About non-uniformity smoothing using foam substrate

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It is well known that an inertial confinement fusion (ICF) driven by lasers requires a very high degree of uniformity laser spot on a target in order to assure both a high degree of compression and ignition via the formation of a central spark due to the convergence of spherical shock waves.

Smoothing techniques (such as random phase plates, phased zone plates, Kinoform phase plates, smoothing by spectral dispersion, induced spatial incoherence) has dramatically improved our control on laser-implosions and laser-plasma interactions. However, there still remains an issue of non-uniformity at very early times, called "laser imprint" problem and may affect compression uniformity at later times and in particular on the development of Rayleigh-Taylor instability.

Here we present some analysis and numerical simulations to clear the processes in double-layer target to illustrate results of resent experiments, performed using the PALS (Prague Asterix Laser System) iodine laser, where the non-uniform irradiation was set by splitting the laser beam into two equal parts with a prism and producing a double spot in the focal plane on a targets with and without foam substrates.

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