

INTERNSHIP PROPOSAL

Laboratory name: Institut Lumière Matière (ILM)
CNRS identification code: UMR5306
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Internship location: Villeurbanne (Lyon area)

Thesis possibility after internship: YES
Funding: YES If YES, which type of funding: ANR

Solidification of liquid plaster foams: rheology and structure

Foams are made of liquid or solid containing gas bubbles. **Liquid foams** have numerous liquid-gas interfaces, so their structure and dynamics are ruled by liquid **surface tension** (fig. a). **Solid foams are porous materials** used for properties like lightness, low thermal conductivity or permeability (fig. b). Solid foams are generally elaborated from **liquid foams that solidify**, and the intermediate solidifying foams have intriguing properties ruled by both surface tension and bulk elasticity. In particular, liquid foams age due to a process called **coarsening** (fig. c); foam solidification will **arrest** this process, but **we do not know exactly when and how**.

Our objective is thus to **investigate the rheology and the structure of solidifying foams** made from a plaster reactive suspension. We will monitor the foam evolution upon solidification using three different techniques: 1) **Raman spectrometry** to follow the corresponding chemical reaction, 2) **rheology** to follow the change in mechanical properties (elastic modulus and yield stress) and 3) **video imaging** to characterize the foam structure (statistics for bubble size, number of neighboring bubbles). More specifically, the M2 internship will focus on the generation of such foams, in order to better control the initial foam properties (liquid fraction, bubble size).

Both master internship and PhD thesis will be funded by ANR, in the context of the project ABC2FOAM, in collaboration with LPS Orsay and MATEIS (INSA Lyon). We are looking for a candidate with a taste for experiments.

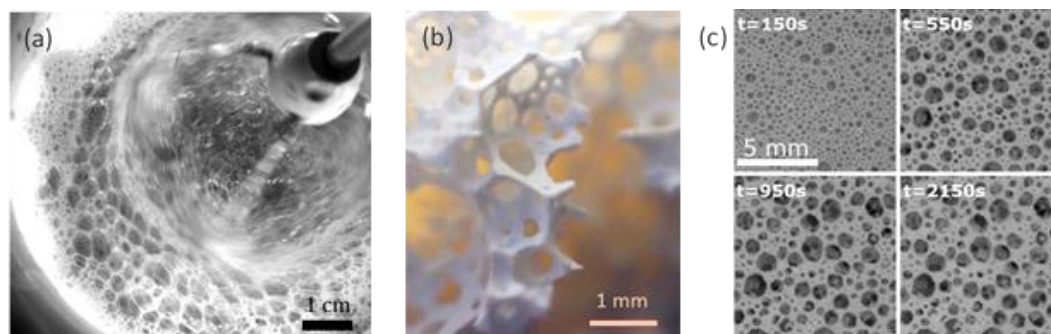


Figure: Liquid (a), solid (b) and (c) solidifying plaster foams

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

Condensed Matter Physics: NO
Quantum Physics: NO

Soft Matter and Biological Physics: YES
Theoretical Physics: NO