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SPACE PROPULSION SYMPOSIUM (C4)
Advanced and Combined Propulsion Systems (8)

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A NOVEL COMBINED PROPULSION CONCEPT FOR DEEP SPACE MISSIONS

Abstract

Solar system exploration necessitates advanced propulsion techniques that are capable of producing high specific impulse and reduces the time required to reach the destination. This paper discusses about the conceptual design of a single stage rocket propulsion system by combining three advanced propulsion systems - Magnetic Confinement Fusion (MCF) and Solar Electric Propulsion (SEP) along with Laser Propulsion (for attitude control). The MCF makes use of D-He3, a non-radioactive fusion fuel, and hydrogen as a propellant to produce fusion plasma which is confined within strong magnetic fields. In solar thermal propulsion, the propellant is heated by solar radiation and expelled through the nozzle to provide thrust. The exhaust of both these propulsion systems is expelled out using one single nozzle. The micro thrusters are operated by laser propulsion. The paper also highlights the benefits of using this type of advanced propulsion technique such as higher specific impulse compared to that of conventional propulsion techniques and thereby enables mankind to accomplish deep space missions.