17:30 Etat de l'art et tendances des dispositifs semiconducteurs de puissance pour une gestion optimisée de l'énergie

State of the art trends in power semiconductor devices for optimized power management

Frédéric Morancho, LAAS-CNRS, Toulouse

This presentation reviews the current status of power semiconductor devices and technologies and discusses new trends in this field. It will first focus on novel concepts of silicon power devices such as MOSFETs and IGBTs which play an increasing role in the realisation of optimized power systems. Then, the recent progresses in the development of high-voltage wide band-gap (SiC, GaN and diamond) power devices will be reviewed. The talk will end with an overview of the performance of silicon and wide band-gap power devices with respect to the "specific on-resistance/breakdown voltage" trade-off.

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Frédéric Morancho was born in Toulouse, France, in 1969. He received his Master degree and his Ph.D. degree in Microelectronics Engineering from the University Paul Sabatier of Toulouse, France, in 1992 and 1996, respectively.

Since 1997, he is Assistant Professor with the "Université de Toulouse" (Université Paul Sabatier) and Research Scientist at LAAS-CNRS in the "Integration of Systems for Energy Management" group (ISGE). In this group, he has led the "New power devices" team since 2000. His research interests include modeling, design, realization and characterization of silicon unipolar power devices, topics on which he has published more than 50 papers (2 books, 4 patents, 17 papers in international scientific journals, 38 papers in international conferences). He has worked on the modeling of VDMOSFETs and vertical trench MOSFETs, and on the design and technological realization of novel concepts of devices such as lateral trench MOSFETs (LUDMOSFETs), floating islands MOSFETs (FLIMOSFETs) and Deep Trench SuperJunction MOSFETs (DT-SJMOSFETs). Recently, he has started in parallel a new research activity dedicated to gallium nitride (GaN) power devices.