

Poster Session (P)

Poster Lunch (1)

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NUMERICAL CALCULATION ON ENERGY LOSS IN DISCHARGE CHANNEL OF HALL THRUSTER

Abstract

A method to compute the energy loss of a Hall thruster is developed based on numerical simulations. Through the analysis of the working process, the energy losses in discharge channel are expressed with microscopic particles parameters. Meanwhile, the discharge process is simulated by particles with the Particle-In-Cell-Monte Carlo Collision (PIC-MCC) method, and then energy losses are calculated directly. A self-excitation LHT100 Hall thruster is studied, the results show that the beam energy loss is 815.4W, the inner wall energy loss is 144W, the outer wall energy loss is 171W, the anode energy loss is 55W, excitation energy loss is 51W, the ionization energy loss is 66W. A comparison between thermal simulations based on energy loss calculation and temperature test in thermal vacuum experiment has been performed. There is a good agreement between the two results with a maximum error less than 4.6%