



TUTORIAL on
Multi-scale simulation of two-dimensional materials based devices

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Location: Porto Antico di Genova Centro Congressi
Additional fees: 25€

Description: 2D-material (2DM) technology is considered an enabling technology for new applications in electronics. However, due its embryonic stage, many fabrication issues still remain unsolved, and a comprehensive analysis of the real performance to be expected in 2DM-based devices is lacking. From this perspective, simulations are actually the only available tool able to guide and inform progress in the field.

In this tutorial, we will focus on the approaches and methods needed to simulate devices based on 2D-materials, which enable an assessment of the expected performance against Industry requirements.

We will first provide an overview of state-of-the-art devices based on 2D materials, ranging from digital (high-performance and low-power devices), to analog (i.e., radio frequency applications) as well as opto-electronics applications. We will then discuss the physical models suitable to describe the electrical behavior of 2D-devices (e.g., classical and quantum transport models).

Finally, we will propose some simple simulations to be run by means of the open-source **NanoTCAD ViDES code** <http://vides.nanotcad.com>

Summary

- 1) State of the art of Electron devices based on 2D materials
- 2) Modeling of devices based on 2D materials:
 - a. Semiclassical models
 - b. Quantum transport models: the NEGF approach
- 3) Assessment of device performance through device modeling
- 4) Simulations of 2D-materials through the NanoTCAD ViDES code.