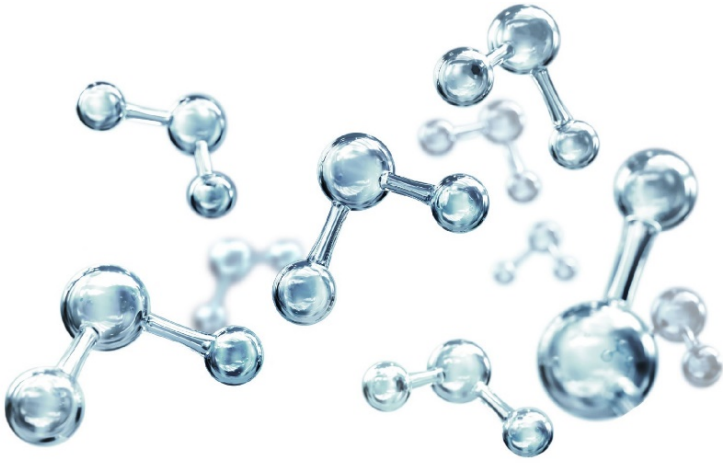
Seminar

CMWS Centre for Molecular Water Science

24th of June 2021
12:00 h

Zoom Virtual Meeting:
https://desy.zoom.us/j/97518013893
Meeting-ID: 975 1801 3893
Password: 320247



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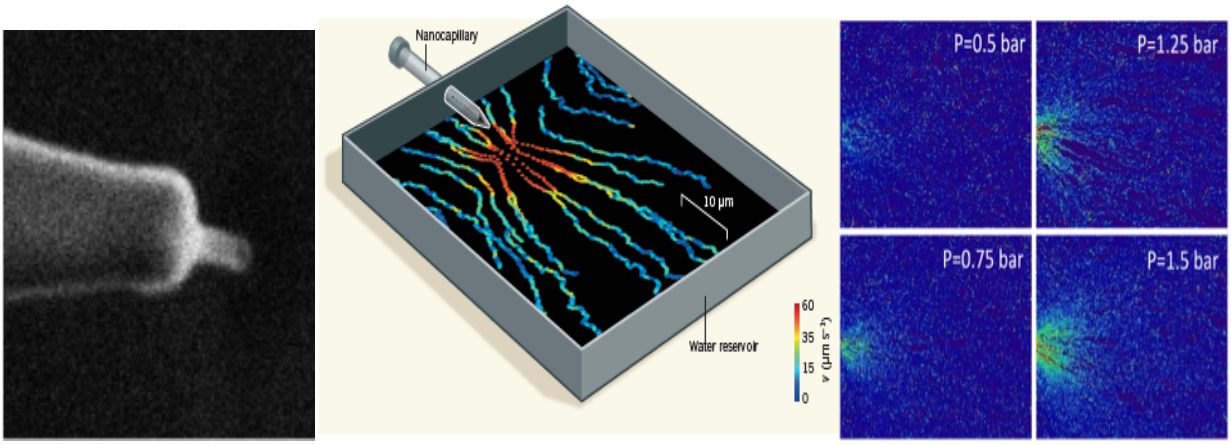
Scale oddity of water transport in nanochannels

In this talk, I will discuss various experimental and theoretical results that we obtained recently in our team on the transport of water and ions in ultra-confinement. I will in particular focus on the odd properties of the water-carbon couple, which highlights a variety of exotic transport properties that we will discuss and rationalize, such as ultra-low friction [1,2], specific charge adsorption, strongly non-linear transport and mechano-sensitivity [3,4], …

I will show how these specificities can be used as building blocks to build a ionic machinery, from ion pumps to artificial neuromorphic behavior [5] and the development of elementary ion-based computing.



References

[1] "*Massive radius-dependent flow slippage in single carbon nanotubes*", E. Secchi, S. Marbach, A. Niguès, D. Stein, A. Siria and L. Bocquet, Nature 537 210 (2016). [2] "*Fluctuation-induced quantum friction in nanoscale water flows*", N. Kavokine, A. Robert, M.-L. Bocquet and L. Bocquet, submitted (2021). [3] "*Molecular streaming and voltage-gated response in Angström scale channels*", T. Mouterde, A. Keerthi, A. Poggioli, S. Dar, A. Siria, A.K. Geim, L Bocquet and R. Boya, Nature 567 87 (2019). [4] "*Mechanically activated ionic transport across single digit carbon nanotubes*", A. Marcotte, T. Mouterde, A. Nigues, A. Siria and L. Bocquet, Nature Materials 19 1057 (2020). [5] "*Principles of Hodgkin-Huxley iontronics with two-dimensional nanofluidic memristors*", P. Robin, N. Kavokine, and L. Bocquet, to be published in Science (2021).