Séminaire LadHyX, Palaiseau, 26 septembre 2019

Colloids and liquids
from suspensions to superhydrophobicity

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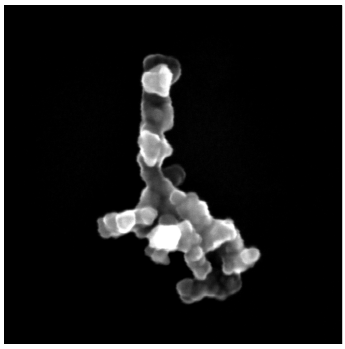
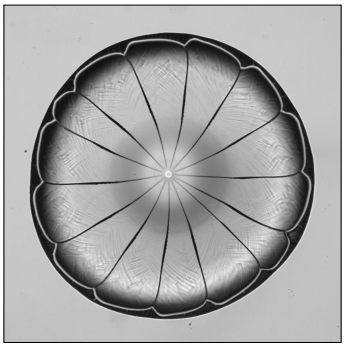
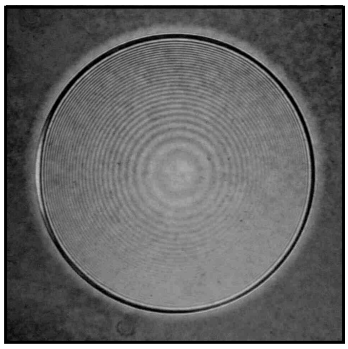

Colloidal suspensions are ubiquitous in our daily life. Micrometric particles dispersed in a solvent are indeed present in common liquids such as paints, inks or even food products. We will discuss the properties of those colloidal suspensions from their liquid phase to solid deposits after drying.

First, colloidal suspensions exhibit a wide range of rheological behaviors from shear-thinning to yield stress fluids. We will focus on the shear-thickening transition as dense suspensions experience a dramatic increase in viscosity above a critical shear-stress. By modifying the physico-chemistry of the particles, we can tune this rheological transition and thus understand the interactions involved in this behavior.

Increasing concentration can also be noticed during drying when solvent evaporates: particles finally form a solid deposit. After drying, a drop of a colloidal suspension leads to a variety of patterns from coffee-stain to more homogeneous coatings in paintings. We will discuss the effect of the initial concentration of particles on the drying pattern and on the subsequent mechanical instabilities such as cracks propagation.

Finally, after the whole drying of the colloidal suspension, coatings are achieved. Depending of the nature of the particles, we can tune the wettability of the substrate up to superhydrophobic solid. We will briefly discuss how such a water-repellent substrate can allow levitation of liquids.