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Dynamics of high power and long pulse laser propagation and its control in underdense plasmas M. NAKATSUTSUMI, Graduate School of Eng. Osaka Univ. Japan, J. FUCHS, P. ANTICI, P. AUDEBERT, N. BOURGEOIS, LULI, France, M. GRECH, CELIA, France; CEA/DPTA, France, R. KODAMA, Graduate School of Eng. Osaka Univ. Japan, T. LIN, Fox Chase Cancer Center, USA, J.R. MARQUÈS, LULI, France, G. RIAZUELO, CEA/DPTA, France, L. ROMAGNANI, LULI, France, V. TIKHONCHUK, CELIA, France — The study of intense laser pulse propagation through long underdense plasmas is of crucial importance for inertial confinement fusion (ICF). We have performed a systematic study of long pulse beams ($\tau_L = 400ps, I = 10^{10} \sim 10^{12} Wcm^{-2}$) propagating through the underdense plasmas ($n_e = 10^{19} \sim 10^{20} cm^{-3}$), by controlling two filaments created from the pulses with variable delay and intensity ratio. These experiments have been performed at the LULI laser facility. The results show that the earlier pulse affects the propagation characteristics of the later pulse. The 2D time-resolved sampling camera provides the ability to examine the possibility of enhanced propagation, collimation, and guiding of a trailing pulse induced by an earlier pulse. These facts are of interest for ICF and other applications. In particular, this study opens perspectives, through shaping the pulses temporally, for the control of propagation of long pulses in the low density plasmas that are present within ICF hohlraums.

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