Séminaire LIONS

Jeudi 01 Décembre à 11h, pce. 157, bât. 125

Colloids: Assembly, Structuration, Detection and Manipulation for Biological applications

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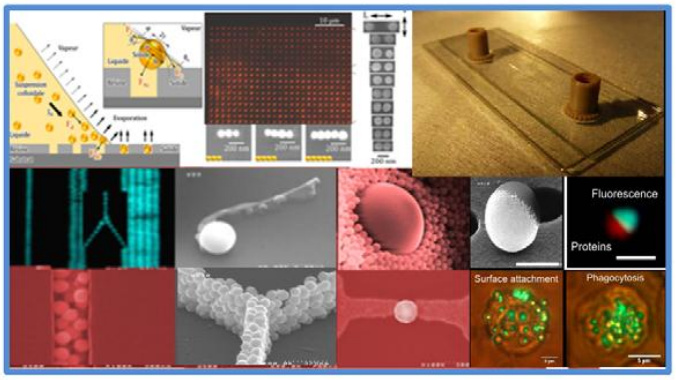
Colloidal Nanostructures (CNs) are offently referred as 'artificial atoms' due to the control of the density of their electronic states/composition/size/shape. Due to their nanometer size, they scattered or emitted light opening the control of light propagation/optical sensing at the wavelength scale. Morevover, their high specific surface combined with CNs core-shell functionalisation allows the development of biosensing applications. Finally, CNs are considered as as potential building blocks in the research field of nanobioscience. But to fully study and exploit their nanoscale properties, rapid and low-cost technological ways must be develop to overcome colloidal Brownian motion and localize in a deterministic way CNs on a surface or in a microfluidic chip.



My intervention will firstly present original alternative strategies to handle (assembly, localize, separate,..) CNs. The integration of colloidal nanostructures into nanodevices is studied in realtime by exploiting capillary forces or by the use of an external field gradient (Electric–Optic). The physical properties of colloidal/supra-colloidal nanostructure devices are determined: Plasmonic coupling -colloidal waveguiding…. Then, I will present several routes to create, manipulate and handle new types of multifunctional colloidal materials based on non-contact forces. I will show the electrokinetics properties of particles, cells and from a particles-cell complex in a microfluidic chip for cell handling. According to the cellular type, those complexes are characterized by a cell that has internalized particles or is decorated by particles attached on its membrane. Submitted to determined electrokinetic forces, those complexes show dual responses that are controllable on both particles or cell independently. By associating the engineering of colloidal particles and this electrokinetic contactless handling microfluidic technology, local forces can be exerted on cells via those particles.