

1. D. Kuwahara et al., Tokyo Univ. of Agri. Tech., Improvement of Thrust Characteristics of Helicon Plasma Thruster using Local Gas Fueling Method. (in this presentation)
2. T. Furukawa et al., Tokyo Univ. of Agri. Tech., Plasma Acceleration by Rotating Magnetic Field Method using Helicon Source.
3. S. Nishimura, Tokyo Univ. of Agri. Tech., Electrodeless Plasma Acceleration Using $m = 0$ Coil.
4. T. Yamase et al., Tokyo Univ. of Agri. Tech., High Frequency, Low Pressure, Plasma Generation using Extremely Small Diameter Tube.

Abstract Submitted
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Improvement of Thrust Characteristics of Helicon Plasma Thruster using Local Gas Fueling Method.¹ DAISUKE KUWAHARA, KOSUKE AMMA, YUICHI ISHIGAMI, AKIHIKO IGARASHI, SHINICHI NISHIMOTO, SHUNJIRO SHINOHARA, Tokyo Univ. of Agri. Tech., JUNICHI MIYAZAWA, National Institute for Fusion Science — A helicon plasma thruster is proposed as a long-lifetime electric thruster which has non-direct contact electrodes. Here, a neutral particle, e.g., H₂, Ar, and Xe works, as a fuel gas. In most cases, these gases are supplied into a discharge tube by the use of a simple nozzle. Therefore, the neutral particle fills a discharge tube homogenous. However, there are two problems in this configuration. First, there is a limitation of an electron density increase, due to a neutral particle depletion in the central region of the high-density helicon plasma [1]. This limitation reduces the thrust performance directly. Second, the high-density plasma causes an erosion of an inner discharge tube wall. For the future MW class thruster, this problem will become serious because the particle and heat fluxes of the plasma will increase drastically. To solve above-mentioned problems, we have proposed local fueling methods for the high-density helicon plasma. In this presentation, we will show the methods and experimental results using a fueling tube, inserted in a plasma directly. [1] A. Fruchtman, Plasma Sources Sci. Technol. 17 (2008) 024016.

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