

Master 2: Internship Proposal

Laboratory name: Laboratoire Interdisciplinaire de Physique (LIPhy)
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Internship location: Grenoble

Thesis possibility after internship: YES

Physics of confined liquids: 1 internship in the group - 3 topics proposed

Confined liquids are a major topic in science and its applications. The behavior of liquids under confinement governs many aspects in nature such as biological lubrication, capillary condensation, electrokinetic effects in electrolyte as example. To study and understand these behaviors, we build a completely new surface force apparatus to measure flow properties of liquids under confinement and to bridge the macroscopic behavior to an molecular description. In this experiment, the confinement is fully controllable in a range of microns to contact with an accuracy smaller than the atomic scale.

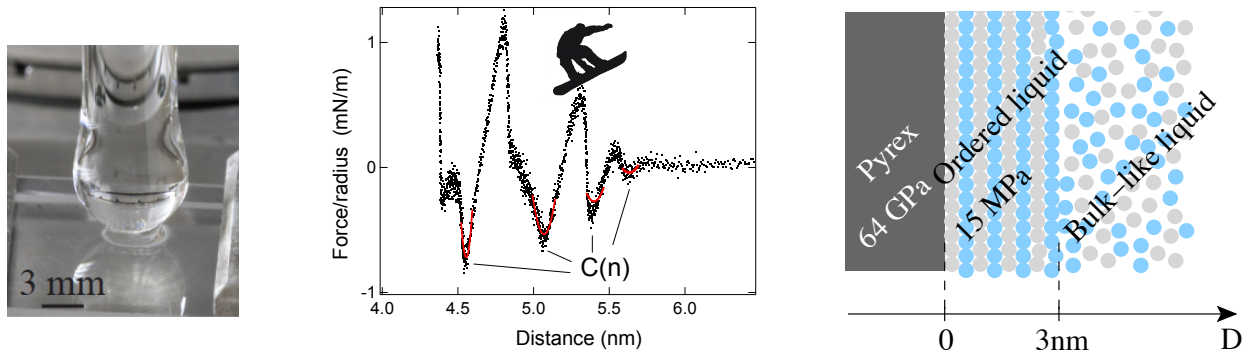


Figure 1: A drop of liquid is confined between a sphere and a plane. The force measured close to the contact between the sphere and the plane shows an ordered film of liquid with a periodicity equal to molecular size. We are able to measure the mechanical properties of this layer. Sketch on the right shows an ordered layer extended on 3 nm away from the solid interface for each surface.

We work in the group on three different projects:

- **ionic liquid under confinement:** surface freezing and capillary solidification.
- **complex fluids:** hydrodynamic slip and interfacial friction.
- **electrolyte under confinement:** friction induced by charge transport in the Debye layer.

The candidate for this internship should have a background in Physics and a real taste for experimental work. The candidate will be immersed in current projects of the group founded by two ANR projects and in collaboration with L.BOCQUET and F.RESTAGNO. Feel free to contact us for more details.

Condensed Matter Physics: YES
Quantum Physics: NO

Soft matter and biological physics: YES
Theoretical Physics: NO