ELEDIA Research Center
ELEDIA@UniTN - University of Trento
Via Sommarive 5, 38123 Trento, ITALY
E-mail: andrea.massa@eledia.org
Web: www.eledia.org/eledia-unitn

SEMINAR

Influence of Symmetry on Analysis and Metamaterials-by-Design

Speaker: **Dr. Michael J. HAVRILLA**
(Air Force Institute of Technology, OH, USA)

Date: 13 September 2017 @ 10:30 AM

Location: Room Garda – Polo Scientifico F. Ferrari – Povo

Note: The seminar will be held in English

Contact: Prof. Paolo Rocca (paolo.rocca@unitn.it)

Abstract

Recent advances in material fabrication capability (e.g., 3D printing) have made the rapid prototyping of engineered materials possible. In the field of electromagnetics, this capability has prompted substantial interest in evermore exotic media, such as hyperbolic and non-reciprocal metamaterials, due to the enhanced control one gains in manipulating the electromagnetic field for desired applications. The goal of this talk is to first provide a brief review of the fundamental aspects of symmetry. It will be explained how symmetry has a profound influence on material tensor properties and how symmetry can be exploited in designing metamaterials for various applications in electromagnetics and optics. A discussion of symmetry groups that may be utilized for non-reciprocal material design is also provided as an example due to the recent interest in this active research area. The next part of the talk discusses how the material tensor form influences the choice of analysis. The last part of the talk provides a simple example of a 3D printed reciprocal biaxial material which helps bring all the above concepts together.

About the Speaker

Michael J. Havrilla received B.S. degrees in Physics and Mathematics in 1987, the M.S.E.E degree in 1989 and the Ph.D. degree in electrical engineering in 2001 from Michigan State University, East Lansing, MI. From 1990-1995, he was with General Electric Aircraft Engines, Evendale, OH and Lockheed Skunk Works, Palmdale, CA, where he worked as an electrical engineer. He is currently a Professor in the Department of Electrical and Computer Engineering at the Air Force Institute of Technology, Wright-Patterson AFB, OH. He is a member of URSI Commission B, a senior member of the IEEE and AMTA, and a member of the Eta Kappa Nu and Sigma Xi honor societies. His current research interests include electromagnetic and guided-wave theory, electromagnetic propagation and radiation in complex media and structures, electromagnetic characterization of complex media and quantum field theory.

Additional Notes:

Additional information can be found at www.eledia.org