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SPACE PROPULSION SYMPOSIUM (C4)
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Author: Mr. Patrick Giddens
UAHuntsville, United States

Dr. Jason Cassibry
Propulsion Research Center, University of Alabama in Huntsville, United States
Mr. Richard Hatcher
Propulsion Research Center, University of Alabama in Huntsville, United States
Dr. William Seidler
University of Alabama in Huntsville, United States
Mr. Ross Cortez
University of Alabama in Huntsville, United States

FAST Z-PINCH THRUSTER FOR SPACE TUGS

Abstract

This paper will present a design for a fast Z-pinch thruster to power space tugs on multiple trips to sun-earth L1 Lagrange point. The thruster is based on current research being carried out at UAHuntsville in Z-pinches. Specifically, the diode consists of a cylindrical wire array of lithium wires which implode onto a lithium deuteride core. For the thruster, the solid state diodes will have to be replaced with molten lithium/lithium deuteride injection systems. In this paper, the focus is on the design of the linear transformer drivers being recharged by solar arrays, obviating the need for a recharging circuit or a high fusion gain. The Z-pinch thruster will use a magnetic nozzle to exhaust the plasma and energy created by the Z-pinch in order to produce thrust. Weight, cost, and trip time are analyzed in order to determine the number of round trips that would be required before the thrust design has advantages over a chemical or electrical power thruster designed tugs.