



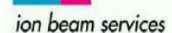
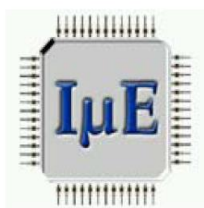
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ICT Project no. 318458
SUPERTHEME
 Circuit Stability Under Process Variability and
 Electro-Thermal-Mechanical Coupling

D1.1: Project Presentation

| | Name | Organisation | Date |
|-----------------------|-------------------|-----------------|-------------------|
| Edited | Juergen Lorenz | Fraunhofer IISB | October 23, 2012 |
| Reviewed | Jo Finders | ASML | November 8, 2012 |
| Final approval | Rainer Minixhofer | ams | November 15, 2012 |



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Contract number

318458

Project acronym

SUPERTHEME

Project name

Circuit Stability Under Process Variability and Electro-Thermal-Mechanical Coupling

Research area

ICT-2011-8-.3.1: Very advanced nanoelectronics components: design, engineering, technology and manufacturability

List of participants

Fraunhofer-Gesellschaft zur Förderung der
angewandten Forschung e.V.

AMS AG

Gold Standard Simulations Ltd

UNIVERSITY OF GLASGOW

TECHNISCHE UNIVERSITÄT WIEN

ASML NETHERLANDS B.V.

Excico France

HQ-Dielectrics GmbH

ION BEAM SERVICES

Germany

Austria

United Kingdom

United Kingdom

Austria

Netherlands

France

Germany

France

Project summary

Among the physical limitations which challenge progress in nanoelectronics for aggressively scaled More Moore, **Beyond CMOS** and **advanced More-than-Moore applications**, **process variability** and the interactions between and with **electrical, thermal and mechanical effects** are getting more and more critical. Effects from various sources of process variations, both systematic and stochastic, influence each other and lead to variations of the electrical, thermal and mechanical behavior of devices, interconnects and circuits. Correlations are of key importance because they drastically affect the percentage of products which meet the specifications. Whereas the comprehensive experimental investigation of these effects is largely impossible, **modelling and simulation** (TCAD) offers the unique possibility to predefine process variations and trace their effects on subsequent process steps and on devices and circuits fabricated, just by changing the corresponding input data. This important requirement for and capability of simulation is among others highlighted in the International Technology Roadmap for Semiconductors ITRS. A project partner has also demonstrated how correlations can be simulated.

Within SUPERTHEME, the most important weaknesses which limit the use of current TCAD software to study the influence of both systematic and stochastic process variability and its interaction with electro-thermal-mechanical effects will be removed, and the study of correlations will be enabled. The project will efficiently combine the use of commercially available software and leading-edge background results of the consortium with the implementation of the key missing elements and links. **It will bridge the current critical gap**

between variability simulation on process and device/interconnect level, and include the treatment of correlations. The capabilities of the software system will be demonstrated both on advanced analog circuits and on aggressively scaled transistors.

Total costs

€ 4,792,541.00

Commission funding

€ 3.300.000.--

Project start and duration

October 1, 2012 to September 30, 2015 — 36 months

Project web site

<http://www.supertheme.eu>

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