



Séminaire *IMPulsion* N°12

Vendredi 5 avril 2019 à 10h30

Salle de Réunion IMP LYON1

3^{ème} étage - Bât POLYTECH

(Visio en Salle du conseil pour l'UJM)

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Near wall dynamics, velocimetry and slip measured by light scattering

Abstract

The ability to probe precisely near wall dynamics of complex fluids is relevant in a number of situations as the presence of a hard boundary and interactions with the fluid constituents may lead to local effect. In the case of flow, the velocity profile is often affected by the presence and the type of boundary with in particular the occurrence of slip at the wall. Total internal reflection and the associated evanescent wave provide a mean to probe the dynamics within microns of the interface. We describe the evanescent wave dynamic light scattering and its application to near wall velocimetry, in particular its implementation on commercial rheometers. Example covering a range of complex fluids (polymer and colloidal dispersion) will be presented, demonstrating the ability to probe different type of near wall flow, and in particular the onset of slip. The relevance in terms rheological measurement will be discussed.

“Near wall velocimetry on a rheometer” Antonio Giuliani, Ruel McKenzie, and Benoit Loppinet
Journal of Rheology 63, 93 (2019); <https://doi.org/10.1122/1.5047020>

Biography

Benoit Loppinet is researcher at IESL FORTH Heraklion since 2002, specializing of experimental soft matter. He obtained is PhD in Physics in Grenoble (1994) and is engineering degree at INP Grenoble (1988)

Benoit Loppinet présentera un second séminaire à l’UJM, le **mercredi 3 avril à 14h00**,

Salle du conseil de l’UJM (Visio vers Lyon possible, salle à définir)

Structure, persistence and hydrodynamics of high generation denpols

Dendronized polymer (denpol) are a subclass of hyperbranched polymers. They consist of dendrimer side chain, covalently linked to a linear polymer main chain. Their unique structure is expected to lead to “sausage”-like persistent nano-object. The question of the persistence of such an object is not entirely clarified.

We use a well-defined dendronized polymers (denpols) series with a 4th, 5th and 6th generation side dendron. They were synthesized by ring-opening metathesis polymerization (ROMP) of macromonomers with large degree of polymerization denpols and narrow polydispersity,

The structure and conformation were investigated in dilute solutions, by a combination of scattering techniques. Careful analysis of GPC couple with Multiple Angle Laser Light Scattering (MALLS) allowed measure of the evolution of the gyration radius R_g with the molecular weight or the degree of polymerization. The form factors were measured by Small Angle Neutron Scattering, and analyzed by fitting with the Kholodenko semiflexible cylinder model form factor. The diffusion coefficient were also measured by Dynamic Light Scattering and were found to compare well to semi-flexible cylinders models. The evolution of the measured dimensions (cross section radius, persistence length, diffusion coefficient) with increasing denpol generation was measured, with rather high values of the aspect ratio lp/Rcs attained in the high generation denpol.