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**Improving thrust density of electrohydrodynamic propulsion** MICHAEL THOMPSON, MUBARAK MUJAWAR, Florida International University — Dielectric fluids may be accelerated with the electrostatic forces generated during controlled electrical discharge. Charged particles collide with molecules of the ambient fluid and propel them along the electric field generated between two opposite sources of electric potential. Electrohydrodynamic (EHD) thrusters capitalize on this phenomenon by linearizing the flow of propelled molecules. In this work the performance of single-stage thrusters with wire-to-cylinder and ring-to-cylinder electrode geometries were characterized. Extremely high thrust-to-power ratios of 20 N / KW have been achieved making the technology a viable form of atmospheric propulsion for small aircraft, however, low achieved thrust densities of approximately 10 N / mmeans that compact propulsion systems are not yet feasible. Multi-staged thrusters that add intermediary electrodes in order to "stack" thrusters are also considered in order to improve thrust density. Emitter-to-collector electrode radius ratios are tested for improved thrust density performance. Results indicate that increased thrust density can be achieved by decreasing the emitter-to-collector ratio at the cost of thrust-to-power efficiency.

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