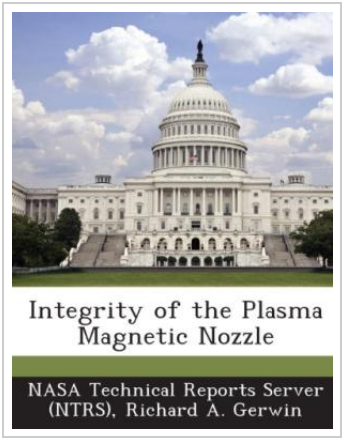

Integrity of the Plasma Magnetic Nozzle

By Richard A. Gerwin

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 124 pages. Dimensions: 9.7in. x 7.4in. x 0.3in.This report examines the physics governing certain aspects of plasma propellant flow through a magnetic nozzle, specifically the integrity of the interface between the plasma and the nozzle s magnetic field. The injection of 100s of eV plasma into a magnetic flux nozzle that converts thermal energy into directed thrust is fundamental to enabling 10 000s of seconds specific impulse and 10s of kWkg specific power piloted interplanetary propulsion. An expression for the initial thickness of the interface is derived and found to be approx. 10(exp -2) m. An algorithm is reviewed and applied to compare classical resistivity to gradient-driven microturbulent (anomalous) resistivity, in terms of the spatial rate and time integral of resistive interface broadening, which can then be related to the geometry of the nozzle. An algorithm characterizing plasma temperature, density, and velocity dependencies is derived and found to be comparable to classical resistivity at local plasma temperatures of approx. 200 eV. Macroscopic flute-mode instabilities in regions of adverse magnetic curvature are discussed; a growth rate formula is derived and found to be one to two e-foldings of the...

Reviews

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