Entropic Electrokinetics. Dynamics of Charged Tracers and Electrolytes under Strong Confinement

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I will analyze the dynamics of electrolytes under confinement. I will describe computational and theoretical methods that allow us to understand how the heterogeneous spatial confinement (found in a wide variety of situations such as porous media, or membrane ion channels) can modify qualitatively the dynamics and transport in charged fluids. Understanding the physical mechanisms controlling electrolyte dynamics in such conditions will shade light on their relevance in a wide variety of situations, ranging from nano- and micro-fluidic devices to biological systems. I will show that when particles are suspended in an electrolyte confined between corrugated charged surfaces, electrokinetic flows lead to a new set of phenomena such as particle separation, mixing for low-Reynolds micro- and nano-metric devices and negative mobility.