



## Post-doctoral position

### Single emitter plasmonic nano-antenna

A post doc position is available at the Institut des Nanosciences de Paris (Sorbonne Université, Paris)

#### Scientific context

Plasmonic nano-antennas confine light on very small scale making it possible to engineer quantum properties of light. We have fabricated and studied plasmonic nanoantennas with a single semiconductor quantum dot exhibiting original quantum properties and brightness, thanks to the high optical and electronic confinement in these structures. In order to maximize the interaction between the resonant field and the nanoemitter within the antenna, both the geometry of the antenna, position and orientation of the emitter inside the antenna have to be controlled. We have developed several lithography protocols to precisely control the position and orientation of a single emitter inside an antenna, with patents pending. In this project, antennas will be fabricated and studied in view of exploring strong coupling and collective effects.

During this project, supported by a transfer technology agency, we will address the realization, characterization and study of highly confined antennas with a single emitter working at room temperature. We intend to take this fundamental research to technological realization for applications.

#### Mission

The post doctoral fellow will be in charge of the fabrication of these antennas by e-beam and optical lithography on single emitters and will optimize the protocols. He will then perform experiments of fluorescence microscopy, characterize antennas and analyze results. He will study optical antenna properties specifically associated to the confinement, such as emission dynamics, brightness, spectral width, and coherence.

#### Skills

A good experience in optical microscopy focused on nanophotonics and quantum optics is required. Experience in nanofabrication and/or lithography will be highly appreciated.

#### Research unit

Institut des NanoSciences de Paris is a joint unit research between Sorbonne Université and CNRS, located in Paris. A clean room and high resolution microscopes (atomic force, scanning electron, confocal and near field optical microscopes) are available in the lab. The Nanostructure and Optics team studies interaction of light with plasmonic, dielectric or biological nanostructures in order to engineer polarization, chirality, spectral properties or to enhance specific emitters properties such as magnetic or quantum ones.

**Expected date of employment:** From September-December 2019

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