

PHOTONICA 2019

7TH INTERNATIONAL SCHOOL AND CONFERENCE ON PHOTONICS

*with Symposium Machine Learning with Photonics,
The European synchrotron and FEL user organization (ESUO) Regional
Workshop and COST action CA16221 ATOM-QT*



Book of abstracts

Editors

Milica Matijević,
Marko Krstić,
Petra Beličev

Belgrade, Serbia,
26th - 30th August 2019.

Nonlinear microscopy and time resolved fluorescence spectroscopy of *Chelidonium majus* L.

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Greater celandine (*Chelidonium majus* L.) is a well-known healing plant. It has segmented laticifers filled with yellowish - brown content that is rich in biologically active substances (alkaloids, flavonoids and phenolic acids) [1, 2]. The concentration of these components can change significantly, depending on the time of year, from flowering period in spring to the fruit - bearing time in autumn [3]. Flavonoids (plant pigments) are responsible for the yellow color of the greater celandine flower [4]. The antioxidant activity was also correlated with the concentration of total phenolics (including flavonoids), which is the highest in the spring months [4].

This study presents the analysis of the physical phenomena diagnosed in *Chelidonium majus* components. Time resolved optical characteristics were analyzed by using TRLS (Time Resolved Laser Spectroscopy) experimental setup. Nonlinear optical properties of the plant have been studied using two-photon excited autofluorescence (TPEF), second - harmonic generation (SHG) and upconversion luminescence (UCL) simultaneously. The benefits of using UCL for biological applications are in reducing the photobleaching and providing photostability. Upconversion emission is also more efficient than the TPEF and SHG. Moreover, UCL could be achieved with a low power continuous wave (CW) laser.

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- [1] K. Seidler-Lożykowska et al., Acta Sci. Pol. Hortorum Cultus 15, 161 (2016).
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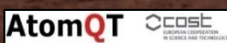
7TH INTERNATIONAL SCHOOL AND CONFERENCE ON PHOTONICS, 26TH - 30TH August 2019, Belgrade, Serbia

Topics: Quantum optics and ultracold systems, Nonlinear Optics, Optical materials, Biophotonics, Devices and components, Optical communications, Laser spectroscopy and metrology, Ultrafast optical phenomena, Laser-material interaction, Optical metamaterials and plasmonics, Machine learning in photonics (for the first time at PHOTONICA)



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- **Machine Learning with Photonics Symposium**
(co-organized with Prof. Darko Zibar)
- **The European synchrotron and FEL user organization (ESUO) Regional Workshop**
- **COST action CA16221 ATOM-QT**



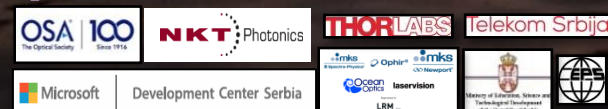
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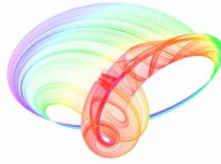
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Book of abstracts



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Photonics, 26 August – 30 August 2019, Belgrade, Serbia

& Machine Learning with Photonics Symposium
(ML-Photonica 2019)



& ESUO Regional Workshop



& COST action CA16221



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Belgrade, 2019

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