

Title: Carbon nanostructures based high frequency interconnections

<http://s2i.ed.univ-poitiers.fr/spip.php?article970&lang=fr>

Full description -

Nanoelectronics applications will face limits imposed by physics laws, material properties, circuits and systems characteristics, assembly and packaging conditions. In this context, packaging will play a major role by providing an effective capability of complementing the nanometric device features to the circuit boards. Interconnecting the nanometric devices will be a major problem, especially on the global level. Assembly approaches are moving toward the system-level integration paradigm and new packaging technologies are proposed (3D system integration, wafer-level packaging, electro/optical integration). The conventional materials used in the classical packaging are expected to be inadequate in terms of thermal, mechanical and electrical performances. A possibility under investigation is the use of new materials in nanopackaging such as carbon nanotubes (CNTs), nanowires, nanoparticles and graphene (monoatomic layer of graphite). In this context, CNTs (rolled-up sheets of graphene) reveal unique physical, electrical and thermal properties, which make them extremely attractive for many applications in the area of nanoelectronics. This new field of research concerns the use of nanomaterials applied to the packaging of electronics components. That can be for interconnect, thermal, mechanical, etc managements. In this PhD-work, we will mainly focused on RF interconnections interconnections.

Industrial partner : This PhD work is part of a larger project named DEFIS RF in strong collaboration with Thales (France), and funded by the ANR Industrial Chair. This Chair is located at XLIM – University of Limoges/CNRS in France. (www.xlim.fr)

Scientific objectives:

- Modeling of nanostructures
- ▶ 3D EM modeling
- ▶ growth of nanostructures
- ▶ fabrication of RF components for packaging
- ▶ characterisations of materials
- ▶ RF packaging tests

Acquired skills at the end of the thesis

pluri disciplinary skills :

- ▶ modeling
- ▶ physics
- ▶ grower of nanomaterials
- ▶ nanotechnologies
- ▶ innovative RF components

Keywords: Photonic Crystal Fiber, high-power fiber laser, fabrication process of optical fibres, thermal effects

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Conditions of access:

- Citizen of the European Union or Switzerland;
- Not having started their professional career;
- In preparation of a Master degree in the year of submission of the application;
- Or hold a Master or equivalent allowing them to enroll in thesis;

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