

Spécialité de Master « Optique, Matière, Paris »
Stage de recherche (4 mois minimum, à partir de début mars)

Proposition de stage (ne pas dépasser 1 page)

Date de la proposition : 13/11/2015

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| Responsable du stage / internship supervisor: | |
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| Nom du Laboratoire / laboratory name: Laboratoire Pierre Aigrain | |
| Code d'identification : UMR 8551 | Organisme : ENS/CNRS |
| Site Internet / web site: www.lpa.ens.fr | |
| Adresse / address: 24 rue Lhomond, 75005 Paris | |
| Lieu du stage / internship place: same address | |

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| Titre du stage / internship title: TeraHertz detection using semiconductor microcavities |
| Résumé / summary |
| <p>The THz frequency range (1 THz = 10^{12} Hz = 4.1 meV) lies between microwaves and mid-infrared and present interesting application possibilities in various fields such as medicine, security imaging, non-destructive control or gas detection. Despite this potential, it remains largely unexplored due to limited efficiency, prohibitive sizes or costs of detectors and emitters.</p> <p>We have recently developed a THz detector based on the electric dipole transition of asymmetric quantum wells in strong coupling with a semiconductor microcavity [1]. Compared to existing devices, this approach is not fundamentally limited to a low temperature regime, which is usually necessary to avoid parasitic thermal transitions which easily mask the radiative transitions of interest. This is possible thanks to the short lifetime of the fundamental excitations (polaritons) at stake in the THz transition whose temperature is arbitrarily low as they deintegrate radiatively before thermalizing with the crystal. During this internship, the optical and THz properties of the heterostructures we have developed will be characterized at low temperature, using a Ti:Sa monomode laser and a quantum cascade laser as a source. The various regimes of this THz detector will be studied.</p> <p>[1] S. Huppert, O. Lafont, E. Baudin, J. Tignon, and R. Ferreira, Terahertz emission from multiple-microcavity exciton-polariton lasers, Phys. Rev. B 90, 241302 (2014)</p> |
| Toutes les rubriques ci-dessous doivent obligatoirement être remplies |

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| Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : Yes |
| Si oui, financement de thèse envisagé/ financial support for the PhD: Ecole Doctorale |

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| Lumière, Matière, Interactions | X | Lasers, Optique, Matière | X |
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