

MASTER INTERNSHIP M2 PPN (5 months)

2023-2024

Title of the project: Thermo optic effect in multimaterial optical fibers

Supervisor(s): C. Strutynski, P. Mathey

Laboratory / Department / Team : ICB / SAFIR / Verres

Collaborations:

Summary:

This internship involves two main areas of focus: theory and experimentation.

The objective is to realize and characterize a system comprising a core embedded within a dielectric material. This system is a fiber-based integrated-optics component. The core is a glassy material possessing a high thermo optic response so that its refractive index strongly depends on the temperature. To control the heating of the core, different practical arrangements will be designed and tested.

The theoretical aspect of the internship involves using numerical methods to calculate the thermal distribution in the system. The aim is to understand the impact of geometrical (shape and dimensions) as well as intrinsic (type of the metallic and dielectric materials used) parameters of the device on the overall system performance.

The experimental part of the internship focuses on developing and characterizing an optical fiber with the micro heating device. This involves making a preform using glass, polymers, or metals, and then drawing the preform to create a fiber. Optical characterizations will be performed to verify the results obtained through theoretical analysis. The impact of the temperature on the dispersion law and guiding characteristics will be investigated. Its influence on the supercontinuum generation in the infrared has to be demonstrated (theoretically and experimentally).

Type of project (theory / experiment): theory and experiment

Required skills: COMSOL simulations, optical waveguide theory, non linear optics