

Postdoctoral position - Roverbal Lab - MEEI Team Magnetic characterization of Additive manufacturing materials

Additive manufacturing (AM) offers many possibilities for new devices, especially for the diversity of geometrical choices. AM applied to electrical machines (motors, actuators) is nascent field research with many scientific challenges. In this emergent context, Electrical machine's design is conditioned by the agreement between geometry and magnetic properties; local manufacturing parameters variations could produce a detrimental magnetic behavior. Thus, to take advantage of the innovative geometrical design is necessary to include a deep understanding of the link between local manufacturing parameters and magnetic properties.

A crucial stage in machine design by AM will be magnetic material characterization. The classical magnetic methods fail to consider the anisotropy generated by AM. For example, the hysteresigraph method, applied to toroidal cores, has a unique magnetic flux direction. The Epstein frame, another classical magnetic measure method used for laminated frames, has similar difficulties. Additionally, these measurement methods have problems in making an adapted coupling with multiphysics measures, such as the variation of strain, stress, or temperature.

Job description: the principal work package is the conception of magnetic measurements. The experimental methods designed need to overcome both difficulties anisotropy and multiphysics measures. An essential item is related to the definition of a Representative Elementary Volume (REV). Finally, the experimental designs will need validation through numerical methods (analytical, finite elements, etc.).

Research team: The postdoctoral position is within the team group "Mechatronics, Energy, Electricity and Integration" (MEEI). The MEEI team focuses on specific scientific issues, from developing multi-physical modeling methods, through optimization methods, to experimental implementation. A principal aim is to design systems and components strongly constrained by the onboard context or the available space. The various research works in this context can be grouped into two axes: the energy control and the mechatronic integration under strongly restricted constraints.

Because of the multidisciplinary aspects, strong interaction with the "Materials and surfaces" team will be necessary, particularly on the links between microstructure and magnetic behavior.

More information : Please send your application by email to Alejandro Ospina: alejandro.ospina@utc.fr

Include the following documents: 1) motivation letter, 2) CV indicating your skills and experience applicable to the position, 3) references (names and contact information). The call is open immediately; interviewing candidates start February 28 / 2022 . Applications will be considered until the position is filled, the position start Mars 14 / 2022.

Université de
technologie
de Compiègne

OSPINA Alejandro
Rue du Docteur
Schweitzer
CS 60319
60203 Compiègne cedex
Tél. 03.44.23.45.09
www.utc.fr