Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Electrodeless RF Plasma Thruster Using $m = 0$ Coil SHUICHI NISHIMURA, DAISUKE ARAI, DAISUKE KUWAHARA, SHUNJIRO SHINOHARA, Tokyo Univ. of Agri. Technol., Japan — In order to realize a deep space exploration in the future, we have been developing a next generation electrodeless electric propulsion system by electromagnetic acceleration of high-density helicon plasma [1]. A new proposed method by $m = 0$ coil plasma acceleration [1,2] (m is an azimuthal mode number) is based on the Lorentz force: a product of the induced azimuthal current by supplying an AC current to the $m = 0$ coil and the radial component of the externally applied magnetic field (divergent field configuration). Here, we have investigated the dependences of an ion velocity and an electron density on the external parameters, leading to optimized conditions, using the SHD device [3]. By increasing AC current on the order of 100 A, we could see the increase of ion velocity and electron density by a factor of 2.5 and 3, respectively. [1] S. Shinohara *et al.*, IEEE Trans. Plasma Sci. **42** (2014) 1245. [2] T. Ishii *et al.*, JPS Conf. Proc. **1** (2014) 015047. [3] D. Kuwahara *et al.*, Rev. Sci. Instrum. **84** (2013) 103502.

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Date submitted: 15 Jul 2016 Electronic form version 1.4