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Characterization of a Diverging Cusped Field Thruster Operating on Krypton NATALIA MACDONALD-TENENBAUM, Air Force Research Laboratory, LANDON TANGO, ERC, Inc., WILLIAM HARGUS, JR., Air Force Research Laboratory, MICHAEL NAKLES, ERC, Inc. — The Diverging Cusped Field Thruster (DCFT) is a low-power plasma with a cusped magnetic field profile. The magnetic fields have strong gradients that cause energetic electrons to mirror back and forth within the discharge chamber, enhancing propellant ionization. Radial portions of the magnetic field are seen only at magnet interfaces, thereby mitigating the ion impingement and heat flux to the channel walls that reduces thruster lifetime. The DCFT has been studied extensively while operating on xenon. This work represents the initial efforts at characterizing the DCFT operating on krypton. Krypton has gained interest in recent years as an alternate propellant for plasma propulsion, mainly because its lower cost has the potential to provide great savings for satellite missions. The results presented include a mapping of changes in the DCFT's discharge current with varying applied anode voltages and propellant mass flow rates, and frequency analysis of the discharge current oscillations. Additionally, time-averaged and time-synchronized laser induced fluorescence velocimetry are used to examine the ionization and acceleration regions of the discharge channel in an effort to better understand the dynamics of the thruster operation on krypton.

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