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Space- and Time-dependent electron velocity distribution in VHF-CCP in CF_4/Ar TAKASHI YAGISAWA, Keio University, TOSHIAKI MAKABE — The electron velocity distribution (EVD) is fundamentally important for all aspects in plasma electronics. EVD given as a solution of the Boltzmann equation provides the swarm parameter as functions of external E/N and B/N utilized for a plasma simulation. Two-term expansion was traditionally employed for solving the Boltzmann equation. This method, however, cannot give EVD in a large E/N appearing in the ion sheath region in front of a wall surface. Particle simulation (PIC/MC) was also used to estimate EVD, but heavy computational load prohibits the sample of a large number of particles in order to eliminate the statistical fluctuation. A solution of the Boltzmann equation in phase space (velocity, position-space, and time) intrinsically involves numerical diffusion resulting from the differenciation of the advection terms. In this study, we develop the numerical procedure for predicting space- and time-dependent EVD. That is, the Boltzmann equation is solved in velocity space by using our direct numerical procedure (DNP) under the presence of 2D-t electric field distribution in VHF-CCP, calculated by the RCT model. Nonlinear behavior of EVD in the bulk plasma during one cycle of VHF (100 MHz) is discussed depending on the collisional relaxation time for energy and momentum of electrons. Also, we will investigate the temporal change of EVD in the sheath region under a large E/N.

Takashi Yagisawa
Keio University

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