Dielectric properties of confined water: a field theory approach

We are looking for a post doctoral researcher to study the dielectric properties of confined water using a field theory approach. It is difficult to overstate the importance of electrostatic interactions in water in nanometric structures, biological organelles or nanofluidic devices to name a few. The dielectric permitivity of the solvent at this scale, which determines the screening of the electrostatic interactions, is a key parameter to describe such systems and is evaluated in an increasing number of simulating or experimental works. These studies confirm that in nanometric structures the vision of an homogeneous dielectric environment is not valid and that the screening differs drastically than in bulk environment.

How do the geometry and the physical properties of the confinement interplay with the dielectric permitivity of water? To answer this question, the postdoctorant will use a continuous field model that captures the dielectric properties of the solvent at the nanoscale. He/She will study the interplay between the characteristics of the solvent and the boundary conditions imposed by the confinement. In parallel to the theoretical project, he/she will perform molecular dynamics simulations to obtain a microscopic description of the fluid polarization on confining surfaces.

The postdoc will be based in Sorbonne Université, Paris, under the supervision of Hélène Berthoumieux and the work will be in collaboration with Alexeï Kornishev, Imperial College London. The postdoc will be integrated in the 'Physics at the interface' group of the LPTMC (Theoretical Physics of Condensed Matter) a theoretical Lab in the center of Paris. The postdoc duration is 12+ months, start date negotiable from January 2020, with salary according to experience.

The candidate should have a PhD (or have it completed before the start of the position) in theory in physics or chemical physics. Interest for molecular dynamics simulations is appreciated.

Candidate interested, please send us a CV and a short email motivating your interest in the position.
Hélène Berthoumieux: helene.berthoumieux@lptmc.jussieu.fr
Alexei Kornyshev: a.kornyshev@imperial.ac.uk

References

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(2) A. Schlaich, E. W. Knapp, and R. R. Netz, Water Dielectric Effects in Planar Confinement, Phys. Rev. Lett. 117, 048001 (2016)
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