

Abstract Submitted
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Compact torus plasma experiments for high specific impulse pulse plasma thruster¹ TAO LAN, CHEN CHEN, SEN ZHANG, GE ZHUANG, University of Science and Technology of China, DEFENG KONG, Institute of Plasma Physics Chinese Academy of Science, CHIJIN XIAO, University of Saskatchewan, WANDONG LIU, University of Science and Technology of China — A new compact torus plasma system (USTC-CT) is developed as a gas pulse plasma thruster (PPT) prototype with very high specific impulse in University of Science and Technology of China (USTC). The USTC-CT is a three-meter long linear device and equipped with two main high voltage power supplies. It is composed of the vacuum vessel, central solenoid, fast gas valves, timing system, pulse power supplies and compact torus (CT) exclusive diagnostics. The CT plasma is generated in the formation region with high voltage up to 10kV and then the self-organized CT plasmoid is axially accelerated to very high speed with strong Lorentz force in the acceleration region. Currently, the single pulse USTC-CT is in the engineering commissioning. The maximum particle number of single CT pulse is 10^{20} for helium. The maximum electron density and axial speed are $1 \times 10^{22} \text{m}^{-3}$ and 150 km/sec, respectively. Correspondingly, it provides the high specific impulse of 10^4sec and the directional momentum of 0.1 N sec. The remarkable results show the CT PPT has great potential for the space electric propulsion.

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