



Contribution ID: 1607 Contribution code: THPA080

Type: Poster Presentation

Online spatio-temporal couplings monitoring diagnostics for laser-plasma accelerator driver

Thursday, 11 May 2023 16:30 (2 hours)

Spatio-temporal couplings (STCs) [1] can have a detrimental effect on the intensity at focus of ultrashort femtosecond lasers. The laser spatio-temporal intensity profile control is a key issue for stable operation of laser wakefield acceleration (LWFA) [2]. Thus, it is necessary to measure and correct STCs. Techniques such as INSIGHT [3] or TERMITES [4] allow reconstructing the full spatial phase for different spectral components of the laser pulse using a phase-retrieval iterative algorithm. However this requires a computing time of the order of several minutes, making it inappropriate for single-shot online monitoring of lasers running at repetition rates of several hertz. We propose a method to characterize STCs in real-time using a multispectral camera [5] coupled with wavefront and temporal measurements and a machine learning algorithm. We will present the sensitivity characterization of the STCs measurement, which has been tested at 10 Hz for the optimization of a large optical compressor. Finally, we will discuss the status of the reinforcement learning implementation for full laser field reconstruction.

Funding Agency

ANR/PIA3-PACIFICS, CNRS/IN2P3, Université Paris Saclay

Footnotes

- [1] Jolly et al., J. Opt. 22 103501 (2020)
- [2] Mittelberger et al., P. REV. E 100, 063208 (2019)
- [3] Borot et al., O. Express 26 26444–61 (2018)
- [4] Pariente et al., N. Photon. 10 547–53 (2016)
- [5] Dorrer et al., O. Express Vol. 26, No. 25 (2018)

I have read and accept the Privacy Policy Statement

Yes

Primary author: KANE, Gueladio (Laboratoire de Physique des 2 Infinis Irène Joliot-Curie)**Co-authors:** LUCAS, Bruno (Université Paris Saclay); BAYNARD, Elsa (Laboratoire de Physique des 2 Infinis Irène Joliot-Curie); GULER, Hayg (Université Paris-Saclay, CNRS/IN2P3, IJCLab); CASSOU, Kevin (Université Paris-Saclay, CNRS/IN2P3, IJCLab); PITTMAN, Moana (Centre Laser de l'Univ. Paris-Sud); KAZAMIAS, Sophie (Université Paris Saclay); KUBYTSKYI, Viacheslav (Université Paris-Saclay, CNRS/IN2P3, IJCLab)**Presenter:** KANE, Gueladio (Laboratoire de Physique des 2 Infinis Irène Joliot-Curie)**Session Classification:** Thursday Poster Session

Track Classification: MC6: Beam Instrumentation, Controls, Feedback and Operational Aspects:
MC6.T25: Lasers