

**FUNDAMENTALS**  
*and* **APPLICATIONS**

**LIGHT**  
**MATTER**  
**INTERACTIONS** *for*

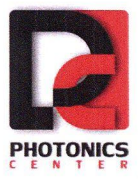
*biophysics  
biomedicine  
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sensors  
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**WORKSHOP** *on*  
**PHOTONICS**

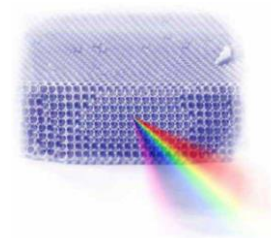
*Kopaonik*  
**11.3-14.3.2018.**

*Organizers*

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UNIVERZITET U BEOGRADU  
Institut za fiziku



Konferencija  
**Jedanaesta radionica fotonike  
(2018)**

**Zbornik apstrakata**



Kopaonik, 11–14.3.2018.

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Kopaonik 11-14.03.2018.

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Dr Dragan Lukić

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## Conference program

### Sunday, March 11<sup>th</sup>

16.00 -16.30	Refreshments and Opening ceremony
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**Chairman: Bratislav Marinković**

16.30 - 17.00	<b>Dejan Pantelić</b> Photophoresis at atmospheric pressure
17.00 - 17.30	<b>Dejan Zečević</b> Electrical structure of dendritic spines: a voltage imaging study with patterned illumination based on computer-generated holography (CGH).
17.30 – 17.40	Coffee break
17.40 – 18.10	<b>Biljana Babić</b> Fast, cost-efficient, synthesis of shining carbon dots

**Chairman: Hrvoje Skenderović**

20.00 - 20.30	<b>Saša Dujko</b> Electron transport, propagation of streamers and the possibility of lightning in the atmosphere of Titan
20.30 - 20.50	<b>Nataša Todorović</b> Development of method for obtaining free fungal protoplast in <i>Phycomyces blakesleeanus</i> by cell wall microsurgery using Ti:Sa laser
20.50 - 21.10	<b>Marko Nikolić</b> High pressure luminescence properties of $Y_2MoO_6:Sm^{3+}$ and $Y_2MoO_6:Eu^{3+}$
21.10 - 21.20	Coffee break
21.20 – 21.40	<b>Aleksander Kovačević</b> Formation of LIPSS on Al/Ti thin metal films by scanning of low-fluence femtosecond beam during cross-directional scanning
21.40 – 22.00	<b>Boban Zarkov</b> Measurement capabilities of Laboratory for photometry and radiometry in Directorate of measures and precious metals
22.00 – 22.20	<b>Pavle Andus</b> Историјат наше Биофизике у време и после Југославије

### Monday, March 12<sup>th</sup>

16.00 -16.30	Refreshments
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**Chairman: Ljupčo Hadžievski**

16.30 - 17.00	<b>Pavle Andus</b> AUTOIGG: AUTOMATED FUNCTIONAL SCREENING OF IgGs FOR DIAGNOSTICS OF NEURODEGENERATIVE DISEASES
17.00 - 17.30	<b>Francesco Cataliotti</b> A quantum phase-gate based on quantum Zeno dynamics
17.30 – 17.40	Coffee break
17.40 – 18.10	<b>Hrvoje Skenderović</b> Digital holography under restricted conditions



**Chairman: Darko Vasiljević**

20.00 - 20.30	<b>Bratislav Marinković</b> Photon interaction with (bio)molecules - Near-edge X-ray absorption fine-structure (NEXAFS) spectroscopy
20.30 - 20.50	<b>Igor Jakovcevski</b> Embryonic loss of HCN/h-channel function in mouse forebrain results in impaired neural progenitor proliferation and microcephaly
20.50 - 21.10	<b>Vladimir Damljanović</b> Symmetry induced electronic dispersions in two-dimensional materials
21.10 - 21.20	Coffee break
21.20 – 21.40	<b>Dragutin Šević</b> Effects of temperature on luminescent properties of YVO <sub>4</sub> :Eu <sup>3+</sup> nanophosphor
21.40 – 22.00	<b>Olga Fedotova</b> Vortex Light Bullets Formation at Femtosecond Filamentation in Kerr Media
22.00 – 22.20	<b>Oleg Khasanov</b> Terahertz radiation efficiency in nanocomposite structures with large permanent dipole moment

**Tuesday, March 13<sup>th</sup>**

16.00 -16.30	Refreshments
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**Chairman: Pavle Andus**

16.30 - 17.00	<b>Srdan Antić</b> Vicissitudinous Nature of Action Potential Backpropagation in Cortical Pyramidal Neurons
17.00 - 17.30	<b>Vesselin Donchev</b> Surface Photovoltage Spectroscopy Studies of Optoelectronic Materials and Nanostructures
17.30 – 17.40	Coffee break
17.40 – 18.10	<b>Ljupčo Hadžievski</b> Multi sensor system for noninvasive detection of cardiovascular pulsations of the human body

**Chairman: Francesco Cataliotti**

20.00 - 20.30	<b>Suzana Petrović</b> Laser surface texturing of Ti-based multilayers for biomedical application
20.30 - 20.50	<b>Marin Šoufek</b> History and achievements of SEM-FIB techniques
20.50 - 21.10	<b>Duška Popović</b> Optimal discrimination between $n$ pure quantum states
21.10 - 21.20	Coffee break
21.20 – 21.40	<b>Marija Ćurčić</b> Towards realization of frequency doubled VECSEL for Rydberg spectroscopy in rubidium and potassium

21.40 – 22.00	<b>Dragan Lukić</b> Anidolic lighting for atelier
22.00 – 22.20	<b>Natalie Sauchyna-Imbro</b> Polymer–CNT composite fiber properties

**Wednesday, March 14<sup>th</sup>**

16.00 -16.30	Refreshments
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**Chairman: Aleksander Kovačević**

16.30 - 16.50	<b>Branislav Jelenković</b> Slow propagation of pulses by Four-Way Mixing in Potassium vapor
16.50 - 17.10	<b>Svetlana Dmitrović</b> Synthesis and characterization of fluorescent spider silk coated with Eu-doped nanoceria
17.10 – 17.30	<b>Darko Vasiljević</b> Mechanical effects of photophoresis on nanometer scale structures
17.30 – 17.40	Coffee break
17.40 – 18.00	<b>Jelena Kršić</b> Exact Solutions for Perfect Transfer in Commensurate Waveguide Arrays
18.00 – 18.20	<b>Jelena Mitrić</b> Surface optical phonon-plasmon interaction in nano-dimensional CdTe thin films

20.00 -	Conference dinner
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## **Apstrakti**

## Photon interaction with (bio)molecules - Near-edge X-ray absorption fine-structure (NEXAFS) spectroscopy

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**Abstract.** Binary collisions of molecules with energy selected atomic particles (photons, electrons, ions) are an ideal tool for determining the structure of molecules and ascertaining their behaviour in the surrounding. Some of the experimental techniques that probe the inner shell molecular structure include Auger ejected electron spectroscopy [1] or Near-edge X-ray absorption fine-structure (NEXAFS) spectroscopy [2]. In NEXAFS an X-ray photon promotes an inner-shell electron to an unoccupied molecular orbital forming a core excited state. When the energy of photon equals to this difference the photoabsorption cross section (PAXC) is enhanced i.e. exhibits the resonant behaviour. In the case when a molecule comprises of atoms of the same kind but having different surrounding atoms, the chemical shift is introduced in the PAXC. Owing to this, the fundamental mechanisms of the fragmentation of different isomers could be elucidated [3].

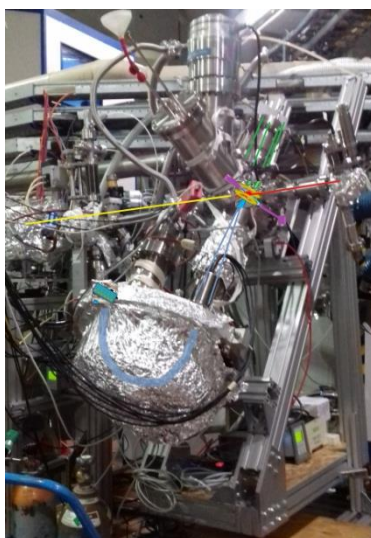


Figure 1. The photoelectron - photoion coincidence (PEPICO) spectrometer at the Gas Phase photoemission beamline of the Elettra synchrotron radiation facility. The electron energy hemispherical analyser (blue) and the time of flight mass spectrometer are mounted opposite to each other at the interaction region, where the vapor beam (light blue) and the photon beam (red) cross each other. [according to 3]

At the GasPhase beamline of the Elettra synchrotron facility in Trieste we have investigated several classes of molecules: halo-pyrimidines; nitroimidazoles, and halothane. The results of mass spectrometry as well as photoelectron–photoion and photoion–photoion coincidence spectroscopy display striking differences in the radiation-induced decomposition.

### REFERENCES

- [1] J. J. Jureta, B. P. Marinković, L. Avaldi, *Eur. Phys. J. D* **70** (2016) 199 [15pp].
- [2] A. R. Milosavljević, A. Giuliani, C. Nicaolas, *Gas-Phase Near-Edge X-ray Absorption Fine Structure (NEXAFS) Spectroscopy of Nanoparticles, Biopolymers and Ionic Species*, in *Nanoscience and Nanotechnology* Vol.5, Springer-Verlag, Berlin, Heidelberg (2016) pp.451-505.
- [3] P. Bolognesi, A. R. Casavola, A. Cartoni, R. Richter, P. Markus, S. Borocci, J. Chiarinelli, S. Tošić, H. Sa'adeh, M. Masič, B. P. Marinković, K. C. Prince and L. Avaldi, *J. Chem. Phys.* **145** (2016) 191102 [5pp].