Transport mechanisms through nanopore: fundamental to applications.

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The experimental control of single nanopore (biological, solid-state or polymer) has opened an avenue to the development of nanofluidic technologies. These nanoscale devices are the central component to the emergence of numerous real applications including the osmotic energy harvesting, single molecule sensing, diagnostic tools and the most achieved DNA sequencing.

Beside these applications, the nanofluidic devices provide a unique environment for a study of transport of simple electrolytes, macromolecules (polymer, DNA, protein) as well as self-assembly systems (protein aggregate, fibril and amyloid) or nanoparticles under confinement which poses major fundamental challenges. The law dimension of the channel requires a deep understanding of the influence of interfacial properties (charge density, double layer, structure, composition, defects, and slippage). The translocation of macromolecules requires a description of numerous phenomena (unfolding, adsorption, etc...). All this knowledge can also serve to understand biological as well as nanofiltration processes. In order to improve nanofluidic technologies a synergy between different expertises from biology, chemistry and physicist is essential.

This mini-colloquium intends to bring different scientific communities which are interested by the transport at nanoscale. It will offer a platform to open multidisciplinary discussion, share the knowledge in this field and initiate new collaborations. All contributions about the transport at nanoscale are welcome including theory, simulation and experiments.

Keyword : nanopore, nanotube, nanofluidic, confinement, dynamics

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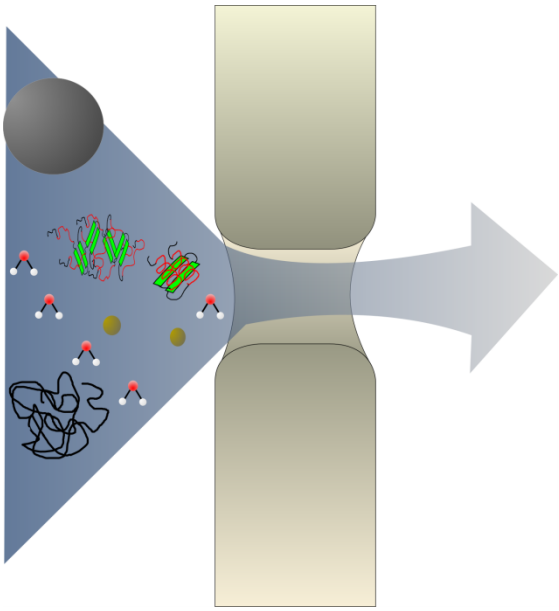

References:

Siria, A.; Bocquet, M.-L.; Bocquet, L. New Avenues for the Large-Scale Harvesting of Blue Energy. Nature Reviews Chemistry 2017, 1, 91.

Lepoitevin, M.; Ma, T.; Bechelany, M.; Janot, J.-M.; Balme, S. Functionalization of Single Solid State Nanopores to Mimic Biological Ion Channels: A Review. Adv. Colloid Interface Sci. 2017, 250, 195–213.

Oukhaled, A.; Bacri, L.; Pastoriza-Gallego, M.; Betton, J.-M.; Pelta, J. Sensing Proteins through Nanopores: Fundamental to Applications. ACS Chem. Biol. 2012, 7, 1935–1949.