

Abstract Submitted
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Laser-produced proton-beam quality control by a robust structured foil target¹ S. KAWATA, M. NAKAMURA, R. SONOBE, S. MIYAZAKI, T. KIKUCHI, Utsunomiya University, Japan — A quality of a laser-produced ion beam is one of the critical factors in ion beam generation in laser-foil interaction. A purpose of this study is suppression of transverse proton divergence by a controlled electron cloud in laser-foil interactions. In this study, the foil target has a hole at the opposite side of the laser illumination. The electrons accelerated by an intense laser are limited in transverse by a neutral plasma at a protuberant part. Therefore the protons are accelerated and also controlled transversely by the electron cloud structure: The laser-generated electron cloud edge induces the proton beam divergence in transverse, and the protuberant part of the rear hole eliminates the electron cloud edge effect. In this work we propose a new realistic robust structure of the foil target in order to relax the laser alignment precision to produce the high quality proton beam. Our simulation results demonstrate that the structured foil target is rather robust against the laser mis-alignment and also against the proton layer mis-placement. [1] R. Sonobe, et al., Phys. Plasmas, 12 (2005) 073104.

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