



SEMINAIRE EXCEPTIONNEL
(de 9 h à 10 h, salle Belledonne, IMEP, MINATEC,
ouvert aux chercheurs des autres laboratoires)

Vendredi 26 novembre 2010

“Numerical simulation of advanced Silicon-based
Photo-voltaic solar cells”

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Abstract: Numerical simulation is required for the optimization of conventional silicon-based photo-voltaic (PV) solar cells and for the development of more advanced technological options based on nano-structured materials such as silicon nano-wire and quantum dot/well solar cells.

Predictive TCAD numerical electro-optical simulation of solar cells involves several challenging issues among which the most relevant are:

- modeling material & interface properties such as dispersion relationships in nano-structured systems and generation-recombinations as a function of doping level & passivation options;
- optical analysis beyond geometrical optics for the simulation of nano-structured solar cells;
- large simulation domains (2D or 3D) necessary for the analysis of advanced cell architectures requires efficient parallelization strategies and numerical algorithms.

The main open issues will be discussed and specific examples will be provided with reference to advanced PV cell architectures such as those adopting selective emitter and rear point-contacts.

***Prof. Claudio Fiegna** received the Laurea and PhD Degrees in Electronics Engineering from the University of Bologna (UB), Italy. From July 1992 to July 1993 he worked at the "ULSI Research Labs.", Toshiba Corporation, Kawasaki, Japan in the frame of a cooperation between Toshiba and the UB. From 1994 to 1999 he was Research Associate and from 1999 to 2004 he was Associate Professor with the University of Ferrara, Italy. Since October 2005 he is professor of Electronics at the Second Faculty of Engineering of the UB. From November 2008 he is the coordinator of the PhD course "Information Technologies" hosted by the ARCES Research Center of the UB. Effective November 1st 2010, he serves as Director of the ARCES Res. Center-UB. His main scientific interests are about numerical simulation and its application to the analysis of advanced MOS device structures, nano-scale biological systems and silicon-based photo-voltaic cells. In 1997 and 1998 he was member of the "Modeling & Simulation" technical committee of IEDM. He is currently member of the program committee of the ULIS international conference. He serves in the committee for the Educational Award of the Electron Device Society of IEEE. C. Fiegna supervises research collaborations with companies in the field of integrated circuits and equipments for the semiconductor industry (Infineon Technologies, Munich, Germany, Applied Materials, Santa Clara Ca. USA).*

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