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Investigation of electron heating in laser-plasma interaction

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Abstract

In this paper, stimulated Raman scattering (SRS) and electron heating in laser plasma propagating along the plasma fusion is investigated by particle-in cell simulation. Applying an external magnetic field to plasma, production of whistler waves and electron heating associated with whistler waves in the direction perpendicular to external magnetic field was observed in this simulation. The plasma waves with low phase velocities, generated in backward-SRS and dominate initially in time and space, accelerated the backward electrons by trapping them. Then these electrons promoted to higher energies by the forward-SRS plasma waves with high phase velocities. This two-stage electron acceleration is more efficient due to the coexistence of these two instabilities.

Keywords: fusion, Whistler wave, laser, plasma, Raman scattering

For full article, refer to the Persian section