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A New Scheme for High-Intensity Laser-Driven Electron Acceleration in a Plasma

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We propose a new approach to high-intensity relativistic laser-driven electron acceleration in a plasma. Here, we demonstrate that a plasma wave generated by a stimulated forward-scattering of an incident laser pulse can be in the longest acceleration phase with injected relativistic beam electrons. This is why the plasma wave has the maximum amplification coefficient which is determined by the acceleration time and the breakdown (overturn) electric field in which the acceleration of the injected beam electrons occurs. We must note that for the longest acceleration phase the relativity of the injected beam electrons plays a crucial role in our scheme. We estimate qualitatively the acceleration parameters of relativistic electrons in the field of a plasma wave generated at the stimulated forward-scattering of a high-intensity laser pulse in a plasma.

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