Postdoctoral position at IS2M – 1 year

Hybrids nanoparticles by thermoplasmonics (M/F)

Context & Research program

Illuminated by a light wave, gold nanoparticles (NPs) generates localized surface plasmons inducing strong local field exaltation, electron/hole pairs and heat. Thanks to these 3 phenomena, NPs lead to numerous applications (biology, catalysis, optics, etc.). It is also possible to attach polymers around these NPs by photopolymerization, [1] thus creating hybrid NPs. Recently, the heat induced by gold NPs, known as thermoplasmonics, enabled us to generate millimetric polymer plots via laser illumination of an assembly of gold NPs. [2]

The candidate will participate in the development of hybrid nanoparticles by thermoplasmonics in the PHOTON team of the Institut de Science des Matériaux de Mulhouse (IS2M - CNRS UMR 7361). The 1-year postdoctoral position is funded by the Maison de la Chimie, enabling the recruitment of a young researcher (less than 2 years' post-doctoral experience).

This project has two aspects, at the interface between physics and chemistry. The first aspect concerns the development and characterization of new samples for thermoplasmonics, enabling the desired temperature to be reached easily via laser illumination, while remaining unaltered as the temperature rises. This can be achieved using a variety of techniques: fine control of the morphology of samples obtained by gold evaporation, nanosphere lithography (NSL) or self-assembly of colloidal NPs... The second aspect concerns the development of chemical temperature probes enabling us to address a wide range of temperatures via different chemical processes. Besides the development of new samples and temperature probes for thermoplasmonics, the candidate will be involved in the characterization of the samples (AFM, SEM, TEM, laser…).

[1] Kameche *et al.* 10.1016/j.mattod.2020.03.023 ; Khitous *et al.* 10.1021/acsanm.1c01377
[2] Molinaro *et al.* 10.1021/acsapm.4c00525

Application

This 1-year postdoctoral position at IS2M will begin between October 1st 2024 and January 1st 2025. The candidate must hold a PhD in nanoscience, materials science, light-matter interaction or physical chemistry, and have **0-2 years post-doctoral experience** at the time of starting this post-doctorate. The candidate will have good experience in metallic sample development (gold evaporation, NSL, self-assembly, ...). Experience in plasmonics and/or optical bench development and/or nanostructure modeling (BEM, FDTD...) will be an advantage.
Ability to work in a team, organize, synthesize and process data will be required.

Applications will include a cover letter highlighting their experiencce and motivation, curriculum vitae, list of publications and the name and contact details of at least two referees, and should be sent to celine.molinaro@uha.fr (deadline: July 14th 2024).