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Mission Enabling: The Plasma Sources of Electric Propulsion—challenges and prospects for the future[1]

JOHN FOSTER, University of Michigan

Plasma propulsion has literally been mission enabling for a wide array of space applications ranging from satellite operational lifetime extension to multi-destination voyages to the asteroids. The success of plasma propulsion, otherwise known as electric propulsion, in many respects is owed to the development of clever plasma sources that bolster both high efficiency and long life. Incidentally, these attributes are also coveted in the broad area of plasma processing and manufacturing and thus are of general applicability from a technological standpoint. Indeed, there is significant cross-fertilization and application of such plasma sources not only in plasma processing but also in fusion as well. Here, a sampling of the plasma sources that enable the practical application of electric propulsion devices will be discussed with commentary on discharge physics, implementation, and technical challenges levied by mission requirements.

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