Internship offered in M2
2018-2019

Responsible for internship

Name: Mivelle Mathieu

Location:
4 place Jussieu, 75005 Paris
Tour 22-32, 5ème étage

Group: Nanostructure et optique

E-mail: mathieu.mivelle@insp.upmc.fr

Tel: +33 (0)1 44 27 44 42

Group websites:
http://www.insp.jussieu.fr/-Nanostructures-et-optique-.html
https://sites.google.com/view/mathieumivelle

Internship topic: Harvesting and Studying Magnetic Light Energy

Light is both made of an electric and a magnetic field, and the energy that light carries is actually perfectly shared between these two fields. Nevertheless, nowadays, the interactions between light and matter, that exists everywhere (photosynthesis, in our eyes, to create a rainbow and so on), are often considered as only due to the electric field of light, neglecting its magnetic counterpart.

At the interface between nanophotonics (optics at nanometer scales) and quantum optics (optics of energy quanta), this master project consists in using metallic nanostructures, known as optical nanoantennas, to isolate and enhance the optical magnetic field with respect to its electric counterpart. From there, a luminescent nanoparticle will be placed, using a near field optical microscope, in the center of the magnetic hot spot, in order to reveal the coupling between the 'magnetic light' and matter (figure 1).

This experimental master project is part of a complete new field of research with high potential both in terms of scientific publications and possible applications.

The master student will work in close collaboration with Cyrine Ernandes, third year PhD student, and Mathieu Mivelle, CNRS Researcher.
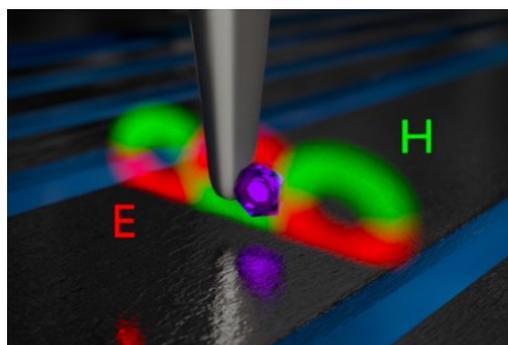

Figure 1. *Illustration of a nanoparticle (purple) coupled to the magnetic or electric optical field around an photonic nanostructure.*

Techniques involved: Near field Scanning Optical Microscopy
Type of internship: Experimental
Paid internship: Yes
Can this internship be continued for a PhD? Yes
If yes, type of PhD funding envisaged is: Ecole doctorale or Project