Dielectric properties of nanoconfined polar fluids

The dielectric properties of confined fluids focus a lot of attention for two reasons: (i) they differ drastically from the macroscopic properties of the fluid [1,2,3]; (ii) they play a key role in controlling reactivity and transport in confinement. These processes are omnipresent *in vivo* metabolic pathways and in nanofluidics.

In this internship, we will investigate the interplay between the structure of the fluid, the geometry and the physical properties of the confining surface on the dielectric properties of the liquid.

To do so, we will describe the fluid molecules with an increasing complexity (starting from punctual dipoles to explicit extended charge distributions). The confinement will first be described as purely geometric and in second step physical properties of the surface (metallic/dielectric) can be included.

Via standard tools of statistical physics and field theory we will derive analytically the properties of this system and will extract the coupling between fluid and confinement.

Molecular Dynamics simulations will be performed to parametrize the field-theory model and validate the analytical results.

The internship **will take place in Berlin, Freie Universität,** under the supervision of H. Berthoumieux and R. R. Netz.

The internship could be followed by a PhD, in the lab LPTMC, Sorbonne, Paris.

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