ESPCI PARIS | PSL

INSTITUT PIERRE-GILLES DE GENNES Pour la microfluidique

CBI CHIMIE BIOLOGIE INNOVATION

Laboratoire Colloïdes et Matériaux Divisés

Postdoc:

Flow of concentrated emulsions in microsystems

Context

It is well established that microfluidics offers a suitable tool for creating emulsions whose properties, in terms of size distribution and dispersed phase composition, including internal architecture, could not be obtained by traditional processes. Such tailored emulsion droplets can then undergo further physicochemical processes to lead to functional microparticles that find applications in various fields and especially in life science. However, to be an efficient and competitive technology, the main challenge is the ability to massively produce such calibrated emulsion droplets.

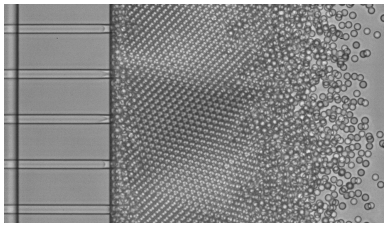

Figure 1: Parrallelized emulsion droplet production in a microfluidic system (droplet size is 10 μm).

Objectives

For this project, we propose to take advantage of recently developed microsystems capable of producing micrometre size emulsion droplets at a high throughput for investigating how confinement alters flow behaviour of concentrated emulsions. A peculiar attention will be devoted to the impact of surface interactions, between droplets and between droplets and solid walls in presence or not of adsorbed solid nanoparticles at droplets' surface, on emulsion motion as well as on continuous phase flow through a concentrated emulsion. We also aim at developing a continuous flow reactor where liquid droplets turned into solid spheres, focusing on an optimization of the emulsion droplets motion to homogenize mass transport between the dispersed phase and the continuous phase and thus final microspheres' features.

Profile

We look for a candidate having accomplished a PhD, or having an engineer degree, in applied physics, fluid mechanics or physico-chemistry of soft matter. Strong skills in microfluidics, soft matter, rheology and experimental work are desired. High motivation, flexibility, autonomy, the ability to work in a highly multidisciplinary team and good interpersonal and communication skills are essential.

Start date: From September 2023
Duration: 12 months
Salary : according to professional experience

Please send a CV with references and a motivation letter to Nicolas Bremond:
nicolas.bremond@espci.fr