

Concepts in Low Power Hall Thruster Design - A Personal Perspective

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Following the general trend in miniaturization of technology there is a growing interest in using microsattelites (< 100 kg) and nanosatellites (< 10 kg) to replace larger and more expensive platforms. To enable these capabilities, small, low mass, and efficient electric propulsion systems are required. Due to their inherent propellant mass economy, Hall effect thrusters (HET) are an obvious choice. However, the current generation of HETs are optimized to operate at power levels above 300 W. Scaling HETs to lower power levels causes a rapid decline in performance, rendering them unusable for smaller spacecraft with limited available power. In this presentation I will review the basic principles that govern HET efficiency and mass utilization in particular. Two non-conventional HET architectures that enable lower power operation will be discussed: the Co-Axial Magneto-Isolated Longitudinal Anode (CAMILA) Hall Thruster and a very low power Thruster with Anode Layer (TAL). Both systems are currently another study at the Technion.

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