SEMINAIRE EXCEPTIONNEL

(de 15h30 à 16h30, Amphi M001 Phelma, Bât. INP, Minatec,
ouvert à tous : enseignants, étudiants, chercheurs, administratifs, techniciens)

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"A Technological Perspective of the Microwave Internet of Things (IoT)"

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Abstract: A completely new approach to the development of wireless microwave systems is required by the advent of Internet of Things (IoT). The next generation of microwave systems demands a technology that guarantees easy integration of complex wireless nodes, combination of multiple functions in a single device, low development cost, compact size and low weight. Among the available technologies for the implementation and integration of microwave components and systems, the substrate integration waveguide (SIW) technology looks a very suitable approach, able to satisfy the requirements of the future IoT systems. In fact, SIW technology allows to implement a variety of passive components, active subsystems, and antennas in a simple and cost-effective way, and to integrate entire systems in a single dielectric substrate, thus avoiding complex transitions and undesired parasitic effects. Different solutions can be adopted to reduce the size and increase the bandwidth of SIW structures, ranging slab and ridge SIW interconnects to half-mode and quarter-mode configurations. These solutions provide a substantial reduction in the circuit size, while retaining the major advantages of SIW technology. Moreover, the choice of the substrate material represents another key point for IoT systems: in fact, depending on the specific application, different requirements are posed. The use of paper, for instance, guarantees the implementation of eco-friendly systems (required in specific fields, e.g., agriculture), a very low material cost, and structure conformability. The use of textile, on the other hand, appears very suitable for the implementation of wearable systems, which can be directly integrated into garments (important, e.g., in biomedical applications). Finally, additive manufacturing techniques like 3D printing represent a rapidly emerging area, which allows the low-cost and ease manufacturing of fully three-dimensional structures.

This presentation will cover the perspectives of microwave systems in the new scenario of the IoT, with particular emphasis on implementation of SIW components and antennas with different features and substrate materials.

Maurizio Bozzi *received the Ph.D. degree in electronics and computer science from the University of Pavia (Italy) in 2000. He held research positions with various universities worldwide, including the Technische Universität Darmstadt (Germany), the Universitat de Valencia (Spain), and the École Polytechnique de Montréal (Canada). Currently he is an Associate Professor at the University of Pavia and a Guest Professor at Tianjin University (China). His main research interests concern the computational electromagnetics, the substrate integrated waveguide technology, and the use of novel materials and fabrication technologies for microwave circuits. He authored or co-authored more than 90 journal papers, 240 conference papers, and the book Microstrip Lines and Slotlines (Artech House, 2013). Prof. Bozzi is the 2016 Secretary of the IEEE Microwave Theory and Techniques Society (MTT-S), an elected member of MTT-S Administrative Commmittee (AdCom) for the 2017-2019 term, and a member of the General Assembly (GA) of the European Microwave Association (EuMA) for the 2014–2016 term. He is an associate editor for the IEEE Microwave and Wireless Components Letters, the IET Electronics Letters, and the IET Microwaves, Antennas and Propagation. He was the General Conference Chair of the IEEE International Conference on Numerical Electromagnetic Modeling and Optimization, NEMO2014, Pavia, Italy, 2014, and the General Chair of the IEEE MTT-S International Microwave Workshop Series on Millimeter Wave Integration Technologies, Sitges, Spain, 2011. He received several awards, including the 2015 Premium Award for Best Paper in IET Microwaves, Antennas & Propagation and the 2014 Premium Award for the Best Paper in Electronics Letters.*

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