

Seminar

Institute for Plasma Research

Title : Investigation of laser induced colliding plasma plume

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Date : 10th December 2018 (Monday)

Time : 10.30 AM

Venue : Seminar Hall, IPR

Abstract :

A high power laser-matter interaction produces a transient plasma plume. Study of Laser Produced Plasma (LPP) has been a key area of interest to the research community for a long time due to its numerous applications in different areas. Apart from practical applications it also facilitates to understand the basic mechanism of ablation and plasma formation in laser matter interaction. The properties of LPP depend on several parameters such as laser energy, beam profile, pulse duration, ambient condition, target materials and ablation geometry.

The laser produced plasma dynamics has been studied in two different geometries i.e. Front Ablation (FA) and Back Ablation (BA) using a thin film target (LiF-C) with different ambient pressures ranging from vacuum (2×10^{-6} mbar) to 1 Torr. Fast imaging and spectroscopic results show significant differences in the dynamical behaviour and plasma parameters of the plumes in the two different geometries. A composition (ion-neutral) analysis of these plasma plumes in two geometries have also been done by using Atomic Data And Analysis Structure (ADAS) as well as from intensity ratio under LTE conditions. In another study, when two simultaneously produced plasma plumes propagate in close proximity, they form an interaction region between them. The properties of the interaction region of colliding plasma are quite different from the source plasma. Experimental investigation on colliding plasma has been done with target materials of different atomic masses (C, Al, Ni) and plasma separations (2, 4 and 6 mm). These studies will be useful in controlling the shape, directionality, composition and plasma parameters as per the suitability of different applications.
