



PHYSIKALISCHES KOLLOQUIUM

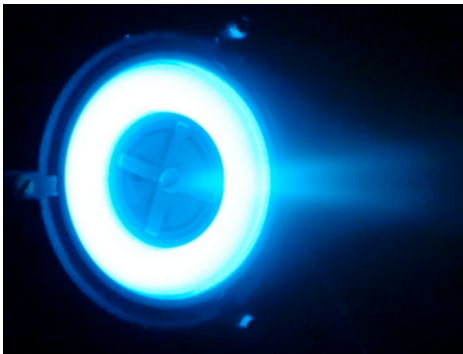
Sommersemester 2019

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With Plasmas into Space - Physics of Hall Thrusters

Dr. habil. Sedina Tsikata

CNRS Orleans, Frankreich



The first ideas on the use of charged particles to generate thrust emerged in notes by Tsiolkovsky and Goddard over a century ago. Today, a range of technologies operating on such principles exist. The acceleration of charged particles to very high velocities allows significant reductions in fuel requirements to be achieved in comparison to chemical propulsion. Such technologies are therefore ideal for long-duration missions – and thus, potentially key to mankind's space exploration

efforts. Hall thrusters belong to this class of devices, and are now widely-used for stationkeeping and orbit topping of communications satellites. These thrusters generate a plasma in crossed magnetic and electric fields, a configuration giving rise to complex and interesting physics, including the development of plasma waves and anisotropies in particle properties. A full understanding such features is required for the development of predictive codes for thruster operation, as yet beyond reach.

In this talk, recent progress made towards the understanding of Hall thruster physics is discussed. Insights have been gained from the development and application of advanced laser diagnostics. Coherent Thomson scattering has provided clues for the origins and features of different plasma waves, while recent incoherent Thomson scattering investigations have provided detailed information on electron properties in such sources for the first time. These advancements offer the chance to solve long-standing questions relevant to Hall thrusters and other crossed-field discharges.

Einführung: Prof. Dr. A. von Keudell

Die Fakultät lädt alle Interessierten herzlich ein.