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Numerical Simulation of Discharge in the Ion Thruster Using BUMBLEBEE-EP Code.¹ XIAOLIN JIN, SHENGLONG GUO, MINGJUAN YANG, TAO HUANG, BIN LI, University of Electronic Science and Technology of China — Due to high efficiency, high specific impulse, long lifetime and high reliability, ion thrusters have already become the research focus of the electrical propulsion. Up to now, the numerical simulation of the ionization characteristics in the discharge chamber of ion thruster was mainly based on electrostatic model, which cannot give the important information on the electromagnetic radiation features and the self-consistent interaction between charged particles and time-varying electromagnetic fields. The 2D3V PIC/MCC code ‘BUMBLEBEE-EP’ was developed based on the electromagnetic model for the research of ion thruster. In this paper, the discharge process of the ion thruster was simulated using BUMBLEBEE-EP. The complete Maxwell’s equations were solved and the effects of the electromagnetic fields on the charged particles were taken into account in the self-consistent way. The spatiotemporal distribution of the charged particles and electromagnetic fields were obtained in detail.

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