
Ref. PROMETEO-LNF-T1: Experimental turbulence studies in space propulsion plasmas

Description and objectives:

Performance of magnetic fusion reactors is limited by heat and particle losses. The heat and particle losses are understood to be governed by the non-linear interplay of turbulence and plasma flows but uncertainty remains regarding, e.g., the physics of the sudden transitions between confinement regimes, isotopic scaling of confinement, non-linear saturation mechanisms of plasma turbulence and plasma-wall interaction. The impact of plasma turbulence on space propulsion devices remains an open question. The aim of this activity is to study the characteristics, similarities and control of turbulence in both fusion plasmas and space propulsion systems.

The research programme will be based on three lines of investigation to be developed for both fusion plasmas and space propulsion devices: 1) The structure and topology of turbulence and the development of effective control techniques using electric fields. 2) The study of interactions between orbit effects, atomic physics (neutrals) and turbulence. 3) The development of experimental techniques and advanced analysis tools for the study of turbulence.

Specific Requirements:

- Excellent academic record. Strong background in the following fields is desirable:
 - Physics (in particular, plasma physics)
- Comply with all requirements for the admission in the UC3M PhD program (in particular, candidates must have completed 300 ECTS of Bachelor+Master courses)
- Good skills in: team & independent working; critical & creative thinking; initiative & proactiveness; communication of scientific results
- Good proficiency in English (oral & written)

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.