Parallel 3D microfabrication using a SLM display

Sara Vidal[1], Jaime Cuartero[1], Francisco Gontad [1,*], Pablo Romero[1] and Nerea Otero[1]

[1] AIMEN Technology Centre, O Porriño, 36400, Pontevedra, Spain
*Corresponding author email: francisco.gontad@aimen.es

Additive manufacturing is a major key technology for most of the current industry developers because of the great advantages it offers for the fabrication of complex 3D structures. Talking about the photonic industry, great incomes have arrived in the last decades thanks to the evolution of ultrafast lasers, and so, its applications on small optical components. That is the case of the work developed within the FABulous project, that aims to develop new manufacturing processes for industrial-scale applications, creating novel metasurfaces that enhance the efficiency and performance of optical products.
The work presented here shows some of the results obtained by a two-photon polymerization (2pp) process where a spatial light modulator (SLM) device is used to create arrays of identical 3D structures in just a few milliseconds. The fabrication of features with lateral sizes well below the micron range using a combined phase-amplitude laser beam modulation is introduced and discussed. Moreover, the use of different scanning strategies to make use of the parallelization of 2PP through the use of SLM displays as a function of the nanofeature design will be analyzed, showing its great advantages in terms of enhanced process productivity without affecting the resolution of the nanostructures to be produced.

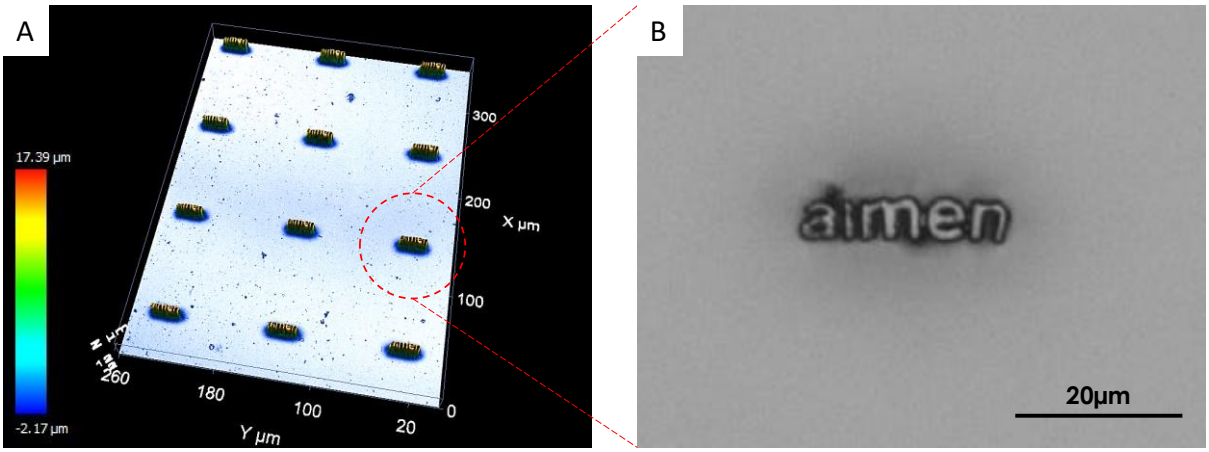

Figure 1: A) Topography capture of the matrix of logos performed with the SML. B) Detail of one of the logos performed.

Thus, the lates results in terms of improved resolution and productivity obtained within the frame of the FABulous project will be presented, showing how the developed technology can boost the fabrication of 3D nano- and metasurfaces with unprecedent productivities.

Acknowledgements:
The work presented in this presentation has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement number 101091644

Funded by
the European Union