

Master and Engineer Internship: 2018-2019

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Research group : CARBON

Title : Towards RF switches based on 2D materials.

Abstract :

The Radio Frequency Front End Module (RF-FEMs) found in WiFi and connected devices includes the circuitry between the antenna and at least a mixing stage of a receiver. The RF switch is a key element of the FEM, as illustrated by the market analysis by Mobile Experts : “The market for RF front-end chips will grow at a 13% compound annual rate to create an \$18 billion market by 2020”. Two-dimensional materials seems well adapted for resistive switching. Indeed, first non-volatile RF switches incorporating a 2D material of the family of transition metal dichalcogenides (TMDC) begins to appear in literature.

The internship has two main objectives. The first one is to design, fabricate, and characterize the RF coplanar waveguide (CPW) that will allow coupling the 2D-based RF switch to the high frequency probe stations of the IEMN characterization platform. The second goal is to develop a technique to transfer exfoliated two-dimensional materials from a host substrate onto a target CPW structure. These two results are essential steps for the nanofabrication of the RF switch.

Methodology:

- Coplanar waveguide design
- Clean room fabrication of simple passive CPW
- RF and DC characterization (IV, S parameters)
- TMDC exfoliation and transfer using custom-made station

Keywords: Radio Frequency, coplanar waveguide, 2D materials,