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Acceleration of ions to tens of giga electron-volts in the interaction of two color laser with relativistic thin layer plasma

M Moshkelgosha and F S khalili yazdi

University of Qom, Qom, Iran

E-mail: m.moshkelgosha@qom.ac.ir

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Abstract

Recently, the production of high-speed ions has attracted the attention of researchers because of the important applications in fusion and medicine applications. In this study, the production of energetic ions of tens of giga electron-volts in the interaction of a femtosecond laser with a very thin layer of plasma has been investigated using Particle in Cell LIPIC ++ Code. Access to such energetic ions become possible by using a two color laser beam including the first and third harmonics and by means of the proper selection of many effective factors such as the ratio of intensities and relative phases of the two harmonics, material, charge and thickness of the target, angle of the incident pulse , the duration and intensity of the laser pulse, and the density of the plasma. The intensity of the laser is not relatively high in respect to the rate of acceleration, and it can be hoped that the proposed conditions will be appropriate way to produce highly energetic ions with energies greater than 35 GeV.

keywords: acceleration of ions, relativistic thin film

For full article, refer to the Persian section