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Acceleration of Cone-Produced Electrons by Double-Line Ti-Sapphire Laser Beating[1] YOSHITAKA MORI, Graduate School for the Creation of New Photonics Industries, HAJIME KUWABARA, IHI Corporation, KIMINORI KONDO, Kansai Photon Science Institute, JAEA, YONEYOSHI KITAGAWA, the Graduate School for the Creation of New Photonics Industries — We proposed a new scheme for simultaneously injecting and accelerating electrons. Acceleration and stochastic heating of electrons are demonstrated in a beat wave scheme using a pre-pulse free short-pulse (150 fs) double-line Ti-Sapphire laser. The laser beat wave produces a resonant relativistic plasma wave of field intensity 11 GV/m in a hydrogen plasma of density $2.5 \times 10^{18} cm^{-3}$. To inject electrons, we used a hybrid target composed of a cone-drilled plane and a gas jet, where the cone-produced electrons are accelerated via the resonant plasma wave excited in the gas jet set behind the plane, increasing the slope temperature from 0.05 MeV to 0.15 MeV. A one-dimensional particle-in-cell simulation and a stochastic acceleration model confirm the slope temperature increase.

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