Ref. PROMETEO-EP2-T3: Design of a microwave EPT for in-space propulsion

Description and objectives:
The use of plasma thrusters for in-space propulsion has become very relevant in the last two decades. Today, the space market is opened to novel technologies that could overpass the existing thrusters, such as the HET or the ion gridded thruster, at cost or performance level. Among them, the electron-cyclotron resonance thruster (ECR) has been asserted as a disruptive thruster by the European Commission: Electric Propulsion Strategic Research Thruster. In this activity a low-mid power ECR will be designed and tested.
To reach this, the pre-doctoral student will cover three phases. (1) Review the state-of-the art of ECR plasma sources and definition of requirements. (2) Design an ECR plasma thruster. The ECR prototype must be designed aiming to achieve good propulsive performances and to be used as a testing platform for the PROMETEO project. (3) ECR testing. The prototype will be tested and its performances will be characterized. This part also includes the implementation of existing plasma diagnostics or the design of new diagnostics, as well as the use of other diagnostics used along the PROMETEO project.

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 is desirable:
    - Plasma Physics (in particular, electromagnetic waves in plasmas)
    - Knowledge/experience on Propulsion, Electronics, and CAD design
    - Experimental work in a laboratory (especially with high vacuum)
- 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**