



Open postdoctoral position:

Thermal Behavior of Linear Tubular Flux Switching Electrical Machines with Integrated Bearings

Summary: Tubular linear machines can be found in several emerging devices resulting from the energy transition, and future industry 4.0. These structures can be used as wave generators to convert wave energy. They can also be used as electric generators for hybrid and electric vehicles. They are also widely used in industry in machine tools, and as actuators in production lines.

The goal of this project is to work upstream on the electromagnetic and mechanical structure of these machines to improve their performance. Indeed, the current requirements in terms of compactness and power density motivate major academic and industrial research efforts. Thus, current projections, in order to move towards zero-emission transports (land and flying vehicles), foresee the need to achieve power densities of the order of 20 kW/kg, whereas we are currently well below.

Integration is one of the most relevant tracks for achieving such an objective. The integration of the bearings in the tubular machines allows the improvement of the power density, and the resilience to eccentricity faults. This integration will instead concentrate the heat sources within the active part of the machine. It is then necessary to take into account, in a thorough way, the thermal behavior of this structure. This project will be carried out as part of a collaboration between the themes "Systèmes Electrotechniques et Actionneurs" (SEA) of GREAH, and "Energy Efficiency and Thermal Transfers" of LUSAC.

Objectives: This project aims at proposing an innovative and robust integrated design of tubular linear machines. Main steps of the postdoctoral researcher work can be chronologically defined as follows:

1. Studying the thermal behavior of an available prototype of a tubular linear structure.
2. Participating to the design (electromagnetic and thermal) of a prototype.
3. Following the realization of a prototype.
4. Writing of at least two scientific contributions.

Practical information: 10 months postdoctoral contract (salary: 2000 €/month). Deadline for application: 31 March 2022.

Funding: This postdoctoral project is part of the THERMALTUB project, funded by Region of Normandy. This project will be carried out at GREAH laboratory of the ULHN (Université Le Havre Normandie, Le Havre).

Prerequisites: The candidate must have solid experimental skills, good programming skills (Matlab and FE packages), a strong interest in the applicative part of the project (renewable energy), as well as an aptitude for teamwork.

To apply, provide a CV + cover letter + 2 names of references.

Contact:

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