

Abstract Submitted
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GPU-Accelerated PIC/MCC Simulation of Laser-Plasma Interaction Using BUMBLEBEE XIAOLIN JIN, TAO HUANG, WENLONG CHEN, HUIDONG WU, MAOWEN TANG, BIN LI, University of Electronic Science and Technology of China — The research of laser-plasma interaction in its wide applications relies on the use of advanced numerical simulation tools to achieve high performance operation while reducing computational time and cost. BUMBLEBEE has been developed to be a fast simulation tool used in the research of laser-plasma interactions. BUMBLEBEE uses a 1D3V electromagnetic PIC/MCC algorithm that is accelerated by using high performance Graphics Processing Unit (GPU) hardware. BUMBLEBEE includes a friendly user-interface module and four physics simulators. The user-interface provides a powerful solid-modeling front end and graphical and computational post processing functionality. The solver of BUMBLEBEE has four modules for now, which are used to simulate the field ionization, electron collisional ionization, binary coulomb collision and laser-plasma interaction processes. The ionization characteristics of laser-neutral interaction and the generation of high-energy electrons have been analyzed by using BUMBLEBEE for validation.

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