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Plasma jet generation by flyer disk collision with massive target

Andrzej KASPERCZUK, Tadeusz PISARCZYK, Stefan BORODZIUK, Sergey Yu. GUS'KOV, Jiri ULLSCHMIED, Edward KROUSKY, Karel MASEK, Miroslav PFEIFER, Karel ROHLENA, Jiri SKALA, Milan KALAL, Jiri LIMPOUCH, Pawel PISARCZYK

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Abstract

In this paper, results from experiments with Al flyer targets (disks with a diameter of 300 μm and a thickness of 6 μm) accelerated at first to high velocities by PALS iodine laser pulses (with an energy of 130 J, pulse duration of 400 ps, a wavelength of 1.315 μm , and laser spot diameter of 250 μm), subsequently creating craters after their collisions with massive Al targets (placed at a distance of the order of 200 μm) are presented. To measure the plasma density evolution a three frame interferometric system was employed. The experimental results demonstrate that the flyer disk-massive target collision generates an axial plasma jet corresponding to a flat shock wave propagating in a massive target. This form of the shock wave was deduced from a crater trapezoidal shape which was reconstructed by means of crater replica technique.

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