

Distinguished Lecture on

Metamaterials and Composites: Electromagnetic Description and Unexpected Effects

by

Prof. Ari Sihvola

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Abstract

In the analysis of electromagnetic fields interacting with material structures, the response of medium is condensed in dielectric and magnetic material parameters, like permittivity, conductivity, and permeability. In complicated and anisotropic media, these material parameters may need to be generalized from scalar quantities into matrices, or equivalently dyadics. The complicated response of materials is very often of structural origin, in other words the manner in which a heterogeneous mixture is formed determines its macroscopic electromagnetic material parameters. This lecture deals with the variety of ways how one is able to characterize and effectively describe the macroscopic dielectric and magnetic behavior of composite materials with given properties of the constituents and the geometrical microstructure. Homogenization principles will be applied to analyze and understand mixtures that display very interesting properties that differ strongly from these of the constituent materials. This is the domain of metamaterials, and the talk will shed light into this new paradigm in electromagnetics.

Biography

Ari Sihvola was born in 1957, in Valkeala (Finland). He received the degrees of Diploma Engineer in 1981, Licentiate of Technology in 1984, and Doctor of Technology in 1987, all in Electrical Engineering, from the Helsinki University of Technology (TKK), Finland. Besides working for TKK and the Academy of Finland, he was visiting engineer in the Research Laboratory of Electronics of the Massachusetts Institute of Technology, Cambridge, in 1985–1986, and in 1990–1991, he worked as a visiting scientist at the Pennsylvania State University, State College. In 1996, he was visiting scientist at the Lund University, Sweden, and for the academic year 2000–2001 he was visiting professor at the Electromagnetics and Acoustics Laboratory of the Swiss Federal Institute of Technology, Lausanne. In the Summer of 2008, he was visiting professor at the University of Paris XI, France. Ari Sihvola is professor of electromagnetics in Aalto University School of Electrical Engineering (Aalto University was created in 2010 as a merger of three universities: Helsinki University of Technology, Helsinki School of Economics, and the University of Art and Design). His scientific interests range from electromagnetic theory, complex media, materials modeling, remote sensing, and radar applications, into engineering education research and history engineering and technology. Ari Sihvola is Chairman of the Finnish National Committee of URSI (International Union of Radio Science), Vice Chairman of the Commission B (Fields and Waves) of the international URSI, and Fellow of IEEE. In 1990's, he has served as Chairman of the IEEE AP–MTT Chapter for several years. He was awarded the five-year Finnish Academy Professor position in 2005–2010. He is also director of the Finnish Graduate School of Electronics, Telecommunications, and Automation (GETA). Author of several books and hundreds of publications, Ari has been active in organizing conferences and workshops, convening and chairing sessions, and serving in advisory, technical, and organizing committees for numerous national and international scientific symposia as member, secretary, or chairman. In TKK and Aalto University, Ari Sihvola has received several teaching awards, like the “Teacher of the Year” Prize in 1995 from the Student Union of TKK.

Date : 02 March, 2015 (Monday)
Time : 04:00 pm – 05:00 pm
Venue : Room 15-202, meeting room of State Key Laboratory of Millimeter Waves, 15/F, Academic 3, City University of Hong Kong

*** ALL ARE WELCOME ***

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