Paper ID: 48882
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IAF SPACE POWER SYMPOSIUM (C3)
Joint Session on Advanced and Nuclear Power and Propulsion Systems (5-C4.7)

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THE SPACEDRIVE PROJECT – OVERVIEW OF REVOLUTIONARY PROPULSION EFFORTS AT TU DRESDEN

Abstract

Interstellar propulsion within a human lifetime is the ultimate challenge for space travel to which no technological solution exists as of today. Traditional concepts such as solar sails or photon rockets require gigantic energy sources and may only enable nano-scaled spacecraft to go on a one-way trip. At TU Dresden, we are looking into non-traditional approaches for revolutionary propulsion by building a unique infrastructure to test and investigate claims on new propellantless thrusters as well as to explore new ideas in that area. At present, we are focusing on two possible revolutionary concepts: The EMDrive and the Mach-Effect Thruster. The first concept uses microwaves in a truncated-cone shaped cavity that is claimed to produce thrust. Although it is not clear on which theoretical basis this can work, several experimental tests have been reported in the literature that warrants a closer examination. The second concept is believed to generate transient mass fluctuations in a piezo-crystal stack that creates non-zero time-averaged thrusts. Within the SpaceDrive project, a number of unique thrust balances and sensors are under development that can reliably detect tiny forces for such devices, which are powered by high voltages and high frequencies including two different classical torsion balances, a double-pendulum balance as well as a new superconducting levitating friction-free balance. In addition, a number of complementary experiments are carried out such as direct measurements of mass-fluctuations in a dedicated rotating dynamic teststand. This paper will give an overview on our program and a summary of the latest results.