M2-internship: Quantum Magneto-Plasmonics

Proposition de stage / Internship proposal

Date de la proposition : 16.10.2026

Responsable du stage / *internship supervisor*:

Nom/name:TEMNOV Prénom/firstname:Vasily

Tél : Courriel / *mail*: vasily.temnov@polytechnique.edu

Nom du Laboratoire / *laboratory name*:

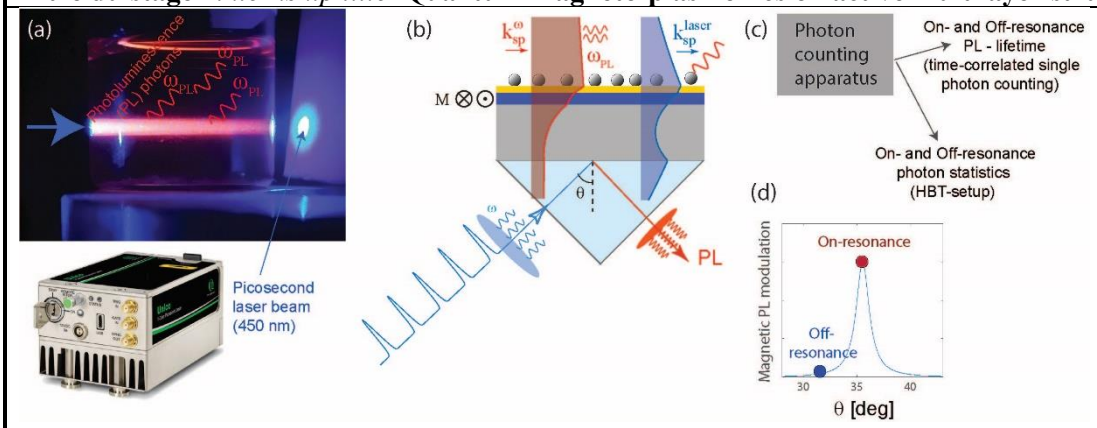
Etablissement / *institution* : LSI @ Polytechnique Code d'identification : CNRS UMR 7642

Site Internet / *web site*: https://lsi.ip-paris.fr/equipes/physique-chimie-des-nano-objets

Adresse / *address:* Ecole Polytechnique, Palaiseau

Lieu du stage / *internship place*: Equipe **PCnano**

Titre du stage / *internship title*: **Quantum magneto-plasmonics on active multilayer structures**



Résumé / *summary*

The project will focus on active control of photo-luminescence (PL), both continuous wave and time-resolved, in functional quantum plasmonic nanostructures [1]. Through a series of magneto-plasmonic PL experiments the student will be asked to identify the mechanism beyond the magneto-plasmonic modulation [2], where a periodically modulated external magnetic field will modify the intenstiy of photoluminescence of nanoscaled light emitters coupled to magneto-plasmonic multilayers. Recent collaborative efforts in unconventional solitonic superfluorescence in perovskites [3] makes us believe that these structures are intersting for more sophisticated quantum-optical plasmon-coupled experiments focused on the second-order photon statistics [4]. This research project will be part of existing national and international collaborations providing access to fluorescent nanoparticles (PCnano), high-quality colloidal CdSe quantum dots and J-aggregates (France), hybrid metallic multilayers (Germany) and magneto-plasmonic metasurfaces (Sweden) [5].

[1] D. Pacifici et al., **Nature Phot. 1**, 402 (2007); Y. Fedutik et al. **Phys. Rev. Lett. 99**, 136802 (2008)
[2] V.V. Temnov, **Nature Phot. 6**, 728 (2012); **J. Opt. 18**, 093002 (2016)
[3] M. Biliroglu et al., **Nature 642**, 71 (2025)
[4] V.V. Temnov and U. Woggon, **Phys. Rev. Lett. 95**, 243602 (2005); **Opt. Express 17**, 5774 (2009)
[5] M. Tran et al., **Phys. Rev. B 98**, 245425 (2018)



The Physics and Chemistry of NanoObjects (**PCnano**) team, Laboratory of Irradiated Solids @ Ecole Polytechnique is an interdisciplinary research team investigating physics and chemistry of functional (nano-)materials using a vast majority of nanofabrication and characterization techniques including colloidal chemistry (Dr. Florian AUBRIT), femtosecond laser litography, magneto-optical and femtosecond time-resolved pump-probe microscopies and ultrafast time-resolved photoluminescence (a few techniques relevant for this internship).

Ce stage pourra-t-il se prolonger en thèse ? *Possibility of a PhD* **? : yes**

Si oui, financement de thèse envisagé ou acquis / *financial support for the PhD* **?**

Financement acquis / *Secured funding*		Nature du financement */Type of funding*	
Financement demandé / *Requested funding*	*x*	Nature du financement */Type of funding*	*Bourse de l'X*