



NAVOLCHI

Nano Scale Disruptive Silicon-Plasmonic Platform for Chip-to-Chip Interconnection

Project no. 288869

*Specific Targeted Research Project (STREP)
Information & Communication Technologies (ICT)*

MS 45

Press Release

Lead beneficiary for this milestone: *Research and education laboratory in information technologies, Athens Information Technology, Greece*

Contact Person: *Emmanouil-Panagiotis Fitrakis*

Address: *Athens Information Technology
19.5 Km Markopoulo Avenue,
19002 Peania, Attiki, Greece*

Phone: *+30 210 668 2721*

e-mail: *mfitrakis@ait.gr*

Date due of deliverable: *31/12/2011*

Actual submission date: *31/12/2011*

Authors: *Research and education laboratory in information technologies, Athens Information Technology, Greece*

Participants: *All*

Workpackage: *WP7*

Security: *Public (PU)*

Nature: *Press Release*

Version: *1.0*

Total number of pages: *3*

NAVOLCHI project members are pleased to announce the kick-off of the European Research Project NAVOLCHI (Nanoscale Disruptive Silicon-Plasmonic Platform for Chip-to-Chip Interconnection). NAVOLCHI is a Specific Targeted Research Project that is funded by the European Union within the 7th R&D Framework Programme. The project duration is 36 months and the total level of funding provided by EU is 2.400.000 Euros.

NAVOLCHI (www.navolchi.eu) is targeting a novel approach to chip-scale circuits. Today, electronics is limited in operating speed, while photonics is limited in miniaturization capability. By use of the emerging science field of plasmonics, NAVOLCHI aims to bridge the gap between electronics and photonics, thus paving the way for the faster and smaller chip technology of the future. To this end, NAVOLCHI aims to demonstrate a working prototype for chip-to-chip interconnection with plasmonic transceivers. The application fields are high performance computing, data centers and optical communication devices, which are of great interest to global industry giants.

The project consortium comprises of 6 academic research centers and a large company:

- KIT - Karlsruhe Institute of Technology (Germany), *Project Coordinator*
- IMEC (Belgium)
- TU/e - Eindhoven University of Technology (Netherlands)
- RELIT/AIT - Athens Information Technology (Greece),
- UVEG – University of Valencia (Spain)
- STi - ST Microelectronics (Italy)
- UGent – Ghent University (Belgium)

KIT is the Project Coordinator of NAVOLCHI. KIT will contribute the plasmonic modulator design for the development of plasmonic transmitter. KIT will fabricate and characterize the plasmonic modulator. KIT will also develop passive components, particularly plasmonic couplers and filters as well as suitable plasmonic waveguides for plasmonic amplifiers. Finally, KIT will be involved in the dissemination activities within WP7.

IMEC will develop an electrically injected integrated optical amplifier based on colloidal nanocrystals, embedded in a hybrid silicon-plasmonic device. In addition it will provide the basic silicon photonics circuits needed to form the interconnect backbone connecting the different plasmonic devices with low loss and develop optical beam steering structures.

TU/e participates in NAVOLCHI with the Photonic Integration group (PhI). The PhI group concentrates on electrically pumped metallic/plasmonic nanolaser devices, which at this moment are unique in the world. In 2007 it reported the first electrically injected metallic nanocavity laser. More recently in 2009 it also reported the first Plasmon mode lasers with nanoscale confinement of light. The PhI group will use its plasmonic nanolaser technology and simulation expertise to develop nanoscale metallic/plasmonic laser sources which are bonded onto SOI wafers.

AIT participates in NAVOLCHI with the “High Speed Networks and Optical Communications - NOC” Group. AIT will contribute with their expertise in system/subsystem design, and will also investigate the performance of the hybrid technology in terms of cost efficiency and power consumption. In addition, AIT will contribute to the design of the plasmonic amplifier, to the final system testing, and to demonstration activities.

UVEG is strongly involved in the preparation of patternable polymer based materials doped with quantum dots in order to fabricate plasmonic amplifiers and photodetectors. Modelling, structural, morphological, electrical, optical and electro-optical characterization of materials and devices will be also developed by the team.

The ST Interconnect Systems Group (ISG), based in Catania, Sicily, is responsible for on-chip and off-chip interconnect systems development from architecture to Front-End implementation (gate level netlist), both for internal ST divisions and external customers. In this project, the ISG group will be the project coordinator for WP6 (Integration, characterization and testing) and will develop the CMOS circuits for the chip-to-chip communication modules, to be interfaced with the plasmonic interconnect devices. In addition, the ISG group will contribute to technical and economical evaluation forecasted in WP2.

UGent will contribute to the synthesis of PbS(e), PbS(e)/CdS(e) core-shell dot-like and rod-like quantum dots, in the preparation and processing of quantum dot or quantum dot doped layers and in their optical and electrical characterization.

NAVOLCHI started on November 1st, 2011 and will conclude on October 31st, 2014. Those interested in getting more information on the project may contact Prof. Dr. Juerg Leuthold, Juerg.Leuthold@kit.edu.