

Abstract Submitted
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Increasing Extracted Beam Current Density in Ion Thrusters through Plasma Potential Modification NEIL ARTHUR, JOHN FOSTER, University of Michigan — A gridded ion thruster's maximum extractable beam current is determined by the space charge limit. The classical formulation does not take into account finite ion drift into the acceleration gap. It can be shown that extractable beam current can be increased beyond the conventional Child-Langmuir law if the ions enter the gap at a finite drift speed. In this work, ion drift in a 10 cm thruster is varied by adjusting the plasma potential relative to the potential at the extraction plane. Internal plasma potential variations are achieved using a novel approach involving biasing the magnetic cusps. Ion flow variations are assessed using simulated beam extraction in conjunction with a retarding potential analyzer. Ion beam current density changes at a given total beam voltage in full beam extraction tests are characterized as a function of induced ion drift velocity as well.

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