Title: **Post-doc position – Experimental study of dynamic phenomena in two-phase thermosyphons**
Category: Research fellow Position
Employer: ISAE-ENSMA in partnership of EDF
Duration: 12 months from November, 2020
Location: France, Poitiers, Futuroscope, ISAE-ENSMA

Context:
Pprime Institute, COST (Convection, Optimization and Two-phase Systems) team, CNRS-ISAE-ENSMA, is seeking a highly qualified candidate for a post-doctoral position in the area of experimental fluid mechanics coupled with heat and mass transfer. Pprime Institute is a center of excellence established by CNRS, University of Poitiers and ISAE-ENSMA near Poitiers, France, whose primary focus is on the aero-technical, mechanical and energy management fields. COST is the Pprime Institute team concerned with assessing heat and mass transfer phenomena in order to design thermal devices and environments, to understand their working and to predict their performance and developing modern fluid flow metrology.

As part of the work on new nuclear reactors generation, special attention is paid to Passive Safety Systems. These systems and the associated technologies are considered offering an interesting alternative to the essentially active systems used in the nuclear power plants. Such passive systems are aimed at participating in the simplification of the overall design (owing their passivity, fewer support systems are required) and at the improvement of safety.

Amid these technologies are heat pipes and loop thermosyphons. Both transfer thermal energy passively from heat source to the heat sink that the external environment represents. The studies carried out previously on these natural two-phase (open or closed-loop) thermosyphons have raised several questions about:

1. The real performance of the systems studied due to strong coupling between complex mechanisms and due to the lack of documented experimental data in order to validate the first rough estimation;
2. The dynamic behavior of two-phase thermosyphon loops showing some physical instabilities. The actual occurrence of such a behavior remains not well-established (magnitude, frequency, transient start-up). These instabilities could prove problematic issues from a mechanical point of view (interactions with structures) or thermal point of view (starting reliability and overall system behavior).

Scientific objectifs:
The successful candidate is aimed at better identifying the fundamental reasons for the appearance of the instabilities, ultimately to better quantifying them, and at studying the possibility of attenuating or even eliminating them through appropriate solutions that have to be defined.

To carry out this work, it is planned to:
1. Perform a detailed test campaign on a simplified device in the laboratory,
2. Study the causes of instabilities specific to these systems,
3. Develop strategies aimed at suppressing the dynamic instabilities or mitigating their effects.

Qualifications and skills:
The candidate must have a solid background in two-phase fluid mechanics and heat and mass transfer. Given the work on the experimental device that he/she will be involved in, he/she must have acquired during his Ph.D. thesis a strong experience in directing experimental campaigns (development, measurement, acquisition, post-processing).

Salary:
About 2300 Euros/month.

Contact:
Interested applicants should send a CV with a cover letter, name and recommendation letter of at least **two references**, and a summary of recent work and publications. All applications should be submitted electronically as a single PDF document to the Email address below:

etienne.videcoq@ensma.fr