



Electrical & Computer Engineering

FLORIDA INTERNATIONAL UNIVERSITY

Invited Speaker Series



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Ferrites for RF Passive Devices

Friday, October 20 | 10 am - 12 pm

Florida International University | Engineering Center 3930

Abstract

Recent advances in mobile devices and telecommunications demand compact and high-performance radio frequency (RF) devices such as antennas, isolators, circulators and inductors. These devices offer functions such as electromagnetic radiation, directional wave propagation and RF signal processing. The fundamental functions of RF devices arise from strong coupling of magnetization dynamics to an electromagnetic field. High frequency ferrites have been widely studied and applied in antennas, circulators, isolators, inductors and transformers. This is because the ferrite is electrically insulating material and possesses unique features, such as high magnetic permeability and electrical resistivity, and moderate permittivity. Ferrite is classified into two types: cubic and hexagonal, according to the crystalline structure. Cubic ferrite includes garnets and spinels, which have highly symmetric structures, resulting in a low magnetic anisotropy field. In contrast, hexagonal ferrite has a magnetoplumbite structure with various metal and oxygen stoichiometries, and possesses a large magnetic anisotropy field, which leads to a high ferromagnetic resonance frequency. This talk will provide an introduction to the theoretical basis of ferrite properties, the operation of RF ferrite devices and fundamental equations of RF devices.

Bio

Dr. Yang-Ki Hong is the E. A. "Larry" Drummond Endowed Chair Professor of the Department of Electrical and Computer Engineering, a Professor of Materials Science Ph.D. Program, and the Graduate Program Director of the Department. He is currently serving as the Director of the NSF IUCRC-UA: Center for EV-STS. Dr. Hong received his Ph.D. in Metallurgy at University of Utah in 1981 and received BS and MS (Magnetism and Mossbauer spectroscopy) in Physics from Yonsei University, Seoul, South Korea. He completed the Program for Management Development of Graduate School of Business Administration, Harvard University in 1992. He has published more than 150 peer-reviewed journal papers and presented more than 200 papers at conferences and symposia. His primary research interests include nano- and submicron scale magnetism, magnetic materials and magnetic devices. Dr. Hong serves on the program committee of 2017 Magnetism and Magnetic Materials Conference, Nov. 6-10, Pittsburgh, PA and is a Sr. Member of the IEEE Magnetics Letters Editorial Review Board.