



LASERLAB-EUROPE

The Integrated Initiative of European Laser Research Infrastructures III

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Work package 30 – Laser and Photonics for Biology and Health (BIOPTICHAL)

Deliverable number D30.8

Workstations for multiphoton microscopy with extended spectral excitation range, penetration depth, sensitivity and selectivity

Lead Beneficiary: VULRC

Due date: Month 42

Date of delivery: Month 42

Project webpage: www.laserlab-europe.eu

<i>Deliverable Nature</i>	
R = Report, P = Prototype, D = Demonstrator, O = Other	R
<i>Dissemination Level</i>	
PU = Public PP = Restricted to other programme participants (incl. the Commission Services) RE = Restricted to a group specified by the consortium (incl. the Commission Services) CO = Confidential, only for members of the consortium (incl. the Commission Services)	PU

A. Abstract / Executive Summary

We have developed a universal workstation for multiphoton microscopy and high resolution additive 3D manufacturing based on widely tuneable OPA combined with spatial and temporal pulse shapers.

B. Deliverable Report

1 Introduction

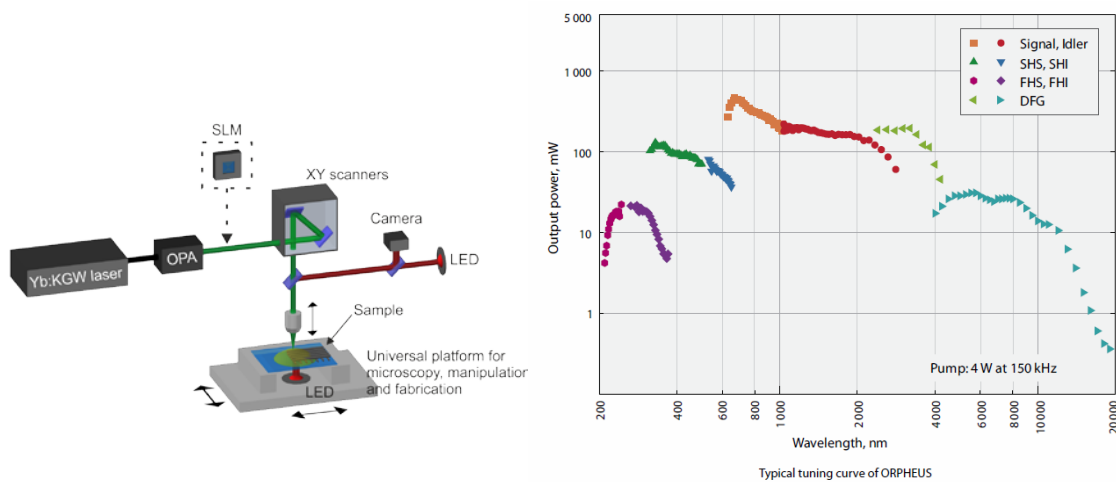
The role of wavelength in deep tissue microscopy is well explained in terms of scattering inevitable in biological samples and loss of information on tissue structure occurring due to opaqueness of a tissue. We aimed at improving the performance of multiphoton microscope introducing new degree of freedom – tuneable wavelength excitation source based on optical parametric amplifier pumped by high repetition rate femtosecond solid state laser.

2 Objectives

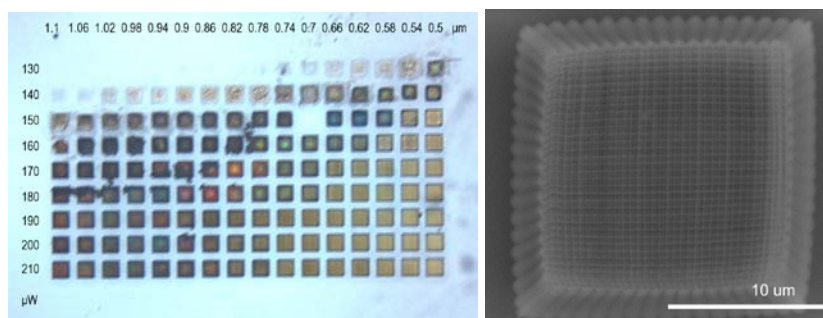
Development of workstations for multiphoton microscopy and additive microfabrication with extended excitation wavelength range.

3 Work performed / results / description

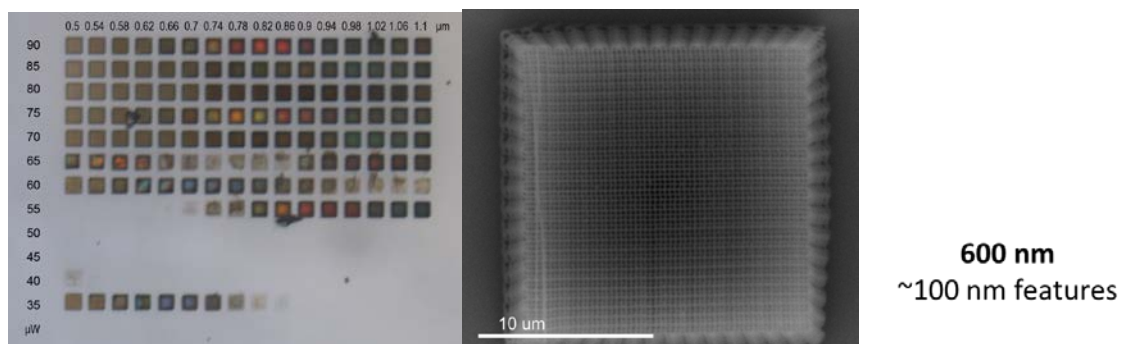
The workstation uses optical parametric amplifier Orpheus pumped by Yb:KGW laser (Light Conversion) as an excitation source for microscopy and fabrication. The tuning range is shown on the picture.



The workstation has been tested for fabrication of polymer SZ2080 woodpile structures with sub-micrometre resolution exhibiting structural colours in the visible range as shown on the pictures.



800 nm
~100 nm features



Conclusions

We developed the workstation with extended excitation wavelength range which can be used for multiphoton microscopy and additive microfabrication. The highest fabrication resolution of about 100 nm has been observed in 600-800 nm range.

4 References/Publications

Publication in progress