

Spécialité de Master « Optique, Matière, Paris »

Stage de recherche (4 mois minimum, à partir de début mars)

Proposition de stage

Date de la proposition : 26 septembre 2017

Responsable du stage / internship supervisor:			
Nom / name:	PAPADOPOULOS	Prénom/ first name :	Dimitris
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Nom du Laboratoire / laboratory name: LULI, Ecole polytechnique			
Code d'identification :	LULI	Organisme :	Ecole Polytechnique/CNRS

Site Internet / web site: <https://portail.polytechnique.edu/luli/fr>

Adresse / address: Campus polytechnique, Palaiseau

Lieu du stage / internship place: Palaiseau

Titre du stage / internship title: Novel methods to generate optically synchronized OPCPA pump pulses

Résumé / summary

Developed within the frame of a collaboration between several laboratories of Université Paris-Saclay, the Apollon laser project has been designed to reach unprecedented peak powers of several petawatts. In order to reach these high peak powers, Optical Parametric Chirped Pulse Amplification (OPCPA) is one of the key technologies of the front-end laser system allowing to amplify ultrashort pulses while maintaining short pulse durations. As parametric amplification is an instantaneous process, it requires the optical synchronization of the pump and the signal pulse. It is currently obtained using a unique seed ultrashort pulsed laser to produce pump and signal pulses. However, the reliability of this solution is critical and the aim of this internship is to study alternative techniques allowing to use two independent seed sources to produce pump and signal pulses.

Preliminary experimental demonstrations as well as numerical simulations have been very promising. The goal of the internship will be to implement the new technique in an OPCPA amplification chain to demonstrate its potential in operational conditions. This technique could potentially be implemented in many high power ultra-short laser pulse facilities including the Apollon laser.

The internship program proposes a very rich experimental work covering a large range of subjects in the laser physics domain. More specifically the candidate will work on the manipulation and the characterization of ultrashort (20-30 fs) energetic pulses (2-3 mJ), the realization and the detailed characterization of different nonlinear optical setups as well as the development of high gain amplification systems operating in the few picosecond regime.

The internship will be supervised by Dimitris Papadopoulos from the LULI laboratory of Ecole Polytechnique and Xavier Delen from the Charles Fabry laboratory of the Institut d'Optique.

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

Si oui, financement de thèse envisagé/ financial support for the PhD: EDOM/CIFRE

Lumière, Matière, Interactions		Lasers, Optique, Matière	x
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