

Contrats doctoraux 2026

Titre du projet de thèse : Additive Manufacturing of original photonic devices by 2 photons polymerization

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Résumé du projet de thèse (en 20 lignes maximum) :

Planar optical devices and fibered components (waveguides, Bragg mirrors, sensors, ...) have revolutionized the field of photonics. Usually, such components are fabricated using complex facilities similar to those used in the domain of silicon devices. With the development of direct laser writing methods (such as 2 Photon polymerization), it is now possible to print transparent 3D devices with a submicron resolution (< 50 nm) allowing to design novel functions or components that cannot be fabricated by usual means.

The subjects addressed in this PhD will concern the design and characterization of original photonic components printed on planar substrates or on the end face of single-core or multicore optical fibers for remote applications. One example of a 1D photonic bandgap microstructure printed on a fiber end face is shown in Fig. 1.

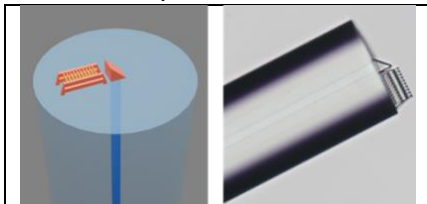


Fig. 1 : lamellar Bragg grating printed at the end of an optical fiber

1.

To print such tiny features whose dimensions are in the order of the light wavelength, an optimization of the printing process is also needed (such as: resin formulation, laser power and scanning speed, hatching and slicing distances). AI algorithms will be implemented to get best parameters and a corresponding fabrication database will be feed.

These activities will be developed in the framework of Equipex+ project hosted by the photonic team (Add4P) and the targeted PhotonIA project started in 2025 which is part of the National Priority research program and equipment (PEPR).

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Remarques/commentaires supplémentaires :