

CONTRATOS PREDOCTORALES 2022 SEVERO OCHOA

PROJECT TITLE / JOB POSITION TITLE:

Miniaturized sub-THz non-reciprocal passive devices for the 6G transition

JOB POSITION RESEARCH LINE:

RL, General.- FUNCTIONAL OR MULTIFUNCTIONAL NANOSTRUCTURED MATERIALS

RESEARCH PROJECT / RESEARCH GROUP DESCRIPTION:

The relentless demand to increase data rates, data traffic and connected devices in our mobile communications have prompted a paradigm shift in wireless technology. New wireless evolutions (5G, 6G) will use sub-THz miniaturized antenna systems that will need to be low-cost and energetically efficient. An unresolved challenge of this transition is the miniaturization of passive, ferrite-based non-reciprocal devices above 100 GHz, for which bulky external magnets are currently required. Non-reciprocal devices such as circulators are key to decouple amplifiers, to protect the systems against mismatched impedances or electromagnetic aggression and to enable the Full-Duplex operation of antennas. The aim of the PhD is achieving an on-chip integration of miniaturized circulators for the forecasted 6G evolution. The PhD work will fill a gap between materials science and mm-wave engineering by integrating new magnetic oxides with ferromagnetic resonances above 100 GHz into planar microstrip circulators. The project will be done in collaboration with the systems at the Antenna & Microwave Systems Group at Escola d'Enginyeria of Universitat Autònoma de Barcelona and will involve interactions with the industry.

JOB POSITION DESCRIPTION:

We seek enthusiastic individuals with a background in physics, materials science or telecom engineering, willing to undertake the thrilling adventure of turning basic science discoveries into real applications. The PhD fellow will work to integrate the most promising materials selected within the ongoing ERC project *Ferrites-by-design for Millimetre wave and Terahertz Technologies (FeMiT)* into devices compatible with the designs of the telecom industry. To you who like to drive and conclude projects independently, take your own initiatives and discuss/develop ideas, be creative and have a problem-solving mindset. The project is in collaboration with other researchers and industry. Hence you will be able to increase your professional network with

relevant industries. The project is aimed at consolidating an international and interdisciplinary research and training framework in the application of functional materials to improve RF-Front End Modules with a direct application in mobile communications with also a direct take-up into satellite technologies offering a dynamic, international and intersectoral environment.

The PhD fellow will join the Nanoparticles & Nanocomposites group and work in close collaboration with the Antenna & Microwave Systems Group at Escola d'Enginyeria of Universitat Autònoma de Barcelona acknowledged with the distinction "HR Excellence in Research". Inquiries about additional details of the PhD project are welcome by email to mgich@icmab.es

GROUP LEADER:

Dr. Martí Gich

Email: mgich@icmab.es

Research project / Research Group website <https://nn.icmab.es/>

RELATED LINKS TO THE POSITION (optional)

URL: <http://ams.uab.cat/index.php>

Title link: Webpage of the Antenna & Microwave Systems group at Escola d'Enginyeria of Universitat Autònoma de Barcelona