

Abstract Submitted
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Efficient Generation of High-Quality Proton Beam in Laser Tailored-Target Interaction¹ S. KAWATA, K. TAKAHASHI, D. SATOH, D. BARADA, Utsunomiya Univ., Y.Y. MA, National Univ. of Defence Tech., China, Z.M. SHENG, Shanghai Jio Tong Univ., O. KLIMO, J. LIMPOUCH, Czech Tech. Univ. Prague, Q. KONG, P.X. WANG, Fudan Univ., China — Improvement of energy conversion efficiency from laser to proton beam is demonstrated in a laser-foil interaction. When an intense short-pulse laser illuminates the thin foil target, the foil electrons are accelerated around the target. The hot electrons generate a strong electric field, which accelerates the foil protons, and the proton beam is generated. In this paper a multihole thin-foil target is proposed in order to increase the energy conversion efficiency from laser to protons. The multiholes transpiercing the foil target help to enhance the laser-proton energy conversion efficiency significantly. 2.5-dimensional particle-in-cell simulations present that the total laser-proton energy conversion efficiency becomes 9.3% for the multihole target, though the energy conversion efficiency is 1.5% for a plain thin foil target. The transpiercing multihole target serves a new method to increase the energy conversion efficiency from laser to ions.

[1] R. Sonobe, et al., Phys. Plasmas, 12 (2005) 073104.

[2] Y. Nodera, et al., Phys. Rev. E78 (2008) 046401.

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