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3P23 - High density plasma thruster

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Utilizing a flow-stabilized plasma we have demonstrated a high thrust and high specific impulse thruster capable of producing 10 N to 1000 N of thrust while maintaining high specific impulse >5,000 s. The scaling relationship of the device suggests that it is possible to build a 10 N thruster with a thrust to power ratio of 95 mN/kW. Thrust of the device is achieved by increasing the plasma pressure and expanding it out of the nozzle of the thruster. Operating in this regime we are able to directly couple the magnetic pressure generated to the thrust of the device. Therefore the thrust is directly proportional to the current applied to the plasma during the current pulse. The present prototype is a pulsed device capable of producing thrust for up to 1 ms. Increasing the energy available to the device would allow for longer thrust duration. Active areas of research involve optimization of device length, pulse duration and input energy level. In addition multiple fuels are being studied.

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