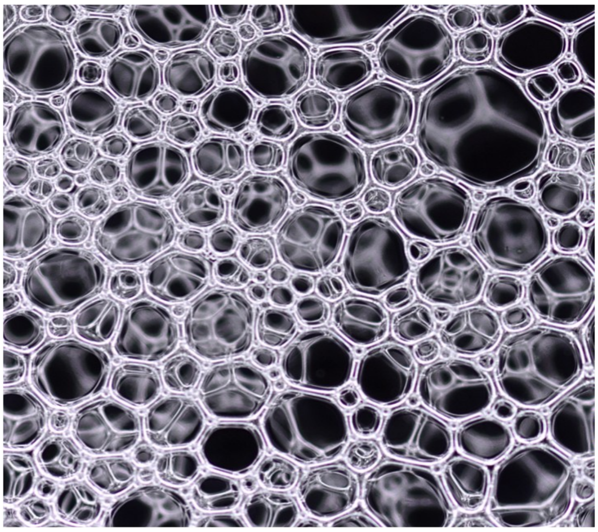
Stability and dissipative properties of liquid foam.

Key words: Fluid mechanics, diphasic fluids, fluorescence, soft matter, surfactants.
Funding: ERC grant.

A 2 years postdoctoral position is currently open at Institut de Physique de Rennes (France). The project is experimental, and part of the ERC project DISFILM (PI I. Cantat).

Context
Liquid foams are complex fluids which absorb energy particularly well. However, the nature of the local flows induced by a foam deformation has not been identified yet. A better understanding of these flows, at the scale of few films, is crucial to make the link between the physico-chemical properties of the surfactant solutions and the foam stability and dissipative properties.

Experiment
The candidate will study the flows in the thin liquid films separating bubbles generated by the deformation of a structure made of a few bubbles. A specific set-up has just been designed to reproduce at the local scale the deformations occurring in films in a 3D sample: compression, dilatation or shear. The candidate will use and improve an innovative optical technique based on the use of fluorescent surfactants (with the help of an engineer in optic) which we just developed to measure such velocity fields (Seiwert et al. PRL 2017). The results obtained will be implemented to predict the rheological properties of 3D foams under steady or oscillatory shear. Langmuir trough experiments and rheometry on 3D foam will allow to built a multi scale model for foam viscosity.



Required skills
Excellent formation in Fluid Mechanics and Optics. Interest for both experiments and models, in the field of Soft Condensed Matter.

Permanent researchers in the team: I. Cantat (Professor at Rennes 1 University), A. Saint-Jalmes (DR CNRS).

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