



Researcher in the field of Power Electronics – Magnetic components (M/F)

Location: Rennes (35), France

Web site : <http://www.fr.mitsubishielectric-rce.eu/>

Job Reference : PES_CDD_DIT_11_23

Contract : 12 to 18 months fixed term contract

Context and description

MITSUBISHI ELECTRIC is one of the leading manufacturers of power electronics related products from components such as semiconductor power devices to systems such as HVDC systems. As MITSUBISHI ELECTRIC Group's subsidiary, MITSUBISHI ELECTRIC R&D CENTRE EUROPE includes a research division specialised in Power Electronics, in particular in the field of Heterogeneous Integration Techniques¹ and high efficiency-ultra compact converters. To further improve the power density of conversion units, activities related to magnetic components² and based on PCB technology are carried out.

The research division, located in Rennes (France – Brittany [35]), is looking for a researcher specialized in Power Electronics, specifically Magnetic components with the following duties:

- Make a survey of magnetic coupling techniques applicable to interleaved converters using Planar PCB inductors. Pros and cons regarding losses, volume and cost will be investigated.
- Based on two set of specifications for converters, select the best-in-class solutions with the motivation being to further improve the power density while fulfilling thermal constraints
- Generate the design routines under Matlab environment, potentially coupled to a FEA software (such as FEMM4.2) if co-simulations are required.
- Practical implementation of the designed devices (PCB routing, manufacturing follow-up and mechanical assembly)
- Small-signal characterization prior to functional validation on MERCE's existing experimental platforms

¹ R. Mrad, J. Morand, R. Perrin and S. Mollov, "A PCB based package and 3D assembly for high power density converters," *2019 IEEE International Workshop on Integrated Power Packaging (IWIPP)*, 2019.

² J. L. Leslé, G. Lefevre, J. Morand, R. Perrin, P. -Y. Pichon and G. Regnat, "Characterisation of a Ferrite-Polymer Based Magnetic Material," *2022 24th European Conference on Power Electronics and Applications (EPE'22 ECCE Europe)*, 2022

- Other activities related to magnetic components developed at MERCE with PCB technologies will complement this mission
- Research results will be publishable in international conferences and journals

Expected education and experience

- Holding a Master Degree within the field of Power Electronics, you have spent at least 3 or 4 years of experience through a public or private R&D laboratory. A PhD graduation would be appreciated.
- Expertise in the design of magnetic components for Power Electronics (Transformers and inductors) in conjunction with soft magnetic material technologies (ferrite, iron powders, amorphous...). Specific know-how in Integrated Magnetics (Inter-Cell Transformer, Transformer with Integrated Inductances, Coupled chokes as examples) would be a plus.
- A good knowledge in FEA software (FEA, Maxwell2/3D) is required
- Practical experience in converter design including the selection and the practical implementation of active/passive components but also cooling systems. Basic knowledge in routing of electronic boards would be a plus.
- Familiar with laboratory environment and associated equipments (power supplies, scopes, thermal or electrical measuring devices or probes), knowledge in metrology and experimental measurements

Personal profile

- Ability to work across multiple tasks methodically and efficiently and meet committed schedules
- Motivated to work in dynamic environment and adaptable to changes in priority
- Excellent communication and interpersonal skills: ability of sharing information with team players (must show evidence of team-working)
- Fluent English
- Availability for frequent international business trips.

Contact

Magali BRANCHEREAU (HR Manager),

Thanks to send your CV and motivation letter in PDF format by email (object: your name + reference PES_CDD_DIT_11_23) to: jobs@fr.merce.mee.com