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Saratov Fall Meeting 2012

Optical Technologies in Biophysics and Medicine XIV; and Laser Physics and Photonics XIV

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Editors

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Introduction

The Annual International Multidisciplinary School for Young Scientists and Students on Optics, Laser Physics and Biophotonics (Saratov Fall Meeting (SFM-12)) was held in Saratov, Russia, 25–28 September 2012 with about 500 participants from Russia, USA, Europe, Australia, and Asia. It covered a wide range of modern problems of fundamental and applied optics, laser physics, photonics, and biomedical optics.

In the framework of the Meeting the following Workshops were organized:

- Optical Technologies in Biophysics & Medicine XIV
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- Low-dimensional structures II
  Olga E. Glukhova, Chair

A special event during the Meeting was the Russian-Chinese Workshop (Qingming Luo and Valery V. Tuchin, Chairs)

The main goal of the School, Workshops and Seminars was to involve students and young researches in recent developments and applications of laser and

optical technologies in medicine and biology, coherent optics of random and ordered media, material and environmental sciences, nonlinear dynamics of laser systems, laser spectroscopy, and molecular modeling. The main attention was paid to the discussion of fundamentals and general approaches to the description of coherent, low-coherent, polarized, spatially and temporally modulated light interactions with inhomogeneous absorbing media, photonic crystals, tissue phantoms, and various types of tissues *in vitro* and *in vivo*. Such effects as static and dynamic light scattering, Doppler, optoacoustic and optothermal interactions, mechanical stress, photodynamic effect, etc., were considered. On this basis, the variety of laser and optical technologies for medical diagnostics, therapy, surgery, and light dosimetry, as well as for spectroscopy of random and ordered media were presented. New fundamental phenomena in quantum optics together with novel laser and fiber-optical technologies were presented, as well as photonics of micro- and nanostructures.

SFM-12 was organized as the morning plenary sessions, afternoon lecture and oral sessions and evening poster presentations and internet discussion. Original oral reports and posters were presented by junior scientists and students. Plenary lectures were listened to with great interest and discussed by the audience.

Plenary and Invited lectures, oral and poster presentations covered a wide aria of tissue optics, spectroscopy and imaging, controlling of optical properties of tissues, as well as biophysical and photo-chemical aspects of photo and laser therapy. Besides this SPIE volume, a few special issues and sections of well-recognized peer-reviewed journals, such as Optics and Spectroscopy and Journal of Biophotonics will be published.

The SPIE/OSA short courses for students, engineers, scientists, and clinicians "Optical elastography: Prospects in medicine for micro-imaging of tissue mechanical properties" by David D. Sampson, The University of Western Australia, (Australia) and "Tutorial Optical Coherence Tomography-based imaging and sensing of tissues and cells" by Kirill V. Larin, University of Houston, (United States), accompanied the conference. They had more than 50 attendees each, mostly students, and were organized by Saratov University SPIE and OSA Student Chapters and supported by SPIE, OSA, and Saratov State University.

The traditional specific feature of Saratov Fall Meetings is the Internet Session and one-day on-line discussion. In 2012, this session included the following plenary lectures: "Optical, Optoacoustic, and Ultrasound Techniques for Noninvasive Diagnostics and Therapy" by Prof. Rinat O. Esenaliev, University of Texas Medical Branch (United States), "Fluorescence detection and photosensitization of malignant brain tumors" by Dr. Herbert Stepp, Laser Research Laboratory, LIFE Center, University Hospital of Munich (Germany), "Microcirculation Imaging" by Prof. Martin John Leahy, National University of Ireland (Ireland), "Optical Coherence Tomography" by Prof. Peter E. Andersen, Technical University of Denmark (Denmark).

The papers by the participants from the United States, Russian Federation, Germany, Finland, Ireland, Bulgaria, Belarus, China, Singapore, New Zealand, Denmark, India, Slovakia, Portugal, located at the meeting website: http://sfm.eventry.org/2012/internet, were available during the meeting and will be available for a whole year until the next meeting.

A great number of the materials presented is the result of collaboration between research groups from different countries supported by international scientific programs such as CRDF, PHOTONICS4LIFE, and others.

The volume includes papers presented at the Workshops "Optical Technologies in Biophysics and Medicine XIV" and "Laser Physics and Photonics XIV". It is a great pleasure and privilege for the editors to thank all of the authors for their contributions to SFM-12, especially to the Internet lecturers for their exciting presentations.

The organizers of SFM-12 are grateful to all the sponsoring organizations and programs that efficiently supported this meeting, especially to: SPIE; Optical Society of America; Russian Foundation for Basic Research; U.S. Civilian Research & Development Foundation for the Independent States of the Former Soviet Union (CRDF), grant REC-006; PHOTONICS4LIFE of FP7-ICT-2007-2 (№ 224014, 2008-2013); and Volga Region Center of New Information Technologies.

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