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Strong Field QED Simulation of Laser-Plasma Interaction Using BUMBLEBEE. XIAOLIN JIN, YUNXIAN TIAN, TAO HUANG, WENLONG CHEN, BIN LI, University of Electronic Science and Technology of China — Next generation laser intensity could reach 10^{24} W/cm², making strong field quantum electrodynamics (QED) effects in laser-plasma interaction a promising research field. The model of photon and pair production in strong field QED is implemented into our 1D3V particle-in-cell (PIC) code BUMBLEBEE with Monte Carlo (MC) algorithm. We apply the kirk and bell model to simulate the photon and pair production, where photon is produced through bremsstrahlung process and the pair is produced through the Bethe-Heitler process. There are two stages in the QED pair production process. Firstly, the intense laser interacts with a relativistic electron or positron to produce the photon. Secondly, the photon interacts with the same laser field to produce the e⁺-e⁻ pair. The QED process is coupled to laser-plasma interaction processes before pushing the particles at each step. Using this code, the evolutions of the particles in ultrahigh intensity laser ($\sim 10^{23}$ W/cm²) interaction with aluminum foil target are observed. Four different initial plasma profiles are considered in the simulations.

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