LABORATOIRE INTERACTIONS, DYNAMIQUES ET LASERS

LIDYL-ERL 9000
CEA, CNRS, Université Paris-Saclay

THESE LIDYL

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Le Jeudi 9 Juillet 2020 à 14H00
Auditorium Pierre Lehmann, Laboratoire de l'accélérateur linéaire (bât 200), Orsay

"Spatio-Temporal Characterization of Femtosecond Laser Beams Using Self-Referenced Imaging Fourier Transform Spectroscopy"

Current ultrashort laser technology makes it possible to generate pulses lasting a few tens of femtoseconds, with energies of up to tens of joules. Strongly focusing such pulses produces ultra-intense fields that are notably used to generate relativistic particle beams. Proper operation of ultra-intense laser facilities requires to control the temporal and spatial properties of ultrashort pulses. Until now, measurement devices used for this purpose have neglected an important aspect of ultrashort pulses structure, which is linked to spatio-temporal couplings. Spatio-temporal couplings are a particular kind of defects in ultrashort pulses, of which the influence on ultra-intense experiments has been largely overlooked until recently. The rare instruments capable of measuring spatio-temporal couplings are hardly scalable to high-energy laser beams. This thesis is dedicated to TERMITES, a device for the full characterization of ultrashort laser beam, which is used to provide their three dimensional shape in space and time. TERMITES is a self-referenced technique based on spatially-resolved Fourier-Transform Spectroscopy. The first part of this work presents the detailed study of TERMITES, as well as the optimization of its design. Multiple laser systems are then characterized using the instrument. The obtained results are used to establish the first experimental review of spatio-temporal couplings origins in ultrashort lasers.

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Sans autorisation, vous ne pourrez entrer sur le Centre de Saclay. Tél. : 33.1.69.08.74 09- Fax : 33. 1.69.08.76.39 - email : caroline.lebe@cea.fr ou veronique.gereczy@cea.fr
Dans TOUS LES CAS, se munir d'une pièce d'identité (passeport et carte d'identité – pas de permis de conduire)