

Public Abstract

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Department:Electrical Engineering

Degree:PhD

Title:Characterization of a piezoelectric transformer plasma source

The piezoelectric transformer plasma source (PTPS) is a compact RF driven plasma source developed for near-space and microspacecraft propulsion. The PTPS uses the mass transfer of emitted charged particles from the plasma to produce thrust.

Research on the PTPS has focused on optimizing the integrated PT within the PTPS and characterizing the plasma source operation at background gas pressures of 100-2000~mTorr. Simulations with COMSOL Multiphysics were used to optimize electromechanical coupling in the PT. Diagnostics used in the characterization of the PTPS include current and voltage monitors, emission current measurements with a Faraday cup and retarding potential analyzer, and imaging with an optical spectrometer and an ICCD camera.