

Titre Thèse Title	Development of nanodevices based on 2D materials, for applications in the field of RF applications (contacts, diodes, transistors, switches, ...)	
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Financement acquis ?	Oui <input checked="" type="checkbox"/>	Non <input type="checkbox"/>
	Origine : PEPR Electronique	
Financement demandé	Contrat Doctoral <input type="checkbox"/>	Etablissement porteur : Univ. Lille <input type="checkbox"/> Centrale Lille <input type="checkbox"/> JUNIA <input type="checkbox"/>
	Région <input type="checkbox"/>	Co-financement acquis : Oui <input type="checkbox"/> Non <input type="checkbox"/> Préciser son origine (qu'il soit acquis ou non) :
	Autre :	

Context:

Two-dimensional (2D) materials are regarded as promising building blocks for future high-frequency electronics, opto-electronics and sensing devices. Despite their exceptional properties, the understanding of their properties and the development of technological processes necessary for the production of device are still in progress.

This thesis is involved in the framework of the French national program PEPR Electronique (Programme et Equipements Prioritaires de recherche sur l'Electronique), and related to the topic 2D materials.

Objectives:

The aim of this thesis is to develop novel devices based on beyond graphene and stacked two-dimensional materials. Encapsulating and/or combining different 2D-materials is key step towards adding novel functionalities and preserving their intrinsic properties. The CARBON group has already developed a custom-made transfer station for assembling 2D heterostructures layer by layer. Progress on the growth of these materials is also underway in the group EPIPHY.

The candidate will fabricate the 2D based devices in the IEMN state-of-art clean room facilities. After fabrication, she/he will characterize their DC and high frequency properties in the IEMN high-frequency characterization facility which is fully equipped with HF probe stations up to THz range.

Therefore, this thesis will give the possibility to learn advanced nano-fabrication and electrical characterizations of novel nanodevices.

The future candidate will join the CARBON group. The group is part of the EU project Graphene Flagship and partner of international collaborations (Singapore University NTU, Texas University). This thesis will be conducted in close collaboration with the EPIPHY group, which is involved in the growth of 2D materials.

Reference to have a broad view on the field:

[1] A. Ferrari and al., "Science and technology roadmap for graphene related two dimensional crystals, and hybrid systems", Nanoscale Volume 7 Number 11 21 March 2015 Pages 4587–5062, DOI: 10.1039/c4nr01600a