

Abstract Submitted
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Proton acceleration: new developments for focusing and energy selection, and applications in plasma physics P. AUDEBERT, Laboratoire pour l'Utilisation des Lasers Intenses — In the last few years, intense research has been conducted on laser-accelerated ion sources and their applications. These sources have exceptional properties, i.e. high brightness and high spectral cut-off, high directionality and laminarity, short burst duration. We have shown that for proton energies >10 MeV, the transverse and longitudinal emittance are respectively <0.004 mm-mrad and $<10^{-4}$ eV-s, i.e. at least 100-fold and may be as much as 10^4 -fold better than conventional accelerators beams. Thanks to these properties, these sources allow for example point-projection radiography with unprecedented resolution. We will show example of such time and space-resolved radiography of fast evolving fields, either of associated with the expansion of a plasma in vacuum [*] or with the propagation of a ICF-relevant laser beam in an underdense plasma. These proton sources also open new opportunities for ion beam generation and control, and could stimulate development of compact ion accelerators for many applications.

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