Post doc position at Lab-STICC - Brest - France

New miniature antennas concepts based on innovative self-biased ferrites for multi-functions and circular polarization applications (« CONTACT » Project)

Published

Duration : 24 months

Starting Date: 1.12.2020 (negotiable)

Location : Lab-STICC research lab, Functional Materials Team, Université de Bretagne Occidentale, Brest, France

Lab-STICC is currently seeking a research associate (Post-Doc) for a 36 months project initiated by the French National Research Agency: « CONTACT: New miniature antennas concepts based on innovative self-biased ferrites for multi-functions and circular polarization applications ». The duration of the post-doc position is 24 months.

About the lab

Created since 2008, the Lab-STICC is a multidisciplinary research laboratory in the field of Information and communication science and technology. Researchers work in a single structure within one central theme: "from sensor to knowledge". The Lab-STICC is a research unit of the French national center for scientific research (CNRS) involving two universities (Université de Bretagne Occidentale, Brest; Université de Bretagne Sud, Lorient) and three graduate schools of engineering (IMT Atlantique, ENSTA Bretagne and ENIB). Under the title UMR 6285, it is attached to department INS2I and INSIS of the CNRS.

The Lab-STICC incorporates more than 566 people including 317 permanent staff, 206 PhD students and 43 non-permanent positions. The staffs are located over the different institutes on several geographical sites in Brittany: Brest, Lorient, Rennes, Quimper and Vannes. Over the last five years, Lab-STICC members have authored more than 700 refereed journal papers, 1800 conference communications and 40 patents. Our research leadership has involved strong academic and industrial collaborations with national and international research grants amounting to more than 30 M€. Lab-STICC members play an important role in the academic training (master, engineering degree) in the field of ICT in western Brittany. Several partner institutions are in charge of these courses.

CONTACT Project

The CONTACT project is part of the context of a very significant increase in the integration density of electronic systems for communications, localisation or surveillance equipment. This requires the design of antennas which must be both miniature and multifunctional since they have to be able to meet several communication standards. In addition, many spatial and military applications need for circular polarization, which is also an interesting solution for civil domains to overcome misalignments between transmitter and receiver and to mitigate inherent polarisation loss factors due to multipath problems. More specifically, the CONTACT project aims to demonstrate an antenna array that will be composed of 4 miniature, tri-band (GPS/Galileo) and circularly polarized radiating elements for satellite radionavigation systems.

Turning points compared with the state-of-the-art offer a two-fold approach, the first on the antenna development and the second on the material.

The consortium is made up of the laboratory that will design the antennas (XLIM, Limoges), a manufacturer (INNOVEOS), both of them beeing located in Limoges, and the Lab-STICC (Functional Materials Team).

In the CONTACT project, we propose to reach these objectives (miniature, multi-band with circular polarization) by proposing innovative solutions based on ferrimagnetic materials. For this material part, improved processes will be developed **to reach self-magnetized ferrites with features fitting with RF applications**. This work on the development of the self-polarised material is the part of the project that is assigned to the lab-STICC.

Job description

The applicant must be a European citizen.

The proposed work takes place in the frame of the CONTACT project.

Within this project, the applicant will have in charge of/ be strongly implicated in:

- The conception and the fabrication of the self-polarized materials
- The characterization of the materials, at several levels : structural characterization, measuremnets of static magnetic properties, measurements of HF permeability and permittivity, in wide ranges of tempertaure and frequencies.

To this purpose, the applicant will be part of a team of eleven people, and work in close cooperation of the XLIM laboratory.

The applicant should have

- Already worked in the context of synthesis magnetic oxydes by chemical methods.
- PhD, preferably with skills in Physico-chemistry, and with knowledge in

○ Co-precipitation method

○ At least basis on ferromagnetism

○ XRD characterization

○ Skills in HF measurements (coaxial line, rectangular guidlines,…) would be appreciated.

- Fluent in English - French appreciated
- Being autonomous, curious, with sense of responsibility and compliance with commitments
- Project Management
- Teamwork

For more information, please contact Jean-Luc Mattei, mattei@univ-brest.fr, +33 (0) 298017334.

To apply, please send Jean-Luc Mattei (mattei@univ-brest.fr)

- CV with list of publications, and referees

- short research statement

References

J.-L. Mattei, C. N. Le, A. Chevalier, A. Maalouf, N. Noutehou, P. Queffelec, and V. Laur, “A simple process to obtain anisotropic self-biased magnets constituted of stacked barium ferrite single domain particles,” *J. Magn. Magn. Mater.*, vol. 451, pp. 208–213, Apr. 2018, doi: 10.1016/j.jmmm.2017.10.121.

H. Turki, L. Huitema, T. Monediere, B. Lenoir and C. Breuil, "New Concept Validation of Low-Loss Dual-Band Stripline Circulator," *in IEEE Transactions on Microwave Theory and Techniques*, 2019