

DOTFIVE - Towards 0.5 Terahertz Silicon/Germanium Hetero-junction Bipolar Technology
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DOTFIVE is a three-year IP proposal for a very ambitious project focused on advanced RTD activities necessary to move the Silicon/germanium heterojunction bipolar transistor (HBT) into the operating frequency range of 0.5 terahertz (THz) (500 gigahertz GHz) enabling the future development of communication, imaging or radar Integrated Circuits (IC) working at frequencies up to 160GHz. For a given lithography node bipolar transistors and more recently HBT have always lead the frequency race compared to MOS devices, while offering higher power density and better analogue performances (transconductance, noise, transistor matching). The main objective of this highly qualified consortium is to establish a leadership position for the European semiconductor industry in the area of millimetre wave (mmW) by research and development work on silicon based transistor devices and circuit design capabilities and know-how. SiGe HBT is a key reliable device for applications requiring power > few mW (future MOS limitation) and enabling high density, low cost integration compared to III-V. To achieve the goal DOTFIVE unites a powerful consortium: Seven academic partners for the physics understanding of nanotransistors, simulation, modelling, and characterization (down to few k) of devices; as well as the design and characterization of demonstrator electronic blocks (Low Noise Amplifier, mixers). Two research institutes in charge of developing novel process modules and transistor structures on silicon wafers, capable of fabricating innovative SiGe HBT concepts.

Two industrial companies, capable of producing 250GHz HBT on silicon, and willing to push their capabilities to 500GHz by incremental structural and technological improvements utilizing some of the most advanced equipments introduced recently by the CMOS miniaturization race. Two SME capable to deliver to designers, transistor parameter extraction and RF advanced compact models for all the silicon providers above.

Coordinator

STMICROELECTRONICS SA (France)

Other participants

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

XMOD TECHNOLOGIES (France)

IHP GMBH - (Germany)

TECHNISCHE UNIVERSITAET DRESDEN (Germany)

UNIVERSITAET DER BUNDESWEHR MUENCHEN (Germany)

JOHANNES KEPLER UNIVERSITAT LINZ (Austria)

INFINEON TECHNOLOGIES AG (Germany)

UNIVERSITAET SIEGEN (Germany)

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ALMA CONSULTING GROUP SAS (France)

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UNIVERSITE PARIS-SUD (France)

INTERUNIVERSITAIR MICRO-ELECTRONICA CENTRUM VZW (Belgium)

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Subprogramme Area Next-Generation Nanoelectronics Components and Electronics Integration

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