

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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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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Interaction of ns laser with 316L-NiB stainless steel obtained by powder metallurgy – morphological effects and LIBS analysis

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Austenitic stainless steel 316L finds a number of applications including filtration technology, nuclear industry, biomedicine, etc. Powder metallurgy (PM) allows obtaining the desired structure of the material, from full density to highly porous one, and PM technology most often comprises pressing and sintering steps. Gravity sintering, applied in this work, i.e. liquid phase sintering where the pressing step is excluded, is enabled by adding small amount of boron or its compound [1]. The addition of NiB lowers the sintering temperature by formation of eutectics (liquid phase), and also enhances mechanical properties (tensile strength, hardness) and corrosion resistance of 316L steel [2]. The aim of this work was to examine the surface behavior of PM-obtained 316L-NiB exposed to conditions of high heat fluxes by employing nanosecond laser pulses (TEA CO₂ laser emitting at 10.6 μm , fluence $\sim 14 \text{ J/cm}^2$, intensity $\sim 40 \text{ MW/cm}^2$), which is reported scarcely in literature [3]. Simultaneously with irradiation in vacuum, plasma formed by laser irradiation above the sample surface was analyzed using LIBS (Laser Induced Breakdown Spectroscopy). Namely, small amount of boron (1 wt.% of NiB contains 83 wt.% of Ni and 17 wt.% of B) is not easily detected in gravity sintered sample and one of the techniques of choice could be the LIBS. For comparison purposes, 316L sample without NiB was also examined. Laser-irradiated surfaces were analyzed using SEM connected to EDX device. The damage was superficial, with intense melting in the central part of the irradiated spot, Fig. 1(a). LIBS analysis, Fig. 1(b), has shown successful in detecting the presence of boron in the 316L-NiB stainless steel, with low estimated limit of detection of 32 ppm.

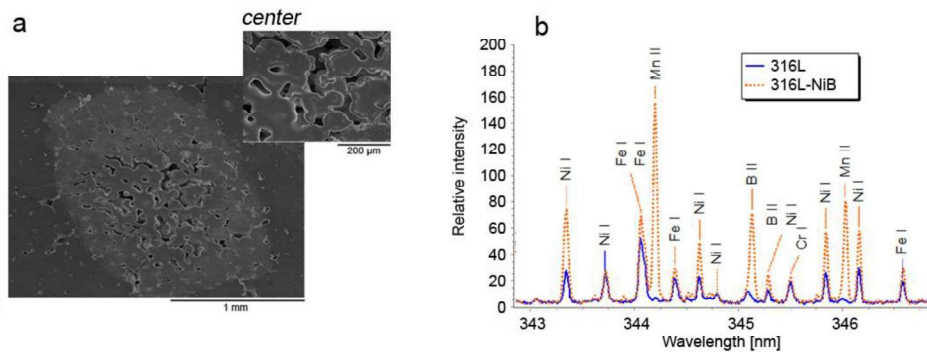


Figure 1. (a) 316L-NiB irradiated by 300 ns pulses (inset - central part); (b) corresponding LIBS spectra.

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