



EPE'22 ECCE Europe – Tutorial Announcement

## **Passives in Power Electronics: Magnetic Components**

### **Name(s) and Affiliation(s) of the Lecturer(s):**

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### **Scope and Benefits:**

This tutorial aims to provide a clear and concise approach to magnetic circuit design for power electronics with emphasis on planar magnetics, based on the fundamentals of electromagnetics. It is a strong resource of reference material for researchers. The overall approach is underpinned by a rigorous methodology with emphasis on the fundamentals and incorporating both depth and breadth in the examples and setting out up to date design techniques.

### **Contents:**

Today, high efficiency and high power density converters are fundamental to the continued profitable growth of the telecommunications, automotive, aerospace and data processing industries. High-frequency operation can lead to a reduction in magnetics size and an increase in power density.

Planar magnetics fabrication and assembly processes have several advantages over conventional magnetics: low profile, automated assembly, high power density and predictable parasitics.

Planar magnetic components are particularly suited to wireless power transfer because of their low profile. In multilayer devices the interlayer capacitance introduces resonance at high frequencies. This seminar covers the basic analytical model of planar structures based on impedance method, and also includes several design considerations such as high frequency winding resistance, high frequency leakage inductance, winding capacitance and magnetic core loss etc.



### **Schedule:**

The schedule is as follows:

#### **Monday, 5 September 2022 - 1<sup>st</sup> Tutorial Day - Morning**

09:30 - 11:00	Tutorials Morning - Part 1
11:00 - 11:30	Coffee break
11.30 - 13:00	Tutorials Morning - Part 2
13:00 - 14:00	Lunch break (Optional – if ordered)

### **Who should attend:**

This tutorial is of interest to students and graduate students dealing with specialised inductor and transformer design and practising engineers working with power supplies and energy conversion systems.

### **Technical Level:**

Technical Level: participants should be familiar with the basics of magnetic circuits and power supplies.

### **About the Lecturers:**



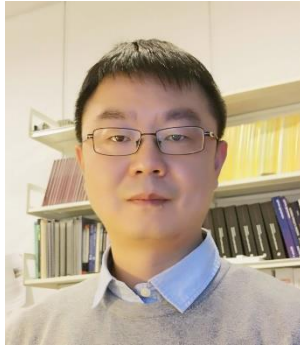
**William Gerard Hurley** received the B.E. degree in Electrical Engineering from the National University of Ireland, Cork in 1974, the M.S. degree in Electrical Engineering from the Massachusetts Institute of Technology, Cambridge MA, in 1976, the PhD degree from the National University of Ireland, Galway in 1988 and the higher doctorate D.Eng. degree based on his publications in 2010.

He worked for Honeywell Controls in Canada from 1977 to 1979. He worked for Ontario Hydro from 1979 to 1983. He lectured at the University of Limerick, Ireland from 1983 to 1991 and was professor of Electrical Engineering at the National university of Ireland, Galway until 2017. He is professor emeritus of Electrical Engineering at the National University of Ireland, Galway. He served on the faculty at the Massachusetts Institute of Technology as a Visiting Professor of Electrical Engineering in 1997/1998.

Research interests include high frequency magnetics, power quality, and renewable energy systems. Prof. Hurley is a Fellow of the IEEE. He was General Chair of the Power Electronics Specialists Conference in 2000. He is the 2013 recipient of the IEEE PELS Middlebrook Award for Technical Achievement. He was appointed Distinguished Lecturer of the IEEE for 2014/17. He received the Harry



Owen Award for Distinguished Service to the IEEE Power Electronics Society in 2018. He has co-authored a textbook on transformers and inductors that has been translated into Chinese. He is a member of the Irish Academy of Engineering.



**Ziwei Ouyang** received his PhD degree from Technical University of Denmark (DTU) in 2011. From 2016, he was appointed as an associate professor at DTU. From Nov. 2021, he has been appointed as head of study in MSc program in Electrical Engineering. His research areas focus on switch mode power supply, high-frequency magnetics modeling and integration, high-density high-efficiency power converters, energy storage system, and wireless charging etc.

He is IEEE senior member. He has over 100 high impact IEEE journal and conference publications, and currently he is the holder of 9 international patents. He was a recipient of Young Engineer Award at PCIM-Asia 2014, and received Best Ph.D. Dissertation of the Year Award 2012 in Technical University of Denmark. He received several Best Paper Awards in IEEE sponsored international conferences. He has been invited to give lectures in many universities, enterprises and educational seminars and workshops around the world. He has served as session chair in some IEEE sponsored conferences and associated editor for IEEE Journal of Emerging and Selected Topics in Power Electronics.