

# PHOTONICA 2017

VI International School and Conference on Photonics

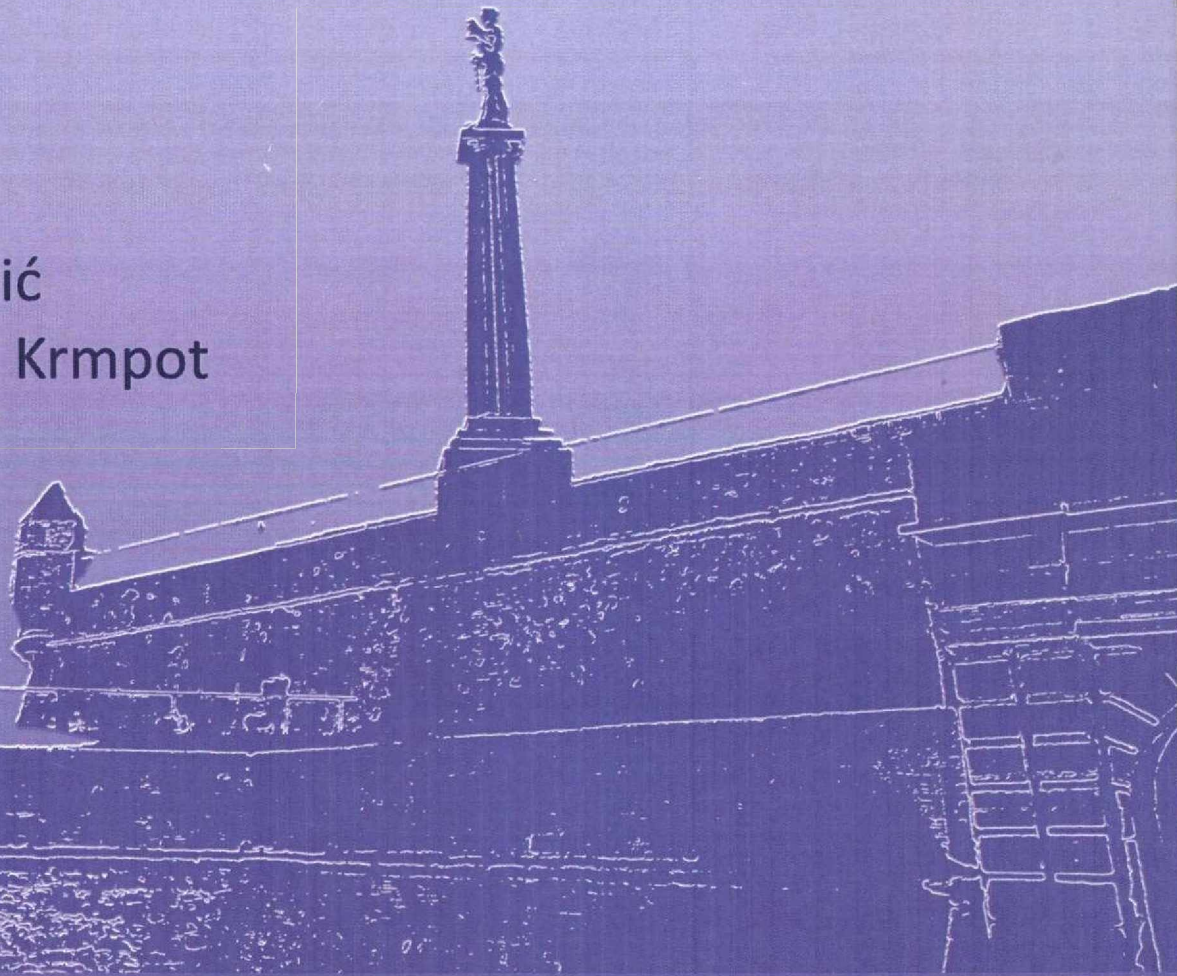
with COST MP1402-HERALD and MP1406-MultiscaleSolar  
and H2020-MSCA-RISE-2015 CARDIALLY workshop

## *Book of Abstracts*

Editors

Marina Lekić

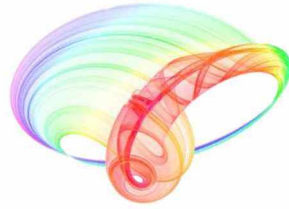
Aleksandar Krmpot



Belgrade, Serbia,  
August 28 – September 1st, 2017



# Book of abstracts



## PHOTONICA2017

The Sixth International School and Conference on Photonics

& COST actions: MP1406 and MP1402



&H2020-MSCA-RISE-2015 CARDIALLY workshop



28 August – 1 September 2017

Belgrade, Serbia

*Editors*

Marina Lekić and Aleksandar Krmpot

Institute of Physics Belgrade, Serbia

Belgrade, 2017

ABSTRACTS OF TUTORIAL, KEYNOTE, INVITED LECTURES,  
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of

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## Luminescence thermometry using $\text{Gd}_2\text{Zr}_2\text{O}_7:\text{Eu}^{3+}$

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Thermographic phosphors are materials that are synthesized in such a way that their structural stability regarding various parameters including the temperature, pressure, magnetic field, electromagnetic radiation could be obtained. They typically consist of a ceramic host and rare-earth dopant. These materials are widely used in many applications [1-9]. The temperature dependency of their luminescence is used for temperature sensing.

In this study we investigate temperature dependence of luminescence spectra of nanopowder samples of  $\text{Gd}_2\text{Zr}_2\text{O}_7:\text{Eu}^{3+}$ . Europium doped  $\text{Gd}_2\text{Zr}_2\text{O}_7$  nanopowders were prepared by Solution Combustion Synthesis (SCS) method [10]. The structural characteristics of obtained material were confirmed by SEM images and XRD analysis [10]. The identification and time resolved analysis of fast decayed (from  $^5\text{D}_1$  state) and slow decayed (from  $^5\text{D}_0$  state) europium lines in this host were performed using TR-LIF (Time resolved Laser induced Fluorescence) spectroscopy experimental setup. The setup consist of tunable OPO (Optical Parametric Oscillator) laser and streak camera, explained in more detail in [11].

The photoluminescence spectra used for analysis of  $\text{Gd}_2\text{Zr}_2\text{O}_7:\text{Eu}^{3+}$  nano phosphor optical emission temperature dependence were acquired using continuous laser diode excitation at 405 nm and Ocean Optics spectrometer USB2000. We plotted the temperature sensing calibration curves based on various combinations of ratio of intensities of two europium optical emission lines. It seems that any combination of one slow decayed and one fast decayed line could be an optimal choice for temperature measurements. Finally, we concluded that the intensity ratio of spectral lines at 613 nm and 539 nm seems to be a good choice for temperature measurements. Our results show that the synthesized material can be efficiently used as thermographic phosphor up to 700 K.

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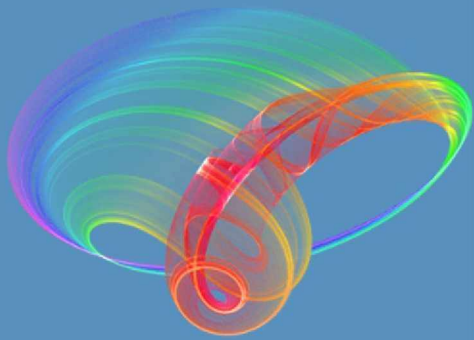
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# PHOTONICA 2017

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