DISTINGUISHED LECTURE

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ADDITIVE MANUFACTURING: EMERGING OPPORTUNITIES FOR MICROWAVE COMPONENTS

Abstract: The Additive Manufacturing (AM) technology, also known as 3D-printing technology, offers several interesting and attractive features, including fast prototyping, geometry flexibility, easily customizable products, and low cost (in some cases). However, using such technologies for microwave devices is not straightforward as AM has not been specifically developed for microwave components, and in most cases, some adaptation and post-processing is necessary. Furthermore, there are many AM technologies available, and it is important to understand their characteristics before selecting one.

In the presentation, an overview of the different AM technologies available will be provided. Additionally, an analysis of some of the most common AM technologies used for the manufacturing of microwave components will be conducted in more detail, with the help of several examples. Several microwave components manufactured with some of the most popular AM technologies will be shown, along with a detailed description of the manufacturing process, post-processing, and all actions necessary to make the component perform well. Furthermore, it will be shown how the flexibility of this technology allows the development of new classes of components with non-conventional geometries that can be exploited to obtain high-performing components in terms of compactness, weight, losses, etc.

14 March 2025
11 AM CEST

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Biography: **Cristiano Tomassoni** received his Ph.D. in Electronics Engineering from the University of Perugia, Perugia, Italy, in 1999. In the same year, he joined the Lehrstuhl für Hochfrequenztechnik, Technical University of Munich, Munich, Germany as a Visiting Scientist, where he worked on the modeling of waveguide structures and devices using the generalized scattering matrix technique. In 2001, he was a Guest Professor at the Fakultät für Elektrotechnik und Informationstechnik, Otto-von-Guericke University, Magdeburg, Germany. In the early stages of his career, he contributed to the enhancement of several analytical and numerical methods for electromagnetic component simulation, including the finite-element method, mode-matching technique, generalized multipole technique, method of moments, transmission-line matrix, and mode matching applied to spherical waves. In 2001, he joined the University of Perugia, where he is currently an Associate Professor and teaches the 'Electromagnetic Fields' course and the 'Advanced Design of Microwave and RF Systems' course. His main research interests include modeling and designing of waveguide components and antennas, miniaturized filters, reconfigurable filters, dielectric filters, and substrate integrated waveguide filters. He is currently studying the use of Additive Manufacturing (AM) technology for the fabrication of microwave components, considering various technologies such as Stereolithography (SLA), Lithography-based Ceramic Manufacturing (LCM), Selective Laser Melting (SLM), Fused Deposition Modeling (FDM), and PolyJet technology.

Prof. Tomassoni has been elevated to the grade of **IEEE Fellow**, Class of 2025. He serves as the **Chair of the MTT-5** Filters Technical Committee of the IEEE MTT-S. Currently, he is a **Distinguished Lecturer** for the IEEE MTT-S. From 2018 to 2022, he served as an **Associate Editor for the *IEEE Transactions on Microwave Theory and Techniques***. Prof. Tomassoni is also the recipient of the **2012 Microwave Prize**, awarded by the IEEE Microwave Theory and Techniques Society.