

---

## Ref. PROMETEO-EP2-T3: Design of a MW-based 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 ECR requirements to enable it as a plasma thruster. (2) Design an ECR plasma thruster. The ECR prototype must be designed aiming to achieve good propulsive performances, but also to easy its use as a testing platform to get experimental information on the other research lines of 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:

- Excellent academic record. Strong background in the following fields is desirable:
  - Plasma Physics (in particular, electromagnetic waves in plasmas)
  - Propulsion
  - Electronics
  - CAD design
  - Experimental work in a laboratory (especially with high vacuum)
- Have completed 300 ECTS of university courses and meet the conditions to apply to an UC3M PhD program in 2019.
- 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 two JCR research journals and two communications at relevant international conferences are expected as output of this PhD. International collaboration with other groups and a PhD internship of minimum three months abroad in a prestigious university/research center will be actively promoted.