

Abstract Submitted
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Controlling the dynamics of a femtosecond laser-driven shock in hot dense plasma AMITAVA ADAK, PRASHANT KUMAR SINGH, GOURAB CHATTERJEE, AMIT D. LAD, P. BRIJESH, G. RAVINDRA KUMAR, Tata Inst of Fundamental Res — We present the dependence of the dynamics of a plasma super-critical layer on the laser intensity contrast in the regime of intense femtosecond laser-solid interaction. Time-resolved pump-probe diagnostics reveal the interplay of inward shock strength and laser contrast of a femtosecond laser at an intensity of 10^{18} W cm⁻². The measurements show that the pulse with 2 orders of magnitude higher intensity contrast than that with a usual lower contrast one ($\sim 10^{-5}$) launches the shock-like disturbance (into the target) having 10 times more speed. This observation is further supplemented by employing an external prepulse (for manipulating the preplasma scale length) which helps to control the inward motion of the critical surface. This opens up the possibility of controlling the inward moving shock disturbance and leads to medical, science and engineering applications.

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