With this design, insertless operation cannot produce currents >100 mA, which are suitable for operation of Hall Effect or Ion Thrusters. However, exotic propellants have the potential to significantly increase current output. Additionally, this cathode design could serve as a fast-start and low power heaterless cathode which could enable the use of these thrusters on power-limited small satellites.

**Impact**

- Hall Thrusters and Ion Thrusters use neutralizing sources, such as hollow cathodes, that require high power (~100 W) and long start up times (10s of minutes), both of which are too high for use on small satellites.
- Heaterless designs can reduce power to a more feasible 10s of Watts and reduce ignition times to seconds.

**Key Findings**

- Flow rate, voltage, frequency and pulse width all affect the temperature and density.
- Increasing density increases theoretical current output.
- Preliminary tests with an insert material showed promising increases in current output.

**Explanation**

- Flow rate, voltage, frequency and pulse width affect the temperature and density.
- Increasing density increases theoretical current output.
- Preliminary tests with an insert material showed promising increases in current output.

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