

DRF: Thesis SL-DRF-20-0595

RESEARCH FIELD

Optics - Laser optics - Applied optics / Engineering sciences

TITLE

Complex scattering media for the spatio-temporal characterization of ultrashort lasers

ABSTRACT

Laser technology now makes it possible to generate coherent light pulses with durations down to a few tens of femtoseconds only, with an energy per pulse of up to several Joules. These laser beams are likely to exhibit spatio-temporal coupling, i.e. a spatial dependence of their temporal properties across the beam, which can considerably degrade their performances. Our team has developed over the last few years different techniques to measure the full spatio-temporal structure of such lasers. These advanced measurement techniques have been demonstrated on different lasers, including some for the most powerful systems in operation to date. The next challenges in this field of optical metrology are, on the one hand, to develop single-shot measurement techniques (that is to say requiring only one laser shot, against several hundred currently), and to develop methods to control the spatio-temporal structure of ultrashort laser beams. The objective of this thesis will be to provide solutions to these two problems, using complex scattering media, which have been studied for several years by many research groups and whose properties are now better understood. Because they introduce deterministic correlations between spatial and spectral properties of light, these media are likely to be used in different configurations to measure as well as to control the spatio-temporal properties of ultrashort laser pulses.

LOCATION

Institut rayonnement et matière de Saclay
Service Laboratoire Interactions, Dynamique et Lasers
Physique à Haute Intensité
Place: Saclay
Start date of the thesis: 01/10/2020

CONTACT PERSON

Fabien QUÉRÉ
CEA
DRF/IRAMIS/LIDyL/PHI
Groupe Physique à Haute Intensité
DRF/IRAMIS/LIDyL
Laboratoire Interactions, Dynamique et lasers
CEA Saclay, Bât 522
91 191 Gif-sur-Yvette Cedex
Phone number: +33 1 69 08 10 89
Email: fabien.quere@cea.fr

UNIVERSITY / GRADUATE SCHOOL

Paris-Saclay
Ondes et Matière

FIND OUT MORE

<http://iramis.cea.fr/Pisp/107/fabien.quere.html>

<http://iramis.cea.fr/LIDYL/PHI/>

THESIS SUPERVISOR

Fabien QUÉRÉ
CEA
DRF/IRAMIS/LIDyL/PHI
Groupe Physique à Haute Intensité
DRF/IRAMIS/LIDyL
Laboratoire Interactions, Dynamique et lasers
CEA Saclay, Bât 522
91 191 Gif-sur-Yvette Cedex