
Ref. PROMETEO-EP2-T2: Modeling the wave propagation and absorption in EPTs**Description and objectives:**

Electromagnetic waves can be used on magnetized plasmas to achieve multiple effects: perform plasma diagnostics, deposit power in the plasma in an efficient and localized way, etc. Wave heating is indeed a central mechanism in the operation of electrodeless plasma thrusters and fusion plasmas, which may exploit resonances such as the electron cyclotron resonance to deliver power to the plasma. To a large extent, efficient operation of the device depends on the plasma-wave propagation and absorption.

The activity of the candidate will be organized in the following tasks: (1) Extend and improve the 2D full-wave frequency-domain code available at EP2 to incorporate new physics and numerical enhancements, coupling it with other plasma codes at EP2 to run full simulations of electrodeless plasma thrusters (EPTs); (2) Develop an electromagnetic PIC code to study the mutual interaction between the plasma wave and the distribution function of electrons and ions, focusing on the effects on plasma transport and power absorption; (3) Analyze the wave-plasma phenomena in relevant geometries for these devices. The output of these studies will be used in and compared against the wave-particle problem studies of PROMETEO-LNF-T2.

Specific Requirements:

- Excellent academic record. Strong background in the following fields will be appreciated:
 - Applied Mathematics
 - Scientific Programming (preferably in python, Fortran)
 - Plasma Physics (in particular, electromagnetic waves in plasmas)
 - Electromagnetism
- 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.