



CNRS PROFILE : Multiphysics Microsystems integrated on glass

The applications of lab-on-a-chip are extremely diverse and include environmental monitoring, medical devices, bio-production, etc. In this context, the IMEP-LaHC laboratory has long been developing a glass-based integrated optics technology whose excellent integrability with microfluidic systems has already been demonstrated. Glass has excellent chemical resilience and mechanical properties that make it an efficient substrate to co-integrate high performance optical waveguides with micro or nanofluidic channels.

For this purpose, the work of the group PHOTO, which is internationally recognized for its research in the field of integrated optics on glass (waveguides, junctions, MUX, lasers, networks, etc.), relies on a technology platform labeled Renatech+ and on a unique know-how in modeling, simulation, design, fabrication and characterization of integrated optical components. The research of the team is supported by several contracts (ANR, PEPR etc..) and by strong multi-disciplinary, national and international collaborations.

These collaborations have been particularly fruitful with local companies. The PHOTO team has regularly contributed to the creation or development of start-ups related to the historical activities of the group. For example, we have many partnerships with the company Teem Photonics, located in Meylan. Another example of a spin-off directly resulting from the team's activities is A2PS, an active partner still hosted by the laboratory.

Among the work carried out by the group PHOTO in the field of sensors, one may quote the development of optofluidic sensors for harsh environment, which allowed the first measurement of plutonium (IV) concentration in a microsystem (carried out in collaboration with the CEA of Marcoule). Other examples include sensors for aerospace and biology.

The group wishes to develop and reinforce its research activities on the following topics

- the development of advanced integrated optical components on glass (dispersion and polarization management, pulse lasers, spirals, etc.),
- multi-physics hybridization (optics, electronics, RF, microfluidics and nanofluidics, opto-mechanics etc.)

For all the applications envisaged, one of the major challenges is to increase the degree of integration/aggregation of different components in order to reduce the size of the systems, their energy consumption, to increase their potential, biocompatibility, reliability, durability, etc.

The candidate will join the PHOTO team of the IMEP-LaHC laboratory and will work in particular on the development of devices designed with the glass technological platform, on one or more of the axes presented above. We are therefore looking for a person with a previous experience in photonics and/or multiphysics systems, strongly involved in the experimental aspect of the research, with, possibly, a previous experience in the development of sensors.

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