

Electromagnetic Field Excitation in Magnetized Plasmas by External Electrodes: 1D PIC Simulation Studies

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We perform one-dimensional particle-in-cell (PIC) simulation of external electromagnetic field excitation into magnetized plasmas. We consider two models for the electromagnetic field excitation: electrostatic excitation by electrodes and electromagnetic excitation by current antenna. Here, the external electrodes are placed outside plasma region, background magnetic field is perpendicular to the one-dimensional direction, and the externally applied field frequency is chosen in a range below the lower-hybrid frequency. For both models, we will discuss the electromagnetic field excitation processes by varying the externally applied field frequency and the plasma radius.

Keywords: external electromagnetic field, external electrodes, magnetized plasmas, electric thruster, electrodeless electric thruster