Université de Pau et des Pays de l'Adour

Research subject for a Post-Doc position: 'Development of high-power electromagnetic sources for contactless impact on various targets'

General presentation:

In the framework of the ANR ASTRID MATURATION « ESCAPADE 2 » project (https://anr.fr/Projet-ANR-23-ASM2-0003), the SIAME laboratory of the 'Université de Pau et des Pays de l'Adour' is offering a Post-Doctoral position for a duration of 21 months. The successful candidate will live in Pau but will also have to perform regular visits to various research centers situated in France, in order to participate in common scientific experiments. The suggested research subject will be related to the development and tests of a very fast Pulsed Power Generator (PPG) to be used as a driving power source for pulsed electric field (PEF) technique for contactless electropermeabilization (on bacteria, cells and in vivo) as well as for various defense-related applications. In the medical and food industry domains, there are already implemented techniques that use PEFs. However, the novel techniques to be investigated will use non-invasive methods that require an extremely fast PPG, having a voltage output of the order of a few hundreds of kVs with a rise time of the order of a few hundreds of picoseconds.

There will be very important academic and industrial partners that are involved in the project: the 'UMR Metabolic and systemic aspects of oncogenesis for new therapeutic approaches (METSY)' of CNRS, the 'Université Paris-Saclay à Gustave Roussy à Villejuif', Paris, the 'Institut de recherche XLIM de l'Université de Limoges', two industrial partners : CISTEME and ITOPP, as well as CEA Gramat for defense applications.

Research required:

The SIAME laboratory has a long history of developing very powerful and fast PPGs within different technologies (solid-state switching, electrical discharges in gases, solids and liquids). In recent years, research has also focused on the field of bio-electromagnetism in order to study the interaction of intense pulsed electric fields on living organisms. The successful candidate will be required to perform activities that combine the field of experimentation in fast electrical transients as well as that of the simulation of complex electromagnetic phenomena. These two skills are highly appreciated. He or she will participate in experimental campaigns for biological investigations at METSY, for testing an electromagnetic pulse source at CEA Gramat and collaborate with XLIM to characterize dielectric material in high frequencies.

The final objective of this Post-Doctoral contract is to make reliable a proof of concept of non-contact electroporation with ultra-fast pulsed electric fields and to test the pulsed power source on various devices.

Host Lab:
This Post-Doc position will be hosted at SIAME laboratory headed by Professor L. Pecastaing that is a research unit located in Pau and Anglet, France. SIAME has an extensive and highly competitive research program that encompasses fundamental research in thermal transfer, mechanics and electrical engineering. This position will be a part of the High Voltage Processes team. This team works particularly in the field of the physics and technology of pulsed power.
More information on the research group is available on the website:
https://siame.univ-pau.fr/fr/organisation/equipes/equipe-procedes-haute-tension.html

Details of the Post-Doc position:
Contract duration: 21 months
Starting date: As soon as possible
Work load (in percentage): 100 %.
Remuneration: according to UPPA rules
Deadline for the application: 15/10/2024

Diploma required: PhD Title or an equivalent foreign Diploma in the domain of electrical engineering (e.g., high-voltage, pulsed power or electromagnetism)

Desirable skills:
- Experience in the domain of pulsed power or high-voltage technology would be highly appreciated
- Experience with electric circuit solvers and/or electromagnetic software
- Good fundamental knowledge of electromagnetism
- The candidate must be capable to perform research without day-by-day guidance and to collaborate with foreign researchers (a good level of English is preferable)
- The candidate must be capable to produce reports and manuscripts to be send for publication to international renowned journals. The candidate should also be able to present oral contributions at conferences and present the research in front of sponsors at a general audience level.

Contact: For more information and to apply for this position, please contact Professor Laurent Pecastaing by email at laurent.pecastaing@univ-pau.fr. Please attach a detailed CV and a letter of motivation.