

Laser Interactions with Low-Density Porous Targets

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Laser-target interactions may be tailored for various applications by using porous low-density layers. In the direct-drive inertial confinement fusion, laser imprint and inhomogeneities in the target irradiation can be suppressed in the outer low-density layer of the target. Low-density porous materials with high-Z additions may serve as laser-induced bright X-ray sources suitable for various applications. Nearly critical foam layer may improve the parameters of ion beams accelerated by intense femtosecond lasers.

Laser interaction with low density porous layer is treated here theoretically and via numerical simulations. Propagation of laser-induced heating ionization wave is described via analytical model. The model is compared with two-dimensional fluid simulations. We apply our fluid simulations for the interpretation of the interaction experiments [1,2] performed at the sub-nanosecond iodine laser PALS in Prague. The peculiarities of the experiments are revealed and laser absorption efficiency is deduced via comparison of experimental results with theory.

[1] A.M. Khalenkov, et al., *Laser & Particle Beams* **24**, 283 (2006)

[2] J. Limpouch, et al., *J. Phys.: Conference Series* **112**, 042056 (2008)