

“EMBEDDED MICROWAVE FERRITE COMPONENT INTEGRATION”



Speaker: Dr. Joey Bray

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Day/Time: Thursday, Nov. 5, 2009 10:30-11:30am

Location: RMC, s4200

Abstract:

Ferrite is a highly magnetizable non-conductive ceramic that is used in a multitude of applications. Although not widely known, ferrite is found in many common household items, including: fridge magnets, microwave ovens, loudspeakers, fluorescent lights, and computer cables, to name but a few. At microwave frequencies, ferrite is anisotropic, meaning that its properties depend on which way a signal travels through it. This property has been used for decades to build many useful non-reciprocal microwave circuit components such as phase shifters, isolators, and circulators. Despite its many uses at microwave frequencies, ferrite has a serious flaw: its fabrication is largely incompatible with standard semiconductor processing. As a result, ferrite has not benefited equally from the advances made in circuit integration and miniaturization. Interest in ferrite circuit design has therefore waned, although the market demand for microwave ferrite components has remained strong. As a result, ferrite components are commonly purchased off-the-shelf and "dropped-in" to a circuit instead of being truly integrated with the rest of the circuitry. In this presentation, it will be argued that the correct location for microwave ferrite integration is at the packaging level and not at the semiconductor level. Recent advances in ferrite integration using low-temperature cofired ceramic (LTCC) packaging will be discussed, and new implementations of ferrite non-reciprocal components will be presented.

Biography:

Joey R. Bray received the B.A.Sc. and M.A.Sc. degrees in electrical engineering from the University of Ottawa, Ottawa, ON, Canada, in 1995 and 1998, respectively, and the Ph.D. degree in electrical engineering from Carleton University, Ottawa, ON, Canada in 2003. In 2003 he joined the Department of Electrical and Computer Engineering at the Royal Military College of Canada, Kingston, ON, Canada, where he is currently an Associate Professor. From 2001 to 2002 he was a Visiting Researcher at Valtion Teknillinen Tutkimuskeskus (VTT) Electronics, Oulu, Finland where he worked on the integration of microwave circuitry in low-temperature cofired ceramic modules. His research interests include ferrite microwave devices and microwave passive devices. Dr. Bray received the Young Scientist Award in 2005 from the International Union of Radio Science (URSI).

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Seminar is open to the public. Free admission. Refreshments will be served.