

Organisational Information

Sign up at: www.ecpe.org/events

Registration Deadline:

31 January 2024

Participation Fee:

- € 720,- * for industry
- € 525,- * for universities/institutes
- € 230,- * 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 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).

Organisational Information

Organiser ECPE e.V.
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Venue Starling Hotel
Route Cantonale 31
1025 Lausanne
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Source photo: Starling Hotel
Source graph: Timo Rösch, OPAL-RT



European Center for
Power Electronics e.V.

Hybrid Event

ECPE Workshop

RT-HIL Testing of Power Electronics Converter and Drives Systems



07 – 08 February 2024
Lausanne, Switzerland /
hybrid



in cooperation with

EPFL

OPAL-RT
TECHNOLOGIES

ECPE Hybrid Workshop

RT-HIL Testing of Power Electronics Converter and Drives Systems

07 – 08 February 2024
Lausanne, Switzerland / hybrid

Testing functionality is an essential part of the developing process. Devices need to be stressed also in their final environment and not only in the lab, to see if they work well together with their peripheral devices and to which possible failure modes they might react and in which way. Hardware-in-the-loop (HiL) provides the possibility to test and control software, controllers, and power hardware in a simulated environment. An extension of HiL systems, which have mainly been developed for testing software and sensors, is Power Hardware-in-the-loop (PHiL) which operates at high current and high voltage and thus enables the developer to test power devices like inverters for power grids or electric vehicles, motors or generators e.g. under full load. This saves cost and time in the development process compared to full hardware tests. The system's reaction to possible malfunctions and interferences of connected components or from outside the system can be tested without the risk of damaging peripheral hardware or endangering people's health.

In this workshop, we will discuss recent developments in HiL and PHiL platforms. Practical use cases as well as their challenges will be presented from industrial and University users - for various applications ranging from transportation over grid-connected inverters to industrial drives

The workshop is chaired by:

Prof. Drazen Dujic, École Polytechnique de Lausanne (CH)
Timo Rösch, OPAL-RT Germany (DE)

Programme

Wednesday, 07 February 2023

09:15 Registration / Webex started
09:50 Welcome, Opening

Introduction

10:00 **Introduction**
Drazen Dujic, EPFL (CH); Timo Rösch, OPAL-RT (DE)

10:10 **Use of RT-HIL Systems for Education and Research**
Drazen Dujic, EPFL (CH)

10:40 **Hardware-in-the-Loop (HIL) Simulation Based Testing of Electric Power Apparatus and Controls**
Georg Lauss, AIT (AT)

Modelling

11:10 **Concepts and Methods for FPGA-based Simulation of Power Electronic Circuits on the RT Box**
Jost Allmeling, Plexim (CH)

11:40 **Configurable FPGA Solver Approach: High Performance Meets Ease-of-use**
Dusan Majstorovic, Typhoon HIL (DE)

12:10 **Testing Grid-tied Inverters and their Embedded Controllers: from HIL to Power HIL Testing**
Carlos Villegas, Speedgoat (CH)

12:40 Lunch Break

C-HIL

13:40 **High-fidelity FPGA-based Real-time Simulation of Power Electronic Converters**
Marija Stevic, Opal-RT (DE)

P-HIL

14:10 **Power-HIL – Real-time Simulation and Closed Loop Stability**
Sebastian Hubschneider, Opal-RT (DE)

14:40 **Hybrid Topologies as PHiL Emulators - Applications and Capabilities**
Rüdiger Schwendemann, KIT (DE)

15:10 **PHiL-based Impedance Measurement for Electromagnetic Stability Analysis of Grid-connected Converters**
Srdjan Srdic, EGSTON Power Electronics (AT)

15:40 **P-HIL Interface Algorithms: Accuracy and Stability**
Muhammad Umair Mutarraf, Fraunhofer ISIT (DE);
Marco Liserre, Fraunhofer ISIT (DE)

16:10 Coffee Break

16:40 Lab Tour
18:10 End of 1st Day

19:30 Dinner

Programme

Thursday, 08 February 2024

08:00 Start of 2nd Day / Webex started

Microgrids

08:30 **Power Hardware In the Loop: Opportunities, Challenges, and Business Cases**
Giovanni De Carne, KIT (DE)

09:00 **Use of HIL for the Performance Assessment of Wide Area Monitoring Protection and Control (WAMPAC) of Modern Power Systems**
Mario Paolone, EPFL (CH)

Grid/ Motors and Drives

09:30 **HIL Validation of Isolated DC-DC Converters in a MVDC network**
Laurent Chédot, SuperGrid Institute (FR)

10:00 **Coffee Break**

10:30 **Direct MMC for Pumped-hydro Powerplants on RT-HIL from RTDS Technologies**
Alexander Faulstich, Hitachi Energy (CH)

11:00 **HIL Simulation Supporting Development, Commissioning and Maintenance for Industrial Motion Control**
Oliver Dreher, Siemens (DE)

Transportation

11:30 **Usage of Real Time Systems for SW Testing of MV Converter at ABB**
Xinhua Ke, ABB (CH)
Panagiotis Syrpas, ABB (CH)

12:00 **PHiL-testbenches for Drive Inverters: How to Cope the Challenge?**
Yasser Rahmoun, AVL SET (DE)

12:30 **Lunch Break**

13:30 **Prototyping Power Electronic Converters Using HIL Simulation for Avionics Applications**
Sumantra Bhattacharya, H2fly (DE)

14:00 **Test of Traction Inverters at Full Power in a Virtual Environment**
Manuel Fischer, d-space (DE)

14:30 **HIL Infrastructure for Drive and Elevator Control Software Testing**
Daniel Bogdanovski, Schindler (CH)

15:00 **A Train Like No Other**
Florent Chabrier, SNCF

15:30 End of Workshop