SYNP 2 Noneqilibrium Phenomena in Soft Condensed Matter

Time: Tuesday 11:00–12:30 Room: HSZ 04

Invited Talk SYNP 2.1 Tue 11:00 HSZ 04

The dynamics of a moving wetting line: a review — •Joël De Coninck — University of Mons-Hainaut, 20 Place du Parc, 7000 Mons, Belgium

This talk will be devoted to a review of the recent results concerning the dynamics of wetting on different types of substrates: flat surfaces, fibres, pores ... Combining theoretical approach, experimental results and large scale molecular simulations, it will be shown that the dynamics of moving wetting line can be related to the equilibrium properties of the constituents, to the friction between the liquid and the solid surface, to the viscous bending of the meniscus, ... many different contributions to a mechanism which is still not completely elucidated despite its considerable importance in practice.

Invited Talk SYNP 2.2 Tue 11:30 HSZ 04

Droplet pinch off of diluted polymer solutions — •Christian Wagner — Institut für Experimentalphysik, Universität des Saarlandes, D-66123 Saarbrücken

Tiny amounts of polymers can alter the flow behaviour of simple liquids dramatically. An aesthetic and instructive example is the detachment process of a droplet of a polymer solution, e.g. a diluted DNA solution. It is characterized by the suppression of the pinch off finite time singularity and the formation of a cylindrical filament between the droplet and the nozzle. On later stages of the experiments beads on a string a formed. Their generation can be well explained with scaling arguments of the intrinsic time scales of the experiment. The dramatic increase of resistance against the flow is macroscopically described by the elongational viscosity. It is a crucial parameter in many different industrial processes where contraction flows are generic. A pure elongational flow stretches the macromolecules at maximum and we use different experimental techniques simultaneously to relate macroscopic flow profiles with microscopic polymer configurations.

Invited Talk SYNP 2.3 Tue 12:00 HSZ 04

Equilibrium and non-equilibrium phenomena in complex food systems — •Raffaele Mezzenga — University of Fribourg and Nestlé Research Center, Switzerland

Complex food systems, as any other soft-condensed matter material, exhibit a behaviour, whose thermodynamic nature is intimately related to the relevant length scale considered. Since foods are structured over a broad range of different typical length scales, very different kinetics to attain their equilibrium configuration are encountered. If correlation length scales are small, very short times are needed to re-organize molecules to attain equilibrium, while if correlation length scales are large, very slow kinetics will be followed. This explains why, for examples, foams, where length scales reach the order of millimeters, can be stable for long times despite their high internal energy associated with the presence of very large interfaces, whereas self-assembled liquid crystalline foods, whose typical feature size is of the order of few nanometers, are almost always observed at the equilibrium. In the present talk we consider a few selected examples of foods in which the equilibrium/non equilibrium nature can be directly related to the typical length scale of the structure and we will discuss the current understanding of the physics ruling their macroscopic behaviour.