

Organisational Information

Sign up at: www.ecpe.org/events

Registration Deadline:

14 November 2023

Participation Fee:

- € 720,- * for industry
- € 525,- * for universities/institutes
- € 180,- * for students/PhD student (limited spaces; copy of students ID required)
- * plus VAT

- The on-site participation fee includes dinner, lunches, coffee/soft drinks and digital proceedings. The reduced (PhD) students fee includes all except for dinner (can be booked for an extra fee of € 50,-*)
- The online participation includes remote access via the meeting software Webex and digital proceedings.
- Digital proceedings will be provided by download link latest one day before start of the event. A printed handout is available on request.
- Upon receipt of registration confirmation via email you are signed-up for the event. The invoice will be sent via email.
- Three participants from each ECPE member company free of charge. Allocation in sequence of registration.
- 10% discount on university/institute fee for participants from ECPE competence centres.
- Further information (hotel list and maps) will be provided after registration and can be found on the ECPE web page.
- Cancellation policy: Full amount will be refunded in case of cancellation upon to 2 weeks prior to the event. After this date 50 % of the fee is non-refundable (replacement is possible).

16/11/23

Organisational Information

Organiser	ECPE e.V. 90443 Nuremberg, Germany www.ecpe.org
Technical Chair	Prof. Thomas Ebel, University of Southern Denmark (DK) Prof. Huai Wang, Aalborg University (DK)
Technical Contact	Dr. Chris Gould, ECPE e.V. chris.gould@ecpe.org
Organisation	Ingrid Bollens, ECPE e.V. +49 911 81 02 88 – 10 ingrid.bollens@ecpe.org Katarzyna Janus-Fiutowska, SDU +45 65 50 16 24 katarzyna@sdu.dk
Venue	SDU University of Southern Denmark Alsion 2 6400 Sønderborg Denmark



Source: Sønderborg Kommune
Source graph: Thomas Ebel, SDU:

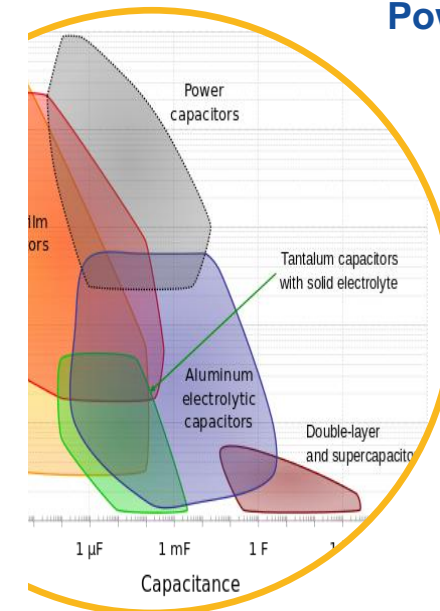


Hybrid Event

ECPE Workshop

Capacitors in Power Electronics

22 - 23 November 2023
Sønderborg, Denmark / hybrid



in cooperation with

SDU

AALBORG UNIVERSITY
DENMARK

Capacitors in Power Electronics

22 - 23 November 2023
Sønderborg, Denmark / hybrid

The main focus in the research areas in power electronics has been on active devices, both on power semiconductors and on the integration of control, protection and driving circuits with the main switches. Due to the already achieved progress in this field a further miniaturisation and increase in power conversion efficiency is more and more expected from the passive components. Furthermore, new demands and challenges related to higher switching frequencies and higher power densities and temperatures arise from the use of the wide bandgap semiconductors SiC and GaN.

The available capacitor technologies cover several orders of magnitude in the C-V space. In power electronics involving high voltages and high energy, Al-electrolytic and film capacitors are mainly used, and ceramic capacitors for the lower power range only.

The main goal of this workshop is to bring together experts from industry and university to present and discuss the current trends and the new developments related to the field of capacitor device technology. Improvements in the design of capacitive components can be expected from new materials and technologies, from innovative cooling concepts, but also from better understanding and improved analysis of the underlying loss mechanisms.

The workshop is chaired by:

Prof. Thomas Ebel,
University of Southern Denmark (DK)

Prof. Huai Wang,
Aalborg University (DK)

All presentations and discussions will be in English.

Draft Programme

Wednesday, 22 November 2023

08:30 Registration / Webex started

Session 1: Introduction

09:00 Welcome, Opening and Introduction to the Workshop
Thomas Ebel, Huai Wang, Chris Gould

09:15 Keynote: Capacitors in Future Power Electronic Applications - an Introduction from the Material and the System View
Thomas Ebel, SDU, Huai Wang, Aalborg University (DK)

10:00 Break

Session 2: Capacitor Materials and Technologies - Part 1

10:30 Recent Developments in Metallized-film Capacitor Technologies
Jan Knoch, Electronicon Kondensatoren (DE)

11:00 Characteristics of Class 2 MLCC and how they Change and Influence the Application
Frank Puhane, Würth Elektronik (DE)

Session 3: Applications / Reliability – Part 1

11:30 High Temperature and Long Lifetime Power Can Capacitor for DC-Link application
Lachezar Zhivkov, KEMET Electronics (BG)

12:00 Powercycling for DC-Link Capacitors
Juergen Leib, Fraunhofer IISB (DE)

12:30 Lunch break

Session 4: Applications / Reliability – Part 2

13:30 Understanding the Influence of ESR and Ripple Current for the Capacitor Selection
Alexander Nebel, KEMET – YAGEO Group (DE)

14:00 Self-Healing in Metallized Film Capacitors: Theory of Breakdown Interruption
Thomas Christen, Hitachi Energy (CH)

14:30 Interaction of Multiple Drives and Their Effects on DC-link Capacitor Lifetime
Dinesh Kumar, Danfoss Drives (DK)

15:00 Break

Session 5: Applications / Reliability – Part 3

15:30 Life Cycle Assessment of Aluminium Electrolytic Capacitors (Online)
Luca Primavesi, Intelcond (IT)

16:00 Life Cycle Assessment of Ceramic Capacitors for Power Electronics
Juergen Leib, Fraunhofer IISB (DE)

16:30 Lab Tour 1.5 Hours

19:30 Dinner : Restaurant „Torve-Hallen“,
Nørre Havnegade 28, 6400 Sønderborg, Denmark

Draft Programme

Thursday, 23 November 2023

08:30 Webex started

Session 6: Modelling and Condition Monitoring

09:00 Condition and Health Monitoring of Capacitors in Inverter Applications
Huai Wang, Aalborg University (DK)

09:30 FEA based Electromagnetic Simulation and Modelling: Virtual Characterization of Power Electronic Capacitors
Fernando Rodriguez, TDK Electronics (DE)

10:00 Lifetime modelling of Hybrid Polymer Aluminium Electrolytic Capacitors for automotive use
Daniel Klingshirn, Vitesco Technologies (DE)

10:30 Break

Session 7: Capacitor Materials and Technologies – Part 2

11:00 Latest generation of EMI suppression (film) Capacitors for xEV Systems. New Simulation Module in C.L.A.R.A.: Capacitor Banks (Online)
David Olalla, TDK Electronics (ES)

11:30 Nanocomposite Dielectric Materials
William Greenbank, Southern University of Denmark (DK)

12:00 New Strategies for Improving Dielectric Materials of Metallized Film Capacitors
Luciana Tavares, Southern University of Denmark (DK)

12:30 Lunch Break

Session 8: High Voltage Capacitor Solutions

13:30 High Voltage Capacitor Solutions: Ceramic, Film and Silicon
Satoshi Yoshida, Murata Electronics (DE)

14:00 High Voltage Polymer Electrolytes for Polymer Aluminium Electrolytic Capacitors
Udo Merker, Heraeus Epurio (DE)

14:30 Testing of Film Capacitors for High Power Converter Applications
Bo Yao, Aalborg University (DK)

15:00 Discussion and Conclusions

15:30 End of Workshop