

Book of abstracts



IX International School and Conference on Photonics

PHOTONICA2023

with joint events:

Understanding interaction light - biological surfaces: possibility for new electronic materials and devices

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Biological and bioinspired structures for multispectral surveillance

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Quantum sensing integration within microfluidic Lab-on-a Chips for biomedical applications

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Advanced Biophysical Methods for Soil Targeted Fungi-Based Biocontrol Agents

August 28 - September 01, 2023, Belgrade, Serbia

Editors

Jelena Potočnik, Maja Popović, Dušan Božanić

Vinča Institute of Nuclear Sciences – National Institute of the Republic of Serbia, University of Belgrade

Belgrade, 2023

ABSTRACTS OF TUTORIAL, KEYNOTE, INVITED LECTURES,
PROGRESS REPORTS AND CONTRIBUTED PAPERS

of

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Publisher

Vinča Institute of Nuclear Sciences – National Institute of the Republic of
Serbia, University of Belgrade
Mike Petrovića Alasa 12-14
11351 Vinča, Belgrade, Serbia

Printed by

Serbian Academy of Sciences and Arts

Number of copies

200

ISBN 978-86-7306-165-8

ISBN 978-86-7306-168-9 (Online)



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Other institutions that helped the organization of this event are: Institute of Physics Belgrade, University of Belgrade (www.ipb.ac.rs), Faculty of Physics, University of Belgrade (www.ff.bg.ac.rs), School of Electrical Engineering, University of Belgrade (www.etf.bg.ac.rs), Institute of Chemistry, Technology and Metallurgy, University of Belgrade (www.ihtm.bg.ac.rs), Faculty of Technical Sciences, University of Novi Sad (www.ftn.uns.ac.rs), Faculty of Sciences and Mathematics, University of Niš (www.pmf.ni.ac.rs), Faculty of Biology, University of Belgrade (www.bio.bg.ac.rs) and Faculty of Sciences and Mathematics, University of Kragujevac (www.pmf.kg.ac.rs).

PHOTONICA2023 is organized under auspices and with support of the Ministry of Science, Technological Development and Innovation, Republic of Serbia (www.nitra.gov.rs). PHOTONICA2023 is supported and recognized by Optica (Formerly OSA) - The Optical Society (www.optica.org).



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Tel: +381 21 466 075

Tel: +381 21 466 076

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Dear Colleagues, friends of photonics,

We are honored by your participation at our PHOTONICA 2023 and your contribution to the tradition of this event. It is our pleasure to host you in Belgrade and in Serbia. Welcome to the world of photonics.

The International School and Conference on Photonics, PHOTONICA, is a biennial event held in Belgrade since 2007. The first meeting in the series was called ISCOM (International School and Conference on Optics and Optical Materials), but it was later renamed to PHOTONICA to reflect more clearly the aims of the event as a forum for education of young scientists, exchanging new knowledge and ideas, and fostering collaboration between scientists working within emerging areas of photonic science and technology. A particular educational feature of the program is to enable students and young researchers to benefit from the event, by providing introductory lectures preceding most recent results in many topics covered by the regular talks. In other words, tutorial and keynote speakers will give lectures specifically designed for students and scientists starting in this field. Apart from the oral presentations PHOTONICA hosts vibrant poster sessions. A significant number of best posters will be selected and the authors will have opportunity to present their work through short oral presentations – contributed talks.

The wish of the organizers is to provide a platform for discussing new developments and concepts within various disciplines of photonics, by bringing together researchers from academia, government and industrial laboratories for scientific interaction, the showcasing of new results in the relevant fields and debate on future trends.

PHOTONICA 2023 will host three joint events: PhoBioS COST Action “Understanding interaction light - biological surfaces: possibility for new electronic materials and devices”, NATO Science for Peace and Security Program (grant G5618) workshop “Biological and bioinspired structures for multispectral surveillance”, workshop on “Quantum sensing integration within microfluidic Lab-on-a Chips for biomedical applications” and BioPhysFUN workshop “Advanced Biophysical Methods for Soil Targeted Fungi-Based Biocontrol Agents”. Following the official program, the participants will also have plenty of opportunities to mix and network outside of the lecture theatre with planned free time and social events.

This book contains 130 abstracts of all presentations at the IX International School and Conference on Photonics, PHOTONICA2023. Authors from all around the world, from all the continents, will present their work at this event. There will be 4 tutorial and 7 keynote lectures to the benefits of students and early stage researches. The most recent results in various research fields of photonics will be presented through 16 invited lectures and 8 progress reports of early-stage researchers. Within the poster sessions and a number of contributed talks, authors will present 95 presentations on their new results in a cozy atmosphere of the building of Serbian Academy of Science and Arts.

Belgrade, August 2023

Editors

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1. Quantum optics and ultracold systems
2. Nonlinear optics
3. Optical materials
4. Biophotonics
5. Devices and components
6. Optical communications
7. Laser spectroscopy and metrology
8. Ultrafast optical phenomena
9. Laser - material interaction
10. Optical metamaterials and plasmonics
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Joint Events

PhoBioS COST Action - Understanding interaction light - biological surfaces: possibility for new electronic materials and devices

NATO Science for Peace and Security Program - Biological and bioinspired structures for multispectral surveillance

Workshop - Quantum sensing integration within microfluidic Lab-on-a Chips for biomedical applications

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Rosette based metamaterial for circularly polarized terahertz waves manipulation

D.B. Stojanovic¹, U. Ralevic², Y. Demirhan³, G. Aygun³ and L. Ozyuzer^{3,4}

¹*Vinca Institute of Nuclear Sciences-National Institute of Republic of Serbia, University of Belgrade, Belgrade, Serbia*

²*Institute of physics, University of Belgrade, Belgrade, Serbia*

³*Department of Physics, Izmir Institute of Technology, Izmir, Turkey*

⁴*Teknoma Technological Materials Industrial and Trading Inc., Izmir, Turkey*

e-mail: dankas@vin.bg.ac.rs

Metamaterials that respond resonantly in interaction with the terahertz (THz) electromagnetic waves are significant for the achievement of diverse optical functionalities in THz spectral range [1]. Also, they are virtually desirable platforms for investigating chiral effects which rise due to different interaction of metamaterials with left and right circularly polarized light [2,3]. Light polarization is an important feature of electromagnetic waves and manipulation of polarization plays pivotal role in various areas such as communications, imaging and sensing. One of potential applications of the THz metadevices is for protein quality control in the biotechnology or food industries [4].

Chiral properties of metamaterial can be modified via different external influences, such as by changing the interlayer twist angle, adding a dielectric spacer, or modulating its thickness. Twisting or rotating achiral layered structures in parallel planes enables engineering of the extrinsic chirality and consequential optical performance. For example, the twist angle from counterclockwise rotation of an upper layer with respect to the one under it, leads to a left-handed stacking geometry [5]. In this study, we performed numerical simulations of the metamaterial structure in terahertz frequency range, 0.25-0.75 THz. The numerical simulations were done for the case of two parallel gold rosettes on sapphire substrates in which we analyzed the influence of rotating one rosette with respect to the another on chiral properties. Two geometries of the rosette based structures were studied. First geometry is based on resonator which consists of two same parallel rosettes and the second one of two parallel rosettes, but one of them is trimmed.

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