

Graphene-based Nanoelectronic Devices (GRAND)

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There is no doubt the governing role the semiconductor industry plays in today's high-tech economy, supporting over 100,000 direct and even more indirect jobs in Europe. This dominance has been achieved through aggressive scaling in complementary metal-oxide-semiconductor (CMOS) technology and will last for next 10-15 years. Facing the extraordinary highly developed CMOS technology alternatives to replace Si-CMOS technology have to overcome high hurdles.

The major ICT challenge is to find alternatives for information processing and storage beyond the limits of existing CMOS. Graphene, ultrathin layers of carbon, is particularly promising due its novel QED properties. Preliminary data indicate graphene as a prime candidate for "Beyond CMOS" solutions for switches and interconnects. Still in conventional CMOS concepts it may replace silicon in the transistor world and metals in interconnects.

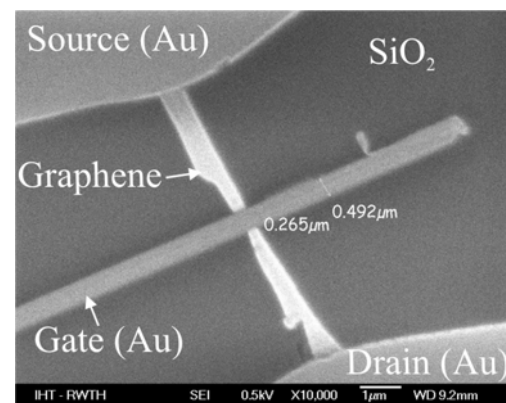


Fig. 1.4: Schematic of a graphene field effect transistor (AMO) [1].

The key objective of the GRAND proposal, coordinated by the AMO GmbH, is to explore these potentials by experimental and theoretical investigations of transport and general transistor actions in Graphene to provide a reliable base for the discussion whether graphene can bring conventional semiconductor technology to the "Beyond CMOS" era. The major role of GRAND is to act as a pathfinder therefore.

The consortium includes internationally renowned experimental and theoretical groups from academia and industry, forming a comprehensive unit with capabilities far beyond those of the individual partners, and ensuring a tight focus on the exploitation of the project results for European industry. In the talk essential parts of the topics of GRAND and some lines of strategy will be presented

- [1] M.C. Lemme, T.J. Echtermeyer, M. Baus, H. Kurz, "A Graphene Field Effect Device", IEEE Electron Device Letters, 28(4):282-284, April 2007.

Beneficiary Number *	Beneficiary name	Beneficiary short name	Country
1(coordinator)	Gesellschaft fuer angewandte Mikro- und Optoelektronik mit beschraenkter Haftung	AMO	Germany
2	Consorzio Nazionale Interuniversitario per la Nanoelettronica	IUNET	Italy
3	Commissariat à l’Energie Atomique	CEA-LETI	France
4	University College Cork, National University of Ireland, Cork, Tyndall National Institute	TNI-UCC	Ireland
5	University of Cambridge	UCAM DPHYS	UK
6	STMicroelectronics (Crolles 2) SAS	STM SAS	France

Table 1: GRAND list of beneficiaries

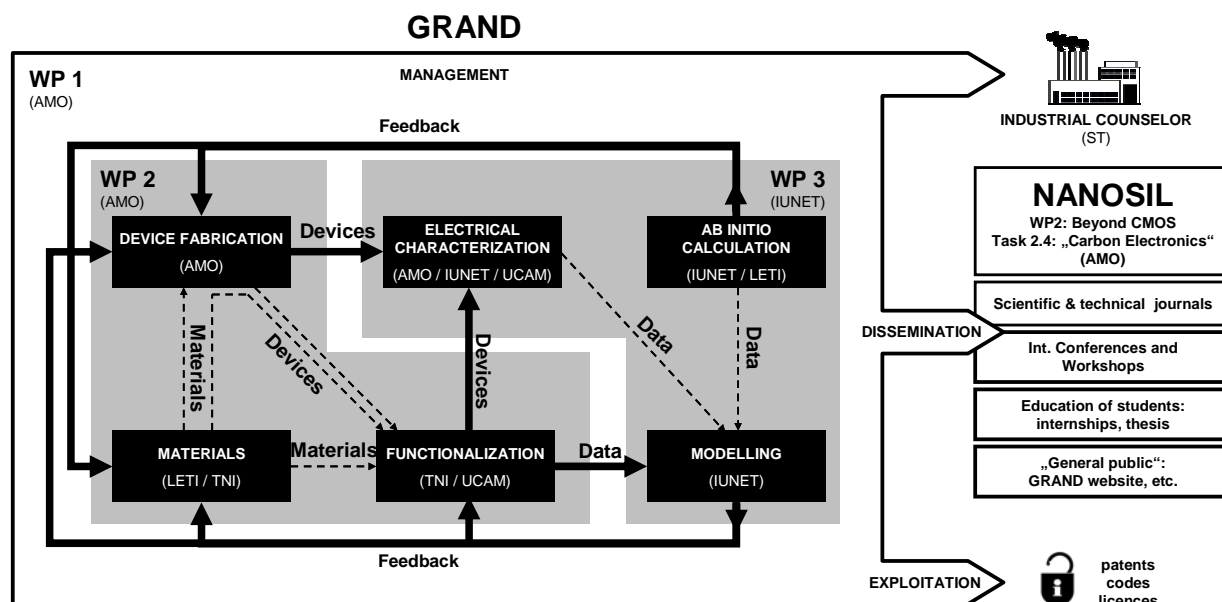


Fig. 2: GRAND Structure