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Energetic proton acceleration in ultra-intense laser interaction with super-low density targets M. TAMPO, Institute of Laser Engineering Osaka Univ, R. KODAMA, K. HIGASHI, K. ENDO, K.A. TANAKA, Faculty of Engineering Osaka Univ, T. MATSUOKA, V. YANOVSKY, M. MAKSIMCHUK, G. KALINTCHENKO, K. KRUSHELNICK, Center for Ultrafast Optical Science University of Michigan, R. TEZUKA, H. YOKOGAWA, Matsushita Electric Works, Ltd., R. STEPHENS, General Atomics, T. NAKAMURA, K. MIMA, Institute of Laser Engineering Osaka Univ. — Aiming to increase the maximum energy of laser-accelerated proton beams, we have studied the relation between maximum proton energies and electron distribution functions, which determine electro-static sheath field to accelerate protons. We have proposed to increase the maximum proton energy using a distribution function of hot electrons produced by an interaction between ultra-short pulse laser (< 100 f sec) and low density plasma ($< 10^{20}$ cm^{-3}). We have carried out the experiment using a silica foam (aerogel) with a density of 3mg /cc as a solid target and 30 f-sec short pulse laser light at the laser intensity of 10^{20} W/cm^2. We will report the result of the experiments and simulations.

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