INTERNSHIP   PROPOSAL

Laboratory name: Gulliver & Saint-Gobain Research
CNRS   identification code: UMR 7083
Internship director'surname: Joshua McGraw / Gabriel Guyard
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Internship location: 6 rue Jean Calvin, 75005 Paris, France

Thesis possibility after internship: ~~YES~~/NO
Funding: ~~YES~~/NO   If   YES, which type of funding:

Fiber characterization with microfluidics

CONTEXT
Mineral wools manufactured by Saint-Gobain are low-density fibrous materials used for thermal insulation and playing a central role in reducing the energy consumption of buildings. The performance of mineral-wool-based products strongly rely on their microstructure, *ie* to the morphology of constitutive fibers.

On the other hand, microfluidics – the whole range of techniques for manipulating liquids at the micron scale – opens new possibilities for the study of systems under flow. Aiming at continuously improving its products, Saint-Gobain wishes to explore the potential of microfluidic technologies to better understand the behavior of fibrous media under flow.

GOAL OF THE INTERNSHIP
During this internship, a model system will be studied, consisting of a single fiber in a controlled laminar flow. The goal is to develop a tool able to detect the passage of a fiber through a micron-sized channel and quantify the induced perturbation on the flow. To achieve this, the intern will work in partnership with the Gulliver laboratory (ESPCI Paris) and will be based at *Institut Pierre-Gilles de Gennes for microfluidics* where he or she will have access to prototyping (microfabrication) and instrumentation (microscopy, pressure, and flow sensors…) tools. The tasks will be the following: 1- design and fabrication of a channel allowing the introduction of a fiber, 2- identification of the relevant tools for the characterization of the flow in the presence of the fiber (imaging, pressure drop measurement…), 3- carry out measurements with the most promising methods, and performance assessment.

PROFILE
Student willing to work at the interface between industry and academia and with knowledge in physics of measurement (instrumentation, data treatment). Affinity for low-Reynolds number hydrodynamics is appreciated. The intern will also have to demonstrate a sense of autonomy, initiative, and good communication skills.

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics: ~~YES~~/NO	Soft Matter and Biological Physics: YES/~~NO~~
Quantum Physics: ~~YES~~/NO	Theoretical Physics: ~~YES~~/NO