IEEE Magnetics Society
Distinguished Lecturer for 2007

Frontiers of Ferrite Materials Research

Vincent G. Harris
William Lincoln Smith Chair Professor
Northeastern University

Ferrite materials have long played an important role in power conditioning, conversion, and generation across a wide spectrum of frequencies (up to 10 decades). They remain the preferred magnetic materials, having suitably low losses for most applications above 1 MHz, and are the only viable materials for nonreciprocal magnetic microwave and millimeter wave devices that include tunable filters, isolators, phase shifters, and circulators. Recently, novel processing techniques have lead to a resurgence of interest in the design and processing of ferrite materials as nanoparticles, films, single crystals, and metamaterials. These latest developments have set the stage for their use in emerging technologies that include cancer remediation therapies such as magnetohyperthermia, magnetic targeted drug delivery, and magnetorheological fluids, as well as enhanced magnetic resonance imaging. In this lecture, we will explore the design and processing of ferrites for high frequency applications and their integration with CMOS devices.

Vincent G. Harris received the B.Sc., M.Sc., and Ph.D. (1990) degrees in engineering from Northeastern University. He has also received the M.Sc. degree in Engineering Management from the University of Maryland (1995), and the M.Sc. degree in Executive Technology Management from the University of Pennsylvania (Wharton) (2003). He presently holds the William Lincoln Smith Chair Professor in the Electrical and Computer Engineering Department at Northeastern University. In 2004, he established and assumed the position of Director of the Center for Microwave and Magnetic Materials and Integrated Circuits, a position he holds today. The mission of this Center is to develop high frequency materials and device solutions for next generation radar and wireless communication electronics. Prior to holding this position, he was a member of the technical staff at the Naval Research Laboratory (1990-2003). During his time at NRL, he served as a materials scientist, the Head of the Complex Materials Section, and the Head of the Materials Physics Branch. In 2001, he established and assumed the position of Director of the NRL Synchrotron Radiation Consortium (2001-2003). His research interests include materials design and the study of processing, structure, and magnetism in a wide range of materials. He has pioneered the use of synchrotron radiation techniques to relate the short range chemical and structural properties of materials to magnetism. He has published more than 170 technical articles, including book chapters and review articles on the topical areas of nanotechnology, magnetism, and magnetic materials. In addition, he holds 9 patents and patent applications, and has presented more than 150 papers at national and international meetings. Vincent Harris is a Fellow of the American Physical Society.

Contact: Prof. Vincent G. Harris, Department of Electrical and Computer Engineering, 440 Dana Research Center, Northeastern University, 360 Huntington Ave., Boston, MA 02115 USA, Phone: 617 373 7603, FAX: 617 373 8146, E-mail: harris@ece.neu.edu