Last advances in two-photon lithography towards parallel printing and multi-functional 3D nanomaterials

Two-Photon Lithography, with its sub-diffraction resolution and versatility across 3D geometries and polymeric materials, opened to several micro-optics and photonic structures with a growing interest in new functional materials to be integrated in photonic chips.

I will discuss the pros and cons of the lithographic techniques together with the last advances in two-photon polymerization and alternative lithographic approaches. Focusing on the high-throughput challenge, I will present recent technological advances that are pushing the printing speed by multi-foci printing and holographic approaches. Moreover, two-step absorption 3D laser nanoprinting offers a promising alternative.

Building upon these lithographic advancements, a key research direction focuses on developing functional materials that can serve as essential building blocks for novel optical functions on integrated photonic chips, thereby enriching the field of polymer photonics.