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Numerical Simulation of Ultrafast Laser Pulse Propagation in Tenuous Plasmas: Envelope Evolving and Modulation

WANG Hong-Yu[1,2,3] and XIE Bai-Song[1,2]

[1] The Key Laboratory of Beam Technology and Materials Modification of Ministry of Education, Beijing Normal University, Beijing 100875, China

[2] Institute of Low Energy Nuclear Physics, Beijing Normal University, Beijing 100875, China

[3] Department of Physics, Anshan Normal University, Anshan 114005, China

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Abstract: We propose an effective and useful numerical simulation scheme for the investigation of the ultra-fast laser pulses in tenuous plasmas. The accuracy of the method is tested by numerical examples. We check some special examples to investigate the laser envelope evolving and modulation in plasmas. Asymmetric two-peak modulation structure is found and its underlying physics is analyzed. The advantages and shortages of the method are also discussed.

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Key words: laser-plasma interactions, plasma simulation

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