

Shadowgraphy of the Plasma Plume Expansion for Aluminum- and Mylar-Foil Targets under the Interaction of Nanosecond Laser Pulse

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Abstract

The behavior of plasma plumes expansion of two, metal and polymer foil targets have been studied by shadowgraphy technique at atmospheric ambient gas pressure. The interaction beam of a Nd:YAG laser with average 30 ns pulse width and maximum 160 – 300 mJ laser energy focused on the Aluminum- and Mylar foil target and the plasma evolution both in the front and rare of the target were investigated. A laser probe beam with 8 ns pulse width, at wavelength 532 nm scans the plasma plume expansion and the signals are registered on a CCD camera up to 400 ns after the interaction time. The plume expansion velocity has been obtained at maximum value velocity for both of front and rare side of Al foil target, as 8×10^7 cm/s and 3.8×10^6 cm/s respectively. In addition, for Mylar foil target, these values are 1.6×10^6 cm/s and 7×10^5 cm/s respectively.