具化合物半導體之先進電源設計研討會

Workshop on Advanced Power Supply Design with Wide Bandgap Semiconductor Devices

報到 13:00~13:20

開幕 13:20~13:30

13:30~14:20
Recent Work on Advanced Power Supply and Exploration into the Future
臺科大電子系
龐敏熙 教授

14:20~15:10
SiC MOSFET與高功率模組的技術發展
尼克森微電子
謝智正 處長

中場休息 15:10~15:20

15:20~16:10
Silicon Carbide MOSFET Application Tips
意法半導體
王超駿 資深經理

16:10~17:00
EV Market - SiC Solutions
Wolfspeed (Cree)
林哲宇 經理

賦歸 17:00

立即報名

2021.12.20(一)

13:20~17:00

國立臺灣科技大學
國際大樓 IB-202會議室

報名期限
即日起至12月17日中午12:00止

聯絡窗口
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主辦單位 電力與能源技術研發中心 Center for Power and Energy Technologies 先進電源產學技術聯盟 Advanced Power Technology Industry-Academia Alliance

Topic 1

Recent Work on Advanced Power Supply and Exploration into the Future

Prof. Bryan Man-Hay Pong, *BSc(Birm), PhD(Cantab), SM-IEEE, MIET, CEng, MHKIE*

Abstract: In this presentation several projects of recent research work are explained. The first project works on the popular LLC converter which is known for its good efficiency versus other switching converters. The converter needs a resonant circuit with a capacitor and inductor to produce a resonant waveform for soft switching. In this project the resonant capacitor is integrated into the transformer by making use of interwinding capacitance in planar windings. This reduces component count and greatly improves manufacturability of the popular LLC converter. A second project works on wireless power transfer through insulation disc in high voltage power transmission circuit for low power monitoring equipment in the field. An advanced optimizer process improves the efficiency dramatically. A third project works on the Improvement of the First Hammonic Analysis (FHA) method popular in all resonant power transfer converters. This new multiple harmonic analysis method extends the analysis of symmetrical 50/50 pulse drive to variable duty cycle control in addition to the popular frequency control. This presentation also probes into the future needs of Advanced Power Supply by looking into the upcoming silicon carbide SiC power devices. This type of power device is becoming popular and opens up applications to high power high voltage applications such as electric vehicle and medium voltage distribution grids. In order to extend the capabilities of discrete devices, upfront issues are discussed. Furthermore, with these devices on hand, design optimization becomes necessary in order to fully exploit the capabilities. Bayesian optimization is proposed for power converter design. This design concept brings CAD to a new multi-platform and multi-physics stage which attempts to make most of powerful computing power and AI technology which are becoming widely available.

Brief Bio of Prof. Man-Hay Pong

Prof. Bryan M.H. Pong received his BSc degree in Electronic and Electrical Engineering from Birmingham University and his PhD degree in Power Electronics from Cambridge University in England. In his early career he was a senior engineer then a chief design engineer at National Semiconductor Hong Kong. Later he joined ASTEC International where he was a principal engineer and then a division engineering manager making switching power supplies. He joined Hong Kong University and worked with the Electrical and Electronic Engineering Department for 30 years. Now he is a Professor at the Electronic Engineering at the National Taiwan University of Science and Technology. Prof. Pong specializes in Power Electronics. In particular, he works on

high frequency switching power supply, bendable power converter, electromagnetic interference (EMI) suppression and lighting equipment. Dr. Pong has extensive research and development experience in Power Electronics. He has published many technical papers and more than 40 patents on the technology.

Prof. Pong is a senior member of the IEEE, member of the IET, chartered engineer and a member of the HKIE.

Topic 2

SiC MOSFET與高功率模組的技術發展

尼克森微電子 謝智正/處長

Abstract:

- Introduction
- The Future of Power Devices for eMobility
- Inverter Modules for EV
- Reliability Test
- Summary

謝智正/處長

- 台科大 78 級電子系
- 清華大學核子工程研究所碩士
- 中科院及核能研究所
- 尼克森微電子 2000 年迄今(現職功率模組事業處處長)

Topic 3

Silicon Carbide MOSFET Application Tips

意法半導體 王超駿/資深經理

Abstract:

- Silicon Carbide MOSFET Technology Introduction
- Miller Turn-on Phenomenon Mitigation
- Application tips

王超駿/資深經理

- 學歷：國立台灣科技大學 電子工程所博士
- 現職：意法半導體電源管理應用部門資深經理

- 專長領域：功率半導體元件相關應用、交換式電源供應器設計、電力電子分析
- 主要經歷：萬加電子研發部副理、台灣戴爾電腦伺服器電源部經理

Topic 4

EV Market - SiC Solutions

Wolfspeed (Cree) 林哲宇/經理

Abstract:
- Introduction to Wolfspeed wafer fabs
- Roadmap and portfolio of Power Die Products
- Power Die Business Model (with major module vendors)
- Gen3 and Gen3+ technology

林哲宇/經理

- Job Title：Technical sales manager (Global account)
- Job Description：
  - Promote SiC solutions to high-end industrial application like Charging infrastructure, PV, ESS, UPS …
  - Major taskforce focuses in EV market – collaboration with tier 1 on different solutions and direct discussion with OEM for future plan.

公館校區校址：臺北市基隆路四段 43 號

開車

- 由中山高速公路下圓山交流道，接台北市建國南北高架道路，下辛亥路往木柵方向行駛，於辛亥路二段與基隆路交叉口（台大校園旁）右轉，過長興街後即可到達台灣科大。
- 由北二高接台北聯絡道，於辛亥路三段與基隆路交叉口左轉，過長興街後即可到達台灣科大。

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- 基隆客運（板橋 - 基隆）。
- 指南客運、中壢客運（桃園 - 台北市政府），經新店、公館、六張犁 。
- 台中客運、大有巴士（台中 - 台北），經龍潭、新店、六張犁、捷運市府站、松山車站 。
- 國光客運、台聯客運、中壢客運（中壢 - 台北）經中永和、公館、六張犁、捷運市府站 。
- 亞聯客運（新竹 - 台北），經工研院、清大、交大、竹科、龍潭、新店、捷運景美、捷運萬隆、捷運公館、新生南路、仁愛路、臺北市政府。（停靠捷運公館站，不停靠台灣科大）。
- 豪泰客運（竹北 - 台北），經新竹縣政府、新竹稅捐處、一高竹北交流道站、二高竹林交流道站、新店、捷運景美、捷運萬隆、捷運公館、新生南路、捷運科技大樓、捷運大安、捷運忠孝復興、捷運忠孝敦化、捷運國父紀念館、捷運市府站。(停靠捷運公館站，不停靠台灣科大)。

搭乘捷運

- 搭乘捷運新店線：由公館站 2 號「銘傳國小」出口左轉，沿台大舟山路步行，於鹿鳴堂右轉，過基隆路後左行即可到達本校。或於公館站 1 號「水源市場」出口轉乘 1、673、907、綠 11、棕 12 直達本校。
- 搭乘捷運文湖線：於捷運六張犁站（往公館、永和方向）轉乘 1、207、672、650、基隆客運板基線直達本校。