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THE SPACEDRIVE PROJECT – DEVELOPING REVOLUTIONARY PROPULSION AT TU DRESDEN

Abstract

Propellantless propulsion is believed to be the best option for interstellar travel. However, photon rockets or solar sails have thrusts so low that maybe only nano-scaled spacecraft can reach the next star within our live times using very high-power laser beams. Since 2012, a dedicated breakthrough propulsion physics group was founded at the Institute of Aerospace Engineering at TU Dresden to investigate different concepts based on non-classical/revolutionary propulsion ideas that claim to be at least an order of magnitude more efficient in producing thrust compared to photon rockets. Most of these schemes proposed rely on modifying the inertial mass, which in turn could lead to a new propellantless propulsion method. Our intention is to develop an excellent research infrastructure to test new ideas and measure thrusts and/or artifacts with high confidence to determine if a concept works and if it does how to scale it up. One of the concepts under investigation of the so-called Mach-Effect Thruster. This concept, based on general relativity and Sciama's/Mach's inertial mass model, proposes to generate transient mass fluctuations in a piezo-crystal stack that can create time-averaged thrusts in the N range. Apart from investigating and developing theoretical models, we are testing and building several such thrusters in novel setups investigating their thrust capability. In addition, we are performing side-experiments to investigate other experimental areas that may be promising for revolutionary propulsion. To improve our testing capabilities, several cutting-edge thrust balances are under development to compare thrust measurements in difference measurement setups to gain confidence and to identify experimental artifacts.