

A permanent position of research engineer in scientific computing is proposed through a CNRS external competition at the Laboratory of Theoretical Physics (LPT-UMR 5152) and at the Institute of Research in Astrophysics and Planetology (IRAP-UMR 5277) in Toulouse. It is a permanent position provided by the French government. It is open to everyone, regardless of citizenship.

Candidates must hold a doctorate or an engineering diploma (some other degrees are possible). The competition can be viewed at:

<http://www.dgdr.cnrs.fr/drhita/concoursita/consulter/resultats/consulter.htm>

To apply, the prospective candidate should go to

<http://www.dgdr.cnrs.fr/drhita/concoursita/>

There is also a candidate guide explaining how to apply. The corresponding competition is No. 53, which contains two similar positions, including the one of the LPT-IRAP and another position at Laboratory M2P2 Marseille. It is possible to apply for both positions, specifying an order of preference, or only one of them.

The deadline is July 2.

For any detailed information on this position, you can contact:

- At LPT: Sylvain Capponi: capponi@irsamc.ups-tlse.fr

- At IRAP: François Lignières: francois.lignieres@irap.omp.eu

Job profile:

The expert in scientific computing will exercise his activity within the framework of a shared function between the Laboratory of Theoretical Physics (LPT) at 50% and the Research Institute in Astrophysics and Planetology (IRAP) at 50%. He / she will provide expertise in the use of algorithmic / mathematical methods and their adaptation to different machine architectures as well as the development, optimization, maintenance and dissemination of parallel codes to numerically solve quantum or classical physics problems in at the heart of the activity of the LPT and the problems of dynamics of astrophysical and physical fluids of plasmas at the heart of the activity of IRAP. He / she will be placed under the hierarchical responsibility of the Director of the LPT.

Activities:

MAIN ACTIVITIES :

- Develop with researchers highly parallel scientific codes optimized for very high performance computers
- Design, develop or adapt methods in scientific computing
- Participate in the promotion of the work, in particular by disseminating to the scientific community codes / libraries developed at IRAP and LPT.

- Ensure a technological watch on the evolution of hardware architectures (GPU ...) and numerical methods in close connection with regional and national data centers and in collaboration with other IT staff from the Institute of Research in Atomics and Molecular Complex Systems (IRSAMC) and the Midi-Pyrénées Observatory (OMP)
- Ensure the transfer of knowledge, know-how and good practices to researchers: participate in the training of users of high performance computing, disseminate and enhance the methods and tools developed.

ASSOCIATED ACTIVITIES:

- Participate in national and international research projects and associated publications
- Supervise or co-supervise students (interns, PhD students) or engineers on numerical projects
- Present the codes / methods developed in dedicated seminars / conferences
- Participate in scientific activities around computation at the OMP / IRSAMC level

Skills:

General, theoretical or disciplinary knowledge:

- General knowledge of applied mathematics in particular in the field of numerical analysis: linear algebra, partial differential differential equation (PDE), stochastic calculations ...
- In-depth knowledge of programming techniques (including Fortran, C, C++ and Python languages), parallelization (MPI, OpenMP ...) and optimization
- General knowledge of scientific computing program libraries
- General knowledge of architectures of computers and distributed systems and operating systems
- General knowledge of software quality tools promoting the user interface

Operational know-how:

- Understand and analyze the scientific problem posed
- Identify numerical methods, optimization and programming techniques as well as validation tests adapted to scientific issues
- Implement programming languages (Fortran, C, C ++ and Python)
- Implement project management and management methods
- Work in interaction with one or more research teams
- Autonomy, taking initiative
- Technical English: read, spoken, written. Level B "independent user" according to the common European frame of reference for languages.

Background:

The LPT (50 people) is involved in many fields of physics, and is a heavy user of intensive scientific computing on computing centers at the LPT, or at a regional (CALMIP) and national (GENCI / IDRIS) level. The codes, often highly parallel, are mainly produced by LPT researchers and their collaborators and relate to quantum mechanical calculations (Monte-Carlo, linear algebra, density functional ...) in electronic physics / magnetism of condensed matter and cluster physics, but also in classical physics (Monte-Carlo, molecular dynamics ...), for example in biophysics and soft matter. The codes must be designed from the outset for very high performance machines or optimized a posteriori.

IRAP (300 people) has a strong theory / modeling component for which numerical simulation is the main tool. This activity is crucial for the exploitation of astrophysical data and in particular that of space missions in which IRAP is strongly involved. Researchers develop and use multidimensional simulation codes in dynamics of astrophysical fluids and plasma physics that operate on massively parallel machines. The engineer will reinforce IRAP's capacity to develop and perpetuate digital codes at the best international level.

The engineer will work in a local environment (IRSAMC federation for LPT and OMP for IRAP) very rich in numerical projects and also including the CALMIP computing center. He / she will be encouraged to follow training courses and to participate, thanks to team funding, in scientific conferences and to publish his/her results. Occasional and short trips are expected in order to participate in collaboration meetings or workshops, in France and abroad.