Seminar

Institute for Plasma Research

Title : Experimental investigation of the phenomena of laser produced plasma-induced shockwaves

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Date : 14th November 2017 (Tuesday)

Time : 03.30 PM

Venue : Committee Room 3, (New Building), IPR

Abstract :

Experimental investigation of the phenomena of laser produced plasma-induced shockwaves in media of different densities (air as well as liquids) has been carried out using non-intrusive and real time diagnostic techniques. One of the refractive index-based imaging techniques, namely laser interferometry has been employed to map the field of interest. In order to record the transients associated with the plasma plume, a Mach Zehnder interferometer has been coupled with an intensified charge coupled device (ICCD) camera. An Nd: YAG laser operating at its fundamental wavelength (1064 nm) at a repetition rate of 10 Hz with a pulse duration of 6 ns has been employed to achieve the process of laser ablation. Majority of the experiments reported in the present thesis have been carried out with copper as the target material. A select set of experiments have also employed titanium as the target material (these experiments were performed to understand the effect of target material on the shape and/or size of the nanostructures produced as a result of the process of laser ablation in liquids). For any given target material, the influence of the presence of physical boundaries placed in the vicinity of the ablation site on the dynamics of the shockwaves propagating through the medium has been studied. These experiments clearly brought out the plausible role(s) of the different configurations of the physical barriers (placed parallel and/or perpendicular with respect to the target) on the density of the ambient medium, which in turn was seen to have significant impact on the size and size distribution of the resultant nanostructures produced as part of the process.