Seminar:
Contractul nr.: 3N/2018
Proiectul: PN 18 13 01 03/ Cercetari de frontieră privind interacția pulsurilor laser ultraintense cu ținte solide
Faza: nr. 3 "Descarcari filamentare in pulsuri ultrascurte pentru simularea impulsurilor electromagnetice specifice interactiei radiatiei laser de mare putere cu materia"
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Rezumat

In cadrul acestei faze ne-am propus realizarea si caracterizarea unei descarcari filamentare care sa simuleze impulsurile electromagnetice specifice interactiei radiatiei laser de mare putere cu materia la o scara convenabila ca sa studiem atat efectul asupra unor componente electronice cat si noi metode de protectie. Descarcarea filamentara prezentata in aceasta faza este realizata intr-o structura de tip spark-gap si este declansata de o plasma generata prin focalizarea unui laser, in spatiul dintre doi electrozi sferici, polarizati la o tensiune mai mica decat cea de autostrapungere utilizandu-se un puls laser generat de un sistem compact dezvoltat in INFLPR „bujia laser". A fost monitorizat pulsul electromagnetic asociat descarcarii pulsate. Noutatea majora a acestor rezultate experimentale este legata de stabilirea unor regimuri de descarcare, in care descarcarea trece prin punctul de focalizare si duce la aparitia sincrona a unui puls electromagnetic generat in urma interactiei dintre "plasmonul" format prin focalizare laser si campul electric in care este imersat.

Abstract

We have designed and characterized a filamentary discharge which simulates the electromagnetic pulses specific to the interaction between the high-power laser radiation and matter, at a suitable experimental scale, with an aim to investigate both its effect on electronic components as well as new methods of shielding. The filamentary discharge we present is generated by using a spark-gap structure triggered by a plasma, produced by focusing a laser within the region located between two spherical polarized electrodes. We used a laser pulse generated by a compact system developed in NILPRP, namely the "laser spark plug". The electromagnetic pulse associated with the pulsed discharge was observed. The originality brought by these experimental results lies in establishing plasma discharge regimes where the discharge passes through the focal point and leads to a synchronous occurrence of an electromagnetic pulse, generated by the interaction between the "plasmon" formed in the laser focus and the electric field in which it submerges.