Photonica09

BOOK OF ABSTRACTS

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II International School and Conference on Photonics

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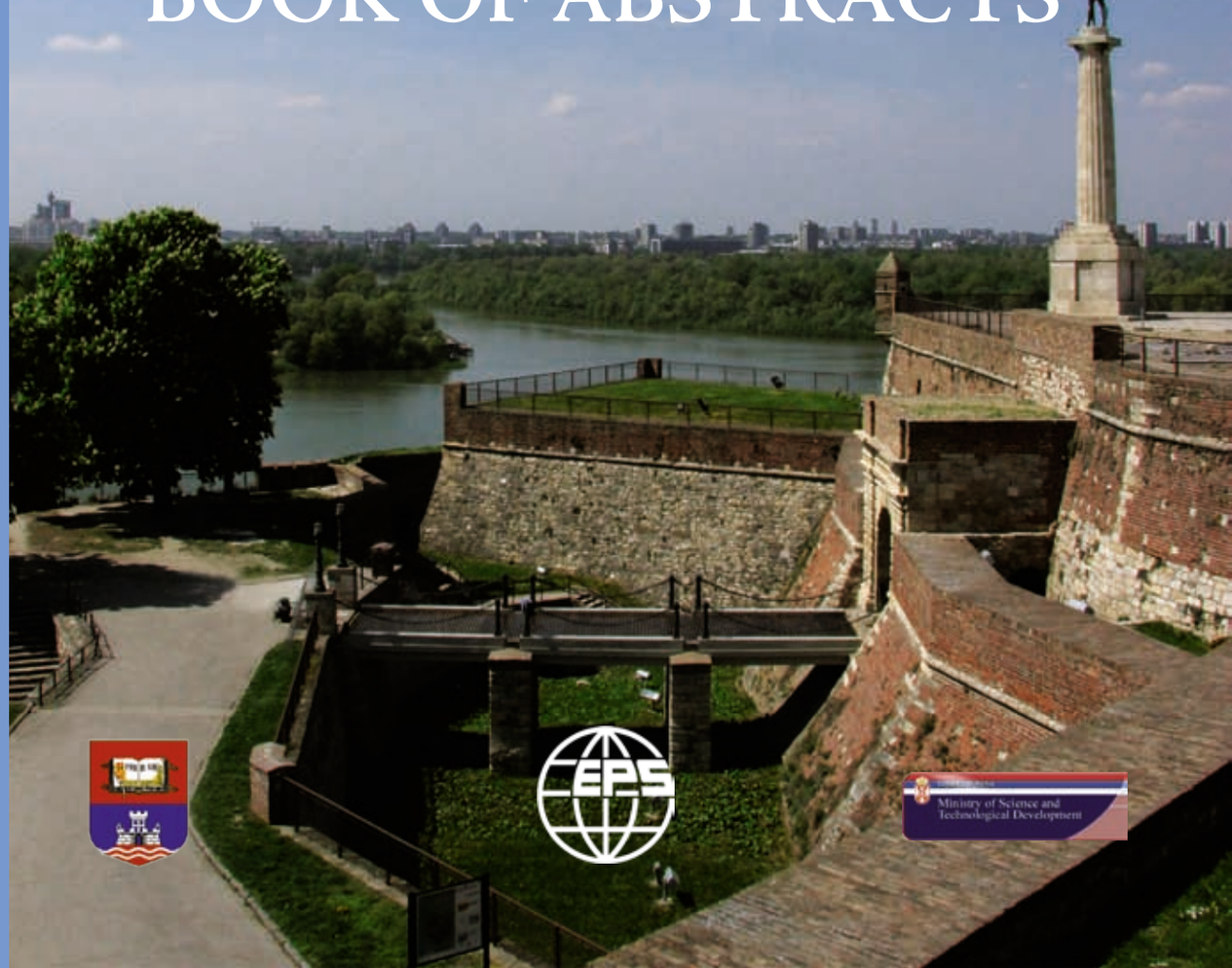

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ABSTRACTS OF PLENARY AND INVITED
LECTURES AND
CONTRIBUTED PAPERS

Editors
Brana Jelenković and Aleksandra Strinić

Institute of Physics
Belgrade, Serbia

Belgrade, 2009

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Contributed papers

Poster session - Tuesday

Measurement of betanin fluorescence using TR-LIF technique

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Laser induced fluorescence (LIF) is a powerful spectroscopic technique commonly used to study the structure and internal state distributions in molecules of biological interest. Betanin ($C_{24}H_{26}N_2O_{13}$) is a specific violet betacyanin and the most prominent pigment in the red beet root where it contributes between 75% - 90% of the total visible color. When used properly, beets can serve as a natural organic food coloring, giving foods a magenta hue [1, 2, 3].

Our method of excitation of the betanin (1% water solution) in optical cell is based on the tunable (320 nm to 475 nm) Nd: YAG laser system. The streak camera used for detection of the fluorescence signal enables simultaneous measurements of the spectrum and lifetime of fluorescence [4]. The calibration of the time-resolved laser-induced fluorescence (TR-LIF) detection system is performed with standard fluorescent solution dyes, such as Rhodamine B and fluorescein [5].

Fluorescence images of betanin (1% water solution) excited at 320, 340, 360 and 400 nm were obtained. The fluorescence is observed in domain from 580 nm to 660 nm.

References

[1] F. G. Herrero, F. G. Carmona, J. Escribano, Nature, Vol.437, 7057 (2005).
[2] F. G. Herrero, F. G. Carmona, J. Escribano, Food Res. Int. 38, 879 (2005).
[3] F. G. Herrero, J Escribano, F. G. Carmona, Planta 222, 586 (2005).
[4] Terzić, B. P. Marinković, D. Šević, J. Jureta and A. R. Milosavljević, Facta Universitatis, Series Phys. Chem. Technol. 6, p.105 (2008).
[5] R. Sjöback, J. Nygren, M. Kubista, Spectrochimica Acta Part A 51, L7-L21(1995).

Contributed papers

Poster session - Thursday

Application of Fourier-Pade approximation in analysis of holographic photonic crystal structures

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Photonic crystal structures are fabricated in Laboratory for Photonics, Institute of Physics, Belgrade, by the holographic technique [1]. Fast Pade approximation is used as a numerical aid in studies of photonic crystals, see recent publication [2] and some of references therein.

In this paper a method based on Fourier transform and Pade approximants is investigated for analysis of holographic photonic crystal structures. Pade approximants are numerical tool that can be used to accelerate the convergence of a slowly converging sequence. For a power series defined as:

$$F_n(z) = \sum_{n=0}^{N} c_k z^k \qquad (1)$$

of order N in the variable z (real or complex) with coefficients c_k, Pade approximant is a rational fraction $P_m(z)/Q_n(z)$, which approximates the fully converged values of the function $F_n(z)$. If we let $z=e^{-jkn}$, then equation (1) corresponds to Discrete Fourier Transform (DFT), so Pade method is used to improve spectral resolution of FFT, the most popular tool in spectral analysis. This method is usually called Fourier-Pade (FP) approximation.

We applied Fourier-Pade approximation to analyze photonics crystal structures fabricated in Laboratory for Photonics, enhancing the FFT analysis of investigated samples.

References

[1] S. Savic-Sevic, D. Pantelic, R. Gajic, G. Isic, Acta Physica Polonica A, vol.112, nr. 5 1079-1082 (2007)
[2] Y. Zhang, W. Zheng, M. Xing, G. Ren, H. Wang, L. Chen, Optics Communications 281, 2774 (2008).