Cover 1

Cover 2

18th European Conference on

Power Electronics and Applications

8 to 10 September 2015
Geneva, Switzerland
EPE 2015 ECCE Europe

Sponsored by:
European Power Electronics and Drives Association
And IEEE Power Electronics Society

Hosted by:
CERN - European Organization for Nuclear Research – Switzerland
And EPFL – Ecole Polytechnique Fédérale de Lausanne – Switzerland

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Contents

Message from the Conference Chairpersons

Welcome to EPE'15 ECCE – Europe

It is our pleasure to welcome you to the 17th Conference on Power Electronics and Applications, EPE'15-ECCE Europe, which will take place in Geneva, Switzerland from 8th to 10th September. All is set for another gathering of power electronic experts from all around at the world, at the largest European event of this kind.

The EPE'15 ECCE Europe conference is hosted by CERN. Founded in 1954, the CERN laboratory sits astride the French-Swiss border near Geneva. It was one of Europe's first joint ventures and now has 21 member states. At CERN, the European Organization for Nuclear Research, physicists and engineers are probing the fundamental structure of the universe. They use the world's largest and most complex scientific instruments to study the basic constituents of matter – the fundamental particles. The year 2012 was marked by one of the most significant events in Fundamental Physics: the experimental discovery of the Higgs Boson at CERN. Subsequently, the Nobel Prize in Physics 2013 was awarded jointly to François Englert and Peter W. Higgs.

The conference is organized in collaboration with the École Polytechnique Fédérale of Lausanne (EPFL), prestigious Technical University located beside the Lake Léman. EPFL's recent progress within the international rankings involves not only its School of Engineering, but also the School of Life Sciences, Computer and Communication, as well as Basic Sciences.

Power Electronics is very present in Europe, with advanced research, successful industrial companies, and many academic laboratories in different countries. Since 1985, the EPE Conference has grown to become the largest in its field, regularly attracting the foremost technical contributors from industry and research centres worldwide. In 2011, EPE Association joined the IEEE-PELS society for organizing the EPE-ECCE Europe Congress cooperatively. One purpose of this Conference is to enable the presentation and discussion of developments in the field of Power Electronics, with attendees coming from all over the world. A characteristic trend from previous EPE ECCE Europe conferences has been an increasingly large industrial participation, which allows enhanced exchanges between academics and people from industry.

For its 17th edition, EPE'15 ECCE – Europe organizers have received 806 submissions, out of which 649 have been accepted and integrated into a conference program. Over three days, conference participants from all over the world will have an opportunity to present and learn about the latest research results during morning lecture sessions and in the afternoon dialogue sessions. Excellent keynote talks have been included in the conference programme including six tutorials scheduled for the 7th of September and four technical visits scheduled for the 11th of September. Furthermore, an exceptionally busy exhibition will be organised in the Conference premises with a large number of booths showcasing all aspects of our field. Product presentations will be organised in the exhibition area during the lunchtime and afternoon during the so-called 'vendor sessions'. Cultural offerings, welcome reception and Gala dinner will provide enough opportunities for networking, meetings with old friends and colleagues as well as creation of new contacts.

For those travelling a distance, Geneva is easily reachable by all means (air, rail, road) and offers a wide variety of hotels. A large number of rooms in various categories at different negotiated rates have been blocked for the time of the conference. The hotels are located in the vicinity of the conference venue in the city centre of Geneva and are accessible easily by public transportation. Your hotel will provide a free Geneva Transport Card.

We are looking forward to welcoming you to Geneva. You will discover that Geneva is more than just a city. It is a whole world on its own, to be discovered within a unique setting.

Imagine a place that brings the world together...

The EPE'15-ECCE Europe Conference Chairs
Frédérick Bordry, Conference Chair; Alfred Rufer, Jean-Paul Burnet and Drazen Dujic, Conference Co-Chairs

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The overall management of the Congress is conducted by the Coordination Committee to ensure consistency in strategy, scope and content of the Conferences from year to year. The committee issues a Call for future locations of the Conferences, and forwards its recommendations to the EPE-Executive Council as well as to IEEE-PELS Administrative Committee for final approval.

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I POWER ELECTRONICS DEVICES AND CONVERTERS

Topic 1: DEVICES, PACKAGING AND SYSTEM INTEGRATION
Prof. P. A. Mawby, University of Warwick, United Kingdom
Prof. Dr. Josef Lutz, Technical University of Chemnitz, Germany

Topic 2: POWER CONVERTERS TOPOLOGIES AND DESIGN
Dr. Colin Oates, ALSTOM GRID, United Kingdom
Dr. Alireza Nami, ABB AB Corporate Research, Sweden

Topic 3: MEASUREMENT AND CONTROL
Prof. Jero Ahola, Lappeenranta University of Technology, Finland
Prof. Lennart Harnefors, ABB Corporate Research, Sweden

II POWER ELECTRONICS APPLICATIONS

Topic 4: ELECTRICAL MACHINES AND DRIVE SYSTEMS
Prof. Dr. Robert D. Lorenz, University of Wisconsin – Madison, USA
Prof. Elena Lomonova, Technical University of Eindhoven, The Netherlands

Topic 5: RENEWABLE ENERGY POWER SYSTEMS
Prof. Mark Bakran, Universität Bayreuth, Germany
Prof. Hans-Guenter Eckel, University of Rostock, Germany

Topic 6: GRIDS & SMART GRIDS
Prof. Sarath Tennakoon, Staffordshire University, United Kingdom
Prof. Axel Mertens, Leibniz Universität Hannover, Germany

Topic 7: POWER SUPPLIES
Dr. Stig Munk-Nielsen, Aalborg University, Denmark
Prof. Dr. ir. Alex Van den Bossche, Universiteit Gent, Belgium

Topic 8: e-MOBILITY
Prof. Dr. ir. Joeri Van Mierlo, Vrije Universiteit Brussel, Belgium
Prof. Mario Cacciato, Università degli Studi di Catania, Italy

Topic 9: INDUSTRY SPECIFIC ENERGY CONVERSION AND CONDITIONING TECHNOLOGIES
Dr. ir. Sjoerd Bosga, ABB AB, Sweden
Prof. Martin Doppelbauer, Karlsruher Institut für Technologie (KIT), Germany

Topic 10: EDUCATION IN ELECTRICAL ENGINEERING
Prof. Frede Blaabjerg, Aalborg University, Denmark
Prof. Leonids Ribickis, Riga Technical University, Latvia

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EPE 2015 ECCE Europe – List of topics

I POWER ELECTRONICS DEVICES AND CONVERTERS

Topic 1: DEVICES, PACKAGING AND SYSTEM INTEGRATION
1.a. Active components
1.b. New materials and active devices
1.c. Passive components
1.d. Power system integration, packaging & thermal management
1.e. Reliability

Topic 2: POWER CONVERTERS TOPOLOGIES AND DESIGN
2.a. Hard & soft switching techniques
2.b. Advanced power converter topologies
2.c. Power factor correction techniques

Topic 3: MEASUREMENT AND CONTROL
3.a. Standard and advanced control techniques for power converters
3.b. Application of control methods to electrical systems
3.c. Estimation and identification methods
3.d. Measurements techniques
3.e. Sensors

II POWER ELECTRONICS APPLICATIONS

Topic 4: ELECTRICAL MACHINES AND DRIVE SYSTEMS
4.a. Electrical Machines
4.b. Adjustable speed drives
4.c. High performance drives
4.d. Motion control, robotics, special drives

Topic 5: RENEWABLE ENERGY POWER SYSTEMS
5.a. Wind energy systems
5.b. Solar energy systems
5.c. Other renewable energy systems
5.d. Energy storage systems

Topic 6: GRIDS & SMART GRIDS
6.a. Power electronics in transmission and distribution systems
6.b. HVDC & FACTS
6.c. Micro-grids
6.d. Smart grids
6.e. Power quality issues (including HF phenomena)
6.f. Fault coordination and protection of DC grids

Topic 7: POWER SUPPLIES
7.a. Low voltage DC power supplies
7.b. High voltage DC power supplies
7.c. Distributed power supplies
7.d. Uninterruptible power supplies (UPS)

7.e. Electronic ballasts and solid state lighting
7.f. Contactless power supply

Topic 8: e-MOBILITY
8.a. Electric propulsion systems for electric vehicles
8.b. Power converters for electric vehicles
8.c. Batteries and Management Systems (BMS)
8.d. EV's battery chargers: Contact and contactless
8.e. Standards and regulations

Topic 9: INDUSTRY SPECIFIC ENERGY CONVERSION AND CONDITIONING TECHNOLOGIES
9.a. Energy conversion and conditioning technologies in the industry (cement, steel, paper, textile, mining, etc…)
9.b. Power electronics in aerospace and space applications
9.c. Rail vehicles
9.d. Marine applications (offshore and ships)
9.e. Energy conversion and conditioning technologies in physics research and related applications

Topic 10: EDUCATION IN ELECTRICAL ENGINEERING
10.a. Education in electrical engineering
10.b. Education policy in Europe

General Information

The EPE'15 ECCE Europe conference will be hosted by CERN, the European Organization for Nuclear Research. Founded in 1954, the CERN laboratory sits astride the Franco-Swiss border near Geneva. It was one of Europe's first joint ventures and now has 21 member states. At CERN, physicists and engineers are probing the fundamental structure of the universe. They use the world's largest and most complex scientific instruments to study the basic constituents of matter. Protons and lead ions are collided at close to the speed of light, giving the physicists clues about how the particles interact and providing insights into the fundamental laws of nature. Particle physicists and their accelerators have for decades required the design, development, construction, control and operation of high precision power converters.

The conference is organized in collaboration with the Ecole Polytechnique Fédérale of Lausanne (EPFL), the prestigious Technical University located beside the Lake Léman. EPFL's recent progress within the international rankings involves not only its School of Engineering, but also the Schools of Life Sciences and Computer and Communication Sciences, as well as Basic Sciences.

GENERAL INFORMATION ON GENEVA

Known both as the «smallest of big cities», or the «city of peace», Geneva, among other things, is home to the European headquarters of UNO. The quayside of Lake Geneva, the parks, the old alleyways and smart boutiques are an invitation to a leisurely stroll.
Geneva is **linked to Europe's capital cities** by its international airport, motorways and railway network. It is the seat of a number of major **multinationals**, as well as the **International Red Cross Committee**.

Fringed by vast mountain ranges of the Alps and Jura, Geneva straddles the River Rhône at the south-western end of Lake Leman (otherwise known as Lake Geneva), one of the largest freshwater lakes in Europe. Its strategic importance as a shallow crossing point was a reason for Roman occupation in 121 BC and the high ground on the northern shore was the first area to be developed as a trading settlement.

This higher part of the city is now **Geneva's Old Town** and classed as a national heritage site. Small bars, cafés and antique shops lie in its winding cobbled streets, narrow passages and hidden courtyards. Best starting point is the 14th-century Maison Tavel museum, where 3D models show how the city was encircled by vast ramparts and fortifications until the 19th century.

Close by is the **Cathedral of St Pierre**, with a panorama of its modern-day layout, 157 steps up its main tower. Here you get superb views of the lake with its Jet d'eau fountain pushing 500 liters of water up to an altitude of 140 m every second and the yellow, wasp-like taxi boats that buzz past it, carrying passengers from shore to shore.

The cathedral, along with its small chapel next door, was the home church of John Calvin, one of key leaders of the Protestant Reformation. An atmospherically, bare interior still houses the preacher's flat-backed chair.

The 100m Reformation Wall built into the old city wall nearly a century ago to mark the 400th anniversary of Calvin's birth commemorates the key role Geneva played in the religious tumult of 16th-century Europe. It also depicts other prominent Protestant leaders, including Oliver Cromwell and Scottish-born John Knox, who translated the Bible into English and lived in Geneva in the 1550's.

INTERNATIONAL CITY

What is so special about Geneva for the Swiss and the rest of the world? The answer is that it has far greater international influence than any other city of 200'000 inhabitants. Today, Switzerland's second largest city is home to around twenty **international organisations**. The permanent missions of over 160 States represent their governments in the city's international conferences and organisations.

Geneva is a centre focused on the **international economy**. Whether private corporate or business, finance, in its widest sense, undeniably plays a major economic role in Geneva, which is a base for around a hundred foreign banks.

GASTRONOMY

Long renowned for culinary austerity, the city of Calvin and Rousseau will amaze you with the creativity of its chefs, the quality of its products and the variety of its restaurants. Things have certainly changed since the days when Jean-Jacques Rousseau, citizen of Geneva, urged his followers to eat plain, frugal food with none of the contrivances of civilization!

In his views on food, Rousseau followed in the footsteps of the austere Calvin who, from 1536 to 1564, had educated the Genevans through edicts and sermons and encouraged them to turn their backs on the pleasures of good food. One must eat to live, conceded Luther's disciple, but watch out for the sin of gluttony!

Over time, and under the influence of nearby France and Italy, Genevan cuisine broke free from the weighty moral heritage that held the pleasures of food up to public contempt. Remaining plain and rustic, it began to use local products to great advantage. The canton of Geneva is today Switzerland's richest in terms of gastronomy. What a pleasure it is to sample fresh fish from the morning's catch, fruity white wine from the villages of Lully or Satigny, and strawberries from Chancy smothered in cream!

But Geneva also has many surprises in store for perfection-seeking gourmets! Several talented chefs here produce a very high level of French cuisine.

REAL GENEVAN CUISINE

Bread soup, fried fillet of perch, rabbit and mushroom stew, cardoon gratin or cardoon "à la moelle" (a typically regional vegetable from the artichoke family was introduced to Switzerland by Huguenots who had fled France after the revocation of the edict of Nantes), longeole (fresh pork sausage flavoured with fennel and cumin) or pear tart...

Traditional Genevan specialities can still be sampled in certain local bistros, brasseries, or country inns such as the Café de la Rive, Café du Marché, Café du Vallon (Conches), Auberge de Gy. The Café de Peney (Peney-Dessous) serves delicious frogs' legs and preserved knuckle of pork on polenta, stuffed with roasted marrow seeds. At Le Buffet de la Gare des Eaux-Vives in Geneva, local cuisine has incorporated spices and tastes from the East with, for example, fillet of pikeperch on couscous, or crayfish from Lake Geneva with citronella!

Eating and drinking in Geneva: http://www.geneve-tourisme.ch/en/eating-drinking/

General Information

PARKS

Geneva is often referred to as the "city of parks" due to the fact that over one quarter of the city is covered by public parks. Many of the parks were once grand estates that were later dedicated to the city. Most of the parks are situated along the lake with stunning views of the surrounding mountains.

WEATHER

In September weather is generally pleasant with mild temperatures.

TOURIST INFO

More tourist information is available at Geneva tourism, tel. +41 (0) 22 909 70 00, info@geneva-tourism.ch, http://www.geneve-tourisme.ch/en/home/

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- Geneva's lakefront
- La Perle du Lac
- Conservatory and Botanical Gardens
- Parc de la Grange et parc des Eaux-Vives
- Plaine de Plainpalais
- For the full list, please visit: www.ville-ge.ch/dsic/wifi/carte

ELECTRICITY

- Voltage : 220-230 V
- Frequency : 50 Hz
- Electrical outlet :
  type C CEE 7/16 (2-pin)
  type J SEV 1011 (3-pin)

AREA CODE

- For Switzerland : 0041 / +41
- For Geneva : 022

CURRENCY

The local currency is the CHF. When making payments, you generally get a better rate when making payments in CHF than in EUR.

THE CONFERENCE VENUE:

Centre International de Conférence Genève (CICG), 17 rue Varembé, CH . 1211 Genève 20, Tel: + 41 22 791 91 11, URL: www.cicg.ch

Free Wireless Internet: User = EPE, Password = 2015

Taxi from airport to CICG: tel. 022 33 141 33, www.taxi-phone.ch/, approximately 35 CHF.

Public transport: http://www.tpg.ch

From the Geneva airport: The Geneva International Airport offers you a free ticket for public transport into town. You can pick up the ticket from the machine in the baggage collection area at the Arrival level, it allows you to use public transport in the canton of Geneva free for a period of 80 minutes.

You will also receive a «Geneva Transport Card» (free travels on the Geneva Public Transport system throughout your stay) when you check in at your hotel (in Geneva hotels).

For more information: http://www.gva.ch/en/desktopdefault.aspx/tabid-67/. You may look up TPG routes using this timetable. In particular, the keywords "Nations" (where the conference will take place), "Aéroport Genève" (Geneva airport), "Gare Cornavin" (Geneva main train station) will be recognized.

From Geneva railway station at Cornavin: Bus F up to "Varembé" stop, then 7 min. on foot. If you are not accommodated in a Geneva hotel, the ticket costs 3.00 CHF (Ticket "tout Genève" on the ticket machine).

DRIVING INSTRUCTIONS

In Switzerland, vehicles and trailers pay to use motorways and dual carriageways by buying a motorway sticker or "vignette". The sticker costs CHF 40. Stickers for a day, a week or a month do not exist. Where to buy it:
http://www.ezv.admin.ch/zollinfo_privat/04338/04340/04720/index.html?lang=en

PARKING

It is recommended to park at "Parking des Nations", Les Genêts, Rue de Varembé: https://www.ge.ch/parkings/parkings/nations.asp

CATERING

Coffee breaks: Coffee will be served in the exhibition area (levels 0, 1 and 2 of the Congress Center) from 11:30 – 11:50.

Lunches: Different lunch boxes will be distributed during the lunch breaks in the exhibition area. Menus for vegetarians will also be available. The lunch breaks are from 13:10 to 14:00.

Water bottles: Water fountains are in self-service in all the Congress Center.

First Aid: The EPE First Aid Point is located on level -1 of the Congress Center. Please inform the staff or the desk in case of emergency.

Award Ceremony and social events

Tuesday, 8th September

18h30 Awards Ceremony
Chair: Vladimir Katic, University of Novi Sad, Serbia
Co-Chair: Jean-Luc Thomas, CNAM and SUPELEC, President of EPE Association

To celebrate the 30's anniversary of EPE association, a special show will be organized just after the Awards ceremony and before the Welcome reception.

WELCOME RECEPTION

A Welcome reception will be held on Tuesday, 8th September from 19:40 to 20:20 in CICG.

PELS STUDENT AND YOUNG PROFESSIONAL RECEPTION

Description: Join us at the famous Bain des Paquis for an evening of fun and networking! Bain des Paquis is on the beautiful Lake Geneva, and has a marvelous view of the Jet d'Eau! During the reception, attendees have the opportunity to chat with fellow students and young professionals, as well as distinguished guests, from around the world in a casual atmosphere. Enjoy free fondue, dessert and drinks while you mingle! This event is free to students and young professionals.

Where: Bain des Paquis – a modest walk from CICG (through the park and along Lake Geneva), or a short tram ride (Tram 15)
When: Tuesday, Sept. 8th, at 8:30pm (after the EPE Welcome Reception)

Wednesday 9th September

GALA DINNER

The gala dinner will take place on cruise boats on the Leman Lake for a beautiful tour of 3 hours with Geneva's spectacular landscapes.

We will be delighted to welcome you on the CGN's boats http://www.cgn.ch/en-gb/accueil.aspx for this special event to celebrate the 30's anniversary of EPE association.

Date: Wednesday 9th September at 6:30 p.m.
(please respect the time as the boats will not wait!)

Badges

All conference delegates are required to wear badges, which they will receive when they register. These badges will indicate the type of registration each delegate has.

On the top left corner of each badge, the following symbol indicates the **type of conference access:**

- L = lunches included
- R = welcome reception included

On the top right corner, the following symbols indicate the **day(s) of access:**

- TUE08
- WED09
- THU10
- none –> all the 3 days of the conference (Tue 08, Wed 09 & Thu 10)

Specific points to be aware of:

- Badges with a specific date on the top right corner gives access to the conference and/or exhibition at the specified date(s) only
- Visitor badges gives access to the exhibition only on the day specified on the top right corner of the badge. People wearing these badges are not allowed to attend the conference's sessions.
- Guest badges gives access to the lunches (if L is indicated) and/or for the welcome reception (if R is indicated) on the specified date(s). When lunch time is over, people wearing these badge must leave the conference hall and are not allowed to attend the conference's sessions.

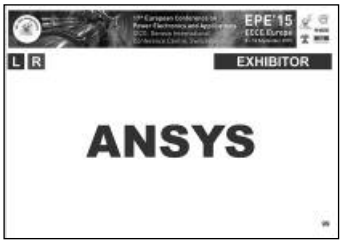
Examples of these badges are below:

Deleguate

One-day Deleguate

Badges

Organisation



Exhibitor

Guest

Gala dinner

The gala dinner will take place on cruise boats on the Leman Lake. Participants whose registration include the gala dinner will receive a ticket indicating the name of the boat they expected on at boarding time: 18h30.

Tickets:

Boarding place: Quai du Mont-Blanc 1 - 1201 Genève

Tutorials Monday 7 September 2015

T1 - Control and Modulation of Medium-Voltage Drives (afternoon)
Tobias Geyer and Nikolaos Oikonomou, ABB Corporate Research, Switzerland

T2 - Energy Efficiency in Electric Drives (afternoon)
Slobodan Mirchevski, Ss. Cyril and Methodius University, Skopje, R. Macedonia

T3 - Advanced Modeling and Simulation of Power Electronic Systems (full day)
Niklaus Felderer, Min Luo, Felix Praußе, Orhan Toker, Application and software engineers, Plexim GmbH

T4 - Modular Multilevel Converters – MMC: Principles, Design, Control, Modelling and Challenges in VSC-HVDC (full day)
Kamran Sharifabadi - Technology Adviser: Power Grid & Regulatory Affairs – Statoil, Norway
Remus Teodorescu - Professor, Department of Energy Technology, Aalborg University, Denmark
Hans Peter Nee - Professor, Department of Electrical Engineering, KTH, Sweden
Lennart Harnefors - ABB, Corporate Research – HVDC, Västerås, Sweden
Staffan Norrga - Associate Professor, Department of Electrical Engineering, KTH, Sweden

T5 - Reliability in Power Electronic Systems (full day)
Frede Blaabjerg, Francesco Iannuzzo, Huai Wang, Ke Ma, Center of Reliable Power Electronics (CORPE), Aalborg University, Denmark

T6 - Fundamentals and Multi-Objective Design of Inductive Power Transfer Systems (full day)
Prof. Dr. Johann W. Kolar, Roman Bosshard, ETH Zurich / Power Electronic Systems Laboratory

09:00 Opening Session **Location: Room 1**
Chair(s): Frédérick Bordry, CERN - European Organization for Nuclear Research, Switzerland
Jean-Luc THOMAS, Conservatoire National des Arts et Métiers, France

09:30 Keynote 1: High Energy Physics: present and future **Location: Room 1**
Chair(s): Frédérick Bordry, CERN - European Organization for Nuclear Research, Switzerland
Drazen Dujic, Ecole Polytechnique Fédérale de Lausanne, Switzerland

09:30 837 - KEYNOTE 1: High Energy Physics: present and future
HEUER Rolf - CERN - European Organization for Nuclear Research - Switzerland

10:10 LS1a: Topic 2: Advanced Power Converter Topologies (I) **Location: Room 1**
Chair(s): Alireza Nami, ABB Corporate Research, Sweden
Marcel Hendrix, Philips Innovation Services, Netherlands

10:10 127 - A Parallel Three-Phase Converter System for Ripple Current Compensation and Passive Filter Reduction
ENDRES Julian, ACKVA Ansgar - University of Applied Sciences Schweinfurt - Germany

10:30 385 - Analysis of the dc-link stability for the stacked polyphase bridges converter
NIKOUIE HARNEFORS Mojgan - KTH Royal Institute of Technology - Sweden HARNEFORS Lennart - ABB - Sweden JIN Lebing, LEKSELL Mats, NORRGA Staffan, WALLMARK Oskar - KTH Royal Institute of Technology - Sweden

10:50 452 - A Hybrid Modular Multilevel DC/AC Converter
KUCKA Jakub, BARUSCHKA Lennart - Protolar GmbH - Germany

11:10 209 - Validation of a Reduced Order Model for Modular Multilevel Converters and Analysis of Circulating Current
LOPEZ Andres, QUEVEDO Daniel - University of Paderborn - Germany AGUILERA Ricardo - The University of New South Wales - Australia GEYER Tobias, OIKONOMOU Nikolaos - ABB Switzerland - Switzerland

10:10 LS1b: Topic 8: Power Converters for Electric Vehicles **Location: Room 2**
Chair(s): Joeri Van Mierlo, Vrije Universiteit Brussel, Belgium
Alain Bouscayrol, Université Lille 1, France

10:10 239 - Disc Inverter in Highly Integrated 9-phase Drivetrain for E-Mobility
BROCKERHOFF Philip - Infineon Technologies - Germany SCHOEN Wolfgang - ZF - Germany BLAHA Petr - CEITEC BUT - Czech Republic BURKHARDT Yves - Siemens AG - Germany VÁCLAVEK Pavel - CEITEC BUT - Czech Republic

10:30 20 - Operation of Fault-Tolerant Non-Isolated Multiphase 3-Level DC–DC Converters for 48 V Automotive Power Systems

GLEISSNER Michael, BAKRAN Mark-M. - University Bayreuth - Germany

10:50 168 - Optimization considerations for interleaved DC-DC converters for EV battery charging applications, in terms of partial load efficiency and power density

JUNG Marco, LEMPIDIS Georgios, HÖLSCH Daniel, STEFFEN Jonas - Fraunhofer IWES - Germany

11:10 331 - Influence of Environmental Conditions on the Sensing Accuracy of Li-Ion Battery Management Systems with Passive Charge Balancing

BLANK Thomas, OTT Woldemar, LIPPS Christoph, WEBER Marc, HOFFMANN Peter - Karlsruhe Institute of Technology - Germany

10:10 LS1c: Topic 4: Electrical Machines(I) Location: Room 3

Chair(s): Yves Perriard, Ecole Polytechnique Fédérale de Lausanne, Switzerland
Elena Lomonova, University of Technology Eindhoven, The Netherlands

10:10 87 - Harmonic Superposition of Conductor Losses in Switched Reluctance Machines

SCHENK Mareike, HOFMANN Andreas, KAMBADUR Sameera Kumar, DE DONCKER Rik - RWTH Aachen University - Germany

10:30 740 - Determining losses of motors designed for converter operation

AARNIOVUORI Lassi, KOSONEN Antti, NIEMELÄ Markku, PYRHÖNEN Juha - Lappeenranta University of Technology - Finland

10:50 815 - A Comparison of Rotor Bar Material of Squirrel-cage Induction Machines for Efficiency Enhancement Purposes

LIU Yiqi, BAZZI Ali - University of Connecticut - United States of America HAN Paul - Glastonbury High School - United States of America

11:10 711 - Design and Identification of a Lumped-Parameter Thermal Network for Permanent Magnet Synchronous Motors Based on Heat Transfer Theory and Particle Swarm Optimisation WALLSCHEID Oliver, BÖCKER Joachim - University of Paderborn - Germany

10:10 LS1d: Topic 5: PV-Converters Location: Room 4

Chair(s): Mark Bakran, Universität Bayreuth, Germany
Oscar Apeldoorn, ABB Schweiz, Switzerland

10:10 52 - 1-MW Solar Power Inverter with Boost Converter using all SiC Power Module

FUJII Kansuke, NOTO Yasuyuki, OSHIMA Masafumi, OKUMA Yasuhiro - Fuji Electric - Japan

10:30 465 - Solar Photovoltaic Power Electronic Systems: Design for Reliability Approach

SHI Xiaofang, BAZZI Ali - University of Connecticut - United States of America

10:50 431 - Integrated three-phase PV SiC inverter to increase self-consumption with innovative topology, flexible connection options and high efficiency

HENSEL Andreas, SCHÖNER Christian, GASSER Corentin, WIENHAUSEN Arne Hendrik - Fraunhofer Institute for Solar Energy Systems ISE - Germany

11:10 231 - Design and implementation of Boost-Zeta Module-Integrated Converter for PV Power Applications

MARTINS Mário Lúcio da Silva, ANDRADE António M S S, SCHUCH Luciano - Universidade Federal de Santa Maria - Brazil

10:10 LS1e: Topic 7: Power Supplies **Location: Room 5-6**

Chair(s): Joachim Boecker, University of Paderborn, Germany
Jorma Kyyrä, Aalto University School of Electrical Engineering, Finland

10:10 105 - A Matrix-Based Small-Signal Modeling Method for Buck Converters and its Feature Analysis

YUE Xiaolong, WANG Feng, ZHUO Fang, YANG Shuhao, CHEN Ying - Xi'an Jiaotong University - China

10:30 776 - A Power Management IC for Distributed Power Supplies in Low to Medium Power Applications

AHSANUZZAMAN S M, PRODIC Aleksandar, JOHNS David - Univesrsity of Toronto - Canada

10:50 14 - Of-line Capacitive-Insolated Quasi Resonant LED Driver

SHMILOVITZ Doron, ABRAMOVITZ Alex, REICHMAN Isar - Tel Aviv University - Israel EHSANI Mark - Texas A&M University - United States of America

11:10 365 - A Concept of Field Programmable Power Supply Array Utilizing Power Supply on Chip - Fully digital controlled multiple input and output voltages POL--

HIGASHIDA Madoka, YAMAMOTO Takayuki, MATSUMOTO Satoshi, ABE Seiya - Kyusyu Institute of Technology - Japan

10:10 LS1f: Topic 3: Measurements Techniques **Location: Room 18**

Chair(s): Bill Ray, Power Electronic Measurements Ltd, United Kingdom
Francesco Iannuzzo, Aalborg University, Denmark

10:10 185 - Reduction of Saturation-Induced Distortion and Antiwindup in Multifrequency Current Control

HARNEFORS Lennart - ABB Corporate Research Centre - Sweden GOMEZ YEPES Alejandro, VIDAL Ana, DOVAL-GANDOY Jesus - University of Vigo - Spain

10:30 689 - Discrete Time Control Design of Three Phase PWM Rectifiers
VAN DER BROECK Christoph, BISKOPING Matthias, DE DONCKER Rik - ISEA, RWTH Aachen University - Germany

10:50 19 - A Three-Phase Adaptive Phase-Locked Loop Scheme for Utility Grid-Connected Systems
SILVA Sergio, BACON Vinicius - Federal Technological University of Paraná - Brazil

11:10 810 - Wide-bandwidth Identification of Small-Signal dq Impedances of ac Power Systems via Single-Phase Series Voltage Injection
JAKSIC Marko, BOROYEVICH Dushan, BURGOS Rolando, SHEN Zhiyu, CVETKOVIC Igor - Virginia Tech, Center for Power Electronics System - United States of America MATTAVELLI Paolo - University of Padova - Italy

11:50 LS2a: Topic 2: Advanced Power Converter Topologies (II) **Location: Room 1**
Chair(s): Colin Oates, Alstom Grid, United Kingdom
Arman Hassanpoor, KTH Royal Institute of Technology, Sweden

11:50 719 - Experimental Investigations on Grid-connected AC/DC Converter Based on Three-phase SiC MOSFET Module
PIASECKI Szymon, RABKOWSKI JACEK - Warsaw University of Technology - Poland

12:10 349 - Cascaded U-Cell multilevel converter for STATCOM applications
SAU Shambhu, FERNANDES B. G. - Indian Institute of Technology Bombay - India

12:30 519 - Analysis of Modular Multilevel Converters (MMCs) with DC Short Circuit Fault Blocking Capability in Bipolar HVDC Transmission Systems
NAMI Alireza - ABB Corporate Research Centre - Sweden LIANG Jiaqi - ABB Corporate Research Centre - United States of America DIJKHUIZEN Frans - ABB Corporate Research Centre - Sweden LUNDBERG Peter - ABB Grid Systems - Sweden

12:50 552 - Inductor Design Comparison of Three-wire and Four-wire Three-phase Voltage Source Converters in Power Factor Correction Applications
KOUCHAKI Alireza, NYMAND Morten - University of Southern Denmark - DenmarK

11:50 LS2b: Topic 8: EV's Battery Chargers **Location: Room 2**
Chair(s): Emil Levi, Liverpool John Moores University, United Kingdom
Joachim Boecker, University of Paderborn, Germany

11:50 690 - 2.4 kW prototype of on-road wireless power transfer: modelling concepts and practical implementation
CAILLIEREZ Antoine - Ecole Supérieure d'Electricite - France GORI Paul-Antoine - SUPELEC -

France SADARNAC Daniel - Ecole Supérieure d'Electricite - France JAAFARI Alain - Université de Picardie Jules Verne - France LOUDOT Serge - Renault - France

12:10 225 - FPGA-based Hardware-in-the-Loop Simulation of a Rectifier with Power Factor Correction
KIFFE Axel, SCHULTE Thomas - Ostwestfalen-Lippe University of Applied Sciences - Germany

12:30 272 - Configurable Modular Multilevel Converter (CMMC) for Flexible EV
TSIRINOMENY Martel, RUFER Alfred - Ecole Polytechnique Fédérale de Lausanne - Switzerland

12:50 543 - A Three Phase Bidirectional V2G Interface Converter Based on SiC JFETs
ZELJKOVIC Sandra, VULETIC Radovan, MILLER Andreas, DENAIS Alann - Infineon Technologies - Germany

11:50 LS2c: Topic 4: Electrical Machines (II) **Location: Room 3**
Chair(s): Wilfried Hofmann, Technische Universitaet Dresden, Germany
Jouko Niiranen, ABB OY, Finland

11:50 107 - Transverse-flux Motor for Enhanced Torque and Reduction of Torque Ripple
SAKAI Kazuto, TANAKA Junya - Toyo University - Japan

12:10 282 - Design and Analysis of Cross- Coupled 2 DOF Planar Direct Drive Motor
YAMAGUCHI Shuhei - Yokohama National University - Japan MIZOGUCHI Takahiro - Kanagawa Academy of Science and Technology - Japan SHIMONO Tomoyuki - Yokohama National University - Japan NOZAKI Takahiro - Keio University - Japan FUJIMOTO Yasutaka, TANAKA Shodai - Yokohama National University - Japan

12:30 624 - Prediction of Rotor Slotting Harmonics in Induction Machines in the Presence of Air-Gap Eccentricity
SAMONIG Matthias, WOLBANK Thomas - Vienna University of Technology - Austria

12:50 792 - New Capacitive Synchronous AC Machine
SHENKMAN Arie - Shamoon College of Engineering - Israel BAIMEL Nina - SAPIC College - Israel BAIMEL Dmitry, TAPUCHI Saad - Shamoon College of Engineering - Israel

11:50 LS2d: Topic 5: Energy Storage Systems **Location: Room 4**
Chair(s): Frede Blaabjerg, Aalborg University, Denmark
Noriko Kawakami, Toshiba Mitsubishi-Electric Industrial Systems Cor, Japan

11:50 434 - Modular Equalization Architecture Using Inter-Module and Switchless Intra-Module Equalizer for Energy Storage System
UNO Masatoshi - Ibaraki University - Japan KUKITA AKIO - Japan Aerospace Exploration Agency - Japan

12:10 96 - Design Aspects of an Experimental Setup for Investigating Current Ripple Effects in Lithium-ion Battery Cells

SOARES Rudi, WALLMARK Oskar, BESSMAN Alexander - KTH Royal Institute of Technology - Sweden SVENS Pontus - Scania AB - Sweden LEKSELL Mats, BEHM Mårten - KTH Royal Institute of Technology - Sweden

12:30 492 - High efficiency electrolyser power supply for household hydrogen production and storage systems

TOROK Lajos, KARUP NIELSEN Carsten, MUNK-NIELSEN Stig - Aalborg University - Denmark RØMER Carsten, FLINDT Poul - IRD Fuel Cells A/S - Denmark

12:50 809 - The application of double-layer capacitor modules for energy storage devices in production machinery

KOLESNIKOV Artem, PUTZ Matthias, RICHTER Mark, KOCH Thomas - Fraunhofer Institute for MT and Forming Technology - Germany

11:50 LS2e: Topic 7: Low Voltage DC Power Supplies **Location: Room 5-6**

Chair(s): Pat Wheeler, University of Nottingham, United Kingdom
Huai Wang, Aalborg University, Denmark

11:50 573 - New control method of bidirectional isolated dc/dc converter - Control system which can obtain output voltage much higher than winding ratio of transformer -

KAWABATA Yoshitaka, KURODA Shinnosuke, SEKIMORI Kenichi, KAWABATA Takao - Ritsumeikan University - Japan

12:10 576 - Optimizing design of converters using power cycling lifetime models

NIELSEN Rasmus Ørndrup, MUNK-NIELSEN Stig - Aalborg University - Denmark

12:30 567 - Accelerated lifetime testing of energy storage capacitors used in particle accelerators power converters

BOATTINI Fulvio, GENTON Charles-Mathieu - CERN - European Organization for Nuclear Research - Switzerland

12:50 514 - Auxiliary Power Supply for Medium-Voltage Modular Multilevel Converters

PEFTITSIS Dimosthenis, ATNIVACHIS Michael, BIELA Juergen - Lab for High Power Electronics Systems, ETH Zurich - Switzerland

11:50 LS2f: Topic 3: Standards and Advanced Control Techniques for Power Converters (I) **Location: Room 18**

Chair(s): Lennart Harnefors, ABB Corporate Research, Sweden
Mauro Carpita, University of Applied Sciences of Wester Switzerl, Switzerland

11:50 144 - Model Predictive Control of a STATCOM based on a Modular Multilevel Converter in Delta Configuration
GEYER Tobias - ABB Corporate Research Centre - Switzerland DARIVIANAKIS Georgios - ETH Zurich - Switzerland VAN DER MERWE Wim - ABB Medium Voltage Drives - Switzerland

12:10 151 - Increasing the efficiency of the Modular Multilevel Converter with MOSFET switches using Lagrange multipliers
DUDIN Andrey, RÄDEL Uwe, PETZOLDT Jürgen - Technische Universität Ilmenau - Germany

12:30 298 - A digital control algorithm for modular multilevel converter*s*
STANKOVIC Nikola - École Supérieure d'Électricité - France EGROT Philippe, BERNE Erik - EDF R&D - France BERGNA Gilbert - SINTEF - Norway ARZANDE Amir, VANNIER Jean-Claude - SUP-ELEC – France

14h50 – 17h20: Dialogue session 1 Location : Exhibition area

14:50 DS1a: Topic 2: *Advanced Power Converter Topologies*
Chair(s): Michael Braun, Karlsruher Institut für Technologie, Germany
Frédéric Richardeau, University of Toulouse, France

4 - A New Hybrid Seven Level Inverter Topology with a Single DC Supply and Reduced Switch Count **Panel A1.1**
S Arun Rahul, K Gopakumar, KAARTHIK Sudharshan, PUTHEN PURAYIL Rajeevan - Indian Institute of Space Technology - India FRANQUELO Leopoldo, LEON Jose - University of Seville - Spain NAGY Istvan - Budapest University of Technology and Economics - Hungary

10 - State-Space Modeling of Modular Multilevel Converters Including Line Frequency Transformer **Panel A1.2**
CHRISTE Alexandre, DUJIC Drazen - Ecole Polytechnique Fédérale de Lausanne - Switzerland

17 A Highly Efficient 2kW 3-Level Full-MOSFET Inverter **Panel A1.3**
LEFEVRE Guillaume, DEGRENNE Nicolas, MOLLOV Stefan - Mitsubishi Electric R&D Centre Europe - France

29 - Understanding the Contribution of Switch Input Connection Geometry to Overall DC Link Inductance **Panel A1.4**
SAWYER Edward, BRUBAKER Michael, HOSKING Terry - SBE, Inc. - United States of America

30 - AC/DC reversible mixed inverter with built-in Inrush-Current limitation and cut-off stand-by losses **Panel A2.1**
GONTHIER Laurent, RENARD Benoit - STMicroelectronics - France

75 - Voltage control of common flying capacitors in 5-level converter with capacitor current estimation **Panel A2.2**
ISAMU Hasegawa, TAKESHI Kondo, TAKASHI Kodama - Meidensha Corporation - Japan

93 - Design of Dynamic Voltage Restorer for Voltage Sag and Swell Compensation using High Frequency Isolated Direct AC-AC Converter without Commutation Problem **Panel A2.3**

AHMED Hafiz Furqan, KHAN Ashraf Ali, CHA Honnyong - Kyungpook National University - Korea (Republic of)

94 - A 3.6kW Single-ended Resonant Inverter for Induction Heating Applications **Panel A2.4**

YEON Jaeeul - Fairchild Korea Semiconductor - Korea (Republic of) CHO Kyumin - Yuhan University - Korea (Republic of) KIM HEEJUN - Hanyang University - Korea (Republic of)

129 - High Efficiency Buck and Boost Type AC-AC Converters **Panel A3.1**

KHAN ASHRAF Ali, HONNYONG Cha, AHMED Hafiz Furqan - Kyungpook National University - Korea (Republic of)

172 - New High-Power High-Voltage Isolated DC-DC Converter using an NPC Balanced Capacitive Divider **Panel A3.2**

RUFER Alfred - EPFL - Switzerland

200 - AC-side parallel-series active filter with DC-voltage control capability of a diode rectifier **Panel A3.3**

REINHOLD Andreas - HTWK Leipzig, University of Applied Sciences - Germany RÄDEL Uwe - Technische Universitaet Ilmenau - Germany GROHMANN Rolf - HTWK Leipzig, University of Applied Sciences - Germany PETZOLDT Jürgen - Technische Universitaet Ilmenau - Germany

203 - Integrated current-energy modeling and control for Modular Multilevel Matrix Converter **Panel A3.4**

WAN Yun, LIU Steven - Lehrstuhl für Regelungssysteme - Germany JIANG Jianguo - Key Laboratory Power Transmission and Conversion - China

273 - Evaluate Solid State Transformer and Low-Frequency Distribution Transformer under the Daily Loading Profile **Panel A4.1**

YANG Tao, MEERE Ronan, O'DONNELL Terence, MCKENNA Killian - University College Dublin - Ireland

300 - An FPGA-based Real-time HIL Test Bench for Full-Bridge Modular Multilevel STATCOM Controller **Panel A4.2**

LI Wei, BELANGER Jean - Opal-RT Technologies - Canada

307 - Investigation on the commutation process of 20MVA IGCT-Based NPC_H-bridge inverter **Panel A4.3**

YANG Pei - Automation Research and Design Institute of Metall - China DONG Shuai, LI Chongjian - ARIM - China

317 - Dimensioning of a Transformerless Photovoltaic Inverter Circuit for Thin-Film or Back-Side Contacted Solar Modules **Panel A4.4**

GOMMERINGER Mario, KAMMERER Felix, SCHMITT Alexander, BRAUN Michael - Karlsruhe Institute of Technology - Germany

372 - The Controlled Transition Bridge **Panel A5.1**
OATES Colin, DYKE Kevin - Alstom Grid - United Kingdom

353 - Soft-Switched Z-Source Inverter Topology for Variable Speed Electric Drives **Panel A5.2**
BATTISTON Alexandre, MILIANI El-Hadj - IFP Energies Nouvelles - France PIERFEDERICI Serge, MEIBODY-TABAR Farid - Université de Lorraine - Laboratoire GREEN - France

381 - A Multilevel Five-phase Open-end Winding Drive with Unequal DC-link Voltages **Panel A5.3**
DARIJEVIC Milan, LEVI Emil, JONES Martin - Liverpool John Moores University - United Kingdom

383 - Voltage Balancing Control for Reduced Flying Capacitor Converters using Hybrid Phase-Shifted Carrier Phase-Disposition PWM **Panel A5.4**
LIM Ziyou, MASWOOD Ali Iftekhar, OOI Gabriel Heo Peng - Nanyang Technological University - Singapore

412 - Coupling L-CL Filters and Active Damping Method for Interleaved Three-Phase Voltage Source Inverters **Panel A6.1**
SHIN Dongsul - Pusan National University - Korea (Republic of) LEE Jong-Pil, YOO Dong-Wookj KIM Tae-Jin - Korea Electrotechnology Research Institute - Korea (Republic of) KIM Hee-Je - Pusan National University - Korea (Republic of)

424 - Analysis of Output Capacitor Voltage Ripple of the Three-Phase Transformer-Linked Boost Converter **Panel A6.2**
MARTINEZ Wilmar, IMAOKA Jun, YAMAMOTO Masayoshi - Shimane University - Japan

427 - A Passive Three-Phase Rectifier Enhanced by a DC-Side High Switching Frequency Add-On SiC-Converter Stage for Unity Power Factor Applications **Panel A6.3**
MAKOSCHITZ Markus, ERTL Hans - Vienna University of Technology - Austria HARTMANN Michael - Schneider Electric Power Drives - Austria

451 - Analysis of the Power Semiconductor Design Rating for Three-level Neutral-Point-Clamped Inverter based on Datasheet Parameters **Panel A6.4**
BRUESKE Stephan, FUCHS Friedrich Wilhelm, BENKENDORFF Berthold - Christian-Albrechts-University of Kiel - Germany

501 - Power Loss and Efficiency Analysis of a Four-level p-type Converter **Panel A7.1**
JIN Bosen, YUAN Xibo - University of Bristol - United Kingdom

512 - Modular multilevel converter electrical circuit model for HVdc applications **Panel A7.2**
FERREIRA Abel - Cinergia - Spain BELLMUNT Oriol Gomis - CITCEA-UPC - Spain TEIXEIDO Miquel - Cinergia - Spain

544 - Effect of Dead-Time in Interleaved PWM for Two Parallel-Connected Inverters **Panel A7.3**
MAHESHWARI Ramkrishan - IIT Delhi - India BEDE Lorand, GOHIL Ghanshyamsinh, MUNK-NIELSEN Stig - Aalborg University - Denmark

560 - Stability of DC/DC three terminal converter using Modular Multilevel Converters for HVDC systems. **Panel A7.4**
JIMENEZ CARRIZOSA Miguel - Systems and Signals Laboratory Supelec - France BERGNA DIAZ Gilbert - SINTEF - Norway ARZANDE Amir - Supelec - France DAMM Gilney - LSS Supelec - France ALOU Pedro - CEI-UPM - Spain BENCHAIB Abdelkrim - Alstom Grid - France LAMNAB-HI-LAGARRIGUE Francoise - LSS Supelec - France

565 - A Soft Switching Bidirectional DC-DC Converter based onThree-State Switching Cell to Photovoltaic Systems Applications **Panel A8.1**
MAZZA Luan C. S., OLIVEIRA JR. Demercil S., ANTUNES Fernando L. M., ALVES Diego B. S., FREIRE Fábio José L., CAMPELO Paulo C. M. - Federal Institute of Ceara - Brazil

616 - A power electronics controlled current source based on a multi-converter topology **Panel A8.2**
GWOZDZ Michal - Poznan University of Technology - Poland

647 - Quasi Y-Source Boost DC-DC Converter **Panel A8.3**
SIWAKOTI Yam, BLAABJERG Frede, LOH Poh Chiang - Aalborg University - Denmark

685 - Comparison of Basic Power Cells for Quad-Active-Bridge DC-DC Converter in Smart Transformer **Panel A8.4**
COSTA Levy, BUTICCHI Giampaolo, LISERRE Marco - Christian-Albrechts-University of Kiel - Germany

795 - Analysis of Hybrid Thirteen Level Cascaded H-Bridge Inverter Operated Under Different PWM Methods **Panel B1.1**
BAIMEL Dmitry - Shamoon College of Engineering - Israel BAIMEL Nina - SAPIR College - Israel RABINOVICI Raul - Ben Gurion University - Israel TAPUCHI Saad - Shamoon College of Engineering - Israel

14:50 DS1b: Topic 3: Standard and Advanced Control Techniques for Power Converters

Chair(s): Daniel Heredero-Peris, CITCEA-UPC, Spain
Oriol Gomis, Universitat Politecnica de Catalunya, Spain

37 - Cancellation of the Output Ripples of a Three-Phase Converter using Parallel-Connected Inverters and Phase-Shift-Self-Oscillating Controllers **Panel B1.2**
LE CLAIRE Jean-Claude, BENKHORIS Mohamed Fouad - IREENA - France

118 - Multilevel direct current control for grid-connected inverters **Panel B1.3**

SCHAEFER Markus, HOFMANN Martin, RAAB Sebastian, ACKVA Ansgar - University of Applied Sciences WUE-SW - Germany

126 - Control of a Modular DC-DC Converter Dedicated to Energy Storage **Panel B1.4**

RUFER Alfred, BARRADE Philippe, COULINGE Emilien - Ecole Polytechnique Fédérale de Lausanne - Switzerland

138 - A Generalized Predictive Current Control Method based on Two Vectors for Three-Phase Voltage Source Inverters **Panel B2.1**

KWAK Sangshin - Chung-Ang University - Korea (Republic of) BAEK Jaihoon - Korea Railroad Research Institute - Korea (Republic of) PARK So-young - Chung-Ang University - Korea (Republic of) KIM Taehyung - University of Michigan-Dearborn - United States of America

141 - A hybrid discontinuous modulation technique to influence the switching losses of two level three phase inverters **Panel B2.2**

WOELFLE Julian, ROTH-STIELOW Jörg - University of Stuttgart - Germany

142 - A Converter Control Field Bus Protocol for Power Electronic Systems with a Synchronization Accuracy of +/- 5 ns **Panel B2.3**

CARSTENSEN Christoph, BIELA Juergen, CHRISTEN Rolf - ETH Zurich - Switzerland

167 - Direct Control Method for Matrix Converter with Stabilisation of the Input Current **Panel B2.4**

REMUS Nico, LEUBNER Martin - Technische Universitaet Dresden - Germany

182 - Analysis of DC-Link Current Harmonics for Unconventional PWM strategies - Application of the Double Fourier Integral Method **Panel B3.1**

ROUHANA NAJIB - Renault - France PATIN Nicolas, FRIEDRICH Guy - Université de Technologie de Compiegne - France NEGRE Edouard, LOUDOT Serge - Renault - France

201 - Unified Fuzzy-Logic Based Controller for Dual-Function 4-Leg Shunt APF with Predictive Current Control **Panel B3.2**

ABDELSALAM Ahmed, FAHMY Abdullah - Arab Academy for Science and Technology - Egypt KOTB Mohamed - Alazhar University - Egypt

260 - Flyback Converter Using an Observer-Based Digital Controller **Panel B3.3**

ZHANG Ya, HENDRIX Marcel, DUARTE Jorge, LOMONOVA Elena - Eindhoven University of Technology - Netherlands

283 - Novel MMC control for active balancing and minimum ripple current in series-connected battery strings **Panel B3.4**

FROST Damien, HOWEY David - University of Oxford - United Kingdom

297 - Single-phase multifunctional inverter with dynamic saturation scheme for partial compensation of reactive power and harmonics **Panel B4.1**
PEREIRA Heverton - Federal University of Viçosa - Brazil MENDES Victor - UFMG - Brazil CUPERTINO Allan - CEFET - MG - Brazil XAVIER Lucas, DOMINGOS Ramon - UFV-GESEP - Brazil

313 - Direct Model Predictive Control of Quasi-Z-Source Inverter Compared with The Traditional PI-based PWM Control **Panel B4.2**
AYAD Ayman, KENNEL Ralph - Technical University of Munich - Germany

322 - New Strategy to Balance Neutral-point Voltage in Three-level VSI Based on SVM Regarding Output Current **Panel B4.3**
DEHGHANIKIADEHI Abbas - Blaise Pascal University - France AGHAZADEH Amir - Amirkabir Univesristy of Technology - Iran EL KHAMLICHI DRISSI Khalil, PASQUIER Christophe - Blaise Pascal University - France

330 - Repetitive neurocontroller with disturbance dual feed forward – choosing the right dynamic optimization algorithm **Panel B4.4**
UFNALSKI Bartlomiej, GRZESIAK Lech - Warsaw University of Technology - Poland

351 - Dynamic Modeling and Integral Sliding Mode Controller Design for the Cuk Inverter **Panel B5.1**
HAN ByeongCheol, KIM Minsung, LEE Sungho, LEE Jin S. - Pohang University of Science and Technology - Korea (Republic of)

360 - Adaptive Saturation for a Multifunctional Three-Phase Photovoltaic Inverter **Panel B5.2**
PEREIRA Heverton - Federal University of Viçosa - Brazil MENDES Victor, PAULINO Jose Osvaldo - UFMG - Brazil DOMINGOS Ramon, XAVIER Lucas - UFV-GESEP - Brazil CUPERTINO Allan - CEFET - MG - Brazil

390 - A New Non-Characteristic Harmonic Compensation Method in Three-phase Active Power Filters Equipped with a Small DC Capacitor **Panel B5.3**
MANNEN Tomoyuki, FUJITA Hideaki - Tokyo Institute of Technology - Japan

411 - A Novel Capacitor Voltage Balancing Method for Distributed Switching Frequency in a Modular Multilevel Converter Application **Panel B5.4**
KIM Si-Hwan, KIM Rae-Young - Hanyang University - Korea (Republic of) JUNG Hong-Ju - Hyosung Corporation - Korea (Republic of)

425 - Robust Controller Design for Phase-Shifted Full-Bridge Series Resonant Converter under the Nonlinear Load **Panel B6.1**
SON Sungho, KIM Minsung, LEE Sungho, LEE Jin S - POSTECH - Korea (Republic of)

454 - Research on Typical Harmonic Elimination Algorithms in Phase Synchronization Control **Panel B6.2**
XIONG Liansong, LIU Xiaokang, ZHUO Fang, ZHU Minghua - Xi'an Jiaotong University - China

458 - Static Synchronous Generator Model for Grid-tied PWM Inverters of Renewable Energy Generation **Panel B6.3**

XIONG Liansong, LIU Xiaokang, ZHUO Fang, ZHU Minghua - Xi'an Jiaotong University - China

460 - Modulated Model Predictive Current Control for Direct Matrix Converter with Fixed Switching Frequency **Panel B6.4**

VIJAYAGOPAL Manjusha, ZANCHETTA Pericle, DE LILLO Liliana, EMPRINGHAM Lee, WHEELER Patrick, TARISCIOTTI Luca - The University of Nottingham - United Kingdom

474 - Sequential Cycle Stealing – A novel control method dedicated for resonant converters **Panel B7.1**

WIDOREK Rafal - Fideltronik Poland SP. Z O.O. - Poland WOREK Cezary - AGH University of Science and Technology - Poland

484 - Efficiency Improvement at light load in Bidirectional DC-DC converter by utilizing Discontinuous Current Mode **Panel B7.2**

LE Nam, SATO Daisuke, ORIKAWA Koji, ITOH Junichi - Nagaoka University of Technology - Japan

491 - PFC-Control for Improved Inductor Utilization **Panel B7.3**

KEUCK Lukas, BÖCKER Joachim, ZIESSLER Adrian, FRÖHLEKE Norbert - University of Paderborn - Germany

500 Modified PWM algorithm for low duty in SRC **Panel B7.4**

SPANEL Petr, PATOCKA Miroslav - Brno University of Technology - Czech Republic

522 - Minimum Power Losses Operation for Switched Capacitor Converters **Panel B8.1**

SANTOS Rodrigo, BARBI Ivo - Federal University of Santa Catarina - Brazil

524 - Model Predictive Control for an Asymmetric Multilevel Converter with Two Floating Cells per Phase **Panel B8.2**

VASQUEZ Marcelo, OLIVARES Manuel, PONTT Jorge, VARGAS Juan - Universidad Tecnica Federico Santa Maria - Chile

559 - Adaptive Digital Current Mode Controller for DC-DC Converters **Panel B8.3**

TAEED Fazel, NYMAND Morten, ANDERSEN Karsten Holm - University of Southern Denmark - Denmark

595 - Variable Carrier Frequency Deadbeat Control for Single Phase and Three Phase Utility Interactive Inverter using SoC-FPGA **Panel B8.4**

YOKOYAMA Tomoki, OHASHI Shunsuke, NAITO Genya, SUZUKI Yasuhiro, SEKI Kousuke - Tokyo Denki University - Japan

597 - Control of SiC Based Front-End Rectifier under Unbalanced Supply Voltage **Panel C1.1**

MAHESHWARI Ramkrishan - IIT Delhi - India TRINTIS Ionut, GOHIL Ghanshyamsinh, MUNK-NIELSEN Stig, CHAUDHARY Sanjay - Aalborg University - Denmark

608 - Predictive Digital Peak Current Mode Controller with Inductor Inductance Estimation for DC-DC Converter **Panel C1.2**

HOLM ANDERSEN Karsten, TAEED Fazel, NYMAND Morten - University of Southern Denmark - Denmark

613 - Single phase PFC control with Lyapunov method **Panel C1.3**

HONKANEN Jari, HANNONEN Janne, STRÖM Juha-Pekka - Lappeenranta University of Technology - Finland RÄISÄNEN Samuli - Powernet - Finland SILVENTOINEN Pertti - Lappeenranta University of Technology - Finland

618 - System Identification and Adaptive Control of a DC-DC Converter using a Current Balancing ON/OFF Control Technique for Optimal Transient Performance **Panel C1.4**

WANG Chen, GADOUE Shady, ARMSTRONG Matthew - Newcastle University - United Kingdom

635 - SiC heat pump converters with support for voltage unbalance in distribution grids **Panel C2.1**

TRINTIS Ionut - Aalborg University - Denmark MAHESHWARI Ramkrishan - Indian Institute of Technology - India DOUGLASS Philip - Danish Energy Association - Denmark MUNK-NIELSEN Stig - Aalborg University - Denmark

642 - State Current Controller With Oscillatory Terms For Three-Level Grid-Connected PWM Rectifiers Under Distorted Grid Voltage Conditions **Panel C2.2**

GALECKI Andrzej, KASZEWSKI Arkadiusz, UFNALSKI Bartlomiej, GRZESIAK Lech - Warsaw University of Technology - Poland

645 - Performance Characteristic of Digital Peak Current Mode Control Switching Power Supply **Panel C2.3**

FURUKAWA Yudai - Nagasaki University - Japan COLAK Ilhami - Gelisim University - Turkey MAEDA Shusuke, KUROKAWA Fujio - Nagasaki University - Japan

665 - Modulator for Five-Leg Voltage-Source Inverters **Panel C2.4**

KOMRSKA Tomas, GLASBERGER Tomas, PEROUTKA Zdenek - UniversitY of West Bohemia - Czech Republic

693 - 9 kW SiC Mosfet based DC/DC Converter **Panel C3.1**

GRZESIAK Lech M. - Warsaw University of Technology - Poland TARCZEWSKI Tomasz, NIEWIARA Lukasz - Nicolaus Copernicus University - Poland

712 - Adaptive Switching-Loss-Optimized Space-Vector Modulation for Three-Level Neutral-Point-Clamped Converters **Panel C3.2**

SIDDIQUE Hafiz Abu Bakar, PAI Ajay Poonjal, DE DONCKER Rik - RWTH Aachen University - Germany

763 - Comparison between grid side and inverter side current control for parallel interleaved grid connected converters **Panel C3.3**

BEDE Lorand, GOHIL Ghanshyamsinh, KEREKES Tamas - Aalborg University - Denmark CIOB-OTARU Mihai - UNSW - Australia TEODORESCU Remus - Aalborg University - Denmark AGE-LIDIS Vassilios G - UNSW - Australia

765 - A New Understanding and Improvements of Finite Set Model Predictive Control in Inverter Applications **Panel C3.4**

MIRZAEVA Galina, GOODWIN Graham - The University of Newcastle (Australia) - Australia MCGRATH Brendan - RMIT University Melbourne - Australia

801 - Harmonic Comparison of Two Existing Modulation Strategies Applicable to a Multi-Level Cascaded H-Bridge Converter **Panel E1.1**

ALVES BARACIARTE Roberto, ZELAYA Hector, TORMO Daniel, TOWNSEND Christopher. D - ABB Corporate Research Centre - Sweden

817 - Implementation of Iterative Learning Control based Deadtime Compensation for PWM inverters **Panel E1.2**

BEN-BRAHIM Lazhar - Qatar University - Qatar GHAZI Khalid - Texas A&M Qatar University - Qatar GASTLI Adel - Qatar University - Qatar

818 - Design of the LC+Trap Filter for a Current Source Rectifier **Panel E1.3**

HUANG Min, WANG Xiongfei, BLAABJERG Frede, LOH POH CHIANG - Aalborg University - Denmark LI Yunwei - University of Alberta - Canada

821 - Influence of Modulation Method on Using LC-Traps with Single-Phase Voltage Source Inverters **Panel E1.4**

WANG Xiongfei, HUANG Min, BAI Haofeng, LOH Poh Chiang, BLAABJERG Frede - Aalborg University - Denmark

14:50 DS1c: Topic 3: Measurements Techniques

Chair(s): Daniel Montesinos Miracle, CITCEA-UPC, Spain

1 - MOSFET Parasitic Capacitance Change in Non-Zero Current and Voltage Bias Conditions **Panel E2.1**

KUREMYR Tobias, DELEPAUT Christophe, BECHERER Jana, DITTRICH Rok - European Space Agency - Netherlands

123 - Synchronized Current Sensing Techniques and Implementation on dSPACE-FPGA-Board Using Delta-Sigma-Modulator **Panel E2.2**

WOHLFAHRT Thomas, MYRZIK J. M. A. - Dortmund University of Technology - Germany

156 - Increase the thermal conductivity of high voltage electrical insulation systems **Panel E2.3**
TOMASKOVA Tetjana, SVOBODA Michal, SHLYKEVICH Alexey, TRNKA Pavel - University of West Bohemia - Czech Republic

486 - Triple Pulse Tester - Efficient Power Loss Characterization of power modules **Panel E2.4**
TRINTIS Ionut, POULSEN Thomas, BECZKOWSKI Szymon, MUNK-NIELSEN Stig - Aalborg University - Denmark RANNESTAD Bjørn - KK Wind Solutions A/S - Denmark

487 - Switching speed limitations of high power IGBT modules **Panel E3.1**
INCAU Bogdan Ioan, TRINTIS Ionut, MUNK-NIELSEN Stig - Aalborg University - Denmark

803 - Design of a Modular and Scalable Small-signal dq Impedance Measurement Unit for Grid Applications Utilizing 10 kV SiC MOSFETs **Panel E3.2**
SHEN Zhiyu, CVETKOVIC Igor, JAKSIC Marko, DIMARINO Christina, BOROYEVICH Dushan, BURGOS Rolando, CHEN Fang - CPES - Virginia Tech - United States of America

14:50 DS1d: Topic 4: Electrical Machines
Chair(s): Sicong Von Malottki, Daimler AG, Germany
Jouko Niiranen, ABB OY, Finland

27 - Classical DC Excited Synchronous Generator for High Power Direct Driven Wind Turbine: Optimal Design and FEM Validation **Panel E3.3**
TUTELEA Lucian Nicolae, DEACONU Sorin Ioan, BOLDEA Ion - Politehnica University of Timisoara - Romania

112 - Design and prototyping of an optimized limited motion indirect drive actuator for automotive application **Panel E3.4**
GUTFRIND Christophe, ROBERT Florent, DUFOUR Laurent, LIEBART Vincent - EFI Automotive - France VANNIER Jean-Claude, VIDAL Pierre - Supelec - France

119 - Benefits of upgrading Insulating Materials to Operating Temperature of Traction Induction Motor **Panel E4.1**
TOMASKOVA Tetjana, PECHANEK Roman, KINDL Vladimir - University of West Bohemia - Czech Republic

197 - ANN-Based System For Inter-turn Stator Winding Fault Tolerant DTC Induction Motor Drives **Panel E4.2**
KHALIL Shady, ABU-RUB Haitham - Texas A&M University at Qatar - Qatar IQBAL Atif - Qatar University - Qatar

240 - Active and reactive power distribution under steady-state and transient conditions in doubly-fed induction generator (DFIG) **Panel E4.3**
NESCI Sebastian, SANCHEZ Leonardo - National University of Rio Cuarto - IPSEP - Argentina

MORCOS Medhat M - Kansas State University - United States of America GOMEZ Juan Carlos - National University of Rio Cuarto - IPSEP - Argentina

255 - The Effect of Space Harmonic Components in the Air Gap Magnetic Flux Density on Torque Characteristic of a Squirrel-Cage Induction Machine **Panel E4.4**
KINDL Vladimir, SOBRA Jan, PECHANEK Roman, SKALA Bohumil, HRUSKA Karel - University of West Bohemia - Czech Republic

270 - Highly Efficient Constant Speed Drive System Based on a Doubly Fed Permanent Magnet Synchronous Machine **Panel E5.1**
STOCK Alexander, STAUDT Stefan, TEIGELKÖTTER Johannes, KOWALSKI Thomas - University of Applied Sciences Aschaffenburg - Germany

295 - Vector Controlled Brushless Twin Stator Cascaded Doubly Fed Induction Generator for Variable Speed Wind Generation Connected to Weak Grids **Panel E5.2**
ABDELSALAM Ahmed, ABDELKADER Mona - Arab Academy for Science and Technology - Egypt HASSAMELDIN Ahmed - Alexandria University - Egypt

315 - Outcome of Multi-Physics Optimization for Increase in Power Density of Asynchronous Railway Traction Drives **Panel E5.3**
VOGELSBERGER Markus - Bombardier Transportation Austria - Austria SCHMIDT Erich - Vienna University of Technology - Austria ORELLANO Alexander - Bombardier Transportation Germany - Germany BAZANT Martin - Bombardier Transportation (Switzerland) - Switzerland BUSCHBECK Jan - Bombardier Transportation Germany - Germany

345 - Adaptive dv/dt and di/dt Control Current Source Drive with short circuit protection for DC Solid State Power Controllers **Panel E5.4**
RUAN Li-gang, WU Xue-chao, WANG Li - Nanjing University of Aeronautics & Astronautics - China ZHANG Jian-feng - Shanghai Marine Equipment Research Institute - China

359 - Influence of Rotor Structure on the Torque Characteristic of a Novel Claw Pole Type Half-Wave Rectified Variable Field Flux Motor **Panel E6.1**
ABE Takashi, OBA Ryohei, HIGUCHI Tsuyoshi, MAEDA Kyosuke - Nagasaki University - Japan

373 - Development of IPMSM with Rare Earth and Ferrite Magnets **Panel E6.2**
MIYAMOTO Shinnosuke, YAMADA Akitosi, MIKI Ichiro - Meiji UniversitY - Japan

442 - An iterative FEA-based approach for the design of fault-tolerant IPM-FSCW machines **Panel E6.3**
ZHANG Hui, WALLMARK Oskar, LEKSELL Mats - KTH Royal Institute of Technology - Sweden

473 - Circulating Current Suppression of Converter Excited Wind Power Generation System with DC output **Panel E6.4**
SO Takahiro, KIMURA Noriyuki, KASIWAGI Shuta, MORIZANE Tosimitu, OMORI Hideki - Osaka Institute of Technology - Japan

526 - Optimal control of switched reluctance motors by genetic algorithms **Panel E7.1**
SIADATAN Alireza, FOROUGHI Leila, FOROUGHI Mohammadreza - West Tehran Branch, Islamic Azad University - Iran

578 - Impact of Semi-Magnetic Slot Key on the Performance of a Tooth-Coil Traction Motor **Panel E7.2**
MONTONEN Juho, LINDH Pia, PYRHÖNEN Juha - Lappeenranta University of Technology - Finland

629 - Development of a New Approach for Wide Speed Range of PMSM **Panel E7.3**
ZAID Sherif - Cairo University-Faculty of Engineering - Egypt

677 - Adoption of bonded magnets in place of sintered NdFeB: performance and economic considerations on a small power generator **Panel E7.4**
FERRARIS Luca, POSKOVIC Emir, FRANCHINI Fausto - Politecnico di Torino - Italy LA CASCIA Diego - Università Degli Studi di Palermo - Italy

701 - Loss Comparison of Non-Oriented Electrical Steel Materials to be used in PMSM under Explosion Protection Aspects **Panel E8.1**
YOGAL Nijan, LEHRMANN Christian - Physikalisch-Technische Bundesanstalt - Germany HENKE Markus - Institut für Elektrische Maschinen Antriebe Bahnen - Germany SHEN Bin - Physikalisch-Technische Bundesanstalt - Germany

702 - Design Considerations When Developing a 50000 rpm High-Speed High-Power Machine **Panel E8.2**
LAHNE Hans-Christian, GERLING Dieter, MOROS Oleg - Universitaet der Bundeswehr Muenchen - Germany

730 - Comparison of two Concentrated Winding Topologies applied on an Axial Flux Permanent Magnet Machine **Panel E8.3**
JUNG Jakob, HOFMANN Wilfried - Dresden University of Technology - Germany

769 - A Novel Parameter Identification of IM Based on Inverter by Reducing Dead-Time Effect **Panel E8.4**
XU Fei - Chinese Academy of Science - China SHI Liming, WANG Ke, LI Yaohua - Institute of Electrical Engineering - China

785 - Torque ripples in stepping motor driven systems **Panel E9.1**
DERAMMELAERE Stijn, STOCKMAN Kurt, VERVISCH Bram, VERBELEN Florian - Ghent University - Belgium

804 - Experimental Drive Characteristics of HEFSM for Automobile Traction Drives **Panel E9.2**
NAKANE Hiroki, KOSAKA Takashi, MATSUI Nobuyuki - Nagoya Institute of Technology - Japan

14:50 DS1e: Topic 4: High Performance Drives
Chair(s): Walter Schumacher, TU Braunschweig, Germany

41 - A dual two-level inverter with a single supply for open end winding induction motor drive application **Panel E9.3**
CHOWDHURY Shajjad, WHEELER Patrick, GERADA Christopher, PATEL Chintan - The University of Nottingham - United Kingdom

47 - Robust Maximum-Torque-per-Ampere Control Method applying Virtual Inductance to Counteract Parameter Errors for Direct Torque Control of Permanent Magnet Synchronous Motors **Panel E9.4**
MATSUYAMA Tetsuya, TOMIGASHI Yoshio - Panasonic Corporation - Japan

72 - The Proposal of Low Speed Sensorless Drives by Symmetrical Carrier PWM **Panel D1.1**
MAEKAWA Sari, SHIBANO Yusuke, HASEGAWA Yukihisa, SEKIHARA Toshikazu - Toshiba Corporation - Japan KUBOTA Hisao, KINJO Akihito - Meiji University - Japan

179 - Decoupling of Secondary Saliencies in Sensorless AC Drives Using Repetitive Control **Panel D1.2**
CHEN Zhe, WU Chun, KENNEL Ralph - Technische Universitaet Muenchen - Germany QI Rong, LUO Guangzhao - Northwestern Polytechnical University - China

250 - A Robust Position Sensorless control Method of IPMSMs to Magnetic Non-linearity within Over-modulation Range **Panel D1.3**
NAKAYAMA Yosuke, MATSUMOTO Atsushi, HASEGAWA Masaru - Chubu University - Japan

267 - High Performance Synchronous Reluctance Motors in Low Voltage Applications **Panel D1.4**
STAUDT Stefan, STOCK Alexander, TEIGELKÖTTER Johannes, KOWALSKI Thomas - University of Applied Sciences Aschaffenburg - Germany

325 - A Novel Anti-Windup and Flux-Weakening Control Method for Current Control of IPMSMs Using Current and Current Phase Operations **Panel D2.1**
MATSUMOTO Atsushi, HASEGAWA Masaru - Chubu University - Japan

344 - Direct Torque Control of Permanent Magnet Synchronous Motor Using Real-time Simulator with FEA Motor Model for Pulsation Torque Reduction **Panel D2.2**
TANABE Ryo, AKATSU Kan - Shibaura Institute of Technology - Japan

380 - The study of magnetic polarity detection method for permanent magnet reluctance motor **Panel D2.3**
TANIGUCHI Shun, YASUI Kazuya, YUKI Kazuaki, MATSUSHITA Makoto, NAKAZAWA Yosuke - Toshiba Corporation - Japan WAKAO Shinji - Waseda University - Japan

394 - Comparison of induction and synchronous reluctance machine based actuators for elevated temperature environments **Panel D2.4**
LANG Klaus - University of Technology Graz - Austria BAUER Robert, PIRCHER Stefan - Kristl, SEIBT & CO. - Austria MÜTZE Annette - University of Technology Graz - Austria

399 - Improvement of transient state characteristic for Vector control system by using the Inverter Overmodulation range **Panel D3.1**
KONDO Kosuke, DOKI Shinji - Nagoya University - Japan

435 - Multiphase Modular Power Converter using the PEBB concept and FPGA-based Direct High Speed Voltage Measurement **Panel D3.2**
TENCONI Alberto, BOJOI Iustin Radu, ROSU George Stefan, MARIUT Felix - Politecnico di Torino - Italy

462 - Electrothermal Design of Power Inverters for Automotive Electric Drivetrain Systems Using Multidomain Simulation **Panel D3.3**
ILINA Olga, VOSS Leon - Ansys Germany GmbH - Germany HEYD Jean-François - LUK GmbH & Co. KG - Germany

513 - Comparison of the Efficiency of Different Magnetization Strategies for a Variable Speed Induction Machine Drive **Panel D3.4**
TORRISI Giampaolo, SMITH Roy S. - ETH Zurich - Switzerland MARIETHOZ Sebastien - Institute for Energy and Mobility Research, BFH - Switzerland MORARI Manfred - ETH Zurich - Switzerland

528 - On-line Copper Loss Minimization Control Method of Induction and PM Motors with Periodic Fluctuation Load **Panel D4.1**
KATO Masakazu, ITOH Junichi - Nagaoka University of Technology - Japan

532 - Torque Ripple Minimization in Five-Phase Three-Level Voltage Source Inverter Fed Direct Torque Control Induction Motor Drive **Panel D4.2**
AWARE Mohan, TATTE YOGESH - Visveswaraya National Institute of Technology - India

588 - Improvement in Response of Position Estimation for IPMSMs in Low-speed Regions Including Standstill Using Area Calculation **Panel D4.3**
SUZUKI Toshiki, DOKI Shinji - Nagoya UniversitY - Japan HASEGAWA Masaru - Chubu University - Japan

628 - Design of a Transverse Flux Reluctance Machine with Mutual Flux Paths and Disc Rotors **Panel D4.4**
DOERING Jan, HOFMANN Wilfried - Dresden University of Technology - Germany

684 - Optimal Vector Control for Wound Rotor Salient Pole Synchronous Motors over Full Speed Range **Panel D5.1**
UZEL David - University of West Bohemia - Czech Republic PEROUTKA Zdenek - Regional Inovation Centre for Electrical Engineering - Czech Republic

14:50 DS1f: Topic 5: Wind Energy Systems

Chair(s): Philip Kjaer, Vestas Wind Systems, Denmark

70 - Potential of RC-IGBTs in Three Level Converters for Wind Energy Application **Panel D5.2**

GIERSCHNER Sidney, ECKEL Hans-Günter, WEISS David - University of Rostock - Germany HILLER Marc - Siemens AG - Germany

101 - DFIG Wind turbines operating in a fixed reference frame **Panel D5.3**

PRIGNITZ Cord, ECKEL Hans-Günter - University of Rostock - Germany KNAAK Hans-Joachim - Siemens AG - Germany

202 - Repetitive Control of Doubly-Fed Induction Generator For General Distorted Grid Voltage Disturbances Rejection **Panel D5.4**

QUAN Yu, ZHANG Jianmin , ZHAO Chen - College of Automation, Hangzhou Dianzi University - China

391 - Low Dissipative Snubber using Flyback Type Transformer for 10 kV IGCT in 7 MW Wind Turbine Systems **Panel D6.1**

SHIRMOHAMMADI Siamak, SUH Yongsug - Chonbuk National University - Korea (Republic of)

482 - Driving Two Induction Generators with One Frequency Converter Using Stator-Flux-Oriented Control Method **Panel D6.2**

SCHUEMANN Ulf, FRANK Sergej - University of Applied Sciences Kiel - Germany GOLL Olaf - Skywind GmbH - Germany

725 - New ideas to reuse PC power supply for renewable energy applications **Panel D6.3**

MAUSSION Pascal, DAVID Maria - Université de Toulouse, LAPLACE - France BUN Long - Institut Technologique du Cambodge - Cambodia KIM Bunthern, ROTH Anastasia, CENNI Hugues - Université de Toulouse, LAPLACE - France

757 - Stability Characterization of Inverter Based Microgrids considering Configuration changes **Panel D6.4**

KIM Myungchin - The University of Texas at Austin - United States of AmericaKWASINSKI Alexis - University of Pittsburgh - United States of America

16.00 IET Technical Session: Energy Efficiency Opportunities enabled by Power Electronics **Location: Room 3**

Bill Drury (PEMD Consultant / Visiting Professor, University of Bristol), James Campbell (Technical Specialist, Rolls-Royce), Will Drury (Global Technical Expert-Power Electronics, Ricardo), Anna Bonne (Head of Transport Sector, IET) and others.

World energy consumption continues to grow at an unsustainable pace, and whilst Energy efficiency has been the focus of national and international government regulation and initiatives for many years much more needs to be done. To date the approach to energy efficiency measures has tended to be piecemeal and driven by cost and carbon savings.

Energy efficiency is clearly a cross function, cross theme, cross sector and cross energy type activity. The potential for improvements in each sector through the application of existing technologies and future developments is less well defined. This IET technical session will attempt to give some context to energy efficiency measures and opportunities, in order to highlight existing good practice and future opportunities. The session is being led by Bill Drury (PEMD Consultant / Visiting Professor, University of Bristol) and is supported by Anna Bonne (Head of Transport Sector, IET). Bill is developing thought leadership in Energy Efficiency on behalf of the IET and will use this technical session to engage with interested parties and get them involved in developing this area further.

Speakers include James Campbell (Technical Specialist, Rolls-Royce) and Will Drury (Global Technical Expert-Power Electronics, Ricardo). The session will include presentations outlining the challenges, opportunities and future trends followed by a panel discussion and networking session.

16.00 Research Projects in the ECPE Network - Procedure and Examples **Location Room 2**

- Introduction of the ECPE Network (L. Lorenz, ECPE)
- Introduction and Overview of the ECPE Joint Research Programme (J. Koszescha, ECPE)
- 3 ECPE Project examples (3 university/institute speakers)
- Discussion (Q&A)

AWARD CEREMONY

18h30 Awards Ceremony

Chair: Vladimir Katic, University of Novi Sad, Serbia
Co-Chair: Jean-Luc Thomas, CNAM and SUPELEC, President of EPE Association

09:00 Keynote 2: TOSA concept: a full electric large capacity urban bus system **Location: Room 1**

Chair(s): Alfred Rufer, EPFL, Switzerland
Jean-Paul Burnet, CERN - European Organization for Nuclear Research - Switzerland

09:00 838 - KEYNOTE 2: TOSA concept: a full electric large capacity urban bus system
AUGE Olivier - ABB Secheron Ltd - Switzerland

09:30 Keynote 3: HYDROS project: from flying boat to energy efficiency **Location: Room 1**

Chair(s): Frédérick Bordry, CERN - European Organization for Nuclear Research, Switzerland
Drazen Dujic, Ecole Polytechnique Fédérale de Lausanne, Switzerland

09:30 839 - KEYNOTE 3: HYDROS project: from flying boat to energy efficiency
LAGARRIGUE Jérémie - Hydros Innovation - Switzerland

10:10 LS3a: Topic 2: Hard and Soft Switching Techniques **Location: Room 1**

Chair(s): Pat Wheeler, University of Nottingham, United Kingdom
Daniel Siemaszko, HEIG-VD, Switzerland

10:10 237 - A Four-level pi-type Converter for Low-voltage Applications
YUAN Xibo - University of Bristol - United Kingdom

10:30 471 - SiC and GaN Based BSNPC Inverter for Photovoltaic Systems
GURPINAR Emre, CASTELLAZZI Alberto - University of Nottingham - United Kingdom

10:50 574 - A Generalized Multilevel Inverter Topology with Stacked Coupled Inductors
FLORICAU Dan, KREINDLER Liviu - University PolitehnicA of Bucharest - Romania

11:10 787 - Non-isolated DC-DC Converter for High-Step-up Ratio Applications
MUHAMMAD Musbahu, ARMSTRONG Matthew, MOHAMMED Elgendy - Newcastle University - United Kingdom

10:10 LS3b: Topic 1: Active Components and New Materials **Location: Room 2**

Chair(s): Frédéric Morancho, Laboratoire d'Analyse et d'Architecture des Systèmes, France
Ralf Siemieniec, Infineon Technologies Austria AG, Austria

10:10 130 - New 1200V full SiC module with 800A rated current
WIESNER Eugen, MASUDA Koichi - Mitsubishi Electric Europe B.V. - Germany
JOKO Motonobu - Mitsubishi Electric CorporatioN Power Device Works - Japan

10:30 219 - A new package with Kelvin Source connection for increasing power density in power electronics design
CRISAFULLI Vittorio - ON Semiconductor - Germany

10:50 218 - Investigation of the Thermal Runaway of Silicon Carbide Diodes during Blocking Operation
BÖDEKER Christian, SILBER Dieter, VOGT Timo, KAMINSKI Nando - University of Bremen - Germany

11:10 299 - 6.5kV FREEDM-Pair: Ideal High Power Switch Capitalizing on Si and SiC
SONG Xiaoqing, HUANG Alex - North Carolina State University - United States of America

10:10 LS3c: Topic 4: Motion Control **Location: Room 3**
Chair(s): Ralph Kennel, Technische Universität München, Germany
Betty Semail, Laboratoire d'Electrotechnique et d'Electronique de Puissance, France

10:10 303 - A flexible and fast restart strategy for induction motors using a DVR
HUANG Wentao, SHAO Weihua, ZENG Zheng - Chongqing University - China RAN Li - The Univeristy of Warwick - United Kingdom HUANG Di, YANG Hua - Chongqing University - China

10:30 654 - Modeling and Optimized Control of Fault-Tolerant H-Bridge Fed Multiphase Drives
ROSEN Alexander - Fraunhofer Institute for Manufacturing Technology - Germany GRÖNINGER Michael - Fraunhofer IFAM - Germany MERTENS Axel - Leibniz University Hannover - Germany

10:50 56 - Additional Internal Speed Feedback Loop for Suppression of the Servomechanism Residual Vibration
LINDR David - Technical University of Liberec - Czech Republic

11:10 207 - High fidelity closed loop controlled friction in SMARTTAC tactile stimulator
BEN MESSAOUD Wael, AMBERG Michel, LEMAIRE-SEMAIL Betty, GIRAUD Frédéric - Universite de Lille 1 - France BUENO Marie-Ange - University of Haute-Alsace - France

10:10 LS3d: Topic 5: Renewables in the grid **Location: Room 4**
Chair(s): Hans-Günter Eckel, University Rostock, Germany
Per Karlsson, Höganäs AB, Sweden

10:10 447 - Harmonic Current Pollution Source Determination in a Grid Connected Wind Farm
PLOTKIN Juriy - Berlin School of Economics and Law - Germany PETRUSHIN Victor - Odessa National Polytechnic University - Ukraine REICHWALD Michael - E.DIS AG - Germany

10:30 598 - Wind Farm Contribution to Primary Frequency Control
SURYANA RAHMAT, HOFMANN Wilfried - TU Dresden - Germany

10:50 836 - Experience with primary reserve supplied from energy storage system
KJAER Philip, LAERKE Rasmus - Vestas Wind Systems - Denmark

11:10 35 - Effect evaluation of Li-ion battery for regenerative energy utilization in traction power supply system
HAYASHIYA Hitoshi, SUZUKI Takashi - East Japan Railway Company - Japan TAKAHASHI Hirotaka - Hitachi - Japan HINO Masami, HARA Daisuke, TOJO Masateru, SHIMADA Shigeo, KUDO Kishin - East Japan Railway Company - Japan KATO Tetsuya - Hitachi - Japan

10:10 LS3e: Topic 6: Power Electronics in Distribution Systems **Location: Room 5-6**

Chair(s): Sibylle Dieckerhoff, Technical University of Berlin, Germany
Axel Mertens, Leibniz University Hannover, Germany

10:10 77 - Evaluation of Topologies and Optimal Design of a Hybrid Distribution Transformer
BURKARD Johannes, BIELA Juergen - ETH Zurich - Switzerland

10:30 334 - Extended Power Control for Distributed Generation Units
DIETZ René, MERTENS Axel - Leibniz University Hannover - Germany

10:50 539 - Prototype of Power Electronics Transformer for Smart Grid Application Prototype of Smart Energy Router for Distribution DC Grid
GAO Fanqiang, LI Zixin, WANG Ping, XU Fei, CHU Zunfang, SUN Zhandong, LI Yaohua - Chinese Academy of Sciences - China

11:10 581 - Zero sequence voltage suppression control with capacitor voltage balancing for a multilevel modular matrix converter
MIURA Yushi, INUBUSHI Keiji, ISE Toshifumi, YOSHIDA Tomoya, FUJIKAWA Takuya - Osaka University - Japan

11:50 LS4a: Topic 2: Advanced Power Converter Topologies (III) **Location: Room 1**

Chair(s): Drazen Dujic, Ecole Polytechnique Fédérale de Lausanne, Switzerland
Antti Kosonen, Lappeenranta University of Technology, Finland

11:50 420 - Dynamic Control and Dead-Time Compensation Method of an Isolated Dual-Active-Bridge DC-DC Converter
TAKAGI Kazuto, FUJITA Hideaki - Tokyo Institute of Technology - Japan

12:10 715 - Charge Compensation Modulation Method of Partial-Resonant AC-Link Three-Phase Inverter

PECELJ Ilija, FERREIRA Jan Abraham, DE HAAN Sjoerd - Delft University of Technology - Netherlands

12:30 773 - Identification of ZVS Soft Switching Boundaries for Three-Phase Dual Active Bridge Converters using Harmonic Analysis

RIEDEL Jan - Robert Bosch (SEA) PTE Ltd - Singapore TEIXEIRA Carlos, HOLMES Donald Grahame, MCGRATH Brendan - RMIT University Melbourne - Australia

12:50 556 - Three-phase Unidirectional DELTA-Switch Multistate Switching Cells-Based Multilevel Rectifier

SOEIRO Thiago - ABB Switzerland Ltd - Switzerland ORTMANN Marcio, HELDWEIN Marcelo - Universidade Federal de Santa Catarina - Brazil

11:50 LS4b: Topic 1: Power System Integration, packaging & thermal management **Location: Room 2**

Chair(s): Enrique Dede, University Valencia, Spain
Leo Lorenz, ECPE European Center for Power Electronics E.V., Germany

11:50 585 - CMOS Gate Driver with Integrated Optical receiver for Power Electronics applications

LE Thanh Long, COLIN Davy, CREBIER Jean-Christophe, ROUGER Nicolas - Grenoble Electrical Engineering Lab (G2ELAB) - France

12:10 672 - An improved and low-resistive package for high-current power MOSFET

WALTER Ralf, SIEMIENIEC Ralf, HOJA Marion - Infineon Technologies Austria AG - Austria

12:30 65 - Differential-Mode Oscillations between parallel IGBTs in Power Modules

SPANG Matthias, BUETOW Sven, KATZENBERGER Guenter - Semikron Elektronik GmbH & Co. KG - Germany

12:50 461 - In-situ Health Monitoring of Power Converter Modules for Preventive Maintenance and Improved Availability

ALIYU Attahir, CHOWDHURY Shajjad, CASTELLAZZI Alberto - The University of Nottingham - United Kingdom

11:50 LS4c: Topic 4: High Performance Adjustable Speed Drives **Location: Room 3**

Chair(s): Robert Lorenz, University of Wisconsin-Madison, United States of America
Walter Schumacher, TU Braunschweig, Germany

11:50 175 - An Electrolytic Capacitor-less IPMSM Drive with Input Current Shaping Based on the Predictive Control

XUAN Shengxiexian, GAO Qiang, WANG Yong, CAI Xu - Shanghai Jiao Tong University - China LUO Ling - LG Electronic China R&D Center - China

12:10 546 - A PI resonant current controller for an open-end winding induction machine fed by an indirect matrix converter

RIEDEMANN Javier, MELIN Pedro - University of BIO-BIO - Chile PENA Rubén - University of Concepcion - Chile CLARE Jon, WHEELER Patrick - University of Nottingham - United Kingdom BLASCO-GIMENEZ Ramón - Technical University of Valencia - Spain

12:30 652 - Optimum Efficiency Control of Interior Permanent Magnet Synchronous Motors in Drive Trains of Electric and Hybrid Vehicles

PETERS Wilhelm, WALLSCHEID Oliver, BÖCKER Joachim - Paderborn University - Germany

12:50 680 - Analysis and Compensation of Band-Pass-Filter Delay for a High Frequency Signal Injected Sensorless Control

KIM Sang-il, KIM Rae-Young - Hanyang University - Korea (Republic of)

11:50 LS4d: Topic 5: Wind Energy Systems **Location: Room 4**

Chair(s): Ionut Trintis, Aalborg University, Denmark
Vladimir Katic, University of Novi Sad, Faculty of Technical Sciences, Serbia

11:50 48 - Linear Interpolation Model Predictive Control of Large Wind Turbines for Blade Asymmetric Fatigue Loads Mitigation

YANG Wentao, GENG Hua - Tsinghua University - China XIAO Shuai - Beijing Institute of Control Engineering - China YANG Geng - Tsinghua University - China

12:10 633 - A Review of Failure Mechanisms in Wind Turbine Generator Systems

SHIPURKAR Udai - Delft University of Technology - Netherlands BLAABJERG Frede - Aalborg University - Denmark POLINDER Henk, FERREIRA Jan Abraham - Delft University of Technology – Netherlands - MA Ke - Aalborg University - Denmark

12:30 758 - Impedance Modeling of Doubly-Fed Induction Generators

VIETO Ignacio, SUN Jian - Rensselaer Polytechnic Institute - United States of America

12:50 162 - Analysis on Controller of Grid-Connected Inverter by Using Virtual Circuit

ZENG Zheng, RAN Li, LI Hui, SHAO Weihua, LIU Qingyang, ZHAO Weifang - Chongqing University - China

11:50 LS4e: Topic 6: HVDC and FACTS **Location: Room 5-6**

Chair(s): Remus Teodorescu, Aalborg University, Denmark
Felix Kammerer, Karlsruhe Institute of Technology, Germany Lecture

11:50 89 - Electrical Type Tests for the Voltage Sourced Converter Valves based on Modular Multi-Level Converter

XU Tianning, JONES Phil, DAVIDSON Colin - Alstom Grid - United Kingdom

12:10 132 - Double modulation control (DMC) for dual H-bridge current flow controller (2B-CFC)

HASSAN Fainan - Smarter Grid Solutions - United Kingdom KING Rose, WHITEHOUSE Robert, BARKER Carl - Alstom Grid - United Kingdom

12:30 820 - Study of the MMC Circulating Current for Optimal Operation Mode in HVDC Applications

MARCHESONI Mario, VACCARO Luis - University of Genova - Italy

12:50 666 - Modular Multilevel Converter Based LCL DC/DC Converter for High Power DC Transmission Grids

ABOUSHADY Ahmed, AHMED Khaled, JOVCIC Dragan - University of Aberdeen - United Kingdom

11:50 LS4f: Topic 9: Industry Specific Energy Conversion and Conditionning Technologies (I) **Location: Room 18**

Chair(s): Sjoerd Bosga, ABB AB, Corporate Research, Sweden
Martin Doppelbauer, Karlsruhe Institute of Technology, Germany

11:50 40 - Power electronics for a sealed container pasteurization working by electric resonance: first prototype experimental results

CARPITA Mauro, KISSLING Simon, GAVIN Serge - Haute Ecole d'Ingenieurie et de Gestion - Switzerland

12:10 278 - Grid Interface Design for the Compact Linear Collider (CLIC)

JANKOVIC Marija, WATSON Alan, CLARE Jon, WHEELER Patrick - University of Nottingham - United Kingdom AGUGLIA Davide - CERN - European Organization for Nuclear Research - Switzerland

12:30 497 - Control of a Modular Series Parallel Resonant Converter System for a Solid State 2.88MW/115-kV Long Pulse Modulator

JARITZ Michael, ROGG Tobias, BIELA Juergen - Lab for High Power Electronics Systems, ETH Zurich - Switzerland

12:50 749 - Control of an Active Bouncer for an Ultra Precise 140µs-Solid State Modulator System

BLUME Sebastian, JEHLE Andreas, SCHMID Yves, BIELA Juergen - ETH Zürich - Switzerland

14:50 DS2a: Topic 1: Active Components **Location:**
Chair(s): Francesco Iannuzzo, Aalborg University, Denmark

71 - Investigation of Parasitic Turn-ON in Silicon IGBT and Silicon Carbide MOSFET Devices: A Technology Evaluation **Panel A1.1**
JAHDI SAEED, ALATISE Olayiwola, ORTIZ-GONZALEZ Jose, RAN Li, MAWBY Philip, GAMMON Peter - The University of Warwick - United Kingdom

88 - Static and Dynamic Analysis of SiC Based Commercial MOSFET Power Modules **Panel A1.2**
NAWAZ Muhammad, CHEN NAN - ABB Corporate Research Centre - Sweden

104 - Application of proton irradiation with energy over 10 MeV for reverse recovery characteristics control of high voltage freewheeling diodes **Panel A1.3**
SURMA Alexey, PISAREV Alexandr, CHERNIKOV Anatoly - JSC Proton-Electrotex - Russian Federation

170 - The Effect of Different Stray Inductances on the Performance of Various Types of IGBTs - Is Less Always Better? **Panel A1.4**
HAIN Stefan, BAKRAN Mark-M. - University Bayreuth - Germany JÄGER Christian, NIEDER-NOSTHEIDE Franz-Josef, DOMES Daniel, HEER Daniel - Infineon Technologies - Germany

233 - Implementation of the NIST IGBT Model based on Ordinary Differential Equations **Panel A2.1**
FELDERER Niklaus, LUO Min - Plexim Inc. - Switzerland

246 - A new 3 level 4in1 T-type IGBT module with low internal inductance and optimized 6.1st / 7th generation 1200V/650V chipset for UPS and PV inverter application **Panel A2.2**
HONSBERG Marco - Mitsubishi Electric Europe B.V. - Germany GOTO Akiko - Mitsubishi Electric Corporation Power Device Works - Japan MOTTO Eric R. - Powerex INC. - United States of America RADKE Thomas - Mitsubishi Electric Europe B.V. - Germany

277 - Characterization and Evaluation of SiC Devices for DC-DC Power Supply Applications **Panel A2.3**
MIGUEL EDUARDO, BARAIA Igor - University of Mondragon - Spain

326 - Interaction between IGBT, diode and parasitic Inductances during Short-Circuit Type 3 **Panel A2.4**
FUHRMANN Jan, ECKEL Hans-Günter - University of Rostock - Germany

441 - The Single Reference Bi-Directional GaN HEMT AC Switch **Panel A3.1**
BERGOGNE Dominique, LADHARI Othman, STERNA Leo - CEA-LETI - France

601 - 10kV SiC MOSFET split output power module **Panel A3.2**
BECZKOWSKI Szymon, ENI Emanuel-Petre, UHRENFELDT Christian, LI Helong, MUNK-NIELSEN Stig - Aalborg University - Denmark

671 - Soft Recovery Diodes with Snappy Behavior **Panel A3.3**
LOSEE Peter - GE Global Research - United States of America MARI Jorge, CARASTRO Fabio, ZOELS Thomas, KELL Max-Josef, MENZEL Matthias, SCHUETZ Tobias - GE Global Research - Germany

686 - RC-IGBT-thyristor structure having trenches filled with dielectric on the backside: physical analysis and application to the integration of a multiphase generic power converter using the "two-chip" ap **Panel A4.1**
LALE Adem - LAAS-CNRS / LAPLACE - France BOURENNANE Abdelhakim - Laboratoire Analyse Architecture Système (LAAS) - France RICHARDEAU Frédéric - Laboratoire Plasma Conversion Energie (LAPLACE) - France

696 - Analysis of the three-chip switching cells approach for integrated multi-phase IGBT- based power converter **Panel A4.2**
LALE Adem, VIDEAU Nicolas - LAAS-CNRS / LAPLACE - France BOURENNANE Abdelhakim - Laboratoire Analyse Architecture Système (LAAS) - France RICHARDEAU Frédéric - Laboratoire Plasma Conversion Energie (LAPLACE) - France CHARLOT Samuel - LAAS-CNRS - France

789 - A Comprehensive Investigation on the Short Circuit Performance of MW-level IGBT Power Modules **Panel A3.4**
RUI Wu, REIGOSA Paula Diaz, IANNUZZO Francesco, WANG Huai, BLAABJERG Frede - Aalborg University - Denmark

14:50 DS2b: Topic 1: New Materials and Active Devices
Chair(s): Philip Mawby, University of Warwick, United Kingdom

86 - Optimized Switching of a SiC-MOSFET in a VSI using the Body Diode and additional Schottky Barrier Diode **Panel A4.3**
HORFF Roman, BAKRAN Mark-M. - University of Bayreuth - Germany LECHLER Martin - Siemens AG - Germany MÄRZ Andreas - University of Bayreuth - Germany

169 - Design Considerations and Laboratory Testing of Power Circuits for Parallel Operation of Silicon Carbide MOSFETs **Panel A4.4**
TIWARI Subhadra - Norwegian University of Science and Technology - Norway RABIEI Ali - Chalmers University of Technology - Sweden SHRESTHA Praveen, UNDELAND Tore, MIDTGÅRD Ole-Morten - Norwegian University of Science and Technology - Norway LUND Richard - Smartmotor AS, Part of the Rolls-Royce Group - Norway GYTRI Anders - Norwegian University of Science and Technology - Norway

194 - Finite Element Modelling and Experimental Characterisation of Paralleled SiC MOSFET Failure under Avalanche Mode Conduction **Panel A5.1**
HU JI, OLAYIWOLA Alatise, ALEXAKIS Petros, RAN Li, MAWBY Philip, ORTIZ-GONZALEZ Jose - University of Warwick - United Kingdom

235 - Behavioral Model of Gallium Nitride Normally ON Power HEMT Dedicated to Inverter Simulation and Test of Driving Strategies **Panel A5.2**

ROSSIGNOL Timothé - Laboratoire Plasma et Conversion d'Energie UMR5213 - France RICHARDEAU Frédéric, COUSINEAU Marc, BLAQUIERE Jean-Marc - LAPLACE - France ESCOFFIER René - CEA-LETI - France

309 - Temperature Effects on Performance of SiC Power Semiconductors (SiC JFET and SiC MOSFET) **Panel A5.3**

ZHU Ping - Nanjing University of Aeronautics & Astronautics - China ZHANG Jian-feng - Shanghai Marine Equipment Research Institute - China WANG Li, RUAN Li-gang - Nanjing University of Aeronautics & Astronautics - China

404 - Investigation of long-term parameter variations of SiC power MOSFETs **Panel A5.4**

SADIK Diane-Perle - KTH Royal Institute of Technology – Sweden
RANSTAD Per - Alstom - Sweden NEE Hans-Peter, LIM Jang-Kwon - KTH Royal Institute of Technology - Sweden

428 - Experimental Analysis and Modeling of GaN Normally-off HFETs with Trapping Effects **Panel A6.1**

BÖCKER Jan - Technische Universität Berlin – Germany
HILT Oliver - Ferdinand-Braun-Institut – Germany
JUST Hendrik - Technische Universität Berlin – Germany
WÜRFL Hans-Joachim - Ferdinand-Braun-Institut – Germany DIECKERHOFF Sibylle, BADAWI Nasser - Technische Universität Berlin – Germany

594 - Comparison of power losses in 1700V Si IGBT and SiC MOSFET modules including reverse conduction **Panel A6.2**

RABKOWSKI Jacek, PLATEK Tadeusz - Warsaw University of Technology - Poland

607 - Electrical performances and reliability of commercial SiC MOSFETs at high temperature and in SC conditions **Panel A6.3**

BERTHOU Maxime, TOURNIER Dominique, CHAILLOUX Thibaut, OUAIDA Remy - AMPERE Laboratory - France BROSSELARD Pierre - Caly Technologies - France OGE Sebastien - Thales - France

659 - JBS Power-Rectifiers for 1.7 kV Applications with Conduction Properties Close to Pure Schottky-Design **Panel A6.4**

BARTOLF Holger, MIHAILA Andrei, KNOLL Lars, SUNDARAMOORTHY Vinoth, MINAMISAWA Renato, BIANDA Enea - ABB Switzerland Ltd - Switzerland

683 - Short-Circuit Evaluation and Overcurrent Protection for SiC Power MOSFETs **Panel A7.1**

EIAL AWWAD Abdullah, DIECKERHOFF Sibylle - Technische Universität Berlin - Germany

827 - Investigation of Deep Levels in SiC-Schottky Diodes with Frequency Resolved Admittance Spectroscopy **Panel A7.2**

PERTERMANN Eric, LUTZ Josef - Technische Universität Chemnitz - Germany FELSL Hans-Peter, SCHULZE Hans-Joachim, NIEDERNOSTHEIDE Franz-Josef - Infineon Technologies - Germany HAZDRA Pavel, POPELKA S., SHARMA R. K. - Czech Technical University in Prague - Czech Republic

14:50 DS2d: Topic 2: Hard & Soft Switching Techniques

Chair(s): Stig Munk-Nielsen, Aalborg University, Denmark

99 - A New ZVT Snubber Cell for PWM-CCM-PFC Boost Converters **Panel A7.3**

YILDIRMAZ Suat, BODUR Haci - Yildiz Technical University - Turkey

133 - Optimal Switching of SiC Lateral MOSFETs **Panel A7.4**

VELANDER Erik, KRUSE Lennart - Bombardier Transportation Sweden AB - Sweden NEE Hans-Peter - KTH Royal Institute of Technology - Sweden

161 - A Novel ZCS Back-to-Back Current Source Converter for High Power Applications **Panel A8.1**

DE Dipankar, WU Bin - Ryerson University – Canada
ZARGARI Navid Reza - Rockwell Automation - Canada XU Dewei - Ryerson University - Canada

276 - Minimization of Leakage Ground Current in Transformerless Single-Phase Full-Bridge Photovoltaic Inverters **Panel A8.2**

KOUTROULIS Eftichios, ZOGRAFOS Dimitrios - Technical University of Crete - Greece BLAAB-JERG Frede, YANG Yongheng - Aalborg University - Denmark

352 - Complete Analytical Formulae of Inverter Power Loss under Infrequent Switching Condition **Panel A8.3**

FURUKAWA Kimihisa - Hitachi, Ltd. - Japan MIYAZAKI Hideki - Hitachi Automotive Systems, Ltd. - Japan

358 - Design Considerations of 1 MHz LLC Resonant Converter with GaN E-HEMT **Panel A8.4**

PARK Hwapyeong, JUNG Jeehoon - Ulsan National Institute of Science and Technology - Korea (Republic of)

477 - Sliding Mode Control of PV Powered DC/DC Buck-Boost Converter with Digital Signal Processor **Panel B1.1**

SAHIN Mustafa Ergin - RTE University - Turkey OKUMUS Halil Ibrahim, KAHVECI Hakan - KTU - Turkey

599 - The Effect of Circuit Parasitics on Resonant Switched Capacitor Converters **Panel B1.2**

TAGHIZADEH ESFANJANI Hassan, CROSS Andrew - Aston University - United Kingdom

631 - Experimental evaluation of SiC BJT and SiC MOSFET in a series resonant converter **Panel B1.3**

TOLSTOY Georg, COLMENARES Juan, NEE Hans-Peter - KTH Royal Institute of Technology - Sweden

669 - Optimum Switching States Determination for IGCT Based ANPC Topology **Panel B1.4**

COLAK Ilknur - ABB - Switzerland

734 - Modified Current Pulse Charging Method for Lead-Acid Batteries Based on Phase-Shift Full-Bridge Converter in UPS'S Family Applications **Panel B2.1**

CARDOSO Renato, MARTINS Mario Lucio da Silva, ANDRADE António M S S, SCHUCH Luciano, DALL PAI Marcel, TIBOLA Jonas Roberto - Federal University of Santa Maria - Brazil

781 - Switching Losses in a 1.7 kW GaN based Full-Bridge DC-DC Converter with Synchronous Rectification **Panel B2.2**

RAMACHANDRAN Rakesh, NYMAND Morten- University of Southern Denmark - Denmark

830 - Comparison study of Half-Bridge LCC and LLC Resonant DC-DC Converter with Wide Output Range **Panel B2.3**

MAO Saijun - General Electric - China POPOVIC Jelena - Delft University of Technology - Netherlands RAMABHADRA Ramanujam - GE Global Research - United States of America FERREIRA Jan Abraham - Delft University of Technology - Netherlands

14:50 DS2e: Topic 3: Measurement and Control

Chair(s): Eric Monmasson, University of Cergy-Pontoise, France

22 - Adjustable Field Weakening Control of High-Speed Permanent Magnet Motor for Industrial Application **Panel B2.4**

NAGATA Koichiro, KORI Daisuke, KATAYAMA Toshio - Hitachi, Ltd. - Japan

62 - A Novel Phase Locked Loop Scheme for Grid Voltage Synchronisation Using the Energy Operator **Panel B3.1**

NWOBU Chigozie John, CHONG Ben, ZHANG Li - University of Leeds - United Kingdom

80 - Observer-Based Online Parameter Estimation of Squirrel Cage Induction Machine based on a Gradient Descent Method **Panel B3.2**

KOUPENY Jaroslav, LÜCKE Stefan, MERTENS Axel - Leibniz University Hannover - Germany

190 - A new method for fault detection and identification of shadows based on electrical signature of defects **Panel B3.3**

BRESSAN Michael, ALONSO Corinne, EL-BASRI Youssef - LAAS-CNRS - France

257 - Control Interference of Electrical Machines with Double-Star Winding Systems Driven by Independent Current Controllers **Panel B3.4**

MESSAGER Gael, MINK Fabian, BINDER Andreas, WANG Jinou, BECKER Tim - Technische Universitaet Darmstadt - Germany

363 - Variable Speed Drive-Based Fan Impeller Contamination Build-Up Detection: Industrial Case Study **Panel B4.1**

TAMMINEN Jussi, PÖYHÖNEN Santeri, AHONEN Tero, AHOLA Jero - Lappeenranta University of Technology - Finland TIAINEN Toni - Finnsementti OY - Finland

368 - Impact of a non-conventional PWM strategy on the DC link film capacitor sizing **Panel B4.2**

ROUHANA Najib - Renault - France PATIN Nicolas, FRIEDRICH Guy - Université de Technologie de Compiegne - France

414 - Cascade Hinf Linear Parameter Varying Control of PMSM **Panel B4.3**

POHL Lukas, BUCHTA Ludek - Brno University of Technology - Czech Republic

429 - Control topologies for modular system **Panel B4.4**

KADLEC Josef, PATOCKA Miroslav - Brno University of Technology - Czech Republic

448 - High-Speed Sensorless Control of a Synchronous Reluctance Motor Based on an Extended Kalman Filter **Panel B5.1**

NGUYEN Duc-Quan, DAKHOUCHE Kada - IREENA - France LORON Luc - Polytech Nantes - France

483 - Enhanced Performance of SVC via Using Rotor Speed Deviation Signal (RSDS) **Panel B5.2**

GHORBANI Hamidreza, MONADI Mehdi, CANDELA Jose Ignacio, LUNA Alvaro, RODRIGUEZ Pedro - Universitat Politecnica de Catalunya - Spain

517 - Application of Subsynchronous Damping Controller to Static Var Compensator **Panel B5.3**

GHORBANI Hamidreza - Universitat Politecnica de Catalunya – Spain
ESMAEIL MOGHADAM Davoud - Technische Universität Dresden - Germany CANDELA Jose Ignacio, LUNA Alvaro, RODRIGUEZ Pedro - Universitat Politecnica de Catalunya - Spain

523 - Stability analysis of current and voltage resonant controllers for Voltage Source Converters **Panel B5.4**

HEREDERO-PERIS Daniel, SANCHEZ-SANCHEZ Enric, MONTESINOS-MIRACLE Daniel - CITCEA-UPC - Spain

527 - Applying Variable Inputs to Thermal Model of a Distribution Transformer **Panel B6.1**

SIADATAN Alireza, DEHGHANI MOINI Elham, SEDAGHAT Hosein - Shahid Beheshti University G.C. - Iran

545 - Vector control applied to a Langevin transducer **Panel B6.2**
GHENNA Sofiane, GIRAUD Frédéric - L2EP, Université Lille 1 - France GIRAUD-AUDINE Christophe - L2EP - Arts et Metiers Paristech - France AMBERG Michel, LEMAIRE-SEMAIL Betty - L2EP, Université Lille 1 - France

577 - Diagnostics of low-voltage power cables by using broadband impedance spectroscopy **Panel B6.3**
PINOMAA Antti, AHOLA Jero, KOSONEN Antti, AHONEN Tero - Lappeenranta University of Technology - Finland

625 - Control and design of a hybrid energy storage system **Panel B6.4**
DULOUT Jeremy, JAMMES Bruno, SEGUIER Lionel, ALONSO Corinne - LAAS-CNRS - France

675 - Measurement Challenges in Acoustic Emission Research of Semiconductors **Panel B7.1**
KÄRKKÄINEN Tommi, KUISMA Mikko, TALVITIE Joonas, SILVENTOINEN Pertti - Lappeenranta University of Technology - Finland MENGOTTI Elena - ABB Corporate Research Centre - Switzerland

682 - Performance Comparison of Phase Shifted PWM and Sorting Method for Modular Multilevel Converters **Panel B7.2**
REJAS Marcos, TEODORESCU Remus, MATHE Laszlo, BURLACU Paul Dan, SANGWONG-WANICH Ariya - Aalborg University - Denmark BONGIORNO Massimo - Chalmers University of Technology - Sweden PEREIRA Heverton - UFV-GESEP - Brazil

14:50 DS2f: Topic 4: Adjustable Speed Drives
Chair(s): Maria Pietrzak-David, LAPLACE, INPT-ENSEEIHT, France
Frédéric Giraud, L2EP / University Lille, France

5 - Real-time MTPA and Field-Weakening Method for IPMSM in the Full Speed Region **Panel B7.3**
LEE Eun-Woo, PARK Cheol-HyuN, KIM Jeong-Bin - LS Industrial Systems, Co., Ltd - Korea (Republic of)

32 - Energy efficiency of two-level and multilevel inverters - a drive system comparison **Panel B7.4**
MECKE Rudolf - Hochschule Harz University of Applied Sciences - Germany

140 - A compact servo drive: five phase, air cooled, with highly integrated inverter for industrial use **Panel B8.1**
WETTLAUFER Jan, JONSKY Torben, KLUTE Felix, BORCHERDING Holger - Lenze SE - Germany

155 - Voltage behind Reactance Modelling of Electronically Commutated DC Machines **Panel B8.2**
MUPAMBIREYI Ushe, CRANE Allan - GE Power Conversion Ltd - United Kingdom RAN Li, MAWBY Philip - The University of Warwick - United Kingdom

174 - Torsional Vibration in Large Adjustable Speed Drive Systems: Origin and Mitigation Methods **Panel B8.3**

BRUHA Martin - ABB - Switzerland PEROUTKA Zdenek - University of West Bohemia - Czech Republic

220 - Active Braking Schemes for Low and High Power Induction Machines using Loss Manipulation Deadbeat-Direct Torque and Flux Control **Panel B8.4**

WANG Yukai, LORENZ Robert - University of Wisconsin-Madison - United States of America NIIMURA Naoto - Toshiba Mitsubishi-Electric Industrial System Corp - Japan

221 - Sensorless Control of PMSM at Low Speed Range Using Reference Model **Panel C1.1**

URBANSKI Konrad - Poznan University of Technology - Poland

228 - Monitoring of non-return valve operation with a variable-speed drive **Panel C1.2**

AHONEN Tero, AHOLA Jero, TAMMINEN Jussi - Lappeenranta University of Technology - Finland SAUKKO Juha - ABB OY - Finland

321 - Sensorless Observer Based Hysteresis Control of a Transverse Flux Machine at Full Speed Range **Panel C1.3**

KENNEL Ralph - Technical University Munich - Germany BAUER Johannes Gabriel, KLEIMAIER Alexander - University of Applied Sciences Landshut - Germany

343 - Stator-Flux Orientation Vector Control of Hybrid Excited Axial Field Flux-Switching Machine **Panel C1.4**

ZHAO Jilong, LIN Mingyao, XU Da, JIN Long - Southeast University - China

366 - A Comparison of a Signal-Injection Method and a Discrete-Search Algorithm for MTPA Tracking Control of an IPM Machine **Panel C2.1**

WINDISCH Thomas, HOFMANN Wilfried - Dresden University of Technology - Germany

369 - Direct Torque Control with Feedback Linearization for Induction Motor Drives **Panel C2.2**

LASCU Cristian - Politehnica University of Timisoara - Romania BLAABJERG Frede - Aalborg University - Denmark JAFARZADEH Saeed - California State University Bakersfield - United States of America FADALI Sami - University of Nevada Reno - United States of America

443 - Automated design of non-overshooting PI controllers for IPMSM drive **Panel C2.3**

CHOTTIYANONT Pakorn, KONHIRUN Mongkol, LENWARI Wanchak - King Mongkut's University of Technology THonburi - Thailand

505 - New Earth-Fault Protection of AC-Drives with DC-Choke & DC-link Current Sensing **Panel C2.4**

ANDERSEN Henrik Rosendal, LIANG Xiao, WANG Shou, KUN Cai - Danfoss Power Electronics - China

520 - Extended Probability model for discharge activities in the drive train of converter-fed electric motors **Panel C3.1**

TISCHMACHER Hans, TSOUMAS Ioannis - Siemens AG - Germany FURTMANN Alexander - University of Hannover - Germany

529 - Application of Adaptive Neural Controller for Drive with Elastic Shaft and Variable Moment of Inertia **Panel C3.2**

ZAWIRSKI Krzysztof, TOMASZ Pajchrowski, NOWOPOLSKI Krzysztof - Poznan University of Technology - Poland

534 - Modeling and Sensorless Control of a Segmented PMSM **Panel C3.3**

LIN Chiao-Chien, TZOU Ying-Yu - National Chiao Tung University - Taiwan

538 - Simulation of Switched Reluctance Motor Power Electronics to Determine Device Ratings **Panel C3.4**

LOVATT Howard - Commonwealth Scientific and Inductrial Research OR - Australia

541 - A Modified Discretization Method for Discrete Full-Order Flux Observer of Induction Motor **Panel E1.1**

WANG Bo, YU Yong, SUN Wei, WANG Gaolin, XU Dianguo - Harbin Institute of Technology - China

542 - Control Of Multi-Mass System By On-Line Trained Neural Network Based On Kalman Filter **Panel E1.2**

TOMASZ Pajchrowski, DARIUSZ Janiszewski - Poznan University of Technology - Poland

547 - SOGI-based harmonic self-compensated sliding-mode observer for position sensorless IPMSM drives **Panel E1.3**

ZHANG Guoqiang, WANG Gaolin, XU Dianguo, NI Ronggang - Harbin Institute of Technology - China

606 - Three alternative methods to determine voltage source converter losses **Panel E1.4**

AARNIOVUORI Lassi, MUSIKKA Tatu, KOSONEN Antti, NIEMELÄ Markku, PYRHÖNEN Juha - Lappeenranta University of Technology - Finland

614 - Hardware in the Loop Methodologies for the Control of Dual-PMSM Connected in Parallel: FPGA Implementation and experimentation **Panel E2.1**

KHALDOUNE Sahri - Algeria - Algeria KHELOUI Abdelaziz - Ecole Militaire Polytechnique - Algeria FADEL Maurice, PIETRZAK-DAVID Maria - LAPLACE-INPT/ENSEEIHT - France

626 - Sensorless Control System of Induction Machine Supplied by Voltage Source Inverter with Output Filter **Panel E2.2**

MORAWIEC Marcin, GUZINSKI Jaroslaw - Gdansk University of Technology - Poland

638 - Estimating Current Derivatives for Sensorless Motor Drive Applications **Panel E2.3**

HIND David, SUMNER Mark, GERADA Christopher - The University of Nottingham - United Kingdom

655 - Torque Pulsation Reduction in Five Phase Induction Machine Drive **Panel E2.4**

CHOMAT Miroslav, SCHREIER Ludek, BENDL Jiri - Institute of Thermomechanics - Czech Republic

807 - Design Rules for Energy Efficient Servo Drives and Mechanical Systems on the Example of Cross Cutting Machines **Panel E3.1**

EVERS Chris, BENATH Kenneth - Dresden University of Technology - Germany BLÜMEL Rolf - Theegarten-Pactec GmbH & Co. KG - Germany HOFMANN Wilfried, MÜLLER Volkmar, SCHÜTZHOLD Jörg - Dresden University of Technology - Germany

14:50 DS2g: Topic 5: Renewable Energy and Storage Systems

Chair(s): Antoni Sudria Andreu, Universitat Politecnica de Catalunya, Spain

50 - Effect of the MPPT and SOC Control of the Charge Controller in PV System **Panel E3.2**

DUFO-LOPEZ Rodolfo, ARTAL-SEVIL Jesus Sergio, DOMINGUEZ-NAVARRO Jose Antonio, BERNAL-AGUSTIN Jose Luis - University of Zaragoza - Spain

78 - Design of a Bidirectional DC-DC Converter with High-Frequency Isolation for Battery Applications **Panel E3.3**

MARTINS António, SOBRADO Vitor, RAMOS Carlos, CARVALHO Adriano - University of Porto, Faculty of Engineering - Portugal

176 - A Two-level SOC Balance Strategy for a Novel Hybrid Energy Storage Topology **Panel E3.4**

CHANG Fengqi, ZHENG Zedong, LI Yongdong - Tsinghua University - China PENG Ling - China Ship Development and Design Center - China

350 - Stable Startup of Seamless Controlled Parallel Bidirectional DC/DC Converter **Panel E4.1**

OUCHI Takayuki, KANOUDA Akihiko - Hitachi, Ltd. - Japan TAKAHASHI Naoya - Hitachi Industry & Control Solutions, Ltd. - Japan MOTEKI Minoru - Hitachi Industrial Equipment Systems Co., Ltd. - JapaN

422 - Technology description and characterization of a low-cost flywheel for energy management in microgrids **Panel E4.2**

NAVARRO Gustavo, LAFOZ Marcos, BLANCO Marcos, MORENO-TORRES Pablo, TORRES Jorge - CIEMAT - Spain

445 - Lithium-ion battery model and experimental validation **Panel E4.3**
BERRUETA Alberto, URSÚA Alfredo, IRIGARAY Víctor, SANCHIS Pablo - Public University of Navarra - Spain

511 - Systematic Evaluation of Modular Multilevel Converter Topologies for Battery Energy Storage Systems Based on Split Batteries **Panel E4.4**
HILLERS Andre, STOJADINOVIC Milos, BIELA Juergen - Laboratory for High Power Electronics Systems- Switzerland

555 - Hybridization of electrical energy storage for intelligent integration of photovoltaics in electric networks **Panel E5.1**
ABBES Dhaker, HOUARI Azeddine - Ecole des Hautes Etudes d'Ingenieur (HEI) - France LABRUNIE Antoine - GB Solar - France ROBYNS Benoit - Ecole des Hautes Etudes d'Ingenieur (HEI) - France

582 - Practical Design Considerations of Cascaded Hybrid Battery Storage Systems **Panel E5.2**
MOSLEY Iain - Converter Technology - United Kingdom, STRICKLAND Dani - Aston University - United Kingdom MIDDLETON Anthony - Converter Technology - United Kingdom MUKHERJEE Nilanjan - Birmingham University - United Kingdom STONE David, GLADWIN Dan, ROGERS Daniel, FOSTER Martin - Sheffield University - United Kingdom

583 - Comparison of High Power Non-Isolated Multilevel DC-DC Converters for Medium-Voltage Battery Storage Applications **Panel E5.3**
STOJADINOVIC Milos, BIELA Juergen - Lab for High Power Electronics Systems, ETH Zurich - Switzerland

586 - Measurement Results of a Modular Energy Storage System unevenly equipped with Lithium-Ion Batteries **Panel E5.4**
SCHROEDER Markus, HENNINGER Stefan, SCHMITT Stefan, JAEGER Johann - Friedrich-Alexander-Universitaet Erlangen-Nuernberg - Germany RUBENBAUER Hubert - Siemens AG - Germany

592 - Extensive EIS Characterization of Commercially Available Lithium Polymer Battery Cell for Performance Modelling **Panel E6.1**
STANCIU Tiberiu, STROE Daniel, SWIERCZYNSKI Maciej, TEODORESCU Remus - Aalborg University - Denmark

637 - Characteristics Comparison of Interleaved Inductor-Coupled Double Dual Boost Converters **Panel E6.2**
HATSUYADO Haruka, HOSHI Nobukazu - Tokyo University of Science - Japan

692 - Control of a Solid Oxide Fuel Cell / Gas MicroTurbine hybrid system using a multilevel convertor **Panel E6.3**
VECHIU Ionel - ESTIA Institute of Technology – France, VINASSA Jean-Michel - IMS - France CAMBLONG Haritza - UPV/EHU - Spain BAUDOIN Sylvain - ESTIA Institute of Technology - France

790 - Distributed Cooperative Control of Multi Flywheel Energy Storage System for Electrical Vehicle Fast Charging Stations **Panel E6.4**

SUN BO, GUERRERO Josep, DRAGICEVIC Tomislav, VASQUEZ Juan - Aalborg University - Denmark

14:50 DS2h: Topic 6: Power Electronics in Transmission and Distribution Systems; HVDC & FACT's

Chair(s): Axel Mertens, Leibniz University Hannover, Germany
Vladimir Katic, University of Novi Sad, Faculty of Technical Sciences, Serbia

23 - System fault test of SiC device applied 6.6kV transformerless D-STATCOM **Panel E7.1**

KOYAMA Yushi, NAKAZAWA Yosuke, MOCHIKAWA Hiroshi, KUZUMAKI Atsuhiko - Toshiba Corporation - Japan OKADA Naotaka, SANO Kenichiro - CRIEPI - Japan

54 - A modular and scalable HVDC Current Flow Controller **Panel E7.2**

HOFMANN Viktor, BAKRAN Mark-M., SCHÖN André - University of Bayreuth - Germany

61 - A Modular Multilevel Flying Capacitor Converter-Based STATCOM for Reactive Power Control in Distribution Systems **Panel E7.3**

NWOBU Chigozie, OGHORADA Ogaga, EFIKA Ikenna, ZHANG LI - University of Leeds - United Kingdom

63 - Analysis and semiconductor based comparison of energy diverting converter topologies for HVDC transmission systems **Panel E7.4**

BIRKEL Andre, SCHOEN André, BAKRAN Mark-M. - University of Bayreuth - Germany

102 - Impact of different control algorithms on Modular Multilevel Converters electrical waveforms and losses **Panel E8.1**

GRUSON Francois - L2EP - Arts et Metiers Paristech - France SAMIMI Shabab - Ecole Centrale de Lille - L2EP - France DELARUE Philippe - Université de Lille 1 (USTL) - France GUILLAUD Xavier, FREYTES Julian - Ecole Centrale de Lille - L2EP - France COLAS Frédéric - L2EP - Arts et Metiers Paristech - France BELHAOUANE Moez Mohamed - Ecole Centrale de Lille - L2EP - France

153 - Analysis of Deviations on the Optimal Power Flow Operation of MTDC Networks: A Comparison between Droop Control and the DVC Strategy **Panel E8.2**

TEIXEIRA PINTO Rodrigo, ARAGÜÉS PEÑALBA Mònica, SUMPER Andreas, GOMIS-BELLMUNT Oriol - CITCEA-UPC - Spain BAUER Pavol - Delft University of Technology - Netherlands

158 - Extension of Power Transmission Capacity in MMC-based HVDC Systems through Dynamic Temperature-Dependent Current Limits **Panel E8.3**

GONCALVES Jorge, ROGERS Daniel, LIANG Jun - Cardiff University - United Kingdom

216 - Power Module Voltage Balancing Method for a ±350 kV/ 1000 MW Modular Multilevel Converter **Panel E8.4**

LI Zixin - Institute of Electrical Engineering, CAS - China CHU Zunfang, LI Yaohua, WANG Ping, GAO Fanqiang, XU Fei - Chinese Academy of Sciences - China

253 - Individual Capacitor Voltage Balancing in H-bridge Cascaded Multilevel STATCOM at Zero Current Operating Mode **Panel E9.1**

BEHROUZIAN Ehsan, BONGIORNO Massimo - Chalmers University of Technology - Sweden TEODORESCU Remus - Aalborg University - Denmark HASLER Jean-Philippe - ABB AB - Sweden

263 - Operation Range of HVDC-MMC with Circulating Current Suppression and Energy Balancing Control **Panel E9.2**

THE Andrew, FREUDENBERG Benjamin, DIECKERHOFF Sibylle - Technische Universität Berlin - GERMANY FISCHER Wilfried, VAHRENHOLT Volker, STORNOWSKI Reinhard, WILDMANN Manuel - 50Hertz Transmission GmbH - Germany

339 - Current–fed GaN Front–end converter for ISOP–IPOS converter–based high power density DC distribution system **Panel E9.3**

HAYASHI Yusuke, ISO Hiroshi, HARA Daisuke - Osaka University - Japan MATSUMOTO Akira - NTT Facilities - Japan

410 - Operation of a Five-level Current Source Converter based PV Power Plant as a STATCOM **Panel E9.4**

VEKHANDE Vishal, FERNANDES B. G. - Indian Institute of Technology Bombay - India

455 - Instantaneous Active and Reactive Power in Six-Phase Systems **Panel D1.1**

MUSSA Samir Ahmad, ARBUGERI Cesar Augusto, LAZZARIN Telles Brunelli - Federal University of Santa Catarina - Brazil

457 - Active Filtering Based Current Injection Method for Multi Modal SSR damping in an AC/DC System **Panel D1.2**

JOSEPH Tibin - Cardiff University - United Kingdom COVENTRY Paul - National Grid - United Kingdom E. UGALDE-LOO Carlos, LIANG Jun - Cardiff University - United Kingdom

476 - Modular DC/DC Structure with Multiple Power Flow Paths for Smart Transformer Applications **Panel D1.3**

BUTICCHI Giampaolo, ANDRESEN Markus, COSTA Levy, LISERRE Marco - CAU - University of Kiel - Germany

535 - Direct and indirect adaptive control for synchronous generator semiconductor's excitation system **Panel D1.4**

RITONJA Jozef - University of Maribor, FERI - Slovenia

557 - Local and primary controls of a Multi-terminal HVDC grid in an experimental setup **Panel D2.1**

JIMENEZ CARRIZOSA Miguel - Systems and Signals Laboratory Supelec - France ARZANDE Amir - Supelec - France BENCHAIB Abdelkrim - Alstom Grid - France DAMM Gilney - LSS Supelec - France BERNE Erik, EGROT Philippe - EDF - France VANNIER Jean-Claude - Supelec - France LAMNABHI-LAGARRIGUE Francoise - LSS Supelec - France

604 - Conception of a Modular Multilevel Converter in a Multi Terminal DC/AC transmission network **Panel D2.2**

SIEMASZKO Daniel, CARPITA Mauro - Haute Ecole d'Ingenieurie et de Gestion - Switzerland FAVRE-PERROD Patrick - HEFR - Switzerland

664 - Limitations of the H-Bridge Multilevel STATCOMs in Compensation of Current Imbalance **Panel D2.3**

BASIC Duro, GESKE Martin - General Electric Power Conversion - Germany SCHROEDER Stefan - General Electric Global Research Europe - Germany

668 - Decentral control of a multi-terminal HVDC system with automatic exchange of instantaneous and primary reserve power across AC grids **Panel D2.4**

FEIN Florian, ORLIK Bernd, BORECKI Jacek, GROKE Holger - University of Bremen - Germany

695 - High power, High-Boost, Resonant-Type DC-DC Converters as Power Interfaces for Interconnecting Wind Generators to Main Grids from MV DC Collectors: Design and Performance Evaluation in Steady State **Panel D3.1**

ANAYA-RUIZ G.-Adolfo, ZUÑIGA-GARCIA Liza Gabriela, MORENO-GOYTIA Edgar Lenimirco, UGALDE-CABALLERO Luis Eduardo, VENEGAS-REBOLLAR Vicente - Programa de Graduados de Investigación en Ingenier - Mexico

700 - Scaling method for a multi-terminal DC experimental test rig **Panel D3.2**

CHEAH-MANE Marc, ADEUYI Oluwole Daniel, LIANG Jun, JENKINS Nick - Cardiff University - United Kingdom

744 - AC line voltage controller for grid integration of renewable energy sources **Panel D3.3**

GERMANIER Alain, ROGGO Dominique, BINER Hans-Peter - HES-SO//Valais - Switzerland

832 - Side-by-side connection of LCC-HVDC links to form a DC grid **Panel D3.4**

LIU Yingmei - China Electric Power Research Institute - China LI Chuanyue, LIANG Jun - Cardiff University - United Kingdom MU Qing - China ElectriC Power Research Institute - China

14:50 DS2i: Topic 9: Specific Energy Conversion and Conditioning Technologies in Physics Research and Related Applications

Chair(s): Sandro Tenconi, OCEM - Energy TEchnology SRL, Italy

152 - EMI filter design of a DC-fed motor-drives using behavioral EMI models **Panel D4.1**

BISHNOI Hemant - ABB Corporate Research Centre - Switzerland BURGOS Rolando, BOROYEVICH Dushan - CPES - Virginia Tech - United States of America MATTAVELLI Paolo - Università degli Studi di Padova - Italy

159 - Inductive Adders for Replacing Thyratron-Based Modulators at CERN **Panel D4.2**

BARNES Michael - Conseil Européen pour la Recherche Nucléaire - Switzerland HOLMA Janne, DUCIMETIERE Laurent, GODDARD Brennan, FOWLER Tony, KRAMER Thomas - CERN - European Organization for Nuclear Research - Switzerland

248 - A 72 kVA very fast four-quadrant converter based on hybrid Si-SiC IGBTs **Panel D4.3**

FERRO Alberto - Consorzio RFX - Italy MASSARELLI Emanuele - Equipaggiamenti Elettronici Industriali S.P.A. - Italy GAIO Elena - Consorzio RFX - Italy TOMASINI Matteo, MILANI Paolo - Equipaggiamenti Elettronici Industriali S.P.A. - Italy MATSUKAWA Makoto - Japan Atomic Energy Agency - Japan NOVELLO Luca - Fusion for Energy - Germany

264 - Design Process and Series Production of the Intersection Control Rack for the European XFEL Linear Accelerator **Panel D4.4**

MORENO-TORRES Pablo, VAZQUEZ Cristina, MOLINA Eduardo, GUIRAO Angel, MUNILLA Javier, TORAL Fernando, CELA Jose Manuel, MARTINEZ Luis Miguel - CIEMAT - Spain

673 - Solid-state power converter repeatability analysis **Panel D5.1**

DAL GOBBO Anthony, AGUGLIA Davide - CERN - European Organization for Nuclear Research - Switzerland

676 - Efficient Hybrid Optimal Design Method for Power Electronics Converters **Panel D5.2**

CABALEIRO MAGALLANES Francisco, AGUGLIA Davide - CERN - European Organization for Nuclear Research – Switzerland
VIAROUGE Philippe, CROS Jérôme - Laval University - Canada

678 - Novel Active bouncer Topology for klystron modulators based on pulsed transformers **Panel D5.3**

CABALEIRO MAGALLANES Francisco, AGUGLIA Davide - CERN - European Organization for Nuclear Research - Switzerland VIAROUGE Philippe, CROS Jérôme - Laval University - Canada

691 - Reversible Current Power Supply for Fast-Field Cycling Nuclear Magnetic Resonance Equipment **Panel D5.4**

ROQUE António - ESTSETUBAL/IPS - Portugal SOUSA Duarte, LIMA Marco - Instituto Superior Técnico – Portugal, MARGATO Elmano - ISEL/IPL - Portugal

721 - Power Converter Topologies with Energy Recovery and Grid Power Limitation for Inductive Load Applications **Panel D6.1**

ROSSINI Stefano, LEGODEC Gilles - CERN - European Organization for Nuclear Research - Switzerland MAESTRI Sebastian, RETEGUI Rogelio Garcia - Laboratorio de Instrumentacion y Control - Argentina PAPASTERGIOU Konstantinos - CERN - European Organization for Nuclear Research - Switzerland

780 - FEA identification of high order generalized equivalent circuits for MF high voltage transformers **Panel D6.2**

CANDOLFI Sylvain, VIAROUGE Philippe - Laval University - Canada AGUGLIA Davide - CERN - European Organization for Nuclear Research – Switzerland
CROS Jérôme - Laval University - Canada

788 - Design Solutions for Compact High Current Pulse Transformers for Particles Accelerators' Magnets Powering **Panel D6.3**

AGUGLIA Davide, CRAVERO Jean-Marc - CERN - European Organization for Nuclear Research - Switzerland REBESCHINI Renato, RUSSO Carlo, IOVIENO Salvatore - Trasfor SA - Switzerland

WORKSHOPS

16.00 Batteries 2020 consortium **Location: Room 2**

Towards the next generation of high-energy lithium ion cells for hybrid and electric vehicles

Programme:

– Introduction to rechargeable batteries and lithium-ion battery technology (ISEA, 20 mins)

The first part of the workshop gives a short overview of the most common battery technologies and a motivation, why lithium ion batteries are the most feasible for electric vehicle applications. Energy density, working voltage, safety, price and other characteristics will be discussed for a comparison of the technologies.
The basic working principle of a lithium ion battery is explained and a short excurse to the possible combination of active materials is given. All information, necessary to understand the subsequent program points will be discussed. The trends of the development and also an outlook to systems with higher energy density will be taken.

– Development and improvements of a battery (IK4, 20 mins)

The strategies that are being followed within the Batteries 2020 project in order to increase the lifetime and energy density of large format lithium ion batteries towards the goals tar-

geted for automotive batteries, i.e., a lifetime of 4000 cycles at 80% DOD and an energy density of 250 Wh /kg, will be introduced. These strategies include (i) the development of highly focused materials, (ii) the understanding of ageing and degradation phenomena, and (iii) routes to reduce battery cost.

Cathode materials based on nickel/manganese/cobalt (NMC) oxides are being improved as such materials have a high chance to be up-scaled and commercialized near-term. The improvements will somehow rely on the deep understanding of ageing phenomena and degradation mechanisms to be gained during the Batteries 2020 project. A wide number of tests are currently being performed in order to identify critical parameters that affect lifetime battery performance. This identification should help effectively improving materials, system and the development of materials selection criteria. Finally, because battery cost is a major barrier to EV market, the potentiality of reducing costs and recycling batteries for providing viable project outputs is being analyzed.

– Ageing effects of lithium-ion batteries and the stress factors (ISEA, 20 mins)

For applications like electric vehicles or stationary storage the lifetime and reliability of the storage system is one of the most important factors. The economic use in mobile applications depends on the batteries, because the storage system is the most expensive component in the drive train. A decreased driving range of a loss of power is in most applications not acceptable, so that a change of the battery system would be necessary. To prevent this scenario a good understanding of the ageing effects and the stress parameters is important. To get this inside, a detailed explanation of the occurring ageing effects in lithium ion cells will be given. This starts with the physical ageing effects ant the electrodes and the electrolyte, continues with the influence on the electric, thermal and safety behavior. For all this, examples of commercial cells will be given, to have an overview of the performance of the state of the art lithium ion batteries.
The combination of power electronics and batteries leads to a lot of open questions, especially the ageing due to induced ripple current from the inverters is a very interesting topic and research strategies and theories will be discussed. Beside the material development the research focuses on the ageing behavior of batteries.

– How to model a battery, is a source and a resistance enough? (VUB, 25 mins)

Accurate battery models are essential for the development and implementation of novel battery technologies and their applications. Further, battery models can help for understanding the behaviour of batteries under different operating conditions and for developing efficient battery management systems. Battery models can shorten the development process and improve optimal usage of batteries and achieve best lifetime for a given application.

Different dedicated battery models have been developed, from different physical viewpoints: electrical battery models, electrochemical battery models and thermal battery models. These

different battery models allow describing and predicting both the short-term and mid-term behaviour of the battery cells. Further, a lifetime model is being developed and allows predicting the state of health of the battery as a function of different working conditions.

The different steps in the modelling activities and results will be elaborated for each of the different models. In the characterisation step, dedicated cell characterisation tests have been performed, allowing determining the required model parameters. Sometimes, some model parameters cannot be measured (accurately or easily) and therefor, some estimation techniques can be applied. Some parameters are more important than other, and dedicated sensitivity analysis can help to rank and prioritize the model parameters.

Finally, each of the models are validated and evaluated through specific validation tests and analysis.

– Requirements of the application for a battery (IK4, 20 mins)

The application addressed within this workshop covers the use of lithium-ion batteries in hybrid and electric vehicles. The most common battery solutions for such applications will be shown. The objective of this part of the workshop will be to learn how the application requirements translate into battery requirements. Answers will be provided to common questions like: how can the loads for the battery be determined? What is the typical battery pack voltage?
Finally, typical driving profiles and consequent stress conditions for batteries will be explained. The usage of such information within the Batteries2020 project in order to define aging matrices and lifetime validation procedures will be introduced.

– Making li-ion batteries more profitable: Second life of a battery to decrease the total cost of ownership (AAU, 25 mins; presented by: Tiberiu Stanciu)

Aged EVs batteries have the potential to be reused in the second life applications. This may increase the residual battery value and reduce the total cost of battery ownership.

In order to achieve it, two most promising second life applications of li-ion batteries were identified together with their mission profiles. Moreover, the optimal storage size was determined for each of these applications by applying a techno-economic optimization procedure.

Furthermore, battery cells considered as retired for the first life applications will be aged under previously determined mission profiles in order to quantify their degradation rate and the discrepancies between them. Second life ageing will be performed at battery cell level but also in both homogenous and heterogeneous battery stacks.

Several li-ion battery cells from the second life ageing tests will be selected for post-mortem analysis in order to better understand the ageing processes in the selected second life applications and improve accuracy of the lifetime model.

16.00 Consequences of the "Global Economy" and "Planned Economies" on the future of Power Electronics in Europe **Location: Room 3**

Discussion led by Roger Bassett, University of Warwick, UK
Panelists: Leo Lorenz, Frede Blaabjerg, Phil Mawby and others

EPE has decided to start the discussion work towards the production of "White Papers" on Power Electronics (PE) which inform EPE members and are presented to governments and the EU Commission to extol the virtues of new technologies or promote action to adopt strategies to enhance the world leading position of PE in the EU.
A particular topic which will be raised for discussion will be "The effect of Short Termism on Power Electronics".

In order to step up Europe's (as a whole) game in technology we need funding at the basic underpinning research level – this means right down to the component level but includes also fundamental circuit design and systems level development. As a "cross cutting technology" which effects lots of applications PE is particularly important in many fields from microelectronics to power generation and supply. Unfortunately, in Europe governments today have a strong tendency to fund applications only close to market and ones with definitive benefit which can be sold to the "electorate". They do not spend enough investment in supporting basic science and technology in comparison to more planned economies. Instead funded projects "buy in" the technology from outside Europe. This works well in the short term as it gets results, but in the long term it is disastrous as basic knowhow leaks away and Europe will be left with little or no understanding of the underlying technology. Eventually Europe will become reliant on equipment and services supplied from elsewhere which it has no control over or meets its needs. Europe will become uncompetitive and an economic wasteland with disastrous social consequences.

As EPE is one of the most important EU forums in PE it has been decided to propose the development of roadmaps for power electronic research to be published in a series of "White Papers" to help penetrating governmental bodies, strengthen the community and avoid economic disaster.

This workshop will launch the initiative.

Thursday 10 September 2015 Closing session, keynote 4 and lecture session 5

09:00 Closing Session **Location: Room 1**

Chair(s): The President of EPE Association
Frédérick Bordry, CERN - European Organization for Nuclear Research, Switzerland

09:30 Keynote 4: ITER: Fusion challenge and technologies **Location: Room 1**

Chair(s): Alfred Rufer, EPFL, Switzerland
Jean-Paul Burnet, CERN - European Organization for Nuclear Research - Switzerland

09:30 840 - KEYNOTE 4: ITER: Fusion challenge and technologies

TRAN Minh Quang - EPFL - Switzerland

10:10 LS5a: Topic 2: Advanced Power Converter Topologies (IV) **Location: Room 1**

Chair(s): Alfred Rufer, EPFL, Switzerland
Michael Braun, Karlsruher Institut für Technologie, Germany

10:10 605 - Optimised Operating Range of Modular Multilevel Converters for AC/AC Conversion with failed Modules

KUCKA Jakub, KARWATZKI Dennis, MERTENS Axel - Leibniz University Hannover - Germany

10:30 192 - Eight-level DC-AC Converter using Four-Switch Extended Commutation Cells

LEMMEN Erik, VAN DUIVENBODE Jeroen, DUARTE Jorge - EIndhoven University of Technology - Netherlands

10:50 337 - POPS: the 60MW power converter for the PS accelerator. Control strategy and performances

BOATTINI Fulvio, BURNET Jean-Paul, SKAWINSKY Gregory - CERN - European Organization for Nuclear Research - Switzerland

11:10 611 - An AC-DC Multilevel Converter Feasible for Traction Applications

HONORIO Dalton, OLIVEIRA Demercil, BARRETO Luiz - Federal University of Ceara - Brazil

10:10 LS5b: Topic 1: Active Components **Location: Room 2**

Chair(s): Philip Mawby, University of Warwick, United Kingdom
Sandro Tenconi, OCEM - Energy Technology SRL, Italy

10:10 108 - The compact and high power density 7th generation IGBT module

THEISEN Alexander - Fuji Electric Europe GmbH - Germany KAWABATA Junya, KUSUNOKI Yoshiyuki, ONOZAWA Yuichi, NISHIMURA Yoshitaka, KOBAYASHI Yasuyuki, IKAWA Osamu - Fuji Electric Co.,Ltd - Japan

10:30 193 - Physics Based Modelling and Experimental Characterisation of Parasitic Turn-On in IGBTs

BONYADI Roozbeh - The University of Warwick - United Kingdom MICHAELIDES Alexandros - Jaguar Land Rover - United Kingdom ALATISE Olayiwola, JAHDI Saeed, ORTIZ-GONZALEZ Jose, RAN Li, MAWBY Philip, DAVLETZHANOVA Zarina - The University of Warwick - United Kingdom

10:50 518 - Diode snappiness from a user's perspective

MARI Jorge, ZOELS Thomas, CARASTRO Fabio, KELL Max-Josef - GE Global Research - Germany LOSEE Peter - GE Global Research - United States of America

11:10 755 - Recent Advancements in IGCT Technologies for High Power Electronics Applications

VEMULAPATI Umamaheswara, RAHIMO Munaf, ARNOLD MARTIN, VOBECKY Jan, WIKSTRÖM Tobias, STIASNY Thomas, BACKLUND Bjoern - ABB - Switzerland

10:10 LS5c: Topic 4: Electrical machines (III) **Location: Room 3**

Chair(s): Philippe Lataire, Vrije Universiteit Brussel, Belgium
Ingo Hahn, Friedrich-Alexander University Erlangen-Nürnberg, Germany

10:10 113 - Modeling and control of a stand alone Cascaded Doubly Fed Induction Generator supplying an isolated load

EL ACHKAR Maria - University of Cergy-Pontoise - France SALLOUM Georges, MBAYED Rita - Lebanese University - Lebanon PATIN Nicolas - University of Technology of Compiegne - France LE BALLOIS Sandrine, MONMASSON Eric - University of Cergy-Pontoise - France

10:30 137 - Modeling and Parameter Identification of Multiphase Permanent Magnet Synchronous Motors Including Saturation Effects

JONSKY Torben, STICHWEH Heiko, WETTLAUFER Janj THEßELING Matthias - Lenze SE - Germany QUATTRONE Francesco - Leibniz University Hannover - Germany

10:50 205 - Modeling and harmonic analysis a permanent magnet synchronous machine with turn-to-turn fault

HÄRSJÖ Joachim, BONGIORNO Massimo - Chalmers University of Technology - Sweden

11:10 662 - Improvement of the Ground-Fault Detection in Field Windings of Synchronous Machines with Static Excitation based on Voltage Phase Comparison

BLANQUEZ Francisco - CERN - European Organization for Nuclear Research - Switzerland PLATERO Carlos Antonio, REBOLLO Emilio, BLÁZQUEZ Francisco - UPM - Spain

10:10 LS5d: Topic 3: Measurements Techniques and Sensors **Location: Room 4**

Chair(s): Jero Ahola, Lappeenranta University of Technology, Finland
Simon Round, ABB, Switzerland

10:10 640 - On-state voltage drop based power limit detection of IGBT inverters
TRINTIS Ionut, GHIMIRE Pramod, MUNK-NIELSEN Stig - Aalborg University - Denmark RANNESTAD Bjørn - KK Wind Solutions A/S - Denmark

10:30 31 - Comparison of UCE- and RGi-based Junction Temperature Measurement of Multichip IGBT Power Modules
DENK Marco, BAKRAN Mark-M. - University of Bayreuth - Germany

10:50 490 - High precision optical Current Measurement System based on the Faraday-Effect with a large Bandwidth
GERBER Dominic, BIELA Juergen - ETH Zurich - Switzerland

11:10 494 - Pulse Generator for Dynamic Performance Verification of Current Transducers
GOTTSCHLICH Jan, DE DONCKER Rik - RWTH Aachen University - Germany

10:10 LS5e: Topic 9: Industry Specific Energy Conversion and Conditionning Technologies (II) **Location: Room 5-6**

Chair(s): Martin Doppelbauer, Karlsruhe Institute of Technology, Germany
Sjoerd Bosga, ABB AB, Corporate Research, Sweden

10:10 131 - Measurements on Prototype Inductive Adders with Extreme Flat-top Output Pulses for CLIC Damping Ring Extraction Kickers
HOLMA Janne, BARNES Michael - European Organization for Nuclear Research - Switzerland

10:30 558 - High Accuracy, High Bandwidth Magnetoresistive Current Sensors for Spacecraft Power Electronics
SLATTER Rolf - Sensitec GmbH - Germany

10:50 147 - Heat sink design considerations in medium power electronic applications with long power cycles
ASIMAKOPOULOS Panagiotis - CERN - European Organization for Nuclear Research - Switzerland THIRINGER Torbjörn - Chalmers University of Technology - Sweden PAPASTERGIOU Konstantinos - CERN - European Organization for Nuclear Research - Switzerland BONGIORNO Massimo - Chalmers University of Technology - Sweden

11:10 728 - Control strategies for 2-quadrant converter used in grid power flow control
MAESTRI Sebastian, RETEGUI Rogelio Garcia, UICICH Gustavo, BENEDETTI Mario - Laboratorio de Instrumentacion y Control - Argentina LEGODEC Gilles, PAPASTERGIOU Konstantinos - CERN - European Organization for Nuclear Research - Switzerland

10:10 LS5f: Topic 6: Micro-grids and Smart Grids **Location: Room 18**

Chair(s): Pavol Bauer, Delft University of Technology – The Netherlands
Leonids Ribickis, Riga Technical University, Latvia

10:10 36 - Cooperative control of reactive power of distributed PV systems to suppress voltage of distribution line along railroad track

HAYASHIYA Hitoshi, YAMADA Hisashi, HASHIGUCHI Eiji, IINO Tomoki, NAKAHIRA Masashi, MIYAGAWA Takamasa, MATSUMOTO Kazuya, SAKAGUCHI Shinichi, UENO Hideyuki - East Japan Railway Company - Japan ITAYA Nobuhiko, TAKANO Tomihiro - Mitsubishi Electric - Japan

10:30 274 - Islanding Detection Method Based on Virtual PCC Voltage Phase-shift in Microgrid

SLAMA-BELKHODJA Ilhem, GHZAIEL Walid, JEBALI-BEN GHORBAL Manel - Université Tunis El Manar - Tunisia

10:50 376 - Impact of power converters efficiency on building-integrated micro-grid

WU Hongwei, SECHILARIU Manuela, LOCMENT Fabrice - Université de Technologie de Compiegne - France

11:10 603 - Dynamic Consensus Algorithm based Distributed Voltage Harmonic Compensation in Islanded Microgrids

MENG Lexuan, SAVAGHEBI Mehdi - Aalborg University - Denmark TANG Fen - Beijing Jiaotong University - China DRAGICEVIC Tomislav, GUERRERO Josep, VASQUEZ Juan - Aalborg University - Denmark

11:50 LS6a: Topic 2: Advanced Power Converter Topologies (V) **Location: Room 1**

Chair(s): Mario Marchesoni, University of Genova, Italy
Hirofumi Akagi, Tokyo Institue of Technology, Japan

11:50 90 - An Improved Space Vector Modulation Strategy for Three-Level Five-Phase Neutral-Point-Clamped Inverter

TAN Cheng, DAN Xiao, FLETCHER John - UNSW Australia - Australia

12:10 584 - Evaluation for Overall Volume of Capacitor and Heat-sink in Step-down Rectifier using Modular Multilevel Converter

NAKANISHI Toshiki, ITOH Junichi - Nagaoka University of Technology - Japan

12:30 251 - A Smart Current Modulation Scheme for Harmonic Reduction in Three-Phase Motor Drive Applications

DAVARI Pooya - Aalborg University - Denmark ZARE Firuz - Danfoss Power Electronics - Denmark BLAABJERG Frede - Aalborg University - Denmark

12:50 60 - Voltage Stress on Power Switches in Active NPC Topologies
GIUNTINI Lorenzo - GE Consumer & Industrial SA - Switzerland

11:50 LS6b: Topic 1: Passive Components **Location: Room 2**
Chair(s): Juergen Biela, ETH Zurich, Switzerland
Huai Wang, Aalborg University, Denmark

11:50 122 - Optimized Filter Inductors for a 1MW Windmill Demonstrator with an Objective to Reduced Converter Size
STADLER Alexander, STOLZKE Tobias, GULDEN Christof - STS Spezial-Transformatoren-Stockach GmbH & Co. KG - Germany

12:10 463 - Optimal Cross Section Shape of Tape Wound Cores
COUGO Bernardo - Institut de Recherche Technologique Saint Exupery - France

12:30 496 - Impact of Core Shape and Material on the Acoustic Noise Emission of Medium Frequency, Medium Voltage Transformers
SHUAI Peng, BIELA Juergen - ETH Zuerich - Switzerland

12:50 506 - Analysis and Modelling of a Permanent Magnet Biased Inductor Used in Motor Drive Systems
ZUCCHERATO Marco, ZARE Firuz - Danfoss Power Electronics A/S - Denmark

11:50 LS6c: Topic 4: Electrical machines (IV) **Location: Room 3**
Chair(s): Elena Lomonova, University of Technology Eindhoven, The Netherlands
Lech Grzesiak, Warsaw University of Technology, Poland

11:50 204 - Phase Current Harmonics in Transverse Flux Machines: a State Space Representation
KLÖCK Jan, SCHUMACHER Walter - Technische Universität Braunschweig - Germany

12:10 211 - Investigation of Sampling Frequency and Jitter Effects on Transient Current Signal Evaluation for Insulation Condition Monitoring
ZOELLER Clemens - Vienna University of Technology - Austria VOGELSBERGER Markus - Bombardier Transportation Austria - Austria NUSSBAUMER Peter, BELLINGEN Joerg - Bombardier Transportation Switzerland - Switzerland WOLBANK Thomas - Vienna University of Technology - Austria

12:30 125 - Analysis and improvement of a toroidal wound permanent magnet flux-switching machine
LINDNER Andreas, HAHN Ingo, KURTOVIC Haris - University of Erlangen Nuremberg - Germany

12:50 347 - Two Methods for Compensating Motor-current-sensor Offset Error by using DC-voltage Component Included in Phase-voltage Command for Current-controlled PMSM Drive

TAMURA Hiroshi - Hitachi, Ltd. - Japan ITOH Junichi - Nagaoka University of Technology - Japan NOTO Yasuo - Hitachi Automotive Systems, Ltd. - Japan

11:50 LS6d: Topic 3: Measurement and Control **Location: Room 4**

Chair(s): Krzysztof Zawirski, Poznan University of Technology, Poland
Maria Pietrzak-David, LAPLACE, INPT-ENSEEIHT, France

11:50 85 - Optimal Trajectory Control of a CLCC Resonant Power Converter

HUISMAN Henk - Eindhoven University of Technology - Netherlands DE VISSER Isaak - Heliox - Netherlands DUARTE Jorge - Eindhoven University of Technology - Netherlands

12:10 783 - An Improved Control Technique of a Very Precise Positioning System used in Hail Suppression Systems

NICOLAE Marian-Stefan, NICOLAE Petre-Marian, MANOLEA Gheorghe, PRESURA Raluca-Cristina, MARINESCU Radu-Florin - University of Craiova - Romania

12:30 287 - Local observability conditions of sensorless AC drives

KOTEICH Mohamad, MALOUM Abdelmalek - Renault - France DUC Gilles, SANDOU Guillaume - Supelec - France

12:50 393 - Model-based Approach for Sensor Fault-tolerant Drive Systems

OELKERS Fabian - Leibniz University Hannover - Germany ROSEN Alexander - Fraunhofer Institute for Manufacturing Technology - Germany MERTENS Axel - Leibniz University Hannover - Germany

11:50 LS6e: Topic 5: Converters for PV and water **Location: Room 5-6**

Chair(s): Xibo Yuan, University of Bristol, United Kingdom
Tero Ahonen, Lappeenranta University of Technology, Finland

11:50 575 - On- and Off-Grid Laboratory Test Setup for Hydrogen Production with Solar Energy in Nordic Conditions

KOSONEN Antti, KOPONEN Joonas, AHOLA Jero, PELTONIEMI Pasi - Lappeenranta University of Technology - Finland

12:10 651 - Long term energy yield measurements of a string- vs. central inverter concept tested on a large scale PV-plant.

PAASCH Kasper, NYMAND Morten - University of Southern Denmark - Denmark KJÆR Søren Bækhøj - Danfoss Solar Inverters A/S - Denmark

12:30 402 - Power Smoothing System for Wave Energy Converters by means of a Supercapacitor-based Energy Storage System
MORENO-TORRES Pablo, BLANCO Marcos, NAVARRO Gustavo, LAFOZ Marcos - CIEMAT - Spain

12:50 571 - Integration of variable speed hydropower generation and VSC HVDC
YANG Chao, YANG Xiaobo, CHEN Yao - ABB (China) Limited - China

11:50 LS6f: Topic 6: Protection in DC and AC Grids Location: Room 18
Chair(s): Abdelkrim Benchaib, Alstom Grid, France
Oriol Gomis, Universitat Politecnica de Catalunya, Spain

11:50 150 - Development and test of a 200kV full-bridge based hybrid HVDC breaker
WAN DI Zhou, YUNHAI Dan, ZHIYUAN He, JIANCHAO Zheng, GUANGFU Tang, XIAOGUANG Wei, SHENG Zhang, CHONG Gao - State Grid Smart Grid Research Institute - China

12:10 241 - Design of a Centralized Protection Technique for Medium Voltage DC Microgrids
MONADI Mehdi, LUNA Alvaro - Technical University of Catalunia - Spain KOCH-CIOBOTARU Cosmin - Abengoa Research - Spain CANDELA Jose Ignacio - Technical University of Catalunia - Spain RODRIGUEZ Pedro - Abengoa Research - Spain

12:30 338 - A DC grid primary protection algorithm based on current measurements
PIROOZ AZAD Sahar, LETERME Willem, VAN HERTEM Dirk - KU Leuven - Belgium

12:50 340 - A New Topology of Fast Solid-state HVDC Circuit Breaker for Offshore Wind Integration Applications
MOKHBERDORAN Ataollah - EFACEC Energia Máquinas e Equipamentos Eléctricos - Portugal CARVALHO Adriano - University of Porto - Portugal SILVA Nuno - EFACEC Energia Máquinas e Equipamentos Eléctricos - Portugal LEITE Helder - University of Porto - Portugal CARRAPATOSO Antonio - EFACEC Energia Máquinas e Equipamentos Eléctricos - Portugal

14:50 DS3a: Topic 1: Passive Components
Chair(s): Per Karlsson, Höganäs AB, sweden

148 - A Fast Method for the Calculation of Foil Winding Losses Panel A1.1
MUESING Andreas - Gecko Simulations AG - Switzerland KOVACEVIC-BADSTUEBNER Ivana, KOLAR Johann Walter, BURKART Ralph, DITTLI Cedric - ETH Zurich - Switzerland

214 - Accurate and Computationally Efficient Modeling of Flyback Transformer Parasitics and their Influence on Converter Losses Panel A1.2
LEUENBERGER David, BIELA Juergen - ETH Zurich - Switzerland

464 - High-Frequency Effects and Minimum Size Design Methodology for SMPS Transformers with Solid Round Conductors **Panel A1.3**

BARRIOS Ernesto L., MARROYO Luis, URSUA Alfredo, SANCHIS Pablo - Public University of Navarra - Spain

580 - Integrated Inductor for Interleaved Operation of Two Parallel Three-phase Voltage Source Converters **Panel A1.4**

GOHIL Ghanshyamsinh, BEDE Lorand, TEODORESCU Remus, KEREKES Tamas, BLAABJERG Frede - Aalborg University - Denmark

750 - High Frequency Model of Ferrite and Nanocrystalline Ring Core Inductors **Panel A2.1**

CUELLAR Carlos, IDIR Nadir, BENABOU Abdelkader - Université de Lille 1 - France

14:50 DS3b: Topic 1: Power System Integration, Packaging & Thermal Management

Chair(s): Martin Fasching, mfTEC Fasching KG, Austria

3 - Highly integrated power modules basing on copper thick-film-on-DCB for high frequency operation of SiC semiconductors - Design and manufacture of low-inductive module systems **Panel A2.2**

SCHMENGER Max, MEISSER Michael, LEYRER Benjamin, BERND Martin, BLANK Thomas - Karlsruhe Institute of Technology - Germany HAMILTON Dean - Warwick University, PEATER Lab - United Kingdom

111 - A Scale-Photo-Electro-Thermal Model of Organic Light-Emitting Diodes (OLEDs) for to Design Lighting Systems **Panel A2.3**

BENDER Vitor Cristiano,BARTH Nórton Daniel, PINTO Rafael Adaime, MARCHESAN Tiago Bandeira - Federal University of Santa Maria - Brazil ALONSO Marcos - University of Oviedo - Spain

121 - Multi-physic optimization of a Smart Actuator for an Automotive Application **Panel A2.4**

ROBERT Florent - GEEPS Group of Electrical Engineering Paris - France DUFOUR Laurent - EFI Automotive - France VINCI DOS SANTOS Filipe - CENTRALESUPELEC - France GUTFRIND Christophe - EFI Automotive - France DESSANTE Philippe - GEEPS Group of Electrical Engineering Paris - France

145 - Modular thermal design approach for semiconductor modules in power electronic converters **Panel A3.1**

GRUBER Artjom, REHBEIN Matthias, STIEBLER Kirsten, RIGBERS Klaus - SMA Solar Technology AG - Germany

149 - Electro-thermal model of an integrated buck converter **Panel A3.2**

TRAJIN Baptiste, VIVEN Julien, VIDAL Paul-Etienne - Laboratoire Genie de Production - France

312 - Study of Temperature Increase in Large Power-Converter Cabinet Using Iron Materials with Magnetic Characteristics **Panel A3.3**
SAKURAI Naoki, YOSHINARI Kiyomi - Hitachi, Ltd. - Japan

469 - Failure to Short-Circuit Capability of Emerging Direct-Lead-Bonding Power Module. Comparison with Standard Interconnection. Application for Dedicated Fail-Safe and Fault-Tolerant Converters Embed **Panel A3.4**
SANFINS William, RICHARDEAU Frédéric, RISALETTO Damien - LAPLACE - France BLONDEL Gaël, CHEMIN Michaël, BAUDESSON Philippe - VALEO - France

478 - Strength Pareto Evolutionary Algorithm For Sizing a Set of SiC Converter connected to AC Machines Winding by Short Planar Cable **Panel A4.1**
RASOANARIVO Ignace, BOILEAU Thierry, URBAIN Matthieu - Université de Lorraine - Laboratoire GREEN - France

508 - A New Standard IGBT Housing for High-Power Converters **Panel A4.2**
NAGEL Andreas,WEIGEL Jan, LASKA Bernd, KRAFFT Eberhard - Siemens AG - Germany

615 - Analysis of Gate-Driver Circuit requirements for H-Bridge Based Converters with GaN HFETs **Panel A4.3**
SARRAFIN-ARDEBILI Farshid, CREBIER Jean-Christophe - Grenoble Electrical Engineering Lab (G2ELAB) - France ALLARD Bruno - AMPERE Laboratory - France

663 - Water Storage for HVDC Thyristor Valves Cooling System **Panel A4.4**
WEN YULIANG - Guangzhou Goaland Energy Conservation Tech.Co.,Ltd - China KEYTE Jon - Guangzhou Goaland Energy Conservation Tech.Co.,Ltd - United Kingdom HU Jianfeng - South China University of Technology - China CHEN Jianye - Tsinghua University - China WANG Nannan - Guangzhou Goaland Energy Conservation Tech.Co.,Ltd - United Kingdom

741 - Experimental Evaluation of IGBT Junction Temperature Measurement via the Peak Gate Current **Panel A5.1**
BAKER Nick,MUNK-NIELSEN Stig, IANNUZZO Francesco - Aalborg University - Denmark LISERRE Marco - Christian-Albrechts-University of Kiel - Germany DUPONT Laurent - IFSTTAR - France

743 - High Performance Two H-bridge in Cascaded Gradient Driver Design with SiC Power MOSFET **Panel A5.2**
WANG Ruxi - General Electric - United States of America LIU Xiaohu, SABATE Juan, TAO Fengfeng, DELGADO Eladio, ROWDEN Brian - GE Global Research - United States of America

14:50 DS3c: Topic 1: Reliability

Chair(s): Huai Wang, Aalborg University, Denmark

9 - Electro-thermal characterization of 1.2 kV normally-on SiC JFETs under hard switch fault **Panel A5.3**

KAMPITSIS Georgios, GATI Eleni, BATZELIS Efstratios, PAPATHANASSIOU Stavros, MANIAS Stefanos - National Technical University of athens - Greece

242 - A feasibility study of using gate-emitter voltage method to estimate IGBT online junction temperature in practical applications **Panel A5.4**

RIEDEL Gernot J., SUNDARAMOORTH Vinoth K., BIANDA Enea, ZURFLUH Franz, BLOCH Richard - ABB Switzerland - Switzerland

333 - Evaluation of On-state Voltage VCE(ON) and Threshold Voltage Vth for Real-time Health Monitoring of IGBT Power Modules **Panel A6.1**

ELEFFENDI Amir, JOHNSON Mark - The University of Nottingham - United Kingdom

382 - Small Junction Temperature Cycles on Die-attach Solder Layer in IGBT **Panel A6.2**

WEI Lai, BING Gao - Chongqing University - China RAN Li - University of Warwick - United Kingdom NAN Jiang, CHEN Minyou - Chongqing University - China

407 - Temperature and strain mappings over forward biased power IGBT cross-section area by µ-Raman spectroscopy **Panel A6.3**

KOCINIEWSKI Thierry - Université Versailles Saint Quentin en Yvelines - France KHATIR Zoubir - IFSTTAR - France

600 - Vce-based chip temperature estimation methods for high power IGBT modules during power cycling - A comparison **Panel A6.4**

AMOIRIDIS Anastasios - Aalborg University - Denmark ANURAG Anup - ETH Zurich - Switzerland GHIMIRE Pramod, BAKER Nick, MUNK-NIELSEN Stig - Aalborg University - Denmark

612 - Online temperature estimation of a high-power 4.5 kV IGBT module based on the gate-emitter threshold voltage **Panel A7.1**

HOEER Martin, FILSECKER Felipe, MEISSNER Markus, BERNET Steffen - Technische Universität Dresden - Germany

705 - Development of Field Data Logger for Recording Mission Profile of Power Converters **Panel A7.2**

CHAUDHARY Sanjay, GHIMIRE Pramod, BLAABJERG Frede - Aalborg University - Denmark THOEGERSEN Paul - Powercon A/S - Denmark RIMMEN Peter de Place - Danfoss Power Electronics A/S - Denmark

720 - Effects of current filaments during dynamic avalanche on the collector-emitter-voltage of high voltage Trench-IGBTs **Panel A7.3**

DE FALCO Giuseppe, MARESCA Luca - University of Naples "Federico II" - Italy SILBER Dieter - University of Bremen - Germany IRACE Andrea - University of Naples "Federico II" - Italy Kaminski Nando, WÜERFEL Alexander - University of Bremen - Germany

794 - Determination of parameters with high impact on fatigue of new Interconnect Technologies **Panel A7.4**

TINSCHERT Lukas - Technische Universität Chemnitz - Germany HEUCK Nicolas - Infineon Technologies - Germany LUTZ Josef - Technische Universität Chemnitz - Germany

798 - Relibility Enhance Powertrain Using Fuzzy Knowledge Base prognostics Model **Panel A8.1**

ALGHASSI Alireza - IVHM & Boeing Center, Cranfield University - United Kingdom SOULA-TIANTORK Payam - Politecnico Di Milano - Italy SAMIE Mohammad - School of Aerospace, Transport and Manufacturing C - United Kingdom PERINPANAYAGAM Suresh - IVHM & Boeing Center, Cranfield University - United Kingdom FAIFER Marco - Politecnico Di Milano - Italy

14:50 DS3d: Topic 2: Advanced Power Converter Topologies

Chair(s): Jorge Duarte, TU Eindhoven, Netherlands
Kyumin CHO, YUHAN University, Korea (Republic of)

44 - A Novel Modulation Strategy Providing Loss Balancing and Neutral Point Potential Balancing for Three-Level Active Neutral-Point-Clamped Converter **Panel A8.2**

ZHANG Bo, WANG Ping, GE Qiongxuan, YU Yang, WANG Xiaoxin – Chinese Academy of Sciences - China

189 - Analysis and Control of Single-to-Three-Phase Direct AC/AC Modular Multilevel Converters with Integrated Split Battery Energy Storage for Railway Interties **Panel A8.3**

VASILADIOTIS Michail, CHERIX Nicolas, RUFER Alfred - Ecole Polytechnique Fédérale de Lausanne - Switzerland

289 - From a Voltage Divider to a Voltage Doubler for a Large DC Gain Converter **Panel A8.4**

LI Kerui, YIN Zhijian - Sun Yat-Sen University - China CHUNG Henry Shu-Hung - City University of Hong Kong - China IOINOVICI Adrian - Sun Yat-Sen University - China

302 - Research on the Control Strategy of Modular Multilevel Converter for Feeding Three-phase Machines **Panel B1.1**

YU Yang, BO Zhang, GE Qiongxuan - Institute of Electrical Engineering - China LEI Ming - Beijing Electric Economic Research Institute - China KONG Li, WANG Xiaoxin - Institute of Electrical Engineering - China

401 - Matrix Converter Modulation minimizing switching losses and including the 6 rotating vectors of the Space Vector representation **Panel B1.2**
GRUSON Francois - L2EP - Arts et Metiers Paristech - France LE MOIGNE Philippe - Ecole Centrale de Lille - L2EP - France DELARUE Philippe - Université de Lille 1 (USTL) - France CIMETIERE Xavier - Ecole Centrale de Lille - L2EP - France

590 - Comparison of losses in different topologies of step-up/step-down inverters **Panel B1.3**
HERNANDEZ Lucas - Schneider Electric - France MEYNARD Thierry - LAPLACE - France LACARNOY Alain - Schneider Electric - France

797 - New High Availability Four Quadrant Converter [600A; 10V] for LHC **Panel B1.4**
HERRERO Vicente Raúl - CERN - European Organization for Nuclear Research - Switzerland

14:50 DS3e: Topic 2: Power Factor Correction Techniques
Chair(s): Hubert Schierling, Siemens AG, Germany

229 - EMI DM Filter Volume Minimization for a PFC Boost Converter Including Boost Inductor Variation and MF EMI Limits **Panel B2.1**
WYSS Jonas, BIELA Juergen - Eidgenoessische Technische Hochschule Zürich - Switzerland

348 - A Novel Bridgeless PFC Boost Rectifier with a Simple ZVS Circuit **Panel B2.2**
SHIMADA Takae, KANOUDA Akihiko - Hitachi, Ltd. - Japan TSUKAMOTO So - Hitachi Info. & Telecommunication Engineering, Ltd - Japan

778 - Performance/Efficiency Analysis for High Efficiency Three-Phase Buck-Type PFC Rectifiers **Panel B2.3**
OLARESCU Valeriu - Diehl Controls - Germany ANCUTI Mihaela Codruta, SORANDARU Ciprian - "Politehnica" University Timisoara - Romania WEINMANN Martin - Diehl Controls - Germany MUSUROI Sorin, POPOVICI Dorin, HEDES Alexandru, SVOBODA Marcus - "Politehnica" University Timisoara - Romania

14:50 DS3f: Topic 4: Motion Control, Robotics, Special Drives
Chair(s): Ingo Hahn, Friedrich-Alexander University Erlangen-Nürnberg, Germany

49 - Asymmetrical Multilevel Inverter with Staircase Modulation for Variable Frequency Drives in Fractional Horsepower Applications **Panel B2.4**
ARTAL-SEVIL Jesus Sergio, DUFO-LOPEZ Rodolfo, BERNAL-AGUSTIN Jose Luis, DOMINGUEZ-NAVARRO Jose Antonio – University of Zaragoza - Spain

134 - Real-time Position Sensorless Estimation of Position and Force of Solenoid Actuator for Haptic Devices **Panel B3.1**
NAGAI Sakahisa, NOZAKI Takahiro, KAWAMURA Atsuo - Yokohama National University - Japan

389 - Simultaneous Thrust and Attractive force Control of Linear Induction Motor Driven by Power Source with Frequency Component Synchronous with Motor Speed **Panel B3.2**
MORIZANE Toshimitsu, TSURUYA Keisuke, KIMURA Noriyuki, OMORI Hideki - Osaka Institute of Technology - Japan

811 - Sensorless Pump Control Strategy for Hydraulic Systems of Heating Applications Driven by Robust Encoderless PMSM Drive **Panel B3.3**
SIROVY Martin, VOSMIK David - University of West Bohemia - Czech Republic

14:50 DS3g: Topic 5: Solar Energy Systems
Chair(s): Mònica Aragües Peñalba - CITCEA-UPC - SPAIN

16 - Quantified Evaluation and Criteria Analysis for Distributed MPPT PV System **Panel B3.4**
WANG Feng - Xi'an Jiaotong University - China LEE Fred - Virginia Tech - United States of America ZHUO Fan, YUE Xiaolong - Xi'an Jiaotong University - China

59 - Cascaded H-bridge control for PV application **Panel B4.1**
GANESH Jayanti, KANAKASABAI Viswanathan, NAIK Rajendra - GE India Technology Centre - India EL-BARBARI Said - GE Global Research Europe - Germany

91 - Input-Voltage Sliding Mode Control for Improving Energy Harvesting of Grid-Connected PV Inverters **Panel B4.2**
YAN Shuo, TAN Siew-Chong, HUI S. Y. Ron - The University of Hong Kong - China

103 - Low Power Interleaved DC-DC Converter with High Voltage Gain for Photovoltaic Applications **Panel B4.3**
MARTINS António, VARAJÃO Tiago, CARVALHO Adriano, RAMOS Carlos - University of Porto, Faculty of Engineering - Portugal

110 - Comparison of continuous and transition mode in a PV-booster with GaN-transistors and switching frequencies up to 250 kHz **Panel B4.4**
DERIX David, SCHOENER Christian, HENSEL Andreas, FREICHE Rémi - Fraunhofer Institute for Solar Energy Systems ISE - Germany

217 - SysML Methodology for HiL Implementation of PV Models **Panel B5.1**
CHAMORRO Harold - KTH Royal Institute of Technology - Sweden ILLA Luiz, ALONSO Corine - LAAS-CNRS - France JIMENEZ Fernando, GUTIERREZ Alonso - Universidad de Los Andes - Colombia

310 - Repetitive Control of Flyback Inverter for PV Power Applications **Panel B5.2**
LEE Sungho, KIM Sooa, KWON Bong-Hwan - Pohang University of Science and Technology - Korea (Republic of) GOO Taehong, CHAE Hyung jun, CHOI Jung hwan, HUH Dong Young - LG Innotek - Korea (Republic of) KIM Minsung - Pohang University of Science and Technology - Korea (Republic of)

324 - PWM Converter Integrating Switched Capacitor Voltage Equalizer for Photovoltaic Modules under Partial Shading **Panel B5.3**

UNO Masatoshi - Ibaraki University - Japan KUKITA Akio - Japan Aerospace Exploration agency - Japan

346 - A Novel Adaptive Magnetizing Inductance Control Scheme for High-Efficiency LLC Resonant Converter for PV applications **Panel B5.4**

PARK Ki-hyeon, CHOI Yeong-Jun, CHOI See-Young, KIM Rae-Young - Hanyang University - Korea (Republic of)

371 - Phase Shifted Maximum Power Point Tracking in a Cascaded H-Bridge Photovoltaic System **Panel B6.1**

MARKS Nathan, SUMMERS Terry, BETZ Robert - University of Newcastle, Australia - Australia

415 - A Low Leakage Transformer-less 3-Level DC-DC Boost Converter for Transformer-less PV Inverters **Panel B6.2**

FARSWAN Rajesh Singh, DATTA Abhijit, KAMBLE Girish, FERNANDES B. G. - Indian Institute of Technology Bombay - India

468 - Fault Ride Through Control by using New Real Time Symmetrical Coordinate Transformation **Panel B6.3**

YU Xiaoxiao, KIMURA Noriyuki, NIIJIMA Koji, MORIZANE Toshimitsu, OMORI Hideki - Osaka Institute of Technology - Japan

549 - Applying Fault Ride Through Capability to Single Phase Grid Connected PV Systems **Panel B6.6**

PERPINIAS Ioannis - University of Patras - Greece PAPANIKOLAOU Nick - Democritus University of Thrace - Greece TATAKIS Emmanuel - University of Patras - Greece

550 - Analysis of a Flyback Current Source Inverter under Hybrid DCM-BCM operation **Panel B7.1**

CHRISTIDIS Georgios, NANAKOS Anastasios, TATAKIS Emmanuel - University of Patras - Greece

717 - A Tool for the Performance Evaluation and Failure Detection of Amaraleja PV Plant (Acciona) from SCADA **Panel B7.2**

MUÑOZ Mikel, GARCIA Miguel, DE LA PARRA Iñigo - Public University of Navarra - Spain PEREZ Miguel - Acciona - Spain MARCOS Javier - Public University of Navarra - Spain

813 - ANN-Based Extraction Approach of PV Cell Equivalent Circuit Parameters **Panel B7.3**

GASTLI Adel, BEN BRAHIM Lazhar, BEN HAJ RHOUMA Mohamed - Qatar University - Qatar

14:50 DS3h: Topic 6: Grids & Smart Grids
Chair(s): Seddik BACHA, Laboratory G2ELAB, Grenoble, France

106 - A Small Signal Model of an Inverter-Based Microgrid including DC Link Voltages **Panel B7.4**
ISSA Walid, ABUSARA Mohammad - University of Exeter - United Kingdom SHARKH Suleiman - University of Southampton - United Kingdom MALLICK Tapas - University of Exeter - United Kingdom

236 - A Fast Reactive Power Sharing Strategy based on Feeder Current Sensing **Panel B8.1**
ZHU Yixin, WANG Feng, ZHUO Fang, YUE Xiaolong, LIU Baoquan - Xian Jiaotong University - China

269 - Virtual Electrical Test Bench for More Electrical Aircraft Architecture Verification and Energy Management Development **Panel B8.2**
BESTER Jean - École Supérieure d'Ingénieurs en Électrotechnique - France MPANDA Augustin - ESIEE-Amiens - France EL HAJJAJI Ahmed - Université de Picardie Jules Verne - France

318 - Performance of a new fast switching DC-Breaker for meshed HVDC-Grids **Panel B8.3**
WANG Yeqi, MARQUARDT Rainer - Universität der Bundeswehr - Germany

342 - Low-frequency reduced-order modeling approach and implementation of grid emulation in hardware-in-the-loop platforms **Panel B8.4**
VALDIVIA Virgilio, DIAZ-LOPEZ Daniel, FOLEY Raymond, GONZALEZ-ESPIN Francisco - United Technologies Research Center - Ireland

362 - Harmonic Circulation Method with Single-Phase Distributed Generation Units in Three-Phase Three-Wire Power Distribution Systems **Panel C1.1**
YOSHIDA Hidehito, WADA Keiji - Tokyo Metropolitan University - Japan

364 - Power Quality Optimization for Droop-based Voltage Source Inverters in Microgrids **Panel C1.2**
CUI Wenfeng, HE Xiangning, TAO Yong - Zhejiang University - China FUJII Kansuke, OKUMA Yasuhiro - Fuji Electric - Japan

437 - Experimental Verification of an Active Microgrid with Distributed Power-Based Control **Panel C1.3**
CALDOGNETTO Tommaso, TENTI Paolo - University of Padova - Italy IGLESIAS BRANDAO Danilo - State University of Campinas - Brazil BUSO Simone - University of Padova - Italy

480 - Inverter design for four-wire micro-grids **Panel C1.4**
HEREDERO-PERIS Daniel - Entro de Innovación Tecnológica en Convertidores e - Spain MONTESINOS-MIRACLE Daniel, PAGES-GIMENEZ Marc - CITCEA-UPC - Spain

488 - An anti-islanding method for voltage controlled VSI **Panel C2.1**
HEREDERO-PERIS Daniel, LLONCH-MASACHS Marc, MONTESINOS-MIRACLE Daniel - CITCEA-UPC - Spain

504 - Thermal Stress Comparison in Modular Power Converter Topologies for Smart Transformers in the Electrical Distribution System **Panel C2.2**
ANDRESEN Markus - Christian-Albrechts-University of Kiel - Germany MA Ke - Aalborg University - Denmark LISERRE Marco - Christian-Albrechts-University of Kiel - Germany BLAAB-JERG Frede - Aalborg University - Denmark

540 - Control loops design in a grid supporting mode inverter connected to a microgrid **Panel C2.3**
PERINI Roberto, FROSIO Luisa - Politecnico di Milano - Italy IACCHETTI Matteo - University of Manchester - United Kingdom FOGLIA Gianmaria - Politecnico di Milano - Italy

610 - Reverse Droop for Frequency and Voltage Restoration in Microgrid **Panel C2.4**
NUTKANI Inam Ullah, PENG Wang - Nanyang Technological University - Singapore LOH Poh Chiang, BLAABJERG Frede - Aalborg University - Denmark

620 - A seamless Transfer Algorithm Based on Active Frequency Detection with Feed-forward Control Method in Distributed Generation System **Panel C3.1**
KIM Kiryong, KIM Hee-Je - Pusan National University - Korea (Republic of) KIM Tae-Jin, LEE Jong-Pil, YOO Dong-Wook - Korea Electrotechnology Research Institute - Korea (Republic of) SHIN Dongsul - Pusan National University - Korea (Republic of)

746 - Phase locked loop effect on Non Detection Zone of Unintentional Islanding **Panel C3.2**
SGARBOSSA Riccardo, DALLA SANTA Luca, MATTAVELLI Paolo, PETUCCO Andrea, CAVAZ-ZANA Francesco - University of Padova - Italy CERRETTI Alberto - ENEL SPA - Italy

802 - Hierarchical Control Scheme for Accurate reactive Power and Harmonic Current Sharing in Islanded Microgrids **Panel C3.4**
LORZADEH Iman, ASKARIAN ABYANEH Hossein - Amirkabir University of Technology - Iran GUERRERO Josep. M, SAVAGHEBI Mehdi - Institute of Energy Technology, Aalborg University - Denmark

823 - Multiagent based distributed control for operation minimization of droop controlled AC microgrid using incremental cost consensus **Panel E1.1**
LI Chendan, GUERRERO Josep, SAVAGHEBI Mehdi, VÁSQUEZ Juan Carlos - Aalborg University - Denmark

14:50 DS3i: Topic 7: Power Supplies

Chair(s): Jorma Kyyrä, Aalto University School of Electrical Engineering, Finland
Szymon Beczkowski, Aalborg University, Denmark

7 - Primary-Controlled Constant Current LED driver with Extremely Low THD and Optimized Phase-Cut Dimming Compatibility **Panel E1.2**

GRITTI Giovanni, ADRAGNA Claudio - STMicroelectronics - Italy

18 - Influence of Inverse Coupled Inductors on Fault-Tolerant Operation of Two-Phase DC-DC Converters **Panel E1.3**

GLEISSNER Michael, BAKRAN Mark-M. - University Bayreuth - Germany

43 - Reduction of Voltage Drop and Ripple in Voltage Multipliers **Panel E1.4**

SHMILOVITZ Doron - Tel Aviv University - Israel PARK Sehyun - Chung-Ang University - Korea (Republic of) KATZIR Liran - Tel Aviv University - Israel

67 - Architecture and Design of an Inductive Contactless Energy Transfer System with two Mobile Loads for Residential Applications **Panel E2.1**

MOMENEH Arash - Technical University of Catalunia - Spain GUZMAN Ramon, MORALES Javier - Technical University of Catalonia. Barcelonatech - Spain CASTILLA Miguel - Technical University of Catalunia - Spain VAN DER PIJL Frank - Delft University of Technology - Netherlands

69 - New Inductive Contactless Energy Transfer System for Residential Distribution Networks with Multiple Mobile Loads **Panel E2.2**

MOMENEH Arash - Technical University of Catalunia - Spain MORADI GHAHDERIJANI Mohammad, TORRES Javier - Technical University of Catalonia. Barcelonatech - Spain CASTILLA Miguel - Technical University of Catalunia - Spain VAN DER PIJL Frank - Delft University of Technology - Netherlands

73 - A Novel Single Stage Isolated AC-DC Converter with Zero Voltage Switching **Panel E2.3**

TAMADA Shunsuke, MAEKAWA Sari, NAKAZAWA Yosuke, MOCHIKAWA Hiroshi - Toshiba Corporation - Japan USAMI Yutaka, KUSAKA Toyoyasu - Toshiba TEC Corporation - Japan

81 - The load current sensing method in the multiple output high insulation voltage transformer **Panel E2.4**

WYZGA Andrzej, GRUCA Jacek, POLIT Aleksander - ABB Corporate Research Centre - Poland PAPAFOTIOU Georgios - ABB Industrie - Switzerland

92 - Tolerance Design of Ballast Resistance for Multi-string LED Driver **Panel E3.1**

PARK Jun-Young, CHOI Sung-Jin - University of Ulsan - Korea (Republic of)

95 - Efficiency Study of Coaxial Contactless Power Transmission for Electric Railway **Panel E3.2**

MORIKI Kenta, KAWAMURA Atsuo, SHIMONO Tomoyuki - Yokohama NationaL University - Japan NOZAKI Takahiro - Keio University - Japan IKEDA Kunio, YAMAMOTO Hiroshi, SATO Junichi, HAYASHIYA Hitoshi - East Japan Railway Company - Japan

116 - Analysis and Design of a Cost Effective One Stage Topology for LED Lighting Applications **Panel E3.3**

PAWELLEK Alexander, DÜRBAUM Thomas - Friedrich-Alexander University Erlangen-Nürnberg - Germany

173 - Closed-Loop Control with Harmonic Based Phase-Shift Control for Inductively Coupled Power Transfer System **Panel E3.4**

SHI Liming, CAI Hua, JIANG LongBin, LI YaoHua, LI Zixin - Institute of Electrical Engineering, CAS - China

196 - Floating High Step-Down Stacked dc-dc Converter Based on Buck-Boost Cells **Panel E4.1**

TIBOLA Gabriel, DUARTE Jorge - Eindhoven University of Technology - Netherlands BLINOV Andrei - KTH Royal Institute of Technology - Sweden

206 - Operation of Single-Chip MOSFET and IGBT Devices after failure due to repetitive avalanche **Panel E4.2**

BLINOV Andrei, NORRGA Staffan - KTH Royal Institute of Technology - Sweden TIBOLA Gabriel - Eindhoven University of Technology - Netherlands

226 - Active Damping Control of Multi-Mode UPS for Power Quality Improvement **Panel E4.3**

GIUNTINI Lorenzo - GE Consumer & Industrial SA - Switzerland

308 - Capacitor Voltage Balancing Control of a Flying Capacitor Based n-level DC-DC Converter **Panel E4.4**

FAN Boran, WANG Kui, LI Yongdong, XU Lie, ZHENG Zedong - Tsinghua University - China

475 - Multimodular, High Current, Fast response IGBT Inverter Power Supply of SST-1 TOKAMAK **Panel E5.1**

SHARMA Dinesh Kumar, A Varadharajullu - Institute for Plasma Research - India R Ramesh, KUMAR Varunesh - Veeral Controls PVT Ltd - India

587 - An RCDD Snubber for a Bidirectional Flyback Converter **Panel E5.2**

LAGAP Tahir - Danfoss Power Electronics A/S - Denmark DIMOPOULOS Emmanouil, MUNK-NIELSEN Stig - Aalborg University - Denmark

632 - Switched-Capacitor Quasi-Resonant PWM Converters With Continuous Conversion Ratio **Panel E5.3**

TURHAN Mert, DUARTE Jorge, HENDRIX Marcel - University of Technology Eindhoven - Netherlands

643 - Power Decoupling with Autonomous Reference Generation for Single-Phase Differential Converters **Panel E5.4**
YAO Wenli - Northwestern Polytechnical University - China LOH Poh Chiang, TANG Yin WANG Xiongfei - Aalborg University - Denmark ZHANG Xiaobin - Northwestern Polytechnical University - China BLAABJERG Frede - Aalborg University - Denmark

699 - Grid Voltage Emulation at the Secondary Side of a Contactless Power Supply **Panel E6.1**
TURKI Faical - Vahle GmbH & Co. KG - Germany

739 - Next generation of digital control power devices for medium to low power AC/DC SMPS applications **Panel E6.2**
FAHLENKAMP Marc - Infineon Technologies AG - Germany

751 - Thermal Impact Analysis of the Circulating Current in High Power Modular Online Uninterruptible Power Supply Applications **Panel E6.3**
ZHANG Chi, M.GUERRERO Josep, C.VASQUEZ Juan - Aalborg University - Denmark

774 - High Voltage Pulse Speed Study for High Voltage DC-DC Power Supply Based on Voltage Multipliers **Panel E6.4**
MAO Saijun - General Electric - China POPOVIC Jelena, FERREIRA Jan Abraham - Delft University of Technology - Netherlands

775 - A Modulation and Sampling Based Modeling Method for the Nonlinearities of Power Converters and its application analysis **Panel E7.1**
YUE Xiaolong, ZHUO Fang, CHEN Ying, YANG Shuhao, ZHU Yixin, PEI Yunqing - Xi'an Jiaotong University - China

786 - Key Construction Aspects of Low Frequency Wireless Power Transfer System Using Parallel Resonance **Panel E7.2**
KAVALIR Tomas, KINDL Vladimir, PECHANEK Roman - University of West Bohemia - Czech Republic

14:50 DS3j: Topic 8: e-Mobility: Propulsion Systems & Power Converters
Chair(s): Martin Doppelbauer, Karlsruhe Institute of Technology, Germany

143 - Loss modelling to optimize the overall drive train efficiency **Panel E7.3**
STEMPFLE Martin, ROTH-STIELOW Jörg, FISCHER Manuel - University of Stuttgart - Germany

329 - A Novel Thermal Management Algorithm for Improved Lifetime of Traction Converters **Panel E7.4**
KACZOROWSKI Dennis, MERTENS Axel - Leibniz University Hannover - Germany

377 - Capacity of Power-Batteries versus Temperature **Panel E8.1**
LEUCHTER Jan - University of Defence - Czech Republic BAUER Pavol - Delft University of Technology - Netherlands

395 - Comparison of different control strategies for series-series compensated inductive power transmission systems **Panel E8.2**

TRITSCHLER Johannes, GOELDI Benriah, REICHERT Stefan - Fraunhofer Institute for Solar Energy Systems - Germany GRIEPENTROG Gerd - TU Darmstadt - Germany

403 - Output power increase of a series-series compensated inductive power transfer system via asymmetric loading **Panel E8.3**

GATI Eleni, KAMPITSIS Georgios, MANIAS Stefanos - National Technical University of Athens - Greece

418 - Ultra Fast Charging Station for Electric Vehicles with integrated split Grid Storage **Panel E8.4**

CHRISTEN Daniel, JAUCH Felix, BIELA Juergen - Lab for High Power Electronics Systems, ETH Zurich - Switzerland

450 - PWM Modulation for a Three-Level Inverter with Neutral-Point Balancing for a Permanent Magnet Synchronous Machine **Panel E9.1**

BRUESKE Stephan, FUCHS Friedrich Wilhelm - Christian-Albrechts-University of Kiel - Germany

503 - Automatic Selection Scheme of Most Efficient Operation Mode in Buck–boost Type Secondary-side Converter for Inductive Power Transfer **Panel E9.2**

OTA Ryosuke, HOSHI Nobukazu - Tokyo University of Science - Japan

563 - A Direct Three-Phase to Single-Phase AC/AC Converter for Contactless Electric Vehicle Charger **Panel E9.3**

KUSUMAH Ferdi Perdana, VUORSALO Simo, KYYRÄ Jorma - Aalto University School of Electrical Engineering - Finland

621 - Three Phase Voltage Source Inverter Using SiC MOSFETs; Design and Optimization **Panel E9.4**

MUHSEN Hani, HILLER Sebastian, LUTZ Josef - Technische Universität Chemnitz - Germany

644 - A Rare-Earth Free SHEV Powertrain and its Control **Panel D1.1**

FERNANDO W U Nuwantha - RMIT University Melbourne - Australia AKURUGODA GAMAGE Kelum - University of Lancaster - United Kingdom

14:50 DS3k: Topic 8: e-Mobility: Batteries and Management Systems; Chargers and Standards

Chair(s): Martin Doppelbauer, Karlsruhe Institute of Technology, Germany

124 - Investigation on Power Electronics Topologies for Inductive Power Transfer (IPT) Systems in High Power Low Voltage Applications **Panel D1.2**

PETERSEN Marinus, FUCHS Friedrich Wilhelm - Universität Kiel - Germany

726 - Modeling and Analysis of a Hybrid PV/Second-Life Battery Topology Based Fast DC-Charging Systems for Electric Vehicles **Panel D1.3**

HEGAZY Omar, LATAIRE Philippe, MONEM Mohamed Abdel, VAN MIERLO Joeri, Vrije Universiteit Brussel, Belgium

760 - Electric and Hybrid Vehicles Battery Charger Cluster Locations in Urban Areas **Panel D1.4**

KATIC Vladimir, DUMNIC Boris, CORBA Zoltan, PECELJ Milan - University of Novi Sad - Serbia

14:50 DS3I: Topic 9: Industry Specific Energy Conversion and Conditioning Technologies

Chair(s): Andreas Nagel, Siemens AG, Germany

64 - Requirements to change from IGBT to Full SiC modules in an on-board railway power supply **Panel D2.1**

MAERZ Andreas, HORFF Roman, BAKRAN Mark-M. - University of Bayreuth - Germany HELSPER Martin - Siemens AG - Germany

177 - Development of emergency self running train for energy utilization in stationary energy storage system **Panel D2.2**

TAKAHASHI Hirotaka, KUME Yasunori, HONDA Kazuharu, KAWATSU HironorI - Hitachi, Ltd. - Japan KAMINISHI Jyunichi, SHIMIZU Yoshiki - Tokyo Metro Co.Ltd - Japan

198 - Fault Tolerant Dual-Motor Drives: Sizing of Power Electronic **Panel D2.3**

DOS SANTOS MORAES Tiago José, NGUYEN Ngac-Ky - L2EP - Arts et Metiers Paristech - France MEINGUET Fabien - Thales Alenia space - Belgium SEMAIL Eric - L2EP - Arts et Metiers Paristech - France

223 - A Novel Satellite Power Supply Design with Multi-winding High Frequency Transformer **Panel D2.4**

ZHANG Xuan, XU Lie, LIE Yongdng, ZHENG Zedong - Tsinghua University - China

249 - Modular Multilevel Converter Based Super-capacitor Integration Strategies and their Comparative Evaluation for Railway Traction Drive Systems **Panel D3.1**

MUKHERJEE Nilanjan, TRICOLI Pietro - University of Birmingham - United Kingdom

286 - Global current regulation and Ah compensation for aluminum electrolysis substation **Panel D3.2**

AÏT MAHREZ Camal, DE PREVILLE Guillaume - Alstom Grid - France

323 - Control development for an 18 MW pulsed power converter using a real-time simulation platform **Panel D3.3**

GENTON Charles-Mathieu, ROCCA Stefano, BOATTINI Fulvio - European Organization for Nuclear Research - Switzerland

370 - Ensuring the operation of electrical equipment during short time voltage sags or power outage **Panel D3.4**

PITTERMANN Martin, FORT Jiri, KUS Vaclav - University of West Bohemia - Czech Republic

413 - Traction Inverter System with Lithium-ion Batteries for EMUs **Panel D4.1**

AYATA Masataka, SHINOMIYA Takeshi, INARIDA Satoru - Hitachi, Ltd. - Japan

466 - A Study on a Method to Design Energy Capacity of Wayside Energy Storage Devices in DC-electrified Railway Systems **Panel D4.2**

KOBAYASHI Hiroyasu, SAITO Tatsuhito, KONDO Keiichiro - Chiba University - Japan

485 - Investigation of a Waste Heat Recovery System for a More Electric Ship **Panel D4.3**

ZOGOGIANNI Charoula - University of Patras - Greece KYRITSIS Anastasios - Centre for Renewable Energy Sources - Greece LOUPIS Michael - TEI of Central Greece - Greece PAPANIKOLAOU Nick, SARIDAKIS Stefanos - DEMOCRITUS UNIVERSITY OF THRACE - GREECE SYRIGOS Stylianos, TATAKIS Emmanuel - University of Patras - Greece TSIFTSIS Theodoros - TEI of Central Greece - Greece VOGLITSIS Dionisios - Democritus University of Thrace - Greece

489 - New Modular Hybrid Energy Storage System and its Control Strategy for a Fuel Cell Locomotive **Panel D4.4**

KRASTEV Ivan, MUKHERJEE Nilanjan, TRICOLI Pietro, HILLMANSEN Stuart - University of Birmingham - United Kingdom

589 - Evaluation of energy loss in d.c. traction power supply system **Panel D5.1**

HIRANO Taichi, HAYASHIYA Hitoshi, SUZUKI Takashi, KIKUCHI Shinya - East Japan Railway Company - Japan

697 - Torque ripple minimization of SMC drive for an innovative electric naval propulsion system **Panel D5.2**

DEBBOU Mustapha - Laboratoire Plasma et Conversion et d'Energie - France PIETRZAK-DAVID Maria - LAPLACE-INPT/ENSEEIHT - France CUSSAC Philippe - CIRTEM - France

716 - The design and performance of Static Var Compensators for particle accelerators **Panel D5.3**

KAHLE Karsten, GENTON Charles-Mathieu, BLANQUEZ Francisco - CERN - European Organization for Nuclear Research - Switzerland

759 - Parallel-connected bidirectional converters for avionic applications **Panel D5.4**

GIULIANI Francesco - University of Nottingham - United Kingdom DELMONTE Nicola - University of Parma - Italy CASTELLAZZI Alberto, COSTABEBER Alessandro - University of Nottingham - United Kingdom COVA Paolo - University of Parma - Italy

784 - Anti-slip re-adhesion control method for increasing the tractive force of locomotives through the early detection of wheel slip convergence **Panel D6.1**

YAMASHITA Michihiro - Railway Technical Research Institute - Japan SOEDA Tadashi - Japan Freight Railway Company - Japan

791 - Downsizing an Electric Actuator Supplied With Variable Voltage Using an Interlaced High Frequency Boost Converter for More Electric Aircrafts **Panel D6.2**

CUENOT Jérémy - Université de Lorraine - Laboratoire GREEN - France MEURET Regis, ZAIM Sami - Labinal Power Systems - France NAHID-MOBARAKEH Babak, MEIBODY-TABAR Farid - Université de Lorraine - Laboratoire GREEN - France MONMASSON Eric - SATIE / CERGY - France

822 - Verification of Stochastic Tram Model Based on Real Traffic Data **Panel D6.3**

STREIT Lubos, TALLA Jakub - University of West Bohemia - Czech Republic

14:50 DS3m: Topic 10: Education in Electrical Engineering

Chair(s): Frede Blaabjerg, Aalborg University, Denmark

656 - Teaching drive control using Energetic Macroscopic Representation – From maximal to practical control schemes **Panel D6.4**

BOUSCAYROL Alain, DELARUE Philippe, LHOMME Walter, LEMAIRE-SEMAIL Betty - Université de Lille 1 - France

CERN European Organization for Nuclear Research (sold out)

The visit contains an overview presentation of CERN and then it is followed by 3 technical visits: **the first accelerator at CERN (Synchrocyclotron), the LHC superconducting magnets test facility** and **the CERN Control Center**.

Please note that you must have the necessary documents (visa, passport, id card, etc.) for both Switzerland and France in order to take part in this visit.

The appointment will be directly at the CERN reception building 33 **at 8:30 am**. To go from Gare Cornavin to CERN in the morning takes 25 min with **Transport Public Genevois**. Itinerary recommended Tram 18 from Gare Cornavin to CERN http://tpg.hafas.de/hafas/tp/query.exe/en (link is external)

Nant-de-Drance

Nant-de-Drance is a new pump-storage facility in Switzerland, currently under construction. The state end of 2014 is : Galleries and Cavern as well the elevation of the upper basin are finished. Currently, first equipments are arriving on site.

Characteristics of the plant:

Main power: 900 MW, with six motors/generators operated with variable frequency. There is an impressive underground cavern (55 m high).
The visit contains an overview presentation of the project, and visit of the lakes, underground cavern of the machinery, galleries etc. Travel to the site from Geneva by bus, full day excursion.

Nant-de-Drance is situated around 150 km from Geneva, travel time by bus is expected around 1 1/2 to 2 hours. The place is called Le Châtelard-Village
Due to security policy, only two groups of 8 persons can be simultaneously inside of the cavern and galleries. The consequence is that the visit has a limited number of participants equal to 32 persons.
There will be two identical presentations with each 16 persons, further divided into 2 groups of 8 persons.. It is expected to organize two minibuses from Geneva. The schedules are given in table 1.

Prensentation 1	**(8+8 persons)**
Dep. Geneva	08:00
Arr. Nant-de-Drance	10:00
Presentation	10:00
Visit undergroung/ gallery, dam	11:00
Lunch	14:00
Dep. Nant-de-Drance	15:00
Arr. Geneva	17:00

Prensentation 2 (8+8 persons)	
Dep. Geneva	11:00
Arr. Nant-de-Drance	13:00
Presentation	13:00
Visit undergroung/ gallery, dam	14:00
Lunch	17:00
Dep. Nant-de-Drance	17:45
Arr. Geneva	19:45

For the visit, the local organization is providing helmets, boots, jackets. Participants should take good socks. Clothes adapted for walking at this season are also recommended. The altitude is 1120 meters.

EPFL Ecole Polytechnique Fédérale de Lausanne

EPFL is one of the two Swiss Federal Institutes of technology, one situated in Zurich, the other in Lausanne.
Lausanne is situated around 60 km from Geneva., travel by bus from Geneva
The EPFL campus is a modern education and research facility, well situated near the lake.

The technical visit includes two specific laboratories, one being the DESL, the Distributed Electrical Systems Lab lead by Prof. Mario Paolone. The other facility CRPP is dedicated to plasma physics, fusion and related technologies.

Dep. Geneva	08:15
Arr. Lausanne EPFL	09:00
Group 1 DESL	
Start visit DESL	09:10
End visit DESL	10:10
Coffee break	
Start visit CRPP	10:30
End visit CRPP	11:30
Tour at the Rolex Learning Center	
Lunch at Rolex Learning Center (self-service)	12:00
Dep. Lausanne EPFL	13:00
Arr. Geneva	13:45

Dep. Geneva	08:15
Arr. Lausanne EPFL	09:00
Group 2 CRPP	
Start visit CRPP	09:10
End visit CRPP	10:10
Coffee break	
Start visit DESL	10:30
End visit DESL	11:30
Tour at the Rolex Learning Center	
Lunch at Rolex Learning Center (self-service)	12:00
Dep. Lausanne EPFL	13:00
Arr. Geneva	13:45

Maximum 40 visitors, 2 groups of 20 persons for the visits

The EPFL visit will end with a small lunch at the new Rolex Learning Center

GOLD

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Booth no: **8**
Full address: Brown Boveri Str. 6 - CH-5400 Baden
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URL: www.abb.ch
Products/Know-how: ABB (www.abb.com) is a leader in power and automation technologies that enable utility, industry, and transport and infrastructure customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in roughly 100 countries and employs about 140,000 people.

SILVER

Company name: **Mersen France SB S.A.S.**
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Phone: + 33 (0) 686 001 659
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URL: ep.mersen.com
Products/Know-how: Solutions for Power Management Integrated Architecture Approach cooling, Busbars, Fuses for power semiconductors.

CONTRIBUTORS

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URL: http://www.citcea.upc.edu/
http://www.teknocea.cat/
Products/Know-how: Custom power electronics components, systems and services

Sponsors and Exhibiting companies

Company name: **EEI SpA**
Booth no: **38**
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Italy
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Products/Know-how: Power electronics for power conversion systems in the fields of renewable energy, power supplies for particle accelerators, and drives for AC/DC industrial motors

EXHIBITORS

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URL: www.amstechnologies.com
Products/Know-how: Cooling solutions for power electronics, cold plates, pump stations and controls, heat exchangers

Company name: **ANSYS Switzerland**
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Products/Know-how: ANSYS brings clarity and insight to customers' most complex design challenges through fast, accurate and reliable engineering simulation. Our technology enables organizations no matter their industry to predict with confidence that their products will thrive in the real world. Customers trust our software to help ensure product integrity and drive business success through innovation. Founded in 1970, ANSYS employs over 2,750 professionals, many of them expert in engineering fields such as finite element analysis, computational fluid dynamics, electronics and electromagnetics, and design optimization. Headquartered south of Pittsburgh, U.S.A., ANSYS has more than 75 strategic sales locations throughout the world with a network of channel partners in 40+ countries. Visit

www.ansys.com for more information.
ANSYS also has a strong presence on the major social channels. To join the simulation conversation, please visit: www.ansys.com/Social@ANSYS

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Products/Know-how: Distribution of FLUX, Got-It, Portunus and PSCAD in Switzerland and Austria
Consultancy services in energy production and distribution, renewable energy, motors and actuators, watch movements.
Training on finite element analysis, electric systems design, magnetism and electric machines

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URL: http://www.behlke.com/
Products/Know-how: Manufacturer of fast high-voltage solid-state switches (MOSFET, IGBT, SCR) up to 150kV / 16kA. For medical and analytical instruments, for laser and radar equipment as well as for industrial machinery. Liquid cooling solutions with dielectric coolant.

Company name: **Boschman Technologies / APC**
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URL: http://www.boschman.nl/

Sponsors and Exhibiting companies

Products/Know-how: Boschman Technologies is the worlds leading supplier of automatic molding systems using Film Assisted Molding (FAM) technology. QFN, SENSOR, MEMS and other unique applications like Bio-Sensors where bond pads, heat sinks, window or exposed die surfaces must be kept free of mold compound or resin bleed are ideally suited for our cost effective technology. As the holder of many FAM related patents, Boschman brings unique and proven solutions also on Wafer Level Encapsulation (WLE). In addition Boschman provides automatic molding solutions for conventional semiconductor devices and reel-to-reel smartcards. New in the program are presses for the silver sintering process. The Advanced Packaging Center (APC) is an one-stop shop for the advanced packaging for package development, qualification, prototyping and small volume manufacturing services in the semiconductor industry. APC focuses on MEMS, Sensors, advanced IC and Wafer level molding packaging with Film Assist Molding (FAM) technology as a core knowhow. APC works in close cooperation with customer R&D departments to explore new packaging concepts. APC also supports customers in the application of the silver sintering presses. APC provides added value from Innovation to Industrialization.

Company name: **CAEN ELS d.o.o.**
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E-Mail: info@caenels.com
URL: www.caenels.com
Products/Know-how: Digital Power supplies
Precision Current Transducers
Current Calibration Systems

Company name: **CEDRAT S.A.**
Booth no: **10**
Full address: Grand-Rue 84 - CH-1110 Morges
Zwitserland
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E-Mail: magnetics@bluewin.ch
Products/Know-how: Distribution of FLUX, Got-It, Portunus and PSCAD in Switzerland and Austria
Consultancy services in energy production and distribution, renewable energy, motors and actuators, watch movements. Training on finite element analysis, electric systems design, magnetism and electric machines

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URL: www.dewesoft.com
Products/Know-how: DEWESoft Power Analyzer
Power Analysis (Motor, Inverter, Transformer, Equipment etc.),
E-Mobility Testing (Pure Electric Vehicles, Hybrid and Hydrogen Vehicles),
Renewable Power Testing (PV, Wind, CHP, inverter…)
Power Quality (Harmonics, Higher Frequencies, Flicker…)
Power System Testing (Aircraft, Marine, Railway…)

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Products/Know-how: Test & Measurement Solutions for power applications

Company name: **dSpace**
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Germany
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URL: www.dspace.com
Products/Know-how: dSPACE develops and distributes integrated hardware and software tools for developing and testing electronic control units and mechatronic controls. The application areas for dSPACE systems are in the automotive industry, as well as in drives technology, aerospace, and other industrial sectors. The company's customer base includes virtually all major vehicle manufacturers and suppliers. With more than 1,200 employees worldwide, dSPACE is located in Paderborn, Germany; has three project centers in Germany; and serves customers through local dSPACE companies in the USA, France, the UK, Japan, and China.

Sponsors and Exhibiting companies

Company name: **ECPE European Center for Power Electronics e.V.**
Booth no: **4**
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Products/Know-how: ECPE European Center for Power Electronics is an industry-driven Research Network in the field of Power Electronics. In the meantime the Network comprises more than 70 member companies. Furthermore, about 80 European universities and research institutes are integrated in the network as so called Competence Centres. The focus of ECPE activities is put on pre-competitive research, education and advanced training as well as public relations for power electronics in Europe.

Company name: **EPE 2016 – ECCE Europe**
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URL: www.epe2016.com
Products/Know-how: 18th European Conference on Power Electronics and Applications
September 5-8, 2016 - Karlsruhe, Germany

Company name: **EPE 2017 - ECCE Europe**
Booth no: **23**
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URL: www.epe2017.com
Products/Know-how: 19th European Conference on Power Electronics and Applications
September 11-14, 2017 - Warsaw, Poland

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Products/Know-how: Power supplies in switched mode and linear technology. Low to high voltage for magnets, tubes, particle beams and other applications.

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Products/Know-how: GaN Systems is the first place systems designers go to realize all of the benefits of gallium nitride in their power conversion and control applications. To overcome silicon's limitations in switching speed, temperature, voltage, and current, the Company develops the most complete range of gallium nitride power switching solutions for a variety of markets. Its unique Island Technology™ addresses today's cost, performance, and manufacturability-related challenges of gallium nitride resulting in devices that are approximately four times smaller, four times more efficient, and one quarter the cost of traditional design approaches.

Company name: Guangzhou Goaland Energy Conservation Tech. Co., Ltd
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Products/Know-how: Cooling Plant for transmission and distribution system and utilities such as HVDC, FACTS, Renewable energy and vehicles.

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Products/Know-how: Test & Measurement Instruments and Accessories: Semiconductor Curve Tracers, B-H Analyzers, Isolation Measurement Systems, Probes

Sponsors and Exhibiting companies

Company name: **IEEE Power Electronics Society**
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Products/Know-how: The Power Electronics Society is one of the fastest growing technical societies of the Institute of Electrical and Electronics Engineers (IEEE). For over 25 years, PELS has facilitated and guided the development and innovation in power electronics technology. This technology encompasses the effective use of electronic components, the application of circuit theory and design techniques, and the development of analytical tools toward efficient conversion, control and condition of electric power. Our 7,000 members include preeminent researchers, practitioners, and distinguished award winners. IEEE PELS Publishes the IEEE Transactions on Power Electronics, a top referenced journal among all IEEE publications.

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Products/Know-how: see imperix.ch

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Products/Know-how: Inductive components

Company name: **KEYSIGHT Technologies**
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Products/Know-how: Keysight Technologies is a global electronic measurement technology and market leader helping to transform its customers' measurement experience through innovations in wireless, modular, and software solutions. Keysight's electronic measurement instruments, systems, software and services are used in the design, development, manufacture, installation, deployment and operation of electronic equipment. Keysight Technologies will present to customers the B1506A Power Device Analyzer for Circuit Design. Just one connection and one mouse click to get necessary power device parameters for Switching inverter/converter circuit design.

Company name: **Leclanché Capacitors**
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Products/Know-how: Power Capacitors Film and Electrolytic

Company name: **LEM International *sa***
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Products/Know-how: LEM is the market leader in providing innovative and high quality solution for measuring electrical parameters. Its core products – current and voltage transducers – are used in a broad range of applications in drives & welding, renewable energies & power supplies, traction & trackside, high precision, conventional and green cars business.

Sponsors and Exhibiting companies

Company name: **LEMSYS SA**
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URL: www.lemsys.com
Products/Know-how: LEMSYS SA is a leading global provider of test equipment for the power electronics industry. LEMSYS SA designs and manufactures innovative and tailored test and measuring solutions for semiconductor devices such as IGBTs, MOSFETs, Diodes and Thyristors. The company has acquired profound expert knowledge ranging from wafer level to complex and Intelligent Power Modules (IPMs), through chip, substrate and discrete devices. With more than 4 decades track-record of achievements, LEMSYS SA is the preferred choice of world's largest power semiconductor manufacturers.
LEMSYS SA is a key partner in the power semiconductor industry value chain. Its product and service portfolio includes technical support and consulting throughout the entire life cycle of the electronic components from characterisation to mass production.

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Products/Know-how: programmable DC power supplies and electronic loads

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Products/Know-how: MATLAB/Simulink

Company name: **Mesago PCIM GmbH**
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Products/Know-how: Event about power electronics, intelligent motion, renewable energy, energy management

Company name: **OCEM Power Electronic**
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Products/Know-how: High voltage power supplies, Magnet power supplies, RF systems, Plasma Physics, Particle Physics, Superconductivity, Transportation Systems, Advanced Industry, Biomedical

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Products/Know-how: OPAL-RT is the world leader in the development of PC/FPGA Based Real-Time Digital Simulators, Hardware-In-the-Loop (HIL) testing equipment and Rapid Control Prototyping (RCP) systems to design test and optimize control and protection systems used in power grids, power electronics, electrical drives in various industries, as well as R&D centers and universities.

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Sponsors and Exhibiting companies

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Products/Know-how: PLECS
The simulation platform for power electronic systems.

Company name: Positronic Industries and IC Interconnex
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Products/Know-how: Positronic is a global manufacturer of high reliability electronic connectors and cable assemblies for use in various applications. Core capabilities include solid machined contacts for use in standard and custom connectors. Key products include high power connectors, D-sub connectors, modular connectors, circular connectors and cable assemblies. Visit www.connectpositronic.com for details.

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URL: www.pemuk.com
Products/Know-how: PEM Ltd, manufacture and sell state-of-the-art wide-bandwidth, flexible, clip-around, current sensors based on Rogowski technology. Ideal for the latest semiconductor or Power Electronics Development & HF & Current pulse measurements, the sensors cover frequencies from 0.01 Hz to 30 MHz and currents from 10 A to 1,000,000 A.

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Products/Know-how: POWERSYS is an engineering solutions provider that enables its clients to successfully implement their projects through a global offer. From engineering services to software development, POWERSYS offers to industry, research and education a range of professional services covering electrical and electromechanical power systems. By combination of the best relevant software on the market and our high-skilled staff of engineers we offer to local and global clients the most flexible solution for studies applicable to our main markets: Power systems, transmission & distribution, power electronics and drives, automotive, electromagnetic design, renewable energy. PSIM is the ultimate simulation environment for power conversion and control PSIM will allow your research group to gain a competitive edge. With PSIM's powerful simulation environment, it will allow you to work more efficiently, reducing the developmentcost and time-to-market.
Easy to Use, Fast Simulation, & Flexible Control Representation Even without prior experience with CAD software, you can build a circuit and obtain results in minutes.

Company name: **PULSE MC 2**
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URL: www.pulsemc2.fr
Products/Know-how: Pulse MC2 is the major partner with technical expertise in High Voltage and Power Electronics Components and Systems.
Products range: DC Power Supplies, Capacitors (Discharge and filtering), Wirewound & Non inductive Power resistors, High voltage resistors, Diodes and rectifiers, Varistors, Solid State Switches, Spark Gaps and Thyratrons, High voltage relays, Transformers, Magnetic Cores, Industrial Connectors, High Voltage Cable and Connectors, Tests & instrumentation (Voltage and Current Probes, Optical Fiber Links).

Company name: **SP CONTROL TECHNOLOGIES S.L.**
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URL: www.spcontroltechnologies.com
Products/Know-how: SpCard/SpHiL. Developments boards for controlling and emulating power converters.

Sponsors and Exhibiting companies

Company name: **STÄUBLI**
Booth no: **19**
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Fax: + 33.4.50.65.60.69
E-Mail: connectors.sales@staubli.com
URL: www.staubli.com
Products/Know-how: Leader in the field of energy connections, Stäubli's know-how combines electrical and mechanical expertise to design performant and reliable e-mobility connectors for e-power and fluids (cooling, H2, ...)

Company name: **Teledyne LeCroy SA**
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Zwitserland
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E-Mail: contact.sa@teledynelecroy.com
URL: http://teledynelecroy.com/europe/
Products/Know-how: Teledyne LeCroy's Motor Drive Analyzers provide complete three-phase power analysis from motor drive input through motor mechanical output, with results in a numeric table format. Motor speed, position, and torque integration are the most complete available. Long memory, per cycle "synthesized" Waveforms and Zoom+Gate mode provide powerful dynamic drive and motor analysis. 8 channels with high resolution 12-bits ADCs, up to 1 GHz and 250 Mpt/Ch allow complete system debug on the motor drive power section, motor mechanical performance, and embedded drive control system operation.

Company name: **Thales Microelectronics**
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Fax: + 33 2 23 55 40 02
E-Mail: karine.abelard@fr.thalesgroup.com
URL: www.thalesgroup.com/microelectronics
Products/Know-how: Thales Microelectronics is Thales's industrial and technological competence centre for (micro)electronics packaging, interconnections and assemblies. Located in Etrelles (35), the company designs, engineers and manufactures high-added value electronics modules and systems. Design partner and technology provider for robust and reliable electronics:

- Design & development support
- Innovative components and materials : SiC, GaN, MEMS, 3D and hi-T° packaging
- Innovative process implementation
- Expertise services
- Mock-ups and prototyping
- Multi-physics simulation tool
- Hi-density and Hi-efficient power modules
- Harsh environment sensors' packaging
- Intelligent integrated drivers and control command

Company name: **Transrail B.&V.**
Booth no: **29**
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Fax: + 33 (0)4 72 04 42 11
E-Mail: romain.serre@boige-et-vignal.com
URL: www.boige-et-vignal.com
Products/Know-how: Transformers and inductors developed on technical specifications. Dry type and cast resin technology. Low and medium frequency.

Company name: **Triphase NV**
Booth no: **6**
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Belgium
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URL: www.triphase.com
Products/Know-how: Triphase, powering your R&D. Triphase is a leading technology provider in the area of sustainable transportation and smart energy networks. We offer an engineering platform for prototyping, development and testing of power conversion systems between 15 and 360 kW. Our platform significantly reduces development time and enables customers to switch rapidly between simulation, demonstration and validation of power electronics systems. The platform provides modular hardware and software building blocks to realize customized power systems that can be used for rapid prototyping, power hardware in the loop load and source emulation and power flow management. Applications include smart- and microgrids, e-storage, electrical machines and more. Key technologies are open and modular power converters, high-speed voltage and current measurements, powerful control units and a proprietary real-time measurement and control network. We cooperate with companies, universities and R&D centers to develop better products.
More information: www.triphase.com

Sponsors and Exhibiting companies

Company name: **Typhoon HIL**
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Products/Know-how: high fidelity control testing platforms

Company name: **United Technologies Research Center**
Booth no: **41**
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Products/Know-how: United Technologies Research Center delivers advanced technologies to the businesses of United Technologies Corp. (UTC) to improve the performance, energy efficiency and cost of UTC products and processes. UTRC also engages with UTC business units and external research organizations to expand the boundaries of science and technology through research and innovation, delivering technology options that meet and anticipate the needs of the marketplace. Founded in 1929, UTRC is headquartered in East Hartford, Connecticut and has research and development subsidiaries established in Shanghai, China, and Cork, Ireland. UTRC's affiliate, United Technologies Research Center, Inc., has a research facility in Berkeley, California. Find out what it means to Be Curious at www.utrc.utc.com.

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E-Mail: tmi@nl.yokogawa.com
URL: http://tmi.yokogawa.com
Products/Know-how: 100 years of precision making in test and measurement. Yokogawa has pioneered accurate power measurement throughout its history, and is the market leader in digital power analyzers. The guaranteed accuracy and precision of Yokogawa's instruments results from the fact that Yokogawa has its own European standards laboratory at its European headquarters in The Netherlands. This facility is the only industrial (i.e. non-government or national) organisation in Europe to offer traceable power calibration, to national and international standards, at frequencies up to 100 kHz: a requirement for higher harmonic measurements specified in quality standards such as ISO9000.

Vendor Sessions - Groundfloor

Timing	Tuesday 8/9	Wednesday 9/9	Thursday 10/9
14.00-14.20	PLEXIM	OPAL-RT	Lemsys
14.20-14.40	Citcea-UPC - Teknocea	Stäubli	Powersys
14.40-15.00	UTRC	PEM	MathWorks
15.00-15.20	Leclanché Capacitors	EEI Spo	Magna-Power Electronics
15.20-15.40	Thales Microelectronics	CEDRAT- applied magnetics	OCEM Power Electronics
15.40-16.00	MERSEN	ABB	LEM
16.00-16.20	IWATSU Test Instruments	Typhoon Hil	no Vendor session
16.20-16.40	Goaland	GaN Systems	no Vendor session
16.40-17.00	Keysight Technologies	SP Control Technologies	no Vendor session

Vendor Sessions – 2nd floor

Timing	Tuesday 8/9	Wednesday 9/9	Thursday 10/9
14.00-14.20	Triphase	FuG Elektronik	
14.20-14.40	Pulse MC2	Positronic	
14.40-15.00		CAEN ELS d.o.o.	
15.00-15.20	DEWESoft		
15.20-15.40			
15.40-16.00			

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Cover 3

Cover 4