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Liquid-Fed Pulsed Plasma Thruster for Propelling Nanosatellites

A novel micro liquid fed pulsed plasma thruster offers increased efficiency and lifetime for nanosatellites and CubeSats by eliminating the need for a propellant feed mechanism.

Researchers at Purdue University have developed a liquid fed pulsed plasma thruster (LF-PPT) for use in nanosatellites. Contemporary solid/gas phase propellants have been employed with limited success in nanosatellites, stemming from low efficiencies, limited operational lifetime, contamination issues, and complex/bulky injection systems. To remediate these disadvantageous qualities and make thruster systems more applicable to nanosatelitte designs, this technology presents a novel micro LF-PPT propulsion system comprised of a pulsed plasma accelerator and a low-energy surface flashover igniter. No propellant feed mechanism is needed with this design, making it beneficial for nanosatellite application due to their volumetric constraints. Pentaphenyl trimethyl trisiloxan was used as a propellant for testing parameters of the system including igniter breakdown, plasma dynamics, and exhaust velocity.

Advantages:

-Increased efficiency

-Smaller sized propulsion system

-Increased lifetime

-"Green" propulsion system

Potential Applications:

-Nanosatellites

-CubeSats

TRL: 3

Intellectual Property:

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Category
Aerospace & Defense/Hypersonics & Propulsion Systems

Authors
Adam Patel
Alexey Shashurin
Yunping Zhang

Further information
Parag Vasekar
psvasekar@prf.org

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