

PLASMA FORMATION AND MICRODISCHARGES ON PIEZOELECTRIC TRANSFORMERS

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The ferroelectric plasma thruster utilizes plasma formation on the surface of an RF driven dielectric to produce ions. The ions are accelerated away from the device to produce thrust [1]. Plasma formation relies on surface microdischarges due to large electric fields produced along the surface of the lithium niobate dielectric. In order to improve thruster performance the surface microdischarges are investigated to determine the requirements for reliable plasma formation. Surface discharges are compared when created with external power supplies and with high electric fields generated due to the piezoelectric transformer effect of the lithium niobate [2]. Plasma characteristics are compared using optical spectroscopy and ion energy measurements.

1. M.A. Kemp, S.D. Kovaleski, "Thrust Measurements of the Ferroelectric Plasma Thruster," IEEE T. Plasma Sci. 36(2) (2008): 356-62.
2. M.A. Kemp, S.D. Kovaleski, "Piezoelectric Resonance Effect in a Radio Frequency Driven Ferroelectric Plasma Source," IEEE Trans. Plasma Sci. 35(3) (2007): 578-81.

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