

Research Topic for the Arts et Métiers ParisTech - CSC PhD Program

Subfield: Applied Physics, Fluid Mechanics

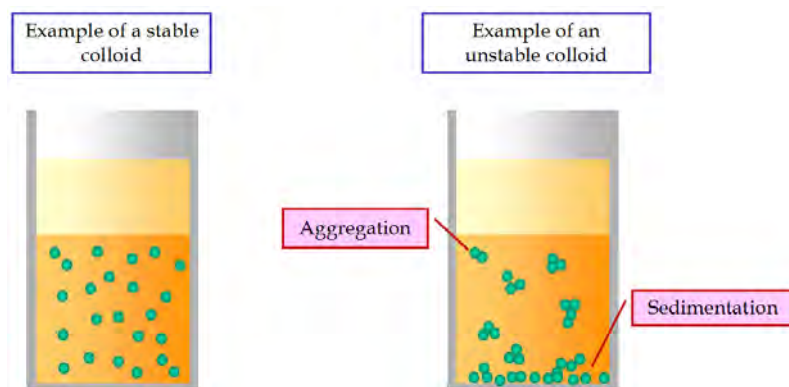
ParisTech School: Angers

Title: Experimental study of the hydrodynamic interactions of a spherical particle in viscoelastic fluids

Advisor(s): A. Ambari, S. Champmartin
Stephane.Champmartin@ensam.eu

Short description of possible research topics for a PhD:

The dynamics of non-dilute suspensions of particles depends greatly on the hydrodynamic interactions between particles or particles and walls. Among these interactions, those which take place in a frontal way control the time of their contact or separation. This time plays a main role in the aggregation and the formation of the plug flow during the transportation of these suspensions. This problem is of fundamental interest as well as relevant in many practical and industrial situations (filtration, fluidization, sedimentation, etc.). Moreover recent applications of Dynamic Surface Force Apparatus (DSFA) in nanorheology need the knowledge of this kind of hydrodynamic interaction. In this study, we want to elucidate experimentally the influence of the fluid rheological properties on the hydrodynamic interactions between a spherical solid particle in the vicinity of a plane surface. The experimental results we be compared to the numerical results previously obtained in our laboratory.



Stable and unstable colloidal suspensions

Required background of the student: the applying student must have a good background in Fluid Mechanics as well as good experimental skills

2-3 representative publications of the group:

A. Despeyroux, A. Ambari, Slow motion of a sphere towards a plane through confined non-Newtonian fluid, Journal of Non-Newtonian Fluid Mechanics - Vol. 167-168, p.38- 45 - 2012

A. Despeyroux, A. Ambari, A. Ben Richou, Wall effects on the transportation of a cylindrical particle in power-law fluids, Journal of Non-Newtonian Fluid Mechanics - Vol. 166, n°19-20, p.1173-1182 - 2011

FOR APPLICATION, PLEASE CONTACT ADVISOR(S) BY EMAIL WITH COPY TO:
ali.siadat@ensam.eu AND yvon.velot@ensam.eu