
Ref. PROMETEO-EP2-T1: Characterization of magnetically shielded Hall-effect thrusters**Description and objectives:**

Magnetic confinement aims at inhibiting plasma transport to the walls, which produces energy losses and erosion of material, reducing efficiencies and thruster lifespan. Energy losses can increase largely by secondary electron emission (SEE) of ceramic materials. The main open problems are three. First, the search for optimal topologies in magnetically-shielded (MS) Hall effect thrusters (HET). Second, the characteristic behavior of the wall material in terms of SEE and sputtering. Third, the characterization of the electron velocity distribution functions (VDF) in the usual conditions of weak-collisionality. Research will be built upon former results within EP2.

The activity of the candidate will be organized in the following tasks: (1) Mastering of existing simulation capabilities for this topic at EP2; (2) Development of a radial-axial kinetic simulator for a simplified MS-HET configuration; (3) Extension to a complete MS-HET simulator; (4) Derivation of approximate fluid plasma-wall interaction model for use in fluid codes.

Specific Requirements:

- A University degree (BSc or MSc) with an excellent academic record.
- Be able to meet the admission conditions to an official UC3M PhD Program by in April 2020 the latest. Minimum conditions are a MSc degree and 300 ECTS; other conditions might apply depending on the Program.
- Strong background in the following fields will be appreciated:
 - Applied Mathematics and Scientific Programming (preferably in python, Fortran)
 - Fluid Mechanics
 - Plasma Physics
- Good skills in: team & independent working; critical & creative thinking; initiative & proactiveness; communication of scientific results
- Good proficiency in English (oral & written)
- Availability to travel abroad (e.g. conferences and research internships)

Expected output:

- A minimum of 2 publications in relevant JCR-listed journals and 2 communications at important international conferences are expected as output of this PhD.
- An international internship of minimum 3 months in a prestigious university/research center will be actively promoted.

Link to: [application and general conditions](#)