

Call for proposals 2020: PhD student international long mobility

AAP 2020

**Deadline: XX**

**General framework and philosophy**

**Main Objective**

**The ISFIN Graduate School aims at strengthening education through research, developing disciplinary and interdisciplinary student skills and knowledge, and internationalizing its education cursus.**

To that aim the ISFIN Graduate School is opening a call for PhD student international long mobility (minimum 6 weeks). The philosophy of the call is to let the student realizing its own project as long as it remains within the thematic area of the institute. Therefore, laureates will be provided with a certain budget to realize their mobility which can be used for different purpose:

* Move to another laboratory to learn a new technique
* Move to another laboratory to work on a subject slightly different from the PhD topics (but somewhat related to)
* Start a collaboration with a PhD student, with a researcher …
* Test an idea, an assumption in a laboratory equipped for
* Move to a laboratory belonging to the CIVIS European Campus
* Get the label “Doctorat Européen”. In this case, the mobility could be made within the framework of a well-established collaboration between your laboratory and the host laboratory, and could be motivated only by your PhD topic. This label requires a 3 months mobility that might require a complementary funding from another source
* Any other good motivation…

Mobility within the CIVIS European Campus is strongly encouraged and will be considered as prioritary. In addition to ISFIN institute, possible CIVIS funding could be obtained

**Secondary objective**

Grant proposals are common in present day research as well as in the industry. In order to help PhD students developing transverse skills, this call for mobility is formatted as a usual grant proposal, including a technical/scientific description of the project, motivation, planning, budgeting… as well as a feedback report after the mobility.

**In Practice**

Ths ISFIN institute is funding up to 10k€/PhD student/mobility. In 2021 up to XX mobility grants could be awarded.

The PhD student must write a 6 pages mobility project in English including:

* Background, motivation and objectives, scientific description of the project
* Project time line description (including a Gantt diagram)
* Risks management
* Personal impact
* Academic and nonacademic impact
* Budget including justification for required resources and possibly complementary funding
* Contact persons in the host institution

This project must be sent to XX before XX. Decisions on proposals will be given on XX

**Timeline**

**Proposal template**

**(to be sent to** [**isfin-direction@univ-amu.fr**](mailto:isfin-direction@univ-amu.fr) **no later thanXX)**

**List of appendix**

* Priority Research Topics. useful ?
* CIVIS European campus
* Label “Doctorat Européen”

**Appendix 1: Priority Research Topics**

The priority research themes listed below will be refined/completed in the coming months by the Institute's Executive Committee, as part of the process of building its roadmap. This list is therefore indicative, and the executive committee will evaluate the projects received on a case-by-case basis. The "strategic" nature for the institute of a PhD topic that does not relate to one of the points explicitly mentioned in this appendix may be laid-out in a specific paragraph. In case of doubt about the eligibility of a thesis subject, please contact the management of the institute ([isfin-direction@univ-amu.fr](mailto:isfin-direction@univ-amu.fr)).

*Edge plasma physics and plasma wall interactions*

* Modeling of turbulent transport perpendicular to magnetic field lines (including the study of the L-H transition)
* Understanding of the physical and physico-chemical phenomena between plasma and walls (retention, permeation, erosion, deposition...) through experimental studies in laboratory and tokamak.
* Improved treatment of fluid/kinetic transitions and non-local transport effects in fluid modeling
* Ability to model transient phases in the evolution of magnetic equilibrium (ramp-up, resonant magnetic disturbances...)
* ….

*Magnetized plasmas conﬁnement physics*

* Studies of isotope effects (H,D,T) for a better understanding of the impact of the isotope mass on transport and containment, plasma density control (changes in particle transport at the plasma edge as a function of the isotope, neutral transport in the SOL, plasma wall interaction (recycling, i.e. reflection of neutrals on the wall), pumping efficiency)
* Integrated modeling for scenario development and for the interpretation of experiments (taking into account MHD (sawteeth, islands), transient phases (ramp-up/down), transport barriers, SOL/edge/core articulation) with improvements in the models used (accuracy and/or speed of execution)
* …

*Nuclear instrumentation and detection*

* Design of innovative sensors/detectors, increasingly miniaturized (nuclear, thermal...) for on-line measurements of experimental conditions, monitoring of materials/fuels behavior and control of parameters in nuclear reactors (fission and fusion) (modeling, characterization and calibration in the laboratory, qualification/validation in real conditions, coupling of methods and techniques).
* Development of innovative electronic interfaces based on the design of circuits for sensor/detector conditioning, signal processing to improve sensor/detector performance (discrimination/selectivity, amplification, filtering...) and resistance to radiation effects.

*Materials and Structures*

* Understanding and characterization of the behavior of materials and structures (from fuel to conﬁnement) under mechanical, thermal, nuclear, multi-physical... constraints at the micro, meso, macro scales and coupling of these different scales by theoretical and numerical modeling.
* Characterization, control and monitoring of materials/structures (NDT) by active or passive ultrasonic acoustic methods. Phenomenological understanding with experiments (reduced scale, scale 1, similarity), numerical modeling and advanced signal processing
* …

*Transverse axis Thermal diagnostics and thermophysical properties*

* Analysis of the evolution of thermal properties of materials before and after use in nuclear facilities (fission and fusion)
* Cross-experiments in thermal diagnostics in nuclear facilities to transpose methods and techniques (IR thermography, Bragg grating fiber)
* Characterization of the thermodynamic properties of inorganic materials and chemical systems (waste + glass matrix) up to high temperatures for the understanding of complex phenomena (understanding of interactions and equilibria between phases: phase separations in the glass liquid or glass, precipitation of crystalline phases) that can affect both the vitrification process and the durability of waste packages
* …

*Transversal axis Human and Social Sciences*

* Favor the emergence of pluri- and then interdisciplinary projects fully integrating relevant aspects of research in the human and social sciences (for example, aspects related to the problems of radioactive waste (especially very low/low level VLL, LLL) and its perception by the general public; to work organization, and the protection of workers in studies and actions related to operations in nuclear environments such as cleanup and decommissioning operations).
* …