

Postdoc position at Matière et Systèmes Complexes laboratory in Paris funded by Agence Nationale de la Recherche

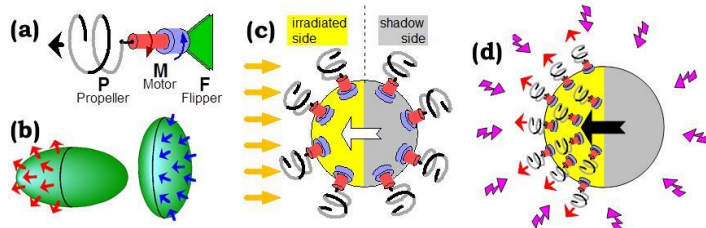
Motorized Nanostructures from Light-responsive Molecular Machines: Structure and Dynamics

Duration: 24 months

Strating date: Flexible (position available immediately)

Positioning:

The main objective of the project is to design and effectively actuate an entirely new class of mechanically active nanostructures functionalized with light-driven rotary molecular motors and helical propellers. In this challenging approach, we will focus on the out-of-equilibrium mechanical properties of these nano-objects in order to understand in details their dynamics upon motor rotation, and to control their changes in size, shape, and directed propulsion behavior. The entire project will be achieved by a unique multidisciplinary consortium that consists of a combination of synthetic chemists, experimental physicists, and theoreticians (ICS Strasbourg and MSC Paris).



Examples of propulsing nanostructures : (a) Self-propelling molecular machine; (b) Motorized Janus nanoparticles (prolate and oblate forms); (c) Motorized NP driven by a laser beam; (d) motorized Janus nanoparticle or vesicle.

Post-doctoral position:

- The propulsion and diffusion properties of the self-propelling molecular machines and motorized nanostructures (e.g. Janus nanoparticles, vesicular self-assemblies, surfactant nanodisks) will be fully characterized by using in particular scattering techniques (light, X-ray, and neutron) and heterodyne dynamic light scattering under UV irradiation allowing to tune and determine the balance between diffusive and ballistic motions. The impact of the project will be threefold: i) to demonstrate that artificial molecular motors can transfer their mechanical work to the nanostructures in which they are integrated; ii) to generate smart nanostructures capable of transient adaptation to their environment; and iii) to achieve the world-smallest propellers to date with potential long-term applications in nanotechnologies and nanomedicine.
- The successful post-doctoral fellow will interact closely with university and ANR collaborators (groups of N. Giuseppone, C. Serra, and A. Semenov): University of Strasbourg, Large Facilities.

Profile:

- A recent Ph.D. or Postdoc. Degree in Physics, Physical-Chemistry, Soft Matter, Polymer Science, Complex Systems, Biophysics, Colloids or other closely related field.
- An expertise in scattering would be appreciated: Light Scattering (e.g. Homodyne, Heterodyne, Static, Dynamics, Cross-correlation, DWS...) and/or Small-Angle Neutron or X-ray Scattering, etc.

Applications:

Applicants should submit detailed curriculum vitae with a list of publications, and the names, emails, and addresses of professional references to:

Prof. Eric BUHLER : eric.buhler@u-paris.fr (phone: +33 1 57 27 61 39)

Laboratoire Matière et Systèmes Complexes (UMR 7057), Université Paris Cité, Bâtiment Condorcet, 75205 PARIS cedex 13, France