

Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

Electron diamagnetic effect in a magnetic nozzle on a helicon plasma thruster performance KAZUNORI TAKAHASHI, TREVOR LAFLEUR, CHRISTINE CHARLES, PETER ALEXANDER, ROD BOSWELL, The Australian National University — The axial force, which is called thrust sometimes, imparted from a magnetically expanding helicon plasma thruster is directly measured and the results are compared with a two-dimensional fluid theory. The force component solely transmitted to the expanding field is directly measured and identified as an axial force produced by the azimuthal current due to an electron diamagnetic drift and the radial component of the applied magnetic field. In this type of configuration, plasma diffusion in magnetic field affects a spatial profile of the plasma density and the resultant axial force onto the magnetic field. It is observed that the force component onto the magnetic field increases with an increase in the magnetic field strength, simultaneously with an increase in the plasma density downstream of the source exit, which could be due to suppression of the cross field diffusion in the magnetic nozzle.

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Date submitted: 04 Jun 2012

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