Development of a Plasma Microthruster

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The development of a Microplasma Microwave MicroThruster (3MT) is presented below. The goal of this research is to develop a low-power and low-cost micro-propulsion system. The microplasma source, based on split-ring resonators, generates a small plasma inside the thruster using Argon as the propellant. Currently we are measuring the microplasma parameters in order to understand thruster performance and testing different nozzle designs to optimize the amount of thrust produced.

**Key Findings**

Three nozzle designs have been chosen for testing: a converging only, a conical nozzle, and a bell shape nozzle. The chamber will also act as the converging part of the nozzle.

The thrusters are 3D printed in ABS plastic in the UAH student machine shop. This allows for the parts to be made quickly which gives the flexibility of multiple designs to be tested.

**Future Development and Impact**

The objective of this project is to optimize the split-ring resonator and the microthruster. The success of this project has applications in small satellites such as CubeSats that have provided inexpensive access to space for experiments in orbit. Having more efficient propulsion units allows for longer duration missions and orbit maneuvering. Detailed results will be presented at the 2016 AIAA SciTech Conference.

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