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Plasma jet generation by flyer disk collision with massive target

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Keywords

ablative acceleration, plasma jet, flyer disk, interferometry, macroparticle, double target, linear electron density, crater, shock wave

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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