

Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (6 mois, début : Mai 2011)

Proposition de stage pour l'année 2010-2011

Date de la proposition : 11.02.2011, pour début souhaité Mai 2011

Responsable du stage /Prof. Véronique Trappe (Physics Department, Univ. Fribourg) / Dr. D.Z.Gunes (Nestlé research Center, Lausanne)	
Nom : Trappe	Prénom: Véronique
Tél : +4126 300 9119	Fax : +4163009747
Courriel: veronique.trappe@unifr.ch	
Nom du Laboratoire / laboratory name: Soft Matter and Photonics (SMP)	
Code d'identification :	Organisme : Fribourg University
Site Internet / web site: http://physics.unifr.ch/en/page/54/	
Adresse / address: University of Fribourg, Chemin du Musée 3, 1700 Fribourg, Suisse	
Lieu du stage / internship place: Soft Matter and Photonics (SMP) lab, Physics Dept, University of Fribourg	

Titre du stage / internship title: Exploring foam-instabilities by time and space-resolved dynamic light scattering
Résumé / summary
Keywords: diffusing-wave spectroscopy, time-resolved methods, foams, stability, rheology
<p>The goal is to develop model systems that will enable us to control the relative importance of drainage, coalescence and Oswald ripening in a coarsening foam [1]. These systems will then be used as benchmark-systems to test the hallmarks of the different instabilities in diffusing wave spectroscopy (DWS) [2], where will use CCD-based correlation schemes to resolve bubble reconfigurations with spatial and temporal resolution [3-5]. Some chosen examples of foams will be investigated to explore specific parameters that govern the long-term stability of foams typically used in food-stuff. The development of model systems will be carried out at the Nestlé Research Center under the supervision of Deniz Gunes, while the core of the investigations using space and time-resolved dynamic light scattering to characterize these systems will be carried out at the University of Fribourg under the supervision of Véronique Trappe. The ideal candidate will have a background in Soft Matter Sciences and have some experience with dynamic light scattering and rheology. General skills in experimental physics, taste for independent work and critical thinking are required.</p>
PROPOSED PROGRAM OF INTERNSHIP
<u>1) Preliminary work</u>
a) Acquiring the theoretical background about foam physics and physical chemistry: hydrodynamics of drainage, coalescence, Ostwald ripening, emulsifiers, interfacial rheology, transport phenomena.
b) Acquiring the basics of advanced dynamic light scattering methods: diffusing-wave spectroscopy, space and time resolved methods.
<u>2) Main work</u>
a) Development of a methodology to produce model foams and to transfer them into cells that can be implemented in a DWS-set up.
b) Study the DWS signature of instabilities using the selected model systems.
c) Comparison with microscopy observation in thin cells.
d) Work on the understanding of the main destabilization phenomena
e) Development of a system for the specific characterization of coalescence by time and space resolved DWS.
References
1. Cipelletti L, Bissig H, Trappe V, Ballesta P, Mazoyer S: Time Resolved Correlation: a new tool for studying temporally heterogeneous dynamics. J. Phys.: Condens. Matter 2003, 15:257-262.
2. Duri A, Bissig H, Trappe V, Cipelletti L: Time Resolved Correlation measurements of temporally heterogeneous dynamics. Phys. Rev. E 2005, 72:051401.
3. Sessoms DA, Bissig H, Duri A, Cipelletti L, Trappe V: Unexpected spatial distribution of bubble rearrangements in coarsening foams. Soft Matter 2010, 6:3030-3037.

Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : Il y a aurait une possibilité mais en 2012			
Si oui, financement de thèse envisagé/ financial support for the PhD: Industriel par Nestlé			
Lasers et matière	X	Lumière, Matière : Mesures Extrêmes	
Optique de la science à la technologie	X	Physique des plasmas	