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Micro-structured and Specialty Optical Fibres VI

Kyriacos Kalli
Alexis Mendez
Pavel Peterka
Editors

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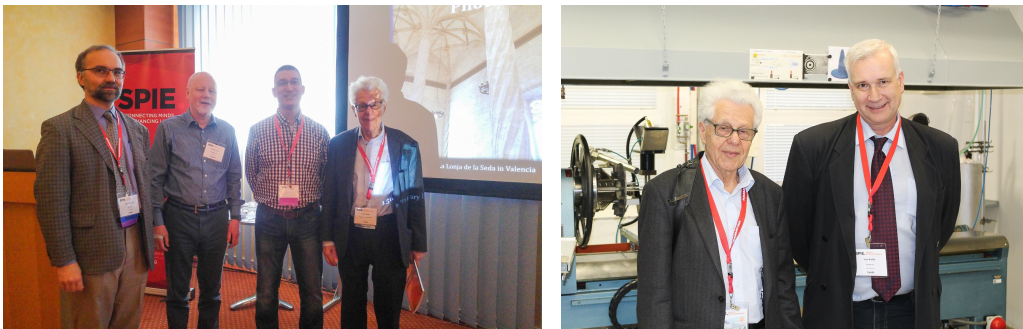
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- 6 Modelling and Analysis of Specialty Fibers and Components
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Introduction

This proceedings volume is from *Micro-structured and Specialty Optical Fibres VI*, held on Wednesday and Thursday 3–4 April 2019, at the symposium SPIE Optics+Optoelectronics in Prague, Czech Republic. The conference was collocated with the special events of the Optical Fiber Technology Workshop and lab tour in optical fibre technology laboratory at the Institute of Photonics and Electronics of the Czech Academy of Sciences that were organized on Tuesday, 2 April 2019.



Left photo: The conference started with keynote lecture of Prof. Philip St. John Russell, the inventor of photonic crystal fibres. From left: Pavel Peterka, Philip St. John Russell, Kyriacos Kalli, and Erich Spitz, honorary chairman of the symposium SPIE Optics+Optoelectronics.

Right photo: Erich Spitz, the co-author of the first single-mode optical fibre for transmission of information, together with Ivan Kašík, chairman of the Optical Fibre Technology Workshop, during the lab tour.

This conference aimed to provide a forum for scientists and engineers-involved with the modelling, design, fabrication, device integration, and application of PCFs and specialty optical fibres-to present and share their latest research and findings. Moreover, this conference expanded on the existing innovations that relate to microstructure and specialty optical fibres, detailing progress in the areas of fibre manufacture, devices, and applications that target the fields of optical communications, fibre lasers, sensing and spectroscopy; and incorporating modelling of novel fibre geometries. Papers focused mainly on the following topics:

Materials, Processes and Fabrication Advances: Advances in speciality and microstructure fibre manufacture based on, silica, chalcogenide and multi-component glasses, rare-earth doped fibres, single crystal material fibre and polymer optical fibres, as well as new and advanced coating materials.

Theory and Modeling: Modelling and simulation of linear and nonlinear characteristics of novel optical fibres, including modal analysis, birefringence, polarisation and dispersion properties, confinement and bending losses, evanescent coupling in multi-core fibre and fibre tapers

Test and Characterisation Methods: Characterisation of optical fibres, e.g. measurements of fibre geometry, birefringence, dispersion, non-linearity and distributed measurements

Optical Components, Sensors and Devices: Speciality and microstructure fibre-based devices and their applications cover a broad spectrum of research areas that can include: Supercontinuum generation, wavelength conversion, fibre lasers and amplification, ultra-high power and ultra-short pulse delivery, optical clocks, pulse shaping, dispersion compensation, micro fluidic devices, liquid crystal fibres, and optical transport of microparticles, optical fibre sensors, e. g. chemical and biosensors, vectorial (multi-core structures) and birefringent sensors (temperature and pressure); Bragg and long period grating sensors in specialised fibres; near-field microscopy, spectroscopy of gases and liquids.

The sixth bi-annual conference presented 36 papers, 27 of them were presented in 6 oral sessions and 9 of them in a poster session. Here are the keynote and invited talks of the program:

Keynote:

Philip St. John Russell, Max-Planck-Institut für die Physik des Lichts (Germany), Paul Roth, Y. Chen, Gordon Wong, "The curious properties of twisted photonic crystal fibres" [11029-1]

Invited:

Markus A. Schmidt, Leibniz-Institut für Photonische Technologien e.V. (Germany), "Optofluidic microstructured fibers: detecting freely diffusing nano-objects via dynamic light scattering" [11029-21]

Ryszard Buczynski, Institute of Electronic Materials Technology (Poland), University of Warsaw (Poland), Alicja Anuszkiewicz, Marcin Franczyk, Adam Filipkowski, et al. "Nanostructured core optical fibres" [11029-6]

Shyam S. Bayya, U.S. Naval Research Laboratory (United States), Woohong Kim, Brandon Shaw, Jason Myers, et al., "All-crystal fiber lasers" [11029-7]

Andreas Ioannou, Cyprus Univ. of Technology (Cyprus) and Univ. de Mons (Belgium), Antreas Theodosiou, Christophe Caucheteur, Kyriacos Kalli, "The modal behaviour of plane-by-plane femtosecond laser fabricated tilted fibre Bragg gratings" [11029-6]

Tomáš Čížmár, Leibniz-Institut für Photonische Technologien e.V. (Germany), "Harnessing multimode propagation for deep tissue imaging" [11029-17]

Laeticia C. Petit, University of Tampere (Finland), "Fabrication and

characterization of phosphate biophotonic fibers" [11029-18]

Laurent Labonté, Institut de Physique de Nice (France), Florent Mazeas, Mattis Reimer, Rachel Cannon, et al., "Quantum metrology for fiber laser applications" [11029-26]

Optical Fiber Technology Workshop, the collocated special event, contained a series of tutorial and invited lectures focused on advanced fabrication methods of optical fibers and optical fiber components. Following the Workshop, registered participants were invited to a tour of the laboratory for fabrication of specialty optical fibres for fibre lasers and optical fibre sensors, part of the Institute of Photonics and Electronics (ÚFE) of the Czech Academy of Sciences. The Workshop and the lab tour were organized alongside the commemoration of 40 years of research of optical fiber technology in the Czech Republic. Special acknowledgement goes to the Strategy AV21 of the Czech Academy of Sciences and its program 'Light at the service of society', who supported these special events.

List of lectures from the Workshop:

Erich Spitz, French Academy of Sciences, National Academy of Technologies, Advisor to Thales (France), "Some original ideas and coherent light experiments during the sixties at the Central Research Laboratory of CSF Company (later Thomson-CSF, today Thales)" (Invited Presentation)

Pavel Honzátko, Institute of Photonics and Electronics of the Czech Academy of Sciences (Czech Republic), "Future trends in optical fibers" (Invited Presentation)

Kyriacos Kalli, Cyprus University of Technology (Cyprus), "Femtosecond-laser processing of optical fibers: component development with applications to lasers and sensors" (Tutorial)

Laetitia C. Petit, University of Tampere (Finland), "Optical fiber preform preparation" (Tutorial)

Overall, this sixth bi-annual conference has continued to serve as a catalyst for the growth of the expanding area of specialty optical fibers and their applications in fibre lasers, optical fibre sensors, telecommunications, biomedicine and other important human activities. We hope you will enjoy the papers submitted for this volume.

Kyriacos Kalli
Alexis Mendez
Pavel Peterka

