Séminaire

Mardi 13 janvier à 10h30
Amphithéâtre Henri Benoît

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Looking into Foams and Liquid Interfaces by Scattering Methods: How Far Can We Go?

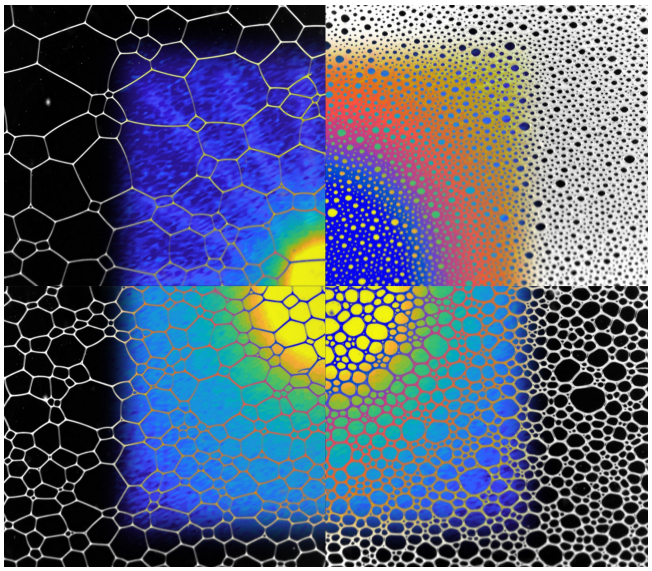
Liquid foams, comprising gas dispersed in a liquid matrix, exhibit unique hierarchical structures ranging from macroscopic bubbles to nanometer-scale thin films. Their dynamic, multiscale nature presents significant analytical challenges. Yet, accessing structural properties across these different length scales is of paramount importance for advancing our understanding of liquid foams.

Small-angle neutron scattering (SANS) has proven to be a valuable tool for probing the nanoscale structure of foams. In this seminar, we demonstrate how technical innovations and refined data-analysis approaches enable the extraction of unprecedented insights into foam behavior. By integrating optical imaging with neutron scattering techniques, we achieve a true multiscale characterization of foams, spanning macroscopic bubble arrangements to nanoscale thin films and colloids. This combination provides a comprehensive perspective on the structural complexity of foams.

Small-angle scattering, however, comes with limitations. In particular, the accuracy of determining the composition of thin liquid films is constrained by the nanometer resolution of the technique and the strong contrast conditions between the liquid and gaseous phases. We therefore outline ongoing developments in the field aimed at overcoming these limitations. These include the combined use of neutron and X-ray scattering, as well as the application of neutron reflectometry to probe the structure of thin liquid films with ångström-level resolution.

The potential use of neutron spin-echo techniques to explore the nanosecond and nanometer dynamics of foam films will also be addressed. Such studies are crucial for unraveling the mechanisms governing foam coalescence and stability.

Finally, since the ultimate decomposition of a liquid foam leads to the “simple” air/liquid interface, recent developments in interfacial scattering will also be discussed.



Les personnes souhaitant rencontrer L. Chiappisi sont priées de prendre contact Wiebke Drenckhan.