum laser resonator for the OSQAR experiment [9450-34]
9450 04	Stable similariton generation in hybrid mode-locked erbium-doped all-fiber ring laser for application in optical frequency standard [9450-16]
9450 05	Mode-locking operation of quasi-continuous diode pumped TGT-grown Nd,Y-codoped:SrF₂ crystal [9450-115]
9450 06	Optical coherence tomography as film thickness measurement technique [9450-5]
9450 07	Single photon lidar demonstrator for asteroid rendezvous missions [9450-46]
9450 08	Optimization of passively mode-locked quasi-continuously diode-pumped Nd:GdVO₄ laser in bounce geometry [9450-65]

OPTICAL SENSORS

9450 09	On the development of a low-cost rigid borescopic fringe projection system [9450-11]
9450 0A	Fiber optic refractive index sensor based on surface plasmon resonance [9450-36]
9450 0B	Characterization of porous surfaces with spatial point pattern analysis [9450-48]
9450 0C	A new technique to monitor the long-term stability of an optoelectronic oscillator [9450-60]
9450 0D	Diffusion of ammonia gas in PDMS characterized by ATR spectroscopy [9450-63]

- 9450 OE **Temperature sensing using the spectral interference of polarization modes of a highly birefringent fiber** [9450-78]
- 9450 OF **Optical properties of metallic nanoparticles trapped by arabinogalactan molecule** [9450-87]
- 9450 OG **Optical fiber sensors for measurement strain and vibration** [9450-89]
- 9450 OH **Active angular alignment of gauge block in double-ended interferometer for its calibration** [9450-91]
- 9450 OI **Effects of hydrogen loading conditions on fabrication of long-period fiber-grating sensors by low-pressure mercury lamp** [9450-97]
- 9450 OJ **Superlinearity and temperature dependence of electroluminescence in heterostructures with deep AlSb/InAs_{1-x}Sb_x/AlSb quantum well** [9450-24]
- 9450 OK **Measurement of the temperature distribution inside the power cable using distributed temperature system** [9450-73]
- 9450 OL **The modification methods of polymer fiber cladding for sensing application** [9450-82]
- 9450 OM **Measurement of insulation layers using DTS system** [9450-119]
- 9450 ON **Designing and simulation smart multifunctional continuous logic device as a basic cell of advanced high-performance sensor systems with MIMO-structure** [9450-124]

BIOPHOTONICS

- 9450 OO **Optical spectral analysis of ultra-weak photon emission from tissue culture and yeast cells** [9450-23]
- 9450 OP **Chemical modulation of the ultra-weak photon emission from *Saccharomyces cerevisiae* and differentiated HL-60 cells** [9450-76]

SIMULATION OF PHOTONIC DEVICES

- 9450 OQ **Defect formation energy for charge states and electrophysical properties of CdMnTe (Invited Paper)** [9450-108]
- 9450 OR **Adaptive Volterra equalizer for optical OFDM modem** [9450-17]
- 9450 OS **Differential interferometer for measurement of displacement of laser resonator mirrors** [9450-14]
- 9450 OT **Study of the effect of temperature on the optical connectors** [9450-47]
- 9450 OU **Security risk assessment of the primary layer of wavelength division multiplexing passive optical network** [9450-84]

- 9450 0V **Bi-directional triplexer with butterfly MMI coupler using SU-8 polymer waveguides** [9450-104]
- 9450 0W **Micro-optical insertion system for WDM transceiver** [9450-112]
- 9450 0X **Analysis of Wiener-Hammerstein equalizer for optical OFDM modem** [9450-129]

PHOTONIC CRYSTALS AND PHOTONIC BANDGAP STRUCTURES

- 9450 0Y **Comparison of characteristics of Bragg fibers with silica and air cores** [9450-28]

DIFFRACTIVE OPTICAL DEVICES

- 9450 0Z **Laser diode modes estimation by moiré analysis of interference pattern** [9450-70]
- 9450 10 **Experimental and theoretical study of deformable mirror actuator arrays** [9450-116]
- 9450 11 **Monitoring of overmodulation effect in high efficient transmission gratings produced in photopolymers** [9450-49]
- 9450 12 **Calculation of the eigenfunctions of two lens imaging system** [9450-62]
- 9450 13 **Forming near-field helical intensity using a binary vortical axicon** [9450-74]
- 9450 14 **Focusing properties of diffractive lenses constructed with the aperiodic *m*-bonacci sequence** [9450-79]

WAVEGUIDE PHOTONICS

- 9450 15 **Burying of channel optical waveguides: relation between near-field measurement and Ag concentration profile** [9450-43]
- 9450 16 **Propagation of ultrashort pulses in single-mode fiber** [9450-67]
- 9450 17 **Characterization of fluorescence lifetime of Tm-doped fibers with increased quantum conversion efficiency** [9450-77]
- 9450 18 **Formation of crystalline dots and lines in lanthanum borogermanate glass by the low pulse repetition rate femtosecond laser** [9450-85]
- 9450 19 **Preparation and characterization of coatings with a high reflectivity on planar substrates and inside silica tubes** [9450-41]
- 9450 1A **Preparation of optical fibers with non-circular cross-section for fiber lasers and amplifiers** [9450-56]
- 9450 1B **Optical fibers of As₂S₃ glasses: preparation and characterization** [9450-68]

- 9450 1C **Design and modeling of multimode interference structures made by two step ion exchange in glass** [9450-93]
- 9450 1D **New approach to design of optical transmitter for indoor free space optical network** [9450-113]

NON-LINEAR MATERIALS, DEVICES, AND APPLICATIONS

- 9450 1F **Space-selective modification of Au-doped optical grade glass by the femtosecond laser beam** [9450-33]
- 9450 1G **All-optical polarization control and noise cleaning based on a nonlinear lossless polarizer** [9450-71]
- 9450 1H **Influence of DFB laser light on spectral properties of LDs and LEDs** [9450-95]
- 9450 1I **Stellar objects identification using wide-field camera** [9450-125]
- 9450 1J **Time-dependent characteristic of negative feedback optical amplifier at bit rates 10-Gbit/s based on an optical triode** [9450-44]
- 9450 1K **Analysis of spectral response of optical switching devices based on chalcogenide bistable fiber Bragg gratings** [9450-45]
- 9450 1L **Repetition rate multiplication of a femtosecond frequency comb** [9450-127]

SOLID STATE LIGHTING AND LED, LD, OLED, SOLAR CELLS

- 9450 1M **SEM and AFM imaging of solar cells defects** [9450-2]
- 9450 1N **Luminescence of fixed site Ag nanoclusters in a simple oxyfluoride glass host and plasmon absorption of amorphous Ag nanoparticles in a complex oxyfluoride glass host** [9450-12]
- 9450 1O **Realization of microscale detection and localization of low light emitting spots in monocrystalline silicon solar cells** [9450-15]
- 9450 1P **Temperature issues with white laser diodes, calculation and approach for new packages** [9450-72]
- 9450 1Q **High-temperature luminescence in light-emitting heterostructures with a high potential barriers based on GaSb** [9450-37]
- 9450 1R **Characterizing SiC-AlN semiconductor solid solutions with indirect and direct bandgaps** [9450-57]

NANOPHOTONICS AND NANOOPTICS

- 9450 1S **Fluorescence coupling to plasmonic nanoparticles** [9450-50]
- 9450 1T **Explanation of extraordinary transmission on 1D and 2D metallic gratings** [9450-54]
- 9450 1U **Rotation of dielectric disks in focused vortex beams** [9450-86]
- 9450 1V **Ag on carbon nanowalls mesostructures for SERS** [9450-106]

PHOTONICS AND MULTIMEDIA

- 9450 1W **Optimizing of functional design parameters of kaleidoscopes** [9450-53]

PHOTONICS AND EDUCATION

- 9450 1X **Project Adopsys as an example of international collaboration in the field of photonics (Invited Paper)** [9450-69]

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.

Akhmedov, Ramazan, 1R	Furlan, Walter D., 14
Anisimova, Elena, 1I	Gašparić, Marija, 1S
Arzola, Alejandro V., 1U	Gladkov, Petar, 17
Astapenko, V. A., 16	Grebenyukov, Vyacheslav V., 04
Attia, Rabah, 0R, 0X	Grmela, Lubomír, 1M, 1O
Aubrecht, Jan, 0D, 0L, 1A	Gruber, Christian, 1S
Azizan, Siti Aisyah, 1J	Hajek, Lukas, 0U, 1D
Azmi, Mohamad Syafiq, 1J	Harada, Yuki, 1J
Baekelant, Wouter, 1N	Hašek, Jiří, 0O, 0P
Bagan, V. A., 16	Havran, Vlastimil, 1W
Bagratashvili, Victor N., 1V	Hejduk, Stanislav, 1D, 1H
Bakala, Bretislav, 0W	Helan, Radek, 0G
Barkman, Ondřej, 15, 1C	Hlubina, Petr, 0A, 0E
Barozzi, Matteo, 1G	Hofkens, Johan, 1N
Bartoň, Ivo, 19	Hohenau, Andreas, 1S
Bašínová, Nikola, 1B	Holík, Milan, 0G
Bednář, Jan, 1I	Honzátko, Pavel, 17
Belitsch, Martin, 1S	Hošek, Jan, 03, 0S, 1W
Bittner, Jiří, 1W	Hospodková, Alice, 0J
Blazej, Josef, 07	Hruby, David, 0K, 0M, 0T
Blažek, Martin, 1I	Hucl, Václav, 0H
Bonora, Stefano, 10	Hulicius, Edward, 0J
Bouafia, Mohamed, 06	Hurta, Jan, 0M
Brzobohatý, Oto, 1U	Ivanov, Edward, 0J, 1Q
Buchta, Zdeněk, 0G, 0H	Jákl, Petr, 1U
Cajzl, Jakub, 17, 1A	Janout, Petr, 1I
Cao, Yuexin, 05	Jarajreh, Mutsam A., 0R, 0X
Čáp, Jiří, 1W	Jaros, Jakub, 0K, 0M
Červinková, Kateřina, 0O, 0P	Jelínek, Michal, 05, 08, 0G, 0Y
Channoufi, Malek, 0R, 0X	Jelinkova, Helena, 10
Chen, Xianmei, 1N	Jeřábek, Vítězslav, 0V, 0W, 1C
Chvátal, Lukáš, 1U	Jiang, Dapeng, 05
Cifra, Michal, 0O, 0P	Journet, Bernard, 0C
Číp, Ondřej, 0G, 0H, 1L	Kadulova, Miroslava, 0A, 0E
Ciprian, Dalibor, 0A, 0E	Kajnar, Tomas, 0K, 0M, 0T
Čížek, Martin, 0H, 1L	Kalinina, Karina, 0J, 1Q
Dallaeva, Dinara S., 1M, 1O, 1R	Kalvoda, Ladislav, 0D, 0L
Danilov, Leonid, 0J, 1Q	Karasik, Valeriy E., 04
Degtyarev, Sergey A., 13	Kašík, Ivan, 0Y, 17, 1A
Djurovic, Goran, 07	Köstner, Markus, 09, 0B
Drzik, Milan, 0Z	Kazansky, Peter G., 18, 1F
Dvoretzkiy, Dmitriy A., 04	Kepak, Stanislav, 0M, 0T, 0U
Endo, Akira, 02	Khonina, Svetlana N., 12, 13
Evlashin, Stanislav A., 1V	Kirilenko, Mikhail S., 12
Fajkus, Marcel, 0T	Kloppenburger, Gerolf, 1P
Ferrando, Vicente, 14	Kostka, Petr, 1B
Fiala, Jan, 1T	Koudelka, Petr, 0M, 0U, 1D
Fojtíková, Jaroslava, 0D, 0L	Krasilenko, Vladimir G., 0N
Frank, Milan, 08, 0Y	Krenn, Joachim R., 1S

Krug, Markus K., 1S	Papes, Martin, 0K
Krylov, Alexander A., 04	Páta, Petr, 1I
Kubeček, Václav, 05, 08, 0Y	Peca, Marek, 07
Kunc, Štěpán, 03	Pedliková, Jiřka, 1B
Květoň, Milan, 1I	Perecar, František, 0K
Lachmayer, Roland, 1P	Peterka, Pavel, 17, 1A
Látal, Jan, 0M, 0T, 0U, 1D	Petukhov, Andrei, 0J, 1Q
Lazar, Josef, 0H	Pham, Toan Thang, 0C
Lazarev, Alexander A., 0N	Picchi, Giorgio, 1G
Lazarev, Vladimir A., 04	Pilar, Jan, 10
Ledoux-Rak, Isabelle, 0C	Pnev, Alexey B., 04
Leonov, Stanislav O., 04	Poboril, Radek, 0U
Lešundák, Adam, 1L	Podrazký, Ondřej, 0Y, 17, 19, 1A, 1B
Levinský, Petr, 0D, 0L	Poladova, V. N., 0Q
Liner, Andrej, 0K, 1D, 1H	Pösch, Andreas, 09
Lipateva, Tatiana O., 18, 1F	Pozharov, Anatoly S., 04
Lipatiev, Alexey S., 18, 1F	Prajzler, Václav, 0V, 0W, 15, 1C
Liu, Yen-Huang, 15	Proboštová, Jana, 1A
Livshits, Irina, 1X	Prochazka, Ivan, 07
Lotarev, Sergey V., 18, 1F	Radchuk, Natalia, 0F
Lucianetti, Antonio, 02, 10	Ramazanov, Gusejn, 1R
Ma, Fengkai, 05	Ramazanov, Shikhgasan, 1R
Mach, Veleslav, 0K	Reithmeier, Eduard, 09, 0B
Macků, Robert, 1M	Řeřucha, Šimon, 0H
Macúchová, Karolina, 03, 0S, 1W	Richter, Ivan, 1T
Maeda, Yoshinobu, 1J	Rostohar, Danijela, 02
Manallah, Aissa, 06	Sadigov, R. M., 0Q
Manuylovich, E. S., 16	Sahu, Jayanta K., 17
Mareš, David, 0V, 0W	Šarbot, Martin, 0H
Matějec, Vlastimil, 0Y, 19, 1A, 1B	Savinkov, Vitaliy I., 1F
Matsutani, Takaomi, 1J	Sazonkin, Stanislav G., 04
Meguelliati, Said, 06	Schaffernak, Gernot, 1S
Mehrabova, M. A., 0Q	Schlobohm, Jochen, 09
Meledina, Maria, 1N	Scholtz, Lubomír, 1K
Mergo, Pawel, 0E	Sedlák, Petr, 1M
Mesaros, Vladimir, 0Z	Senderakova, Dagmar, 0Z
Mhatli, Sofien, 0R, 0X	Shakhgildyan, Georgiy Yu., 1F
Michalek, Vojtech, 07	Shestakov, Mikhail V., 1N
Mikel, Bretislav, 0G	Sigae, Vladimir N., 18, 1F
Mikhailova, Maya, 0J, 1Q	Siska, Petr, 0U, 1D, 1H
Minaeva, Svetlana A., 1V	Skala, Petr, 1I
Mironovich, Kirill V., 1V	Škarvada, Pavel, 1M, 1O
Mizunami, Toru, 0I	Šmíd, Radek, 1L
Monsoniu, Juan A., 14	Stanek, Stanislav, 15
Mocek, Tomas, 02, 10	Stephan, Serge, 1P
Moshchalkov, Victor V., 1N	Stoyanov, Nikolai, 0J, 1Q
Mrázek, Jan, 17, 19	Su, Liangbi, 05
Müllerová, Jarmila, 1K	Suetin, Nikolay V., 1V
Nazarov, A. M., 0Q	Šulc, Miroslav, 03
Nekvindová, Pavla, 15, 17	Tashiro, Yoshihisa, 0I
Němcová, Šárka, 03, 0S, 1W	Todorov, Filip, 17
Nerudová, Michaela, 0O, 0P	Tománek, Pavel, 1M, 1O, 1R
Nikolsky, Aleksandr I., 0N	Tsai, Wan-Shao, 15
Nsirí, Bechir, 0R, 0X	Tsvetkov, Mikhail Yu., 1V
Nunez-Velazquez, Miguel, 17	Turner, Stuart, 1N
Nuriyev, H. R., 0Q	Urbach, Paul, 1X
Obraztsova, Elena D., 04	Ushakov, Alexandr, 0F
Orujov, H. S., 0Q	Ushakov, Nikolai, 0F
Oswald, Jiri, 0J	Vacek, Michael, 07
Pangráč, Jiri, 0J	van den Berg, Steven A., 1L

Vannucci, Armando, 1G
Van Tendeloo, Gustaaf, 1N
Vasinek, Vladimír, 0K, 0M, 0T, 0U, 1D, 1H
Verellen, Niels, 1N
Vitasek, Jan, 1D
Voigt, Dirk D., 1L
Vojtíšek, Petr, 1I
Vu, Van Yem, 0C
Witas, Karel, 1H
Xu, Jun, 05
Yakovlev, Yuri, 0J, 1Q
Zavadil, Jiří, 1B
Zegrya, G., 1Q
Zemánek, Pavel, 1U
Zhang, Qian, 05
Žiková, Marketa, 0J
Zoric, Nenad, 1X
Zou, Yibo, 0B

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Topics

- 1 Lasers in Industry
Petr Páta, Czech Technical University in Prague (Czech Republic)
- 2 Optical Sensors
Vladimír Vašínek, Technical University of Ostrava (Czech Republic)
Vlastimil Matějec, Institute of Photonics and Electronics of the ASCR, v.v.i.(Czech Republic)
- 3 Biophotonics
Alex Vitkin, Friedrich-Schiller University Jena (Germany)
Ivan Richter, Czech Technical University in Prague (Czech Republic)
- 4 Simulation of Photonic Devices
Dagmar Senderáková, Comenius University (Slovakia)
- 5 Photonic Crystals and Photonic Bandgap Structures
Steve J. Smith, South Dakota School of Mines and Technology (United States)
- 6 Diffractive Optical Devices
Roberto Morandotti, L'Institut National de la Recherche Scientifique-Énergie Matériaux Télécommunications (INRS-EMT) (Canada)
- 7 Waveguide Photonics
Radan Slavík, University of Southampton (United Kingdom)
- 8 Organic Photonic Materials and Devices
Roberto Morandotti, L'Institut National de la Recherche Scientifique-Énergie Matériaux Télécommunications (INRS-EMT) (Canada)
- 9 Non-linear Materials, Devices, and Applications
Joël Cox, The Institute of Photonic Sciences (ICFO) (Spain)
- 10 Solid State Lighting and LED, LD, OLED, Solar Cells
Steve J. Smith, South Dakota School of Mines and Technology (United States)

- 11 Nanophotonics and Nanooptics
Václav Prajzler, Czech Technical University in Prague
(Czech Republic)
- 12 Photonics and Multimedia
Joël Cox, The Institute of Photonic Sciences (ICFO) (Spain)
- 13 Photonics and Education
Pavel Tománek, Brno University of Technology and Czech and Slovak
Society for Photonics (Czech Republic)

Introduction

This volume contains a selection of 67 peer-reviewed submitted papers from 85 contributions presented during the eighth Photonics Prague 2014 conference. The conference is dedicated to the development of photonics, particularly in the eastern European countries, with special emphasis on systems and devices in Photonics.

The conference included 13 topical sessions covering various aspects of Photonics as:

1. Lasers in Industry
2. Optical Sensors
3. Biophotonics
4. Simulation of Photonic Devices
5. Photonic Crystals and Photonic Bandgap Structures
6. Diffractive Optical Devices
7. Waveguide Photonics
8. Organic Photonic Materials and Devices
9. Non-linear Materials, Devices, and Applications
10. Solid State Lighting and LED, LD, OLED, Solar Cells
11. Nanophotonic and Nanooptics
12. Photonics and Education
13. Photonics and Multimedia

Also, this volume contains papers of the SPIE Best Student Presentation Awards winners:

1. Matteo Barozzi, Università degli Studi di Parma, Italy, for oral presentation of paper [PPR100-71] **All-optical polarization control and noise cleaning based on a nonlinear lossless polarizer** by Matteo Barozzi, Armando Vannucci and Giorgio Picchi
2. Gernot Schaffernak, Karl-Franzens-Universität Graz, Austria, for oral presentation of paper [PPR100-50] **Fluorescence coupling to plasmonic nanoparticles** by Gernot Schaffernak, Christian Gruber, Joachim R. Krenn, Markus Krug, Marija Gašparić, Martin Belitsch, and Andreas Hohenau
3. Jakub Cajzl, Institute of Photonics and Electronics of the ASCR, Czech Republic, for oral presentation of paper [PPR100-77] **Characterization of fluorescence lifetime of Tm-doped fibers with increased quantum conversion efficiency**, by Jakub Cajzl, Pavel Peterka, Pavel Honzátko, Jan Mrázek, Ondřej Podrazký, Filip Todorov, Petar Gladkov, Jayanta Sahu, Miguel Nunez-Velazquez, Pavla Někvtová, and Ivan Kašík

As well as of ex-equo CSSF Young Scientist Award Winners:

1. **Petr Janout**, Czech Technical University in Prague, Czech Republic, for oral presentation of paper [PPR100-125] **Stellar objects identification using wide-field camera** by Petr Janout, Petr Páta, Jan Bednář, Elena Anisimova, Martin Blažek, and Petr Skála (CZE)
2. **Dinara Dallaeva**, Brno University of Technology, Czech Republic, (CZE) for oral presentation of paper [PPR100-15] **Realization of microscale detection and localization of low light emitting spots in monocrystalline silicon solar cells** by Dinara Dallaeva, Pavel Tománek, Pavel Škarvada, and Lubomír Grmela

We would like to thank all authors for their excellent contributions, which made for an outstanding high-level conference, and members of the Program Committee for their fine effort in preparing the conference technical program, as well as for their opinion concerning the submitted papers and awards. Last, but not least, we would like also thank the staff of SPIE for their support in preparing these Proceedings.

We expect that this Photonics Prague series will continue, and we look forward to inviting scientists from all countries to attend next Photonics Prague conference in 2017.

Pavel Tománek
Dagmar Senderáková
Petr Páta

Welcome Address

Prague
27 August 2014

Ladies and Gentlemen, Dear Participants, Dear Colleagues,

We welcome you who are coming from countries all over the world to the Eighth International Conference Photonics Prague 2014 (Photonics, Devices, and System VI) held 27–29 August 2014 at Clarion Congress Hotel in Prague, Czech Republic.

The Conference traditionally represents the most important event organized by Czech and Slovak Society for Photonics (CSSF) every three years.

Photonics is driving innovation in Europe, and is one of the most important key technologies for markets in 21st century. Photonics is cross-sectoral technology, which comprises ten sectors in Europe, and more than 40 major product segments. Its diverse applications play a vital role in the information society.

Today, lighting; measurement and automated vision; production technology; medical technology and life science; defense photonics; and optical components and systems share more than 10% of the total European production volume. While optical communications, solar energy, information technology, and flat panel displays cover share less than 10%.

European photonics production is now comparable to that of microelectronics in Europe, and it is expected to exceed it soon. To reach this result, it is necessary to ensure and strengthen a close cooperation between academia, the research community, and industry. The foremost idea of the organizers was to show the variety of photonic approaches to the current development of the high-technology in Europe and worldwide in areas such as: information and communication, lighting, manufacturing, security or life science, and health. Furthermore, this year, the trend is very important in view of the Horizon 2020 Framework Programme of the European Commission and of further international collaboration.

Therefore, a principal task of the photonics conference series at Prague is to create an environment for open exchange of topical research information and to stimulate a discussion of novel concepts and fields of application. This conference series also represents the important regional forum for advances in nature of physical phenomena used in photonics, instruments and devices development, and a wide range of industrial photonics applications.

The conference program committee has suggested three plenary talks showing the emerging trends in photonics, not only from experimental or technical points of view, but also from its theoretical principles. In the first part, Radan Slavík gives a talk entitled "Phase sensitive amplification," and I. M. Dharmadasa gives a talk entitled "Next generation solar cells based on graded bandgap structure utilizing low-cost electroplated materials." In the second part, Alex Vitkin presents "Photon mayhems: using light for structural and functional assessment of biological tissues."

From the numerous abstracts that have been submitted, six were selected as invited, 43 for oral presentation, and 35 for poster presentation, which will be presented during a three-day meeting. The presentations are thematically distributed over 13 topics.

About 90 scientists from 24 countries are attending the conference. A quick glance at the program shows that most of participants are local (Czech and Slovak) or from Eastern European countries. A more detailed look reveals the current trends in the research fields.

We acknowledge all the contributors for submitting the manuscripts in time and for preparing their oral or poster presentations.

We would like to thank the International Program Committee for its help in the selection of papers and the review procedures, and especially the members of the local organizing committee for their efforts in preparing this conference.

We hope that you will profit not only from the conference scientific program and its social events, but also from the beauties of the wonderful city of Prague.

We wish you all an inspiring meeting, and we hope you will enjoy it.

Prof. Dr. Pavel Tománek
President of Czech and Slovak
Society for Photonics
Conference Chair

SPIE Best Student Presentation Award Photonics Prague 2014

This year, the Conference honoured three Laureates with SPIE Best student presentation Awards.

Eighteen students took part in the competition. The evaluation commission chose three oral presentations.

Podium of SPIE Best Student Presentation Award:
Dr. Petr Páta, General Secretary of the Czech and Slovak Society for Photonics and
Pavel Tománek, conference chair, announcing the results:

From the left to right: **Matteo Barozzi** (Università degli Studi di Parma, Italy): 1st place for his presentation on "All-optical polarization control and noise cleaning based on a nonlinear lossless polarizer"

Gernot Schaffernak (Karl-Franzens-Universität Graz, Austria): 2nd place for his presentation on "Fluorescence coupling to plasmonic nanoparticles"

Jakub Cajzl (Institute of Photonics and Electronics, Academy of Sciences of the Czech Republic, Prague, Czech Republic): 3rd place for his presentation on "Characterization of fluorescence lifetime of Tm-doped fibers with increased quantum conversion efficiency"

CSSF Young Scientist Award 2014

The Czech and Slovak Society for Photonics (CSSF) awarded its prize for best presentation of young Czech and Slovak scientists at the Photonics Prague 2014 conference.

This year, there were two coequal prizes:

Petr Janout, Czech Technical University in Prague, Czech Republic, for his presentation on "Stellar objects identification using wide-field camera," and **Dinara Dallaeva**, Faculty of Electrical Engineering and Communication, Brno University of Technology, Czech Republic, for her presentation on "Realization of microscale detection and localization of low light emitting spots in monocrystalline silicon solar cells."

Petr Páta, Pavel Tománek and Dinara Dallaeva.