**Post-Doc position in Space Plasma Propulsion**

**Laboratoire de Physique des Plasmas (LPP), Ecole Polytechnique, France**

Nowadays, electric satellites represent more than 50% of an increasingly competitive satellite market. Among the different electric propulsion systems, Hall Thrusters are developed in France by SAFRAN and have successfully been sold as satellite propulsion engines for orbital propulsion and control of space probes and satellites. A key issue for SAFRAN is now to develop low power (300-500W) thrusters to address the exploding market of small satellites in low-Earth orbits (i.e. at altitudes from 500 to 2000 km).

At an international level, Hall effect thrusters have been extensively studied since their invention in the 1960s. However, the physics of magnetized plasmas typical of these thrusters is complex; several plasma processes that have direct relevance to the thruster performance and lifetime are still poorly understood. Hence, the design and development of Hall Thrusters is still semi empirical with long and expensive life tests.

To improve the fundamental understanding and accelerate industrial development, the low-temperature plasma team at LPP is involved in a long-term research project funded by SAFRAN aiming at a better understanding of the physics of Hall Thrusters. Since 2014, the focus has mainly been on numerical simulation and theory. It is now time to develop dedicated diagnostics to validate the numerical and theoretical predictions. Funded by the EU CHEOPS LOW POWER project, the LPP team therefore open a 24 months post-doc position to develop advanced optical emission spectroscopy and imaging.

The post-doc work is divided into two tasks:

1. Develop time and space resolved optical emission spectroscopy and imaging of the channel of a Hall Thruster installed in the propulsion facility test chamber at LPP. The recorded spectrum and the time fluctuations will be compared to synthetic spectrum and fluctuations generated by 2D Particle-In-Cell Simulations compared to Collisional Radiative models.
2. Develop a miniaturized and space flight proven imaging system that will be embarked on a flying satellite within the EU CHEOPS LOW POWER project. The goal is to compare the emission signature of a flying model to the one recorded in ground test facilities to understand the differences already reported between ground and flight engine operation.

The candidate should be familiar with low pressure magnetized plasmas or ideally Hall Thrusters, and/or expert in optical imaging and optical emission spectroscopy in plasmas.

The LPP propulsion team is currently composed of 3 permanent professors/Researchers, 1 post-doc, 4 PhD students, and 4 undergrads

For further information about the post-doc position, please contact:

[anne.bourdon@lpp.polytechnique.fr](about:blank)

[pascal.chabert@lpp.polytechnique.fr](about:blank)

thomas.charoy@lpp.polytechnique.fr