

## Organisational Information

Sign up at: [www.ecpe.org/events](http://www.ecpe.org/events)

### Registration Deadline:

26 November 2019

### Participation Fee:

- € 660,- \* for industry
- € 490,- \* for universities/institutes
- € 165,- \* for students/PhD students\*\*

\* plus VAT; \*\*students seats are limited

- The regular participation fee includes dinner, lunches, coffee/soft drinks and handouts. The reduced (PhD) students fee includes all the above except for dinner (can be booked for an extra fee of € 50,-\*).
- A printed version of the workshop handout is available on request (€ 50,-\*).
- Upon receipt of registration confirmation via email you are signed-up for the event. The invoice will be sent via letter post.
- Three participants from each ECPE member company free of charge. Allocation in sequence of registration.
- 10% discount 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 up to 2 weeks prior to the event. After this date and in case of no-show 50 % of the fee is non-refundable (substitutes are accepted anytime).

## Organisational Information

<b>Organiser</b>	ECPE e.V. 90443 Nuremberg, Germany <a href="http://www.ecpe.org">www.ecpe.org</a>
<b>Chairmen</b>	Prof. Bruno Burger, Fraunhofer ISE (DE)  Dr. Peter Steimer ABB Switzerland Ltd. (CH)  Prof. Leo Lorenz ECPE e.V. (DE)
<b>Organisation</b>	Ingrid Bollens, ECPE e.V. +49 911 81 02 88 – 10 <a href="mailto:ingrid.bollens@ecpe.org">ingrid.bollens@ecpe.org</a>
<b>Venue</b>	Messe Freiburg Neuer Messeplatz 1 79108 Freiburg i. Br.   Germany

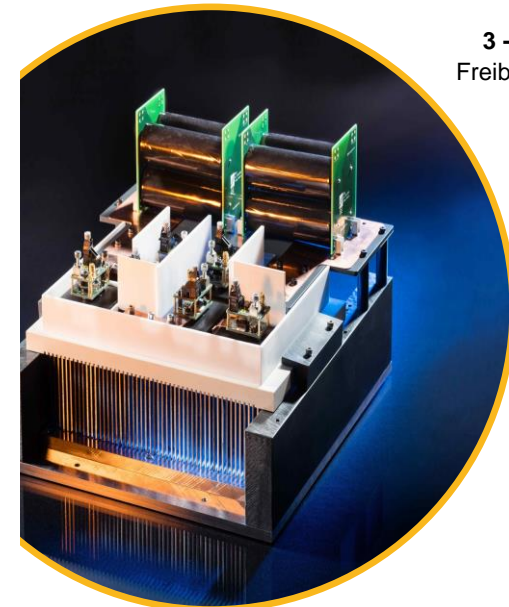


European Center for  
Power Electronics e.V.

## ECPE Workshop

### Power Semiconductors in Medium Voltage Applications - SiC vs. Silicon

3 - 4 December 2019  
Freiburg i. Br., Germany



## ECPE Workshop

### Power Semiconductors in Medium Voltage Applications – SiC vs. Silicon

3 – 4 December 2019  
Freiburg i. Br., Germany

The energy transition with a distributed generation of renewable energies as well as e-mobility lead to new challenges for power generation, transmission and distribution. Hence, the medium-voltage grid and direct medium-voltage applications are becoming increasingly important. Requirements for higher energy efficiency and significant emission reduction offer new development opportunities for power electronics in the medium voltage range in many applications including high-power loads in the railway and industrial sectors.

Power semiconductors have always been a nucleus for innovations in power electronics. Beside the Si power semiconductors, the main focus of the Workshop will be on SiC devices with reverse voltages blocking voltages of 3.3 kV up to the range of > 10 kV and their future applications.

In addition to power semiconductors and the inductive components, the workshop also deals with questions of assembly and interconnection technology for HV components and power modules, with medium voltage converters as well as power electronic applications in power generation and distribution, in traction and industry, in e-mobility and data centres, with a special focus on DC grids. Interesting topics are related to isolation technologies for high dv/dt, measurement and testing, modeling and simulation.

#### The workshop is chaired by:

Prof. Bruno Burger, Fraunhofer ISE (DE)  
Dr. Peter Steimer, ABB Switzerland Ltd. (CH)  
Prof. Leo Lorenz, ECPE e.V. (DE)

All presentations and discussions will be in English.

## Programme

### Tuesday, 3 December 2019

- 09:30 Start of Registration  
09:45 Welcome and Opening  
Leo Lorenz, ECPE, Bruno Burger, Fraunhofer ISE

#### Introduction and Overview

- 10:00 SiC-based Medium Voltage Power Electronics  
Rolando Burgos, Virginia Tech/CPES (US)

#### High Voltage Power Devices

- 10:45 HV Devices (Si and SiC)  
Lars Knoll, ABB Switzerland (CH)  
11:15 Medium Voltage Module Performance and System Analysis  
Ty McNutt, Wolfspeed – a Cree Company (US)  
11:45 Measurement Results and Comparison of HV-Devices (3.3 – 15 kV)  
Juergen Thoma, Fraunhofer ISE (DE)

#### 12:15 Lunch

#### High Voltage Packaging and Isolation

- 13:15 Overview of the Ceramic Substrate Technologies, their Limits and Ongoing Research  
Zarel Valdez Nava, Univ. Paul Sabatier - LAPLACE (FR)  
13:45 HV Si and SiC Power Module Packaging for Traction and Power Grid Applications  
Chunlei Liu, ABB Corporate Research (CH)  
14:15 HV Power Module Packaging (10kV SiC Module)  
Christina Di Marino, Virginia Tech/CPES (US)

#### 14:45 Coffee Break

#### Passive Components for Medium Voltage Applications

- 15:15 SiC-ready Inductive Components for Future Medium Voltage Applications  
Daniel Benner, STS Spezial-Transformatoren (DE)  
15:45 Capacitors for Higher Voltages  
Thomas Ebel, University of Southern Denmark (DK)

#### Medium Voltage Power Electronics Applications – Part 1

- 16:15 Viability of Alternatives to LV Si Technology in Wind Turbine Converters  
Philip Kjaer, Vestas (DK)

#### Medium Voltage Converters and Topologies – Part 1

- 16:45 Low-Voltage SiC-MOSFET based Medium Voltage Converter  
Drazen Dujic, EPFL (CH)  
17:15 End of 1<sup>st</sup> Workshop Day  
17:30 Optional Programme: Lab tour at Fraunhofer ISE (approx. 1 hour)  
19:30 Dinner at Schlossbergrestaurant Dattler

## Programme

### Wednesday, 4 December 2019

#### Medium Voltage Converters and Topologies - continued

- 09:00 Application of SiC Devices for MV Solid-State Transformers and High Speed Drives  
Subhashish Bhattacharya, NC State University (US)  
09:30 Challenges of Medium Voltage Converters with SiC-MOSFETs  
Michael Geiss, Fraunhofer ISE (DE)  
10:00 Multi-Winding dc-dc Converters as Basic Cell of Modular dc-dc Conversion  
Markus Andresen, Christian-Albrechts-Universität zu Kiel (DE)

#### 10:30 Coffee Break

#### Gate Driver for Medium Voltage Applications

- 11:00 Gate Drivers and Power Supply for HV SiC Devices  
Subhashish Bhattacharya, NC State University (US)  
11:30 SCALE-iFlex: Parallel Operation of SiC MOSFETs and IGBTs in New High Power Dual Package  
Olivier Garcia, Power Integrations (CH)

#### 12:00 Discussion

#### 12:15 Lunch

#### Medium Voltage Power Electronics Applications

- 13:15 10 kV Silicon Carbide PiN Diodes and Bipolar Junction Transistors for Medium and High Voltage Direct Current Applications  
Besar Asllani, SuperGrid Institute (FR)  
13:45 Emerging MV Applications-Data Centre and EV Fast Charging  
Johann W. Kolar, ETH Zurich (CH)

#### 14:30 Coffee Break

- 14:45 DC – Future Energy Distribution for Vessels  
Wolfgang Voss, Siemens (DE)  
15:15 Key Requirements and Challenges for Power Semiconductors in Railway Traction e-Transformer  
Frédéric Belmonte, Alstom (FR)  
15:45 Final Discussion

#### 16:00 End of Workshop