

INTERNSHIP PROPOSAL

Laboratory name: Surface du Verre et Interfaces

CNRS identification code: UMR125

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Aubervilliers

Thesis possibility after internship: YES

Funding: YES If YES, which type of funding: CIFRE SGR

Mechanics of entangled fibers for insulation

CONTEXT

Saint-Gobain, actively committed in the effort of energy consumption and CO2 reduction, contributes to energy savings through its thermal insulation solutions for housing. One of the products at the heart of this strategy is the insulation using glass wool, like the blowing wool (aggregates of glass fibers). These fibers are blown into attics or between walls. Ensuring a quality of final insulation requires controlling the evolution of this fibrous material during the pneumatic projection as well as during the filling stage. One key point is understanding the mechanics of this material: the fiber aggregates should not be compacted but should be loosened, and the product density should be homogeneous.

GOALS OF THE INTERNSHIP

We will measure the mechanical response of homogeneous volumes or "flakes" (aggregates) of model fibers (Fig. 1). From a homogeneous material, how do density heterogeneities develop? Under what conditions do the fibers cluster or disassemble?

- Imaging measurement of the effects of shock by vibration of the materials.
- Imaging measurement of the consolidation in a rotating drum.
- Modeling the mechanics of entangled fibers.
- Comparison with the behavior of glass wool.



Figure 1 : Fracture of an aggregate of entangled model fibers.

The internship will be followed by a CIFRE PhD.

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

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