

GEC20-2020-000529

Abstract for an Invited Paper
for the GEC20 Meeting of
the American Physical Society

Plasma thrusters: a fascinating playground for low-temperature plasma scientists

PASCAL CHABERT, CNRS Ecole Polytechnique

Low-temperature plasmas have always been driven by industry, from lighting and gas lasers to materials processing for microelectronics, or by potential new applications like cancer treatment or agriculture. In all of the above, plasma science has been highly interdisciplinary and plasma physics was only a (small) part of the all picture. Atomic and molecular physics, spectroscopy and lasers, plasma chemistry, surface science, and even biology were at least as important as basic plasma physics. Plasma thrusters have recently become the main (and soon the only?) engines of newly launched satellites. Even if the market is much smaller than microelectronics, there is a considerable industrial interest in plasma science to improve the thruster performances. Historically, plasma physics has been the most important aspect of the research, and some of the plasma physicists interested in this topic had background in fusion or space plasmas, where instabilities and anomalous or turbulent transport is crucial. In this talk, it will be shown that other areas of plasma science have become extremely important in the field of plasma thrusters. New designs and new propellant based on molecular gases are considered or used and consequently many topics like plasma-surface interactions, plasma chemistry, negative ions, are now being investigated. Plasma thrusters are therefore a fascinating playground for low-temperature plasma scientists.