

Abstract Submitted
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Shaping of Ultraintense Pulse Front from an Overdense Plasma for Generation of a Concave Flying Electron Mirror and X-ray Focusing
MIN SUP HUR, YOUNG-KUK KIM, UNIST, VICTOR KULAGIN, Moscow State University, HYYONG SUK, APRI, GIST — Shaping of a petawatt laser pulses using relativistic transparency in a nonuniform overdense plasma has been studied. The resultant pulse shape is the Concave and sharp-cut pulse front. As an application of such shaping, we consider the generation of a relativistic electron mirror, which is concave to the propagation direction, so that it can be used in generating and focusing X-ray by reflecting a counterpropagating laser pulses. For this study, for the first time, we derived an analytic formula to calculate the channeling speed of a linearly polarized pulse in an overdense plasma. Using that formula it was possible to design an optimal plasma density profile in transverse direction to make the pulse front not only sharp-cut, but also concave to the propagation direction. By accelerating a nano-film with such a concave sharp-cut pulse, we expect a concave relativistic electron mirror can be generated. The concavity of the electron mirror can be used in focusing X-rays into a very small high-energy-density regime.

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