ABSORPTION AND ABLATION PROPERTIES OF THE POROUS TARGETS IRRADIATED BY ABC LASER

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The behaviour of porous materials of light elements under intense laser irradiation is investigated. The property of redistributing the incident laser energy on a more uniform profile, has been proposed as a possible solution to limit the onset of instabilities in the compression of ICF targets [1]. Experimental analysis using one of the 2 beams of the ABC Neodimium Phosphate Glass laser (E = 100 J / beam, dt = 3ns, I = $10^{13\text{-}14}$ Wcm^{-2}), has shown that almost total absorption of the laser energy can be obtained from Polystyrene and Agar Agar foams optimizing their thickness as a function of the density [2, 3]. On the basis of these results a model of the ablation in foam targets has been proposed [4]. A theoretical approach to the description of the absorption of the foam of different types is developed and the model of laser light absorption coefficient is obtained for both the subcritical and overcritical foams. On this basis the temperature evolution of the partially homogenized laser-produced plasma is evaluated [5].

In the present work the absorption mechanism of pororus materials is further investigated experimentally. The transparency of planar Agar Agar targets is observed both in the visible and in the x-ray range. Foams with densities both higher and lower than the critical density at the fundamental laser wavelength have been examined.

Comparison of the behaviour of various foam targets with metallic targets, under imposed non-uniform laser irradiation, are also shown.

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[5] S.Yu. Gus'kov, et al., to be submitted to PoP