

Abstract Submitted  
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**Investigation of the electromagnetic force and momentum gain in a magnetic nozzle plasma thruster**<sup>1</sup> KAZUMA EMOTO, Yokohama National University, KAZUNORI TAKAHASHI, Tohoku University, YOSHINORI TAKAO, Yokohama National University — We have conducted two-dimensional particle-in-cell simulations with Monte Carlo collisions (PIC-MCC) for a magnetic nozzle plasma thruster, where the simulation area consists of both the source tube and the downstream region with a convergent-divergent magnetic nozzle. The simulation results clearly show the axial Lorentz force exerted to the plasma on the basis of the distributions of the internal plasma current due to a diamagnetic effect in the downstream region, which is qualitatively consistent with previous experiments. In addition, distributions of the momentum gain due to the electrostatic and electromagnetic forces have been obtained by counting the momentum increment of each particle. As a result, it is shown that both the ions and electrons obtain their axial momentum. The relationship between the momentum gain of plasmas and electrostatic and electromagnetic forces is discussed

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