



Post-doctoral position **Laboratoire d'Optique Appliquée, Palaiseau, France**

Scientific project :

LAPLACE (Laser Plasma Acceleration Center) is a research and innovation platform dedicated to laser-plasma accelerators (LPA). Laser-plasma acceleration is an emerging technique for accelerating electron beams through the interaction of an ultra-intense femtosecond laser with an underdense plasma. The electrons are accelerated in the plasma over very short distances (millimeter) and emit X-rays by interaction with the plasma fields (betatron radiation) or laser fields (inverse Compton scattering). This makes it possible to obtain electron and X-ray sources with unique characteristics: compactness, micrometric source size and femtosecond duration, which paves the way to many societal applications (imaging, cancer treatment), in fundamental science (physics, biology), but also for industry (non-destructive testing).

The project, fully funded, has just started in 2023. The host laboratory, LOA, is hiring a post-doctoral researcher to set-up of a high-repetition rate laser-plasma accelerator, in the framework of the LAPLACE-HR (High Rep. rate) project. The objective is to develop an accelerator operating at 100 Hz and producing relativistic electrons in the energy range 20-200 MeV, as well as femtosecond X-rays in the range 1-100 keV. The goal of LAPLACE-HR is to bring laser-plasma acceleration to a high level of maturity (TRL 5-6) and to build a true prototype electron accelerator, whose robustness and stability will allow access to applications.

The post-doctoral researcher will join the APPLI team working on this new project (typically a small team of 5 people). The candidate will address one or several of the following subjects:

- Build the accelerator, along with a small team of engineers, students and researchers. Perform first electron acceleration experiment with the 100 Hz LPA, characterize and optimize electron beam properties.
- Implementation of artificial intelligence and machine learning techniques for automated operation and optimization of the machine.
- Work toward the development and implementation of an inverse Compton scattering source.

Your qualifications :

You hold a PhD in Physics and have a strong interest in experimental physics with beyond state-of-the-art equipment. Taste for team work and ability to work in collaboration with PhD students. You are not afraid of hands on experimental work. You have expertise in some of the following: femtosecond high intensity lasers, laser-plasma interaction and/or laser-plasma accelerators, particle accelerators. Experience in developing small codes (python, matlab) for data analysis. Optional: general skills in instrumentation control and man-machine interfaces (Python, Tango, Labview...) would be useful as well.

Job benefits:

2 year contract with possible extension. Starting date is flexible, typically end of 2023 - first semester of 2024. Salary determined according to the experience of the candidate (typ. starting salary > 2200 €/month). The job comes with health, pension and unemployment benefits.

Modalities: Interested candidates should send a full CV including a list of publication, a cover letter and two letters of recommendation to Jérôme Faure, jerome.faure@ensta.fr



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