

# SciQLOP - CDD\_CDS2015\_ENG - # 11

h1. research engineer position (1 year), developer C++/Qt, visualization/machine learning for satellite data

*%{color:red}POSITION FILLED%*

The space plasma team of the "Laboratory of Plasma Physics":<http://www.lpp.fr> is hiring a *research engineer* for one year, for the development of the GUI application "SciQLOP":<https://hephaistos.lpp.polytechnique.fr/redmine/projects/sciqlop/wik>, dedicated to the research and visualization of in situ spacecraft data measured in the magnetosphere and interplanetary space. Gathering an intuitive and powerful user interface with machine learning methods, SciQLOP will be the first software of its kind for space data analysis.

h2. Context

For decades, satellite missions have been sent to space in order to measure plasma and electromagnetic fields in our nearby space environment. Although this data is continuously stored within large public databases in a single file format, exploring it and extracting intervals revealing signatures of physical interest remains quite difficult. The very dynamic nature of the observed systems results in a great variability of observational signatures, which makes methods based on a fix set of rules, no matter how complex they are, very inefficient. Visual exploration is therefore almost unavoidable but it comes with the drawbacks of being hardly reproducible, long and laborious, mainly because we lack the graphical tools that would for intuitive and efficient exploration independent of the mission from which the data originates. This project aims in developing such a graphical software, with at its core, machine learning methods enabling feature recognition and smart cataloging of scientifically interesting intervals. A proof-of-concept graphical interface has already been developed at the laboratory and is based on the C++ Qt framework. The machine learning learning capabilities will be based to a large extent on existing packages and in collaboration with the laboratory of applied mathematics of Ecole Polytechnique.

h2. Job description

You will be part of the space plasma team at LPP, as a research engineer. You will be in charge of the development of the software SciQLOP. Besides the intuitive graphical interface for visualization and cataloging, you will have to find, propose and implement machine learning solutions allowing SciQLOP to learn and recognize features in the data and suggest them to the user. Collaboration with experts in spacecraft data and instruments in our lab, and machine learning experts in the applied math. lab will be essential for the research and development work. The key points of your development will be:

## **Deal with CDF files and mission databases**

## **Visualization of multiple format data (time series, images, 2D, 3D)**

## **Upgrade from python to full iPython embedded terminal**

## **Module for cataloging features**

## **Machine learning capabilities**

## **Collaborative/network cataloging**

## **Linux/Windows/Mac portability**

## **Documentation**

h2. Location

You will be based at the Laboratory of Plasmas Physics, at "Ecole Polytechnique":<http://www.lpp.fr/Comment-venir-au-LPP>, in Palaiseau.

[https://hephaistos.lpp.polytechnique.fr/redmine/attachments/download/1094/jpg\\_plan\\_lpp\\_X-81667.jpg](https://hephaistos.lpp.polytechnique.fr/redmine/attachments/download/1094/jpg_plan_lpp_X-81667.jpg)!

h2. Salary

gross income 2700€/month depending on the experience and qualifications.

h2. You

You are motivated for developing graphical user interfaces and are particularly sensitive to their ergonomics. You are enthusiastic about developing a unique scientific application and being one of the precursors of machine learning application for space physics. You're curious, you have a spirit of initiative and an independent worker. You enjoy sharing and team work.

### h3. Your experience and formation

- Master or engineering school
- No professional experience is required, however justifying previous experience of team development, such as projects, internships etc. is a strong asset.

### h3. Required skills

- C++ Expert
- Good python knowledge
- experience in GUI programming
- Qt framework

### h3. Desirable skills

Having skills among the following is a great asset:

- Taste for open-source software
- collaborative development, GIT
- "Scikit Learn": <http://scikit-learn.org/stable/>
- Knowledge or curiosity for machine learning / Big data / statistics.

## h2. Contact us/apply

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