DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

COMPEL 2018

UNIVERSITÀ DEGLI STUDI DI PADOVA

The Nineteenth IEEE Workshop on Control and Modeling for Power Electronics

June 25 – 28 2018, University of Padova
Department of Information Engineering (DEI)

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IEEE POWER ELECTRONICS SOCIETY
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Program at a Glance

Monday	Tuesday	Wednesday	Thursday
6/25/2018	6/26/2018	6/27/2018	6/28/2018
DAY 1	DAY 2	DAY 3	DAY 4
Ve Classroom - DEI	Main Hall - Palazzo Bo	Ve Classroom - DEI	Ve Classroom - DEI
08:00 16:30 Onsite registration open (Ke)	08:00 16:30 Onsite registration open (Sala dei Quaranta)	8:00 Onsite registration open (Ke)	
	8:45 Opening		
09:00 11:00 **Tutorial 1 (J. Cobos)**	9:00 10:55 T1.1 T1.2 T1.3 T1.4 **Keynote 1 (A. Mantooth)** Technical Session 1	8:30 10:10 T4.1 T4.2 T4.3 T4.4 Technical Session 4	8:30 10:10 T7.1 T7.2 T7.3 T7.4 Technical Session 7
Coffee Break	10:55-11:15 Coffee Break (Basilica)	10:10-10:30 Coffee break	10:10-10:30 Coffee break
11:15 13:15 **Tutorial 2 (D. Boroyevich, R. Burgos, I. Cvetkovic)**	11:15 12:55 T2.1 T2.2 T2.3 T2.4 Technical Session 2	10:30 12:10 T5.1 T5.2 T5.3 T5.4 Technical Session 5	10:30 12:10 T8.1 T8.2 T8.3 T8.4 Technical Session 8
13:15-14:30 Lunch	12:55-14:30 Lunch (Basilica)	12:10-14:00 Lunch + TC1 Committee meeting	12:10-14:00 Lunch
14:30 16:30 **Tutorial 3 (R. Pilawa-Podgurski)**	14:30 16:25 T3.1 T3.2 T3.3 T3.4 **Keynote 2 (B. Lehman)** Technical Session 3	14:00 15:40 T6.1 T6.2 T6.3 T6.4 Technical Session 6	14:00 15:40 T9.1 T9.2 T9.3 T9.4 Technical Session 9
	16:25-16:45 Coffee Break (Basilica)	15:40-16:00 Coffee break	15:40-16:00 Coffee break
	16:45 18:00 Poster Session 1 (Basilica)	16:00 18:00 Poster Session 2	16:00 18:00 Poster Session 3
	18:00 20:00 Welcome Reception (Palazzo della Ragione)	18:00 18:30 Industry presentation	18:00 18:30 Award committee meeting / student award decisions
		19:30 Social Dinner (Botanical Garden)	

General Information

Official Language: English

REGISTRATION DESK opening hours:

- **Monday June 25**, Department of Information Engineering (DEI) *room Ke* (address: VIA GIOVANNI GRADENIGO 6): **08.00 am – 04.00 pm**
- **Tuesday June 26**, at Main University Hall *Galileo Galilei* of Palazzo Bo (address: Via VIII Febbraio, 2): **08.00 am – 06.00 pm**
- **Wednesday June 27**, at Department of Information Engineering (DEI) *room Ke* (address: VIA GIOVANNI GRADENIGO 6): **08.00 am – 12.00 pm**
- **Thursday June 28**, at Department of Information Engineering (DEI) *room Ke* (address: VIA GIOVANNI GRADENIGO 6): **03.00 pm – 06.00 pm**

Internet / WiFi – WiFi connection is available at the Workshop Venues. Please apply to the Registration Desk for login and passwords. Eduroam is also available in all workshop venues.

Badges – Badges must be visibly worn at all times. You will not be allowed to enter the workshop sessions, the welcome cocktail and dinner locations without your badge.

Coffee Breaks and Lunches- Coffee breaks and lunches will be served to registered participants wearing their badges. Accompanying persons have no access to scientific sessions nor to coffee breaks and lunches.

Please note that vegetarian dishes will be on daily menu; a good variety of food will be served so that it will be easier to get some alternatives in case of special diet restrictions.

Certificate of Attendance - Certificates will be sent by email upon request to **compel2018@sistemacongressi.com** after the Workshop.

Persons with special needs - Every effort has been made to ensure that people with special needs are catered for. Should you require any specific assistance, please let us know.

Tipping - Tipping up to 10% for outstanding service is of course appreciated, but not necessarily expected in Italian restaurants, hotels and taxis.

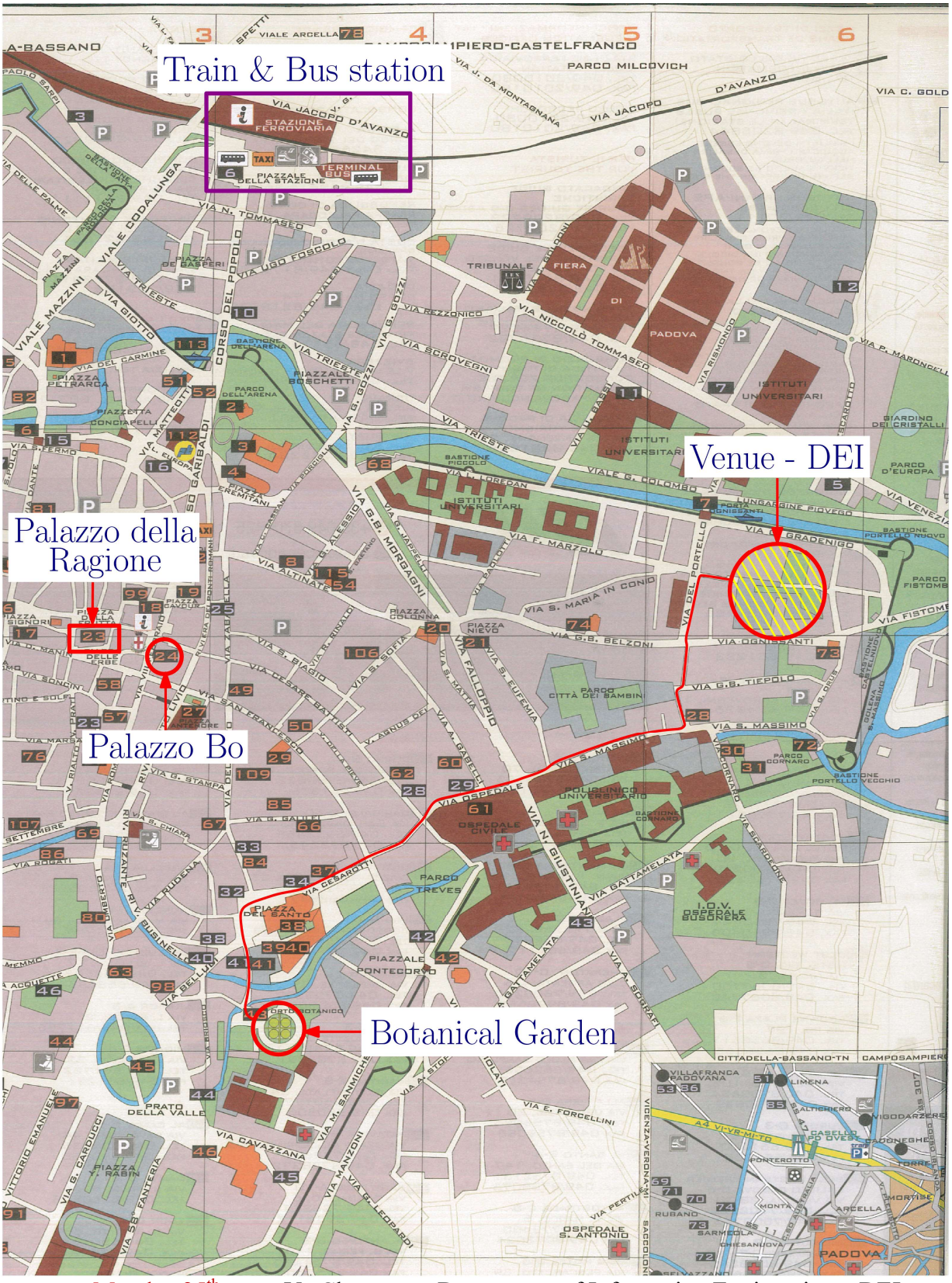
Electricity – Electricity in Italy is 230 V, 50 Hz.

Emergency numbers – Italy Country Code is +39 and Padova City Code is 049. Emergency numbers: Police 113, Ambulance 118, Fire 115.

Welcome reception – It will be held at Palazzo della Ragione on Tuesday, June 26th, at 6 pm (after poster session P1).

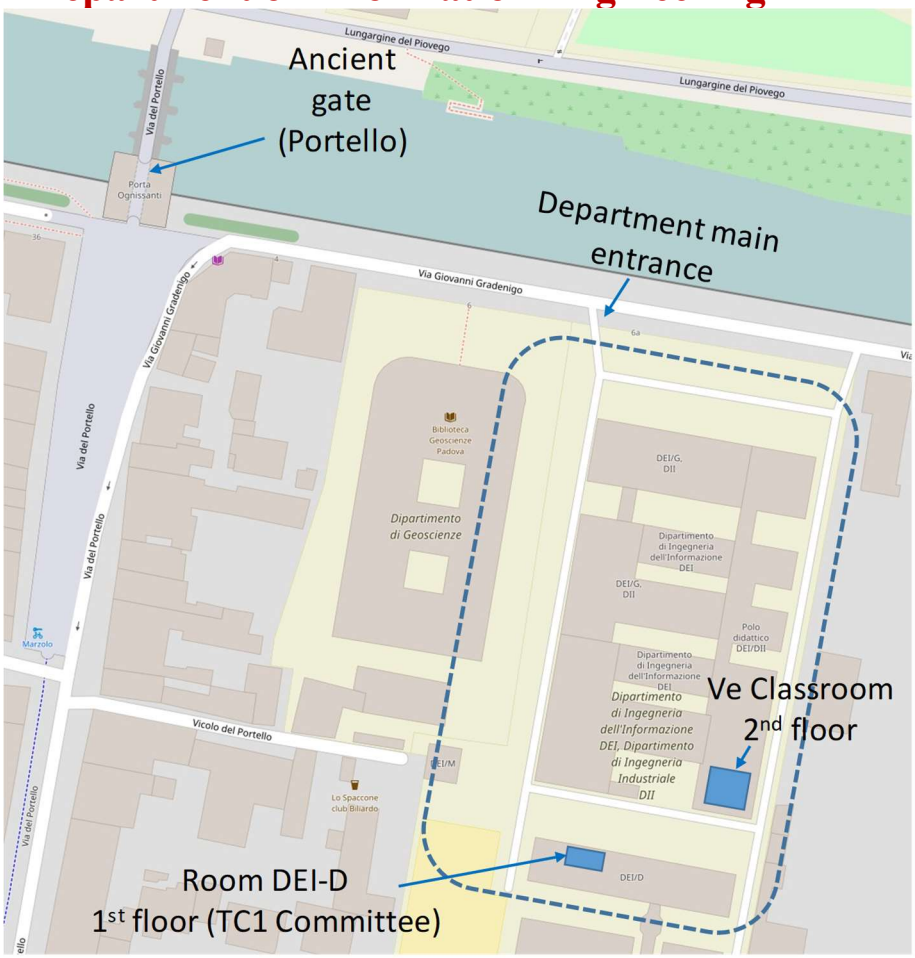
Social dinner – It will be held at Botanical Garden on Wednesday, June 27th, at 7:30 pm. Address is: via Orto Botanico 15.

Conference Locations



Monday 25th	Ve Classroom, Department of Information Engineering – DEI
Tuesday 26th	Main Hall *Galileo Galilei*, Palazzo Bo
Wednesday 27th	Ve Classroom, Department of Information Engineering – DEI
Thursday 28th	Ve Classroom, Department of Information Engineering – DEI

Department of Information Engineering – DEI



COMPEL 2018 – Program

Monday 25th, 2018

Ve Classroom, Department of Information Engineering (DEI)

Tutorial 1: Differential Power - A fundamental limit of power conversion

Time: 9:00 – 11:00

José A. Cobos - *Universidad Politécnica de Madrid*

Abstract. Volume and losses of power converters are determined by the "indirect" power, rather than by the "output" power delivered to the load, because the "indirect" power accounts for the energy stored and delivered by the reactive components in each switching cycle, whereas the power delivered to the load normally includes some amount of "direct" power which does not contribute to losses nor needs to be stored. The "indirect" power may be calculated at circuit-level for any specific circuit and operating conditions, and may be used to compare power topologies or propose new ones. At system-level, it is possible to calculate the lower bound of the "indirect" power for any given specification, which is referred to as "Differential" power. This fundamental limit is very useful to make high-level comparisons of power architectures, and determine the impact of the configuration itself, the number and connection of stages, bus voltage levels, capacitors discharge ratio, etc.

"Differential Power" is also useful to synthesize specific power topologies to operate in this fundamental limit of power processing. This is especially important in the case of 3-port and multi-port converters. Power balancing between stacked sources (PV cells), loads (data processing cores) or batteries are particular cases of "differential power". "Partial power" configurations may also be assessed with the "differential power" approach. The general methodology is described using internal power models for 2-port and 3-port converters, and applied to multiple cases.

One of the most interesting applications of this methodology are energy buffered converters, as those required in single-phase inverters connected to domestic batteries/PV panels or those required in Power Factor Correction applications. The methodology is illustrated for the "Little Box Challenge" (Google and IEEE-PELS) specification. The differential power is calculated, and compared with the "indirect" power processed by the main alternative architectures. Finally, an inverter is synthesized to operate in this fundamental limit.

José A. Cobos *is a Full Professor at the Universidad Politécnica de Madrid and Chair of the "Industrial Council @ CEI". He was RCC Fellow at Harvard University and Fulbrighter at UC Berkeley.*

His contributions are focused in the field of power supply systems for industrial, aerospace, telecom, automotive, renewable energy and medical applications. His research interests include energy efficiency in digital systems and RF amplifiers, magnetic components, piezoelectric transformers, transcutaneous energy transfer and the generation of EM fields for water supercooling and biomedical applications. He advised over 40 Master Thesis, 14 Doctoral dissertations, published 300+ technical papers (50+ JCR, h>44), and holds 8 patents. He conducted professional seminars and tutorials in USA, UK, Austria, Germany, Italy, Sweden, Switzerland, Syria, Mexico and Macedonia.

In 2006, he was the founder Director of the "Centro de Electrónica Industrial, CEI-UPM", a University research center leading a strong industrial program in power electronics and digital systems. Since 2016 he is the founder President of the "Industrial Council @ CEI" to coordinate Education & Research with Industry.

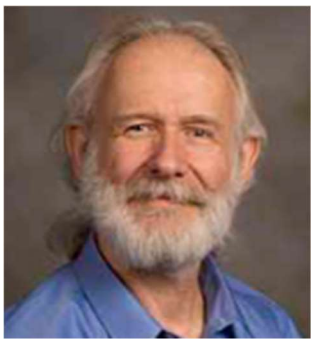
Coffee break 11:00 – 11:15

Tutorial 2: Modeling and Control of Three-Phase AC High-Power High-Frequency Converters

Time: 11:15 – 13:15

Dushan Boroyevich, Rolando Burgos, Igor Cvetkovic - *Bradley Department of Electrical and Computer Engineering Center for Power Electronics Systems (CPES) – Virginia Tech*

Abstract. Three-phase pulse-width-modulated (PWM) converters evolved in conjunction with ac motor drives, and their modeling and control has been for a long time considered an integral part of the motor drive control. However, these converters are now being widely used in many other applications, from uninterruptible power supplies (UPS), active front-end rectifiers (power factor correction), active filters, static var compensators (STATCOM), unified power flow controllers (UPFC), high-voltage dc (HVDC) transmission and distribution stations, and other grid-connected applications, such as wind and solar power generation. In many of these applications, the converters have to be controlled in the presence of unknown or widely varying and often nonlinear dynamic loads and/or sources. For high-power applications, there is also greatly increased interest in multi-level converters and converter paralleling.
The tutorial will present an overview of the unified geometric approach to modeling, modulation, and control of the three-phase high-frequency converters. Operation principles and modulation strategies of the most common topologies in typical applications will be reviewed. Converter switching, average, and multivariable small-signal models will be developed in a consistent framework, and their use for the closed-loop control design will be illustrated. Several recent advancements in the control of multi-level, modular, and parallel converters will be presented, as well as their control in grid-forming applications.



Dushan Boroyevich *received his Dipl. Ing. degree from the University of Belgrade in 1976 and his M.S. degree from the University of Novi Sad in 1982, in what then used to be Yugoslavia. He received his Ph.D. degree in 1986 from Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, USA. From 1986 to 1990, he was an assistant professor and director of the Power and Industrial Electronics Research Program in the Institute for Power and Electronic Engineering at the University of Novi Sad. He then joined the Bradley Department of Electrical and Computer Engineering at Virginia Tech as associate professor. He is now University Distinguished Professor and Associate Vice President for Research and Innovation in Energy Systems at Virginia Tech, and Director of the Center for Power Electronics Systems.*

Dr. Boroyevich has led numerous research projects in the areas of multi-phase power conversion, electronic power distribution systems, modeling and control, and multi-disciplinary design optimization. He has advised over 40 Ph.D. and 40 M.S. students to graduation and has co-authored with them over 700 papers. Dushan was the president of the IEEE Power Electronics Society (PELS) for 2011-12. He is a Fellow of IEEE and recipient of numerous awards, including the IEEE William E. Newell Power Electronics Technical Field Award, the IEEE PELS Harry A. Owen Distinguished Service Award, European Power Electronics Association (EPE) Outstanding Achievement Award, and the Award for Outstanding Achievements and Service to Profession by the European Power Electronics and Motion Control Council. He is an Honorary Professor at the Xi'an Jiaotong University in Xi'an, China, and received the K.T. Li Chair Professor Award at the National Cheng Kung University, in Tainan, Taiwan. Dushan was elected to the US National Academy of Engineering in 2014 for advancements in control, modeling, and design of electronic power conversion for electric energy and transportation.

Rolando Burgos *received the B.S. in Electronics Engineering, the Electronics Engineering Professional Degree, and the M.S. and Ph.D. degrees in Electrical Engineering from the University of Concepción, Chile, in 1995, 1997, 1999, and 2002 respectively. In 2002 he joined, as Postdoctoral Fellow, the Center for Power Electronics Systems (CPES) at Virginia Tech, in Blacksburg, VA, becoming Research Assistant Professor in 2003. From 2009 to 2012 he was with ABB Corporate Research in Raleigh, NC, as Principal Scientist. In 2010 he was appointed Adjunct Associate Professor in the Electrical and Computer Engineering Department at North Carolina State University, working ad honorem at the Future Renewable Electric Energy Delivery and Management (FREEDM) Systems Center. In 2012 he returned to Virginia Tech where he is currently associate professor in The Bradley Department of Electrical and Computer Engineering and CPES faculty.*

His research interests include wide-bandgap semiconductor based power conversion, electromagnetic interference (EMI) and electromagnetic compatibility (EMC), multi-phase multi-level power converters, grid power electronics systems, stability of ac and dc power systems, and modeling and control of power electronics converters and systems.

Dr. Burgos is Member of the IEEE Power Electronics Society where he currently serves as Chair of the Power and Control Core Technologies Committee, and as Associate Editor of the IEEE Transactions on Power Electronics, IEEE Power Electronics Letters, and the IEEE Journal of Emerging and Selected Topics in Power Electronics. He is a member as well of the IEEE Industry Applications Society, the IEEE Industrial Electronics Society, and the IEEE Power and Energy Society.

Igor Cvetkovic *received his Dipl. Ing. Degree from the University of Belgrade, Serbia in 2004 (area - Power Systems). After working several years for the Electric Power Industry of Serbia as an Engineer for Regulation and Maintenance of Power Electronics Equipment at the Nikola Tesla Power Plant, Igor joined Center for Power Electronics Systems (CPES) at Virginia Tech in Blacksburg, USA in 2007 as a visiting scholar. Year later, he started Direct Ph.D. program at Virginia Tech, and completed his M.S. degree in Power Electronics in 2010. The same year he started working full-time as a research engineer at CPES while in parallel pursuing his doctorate part-time. He received his Ph.D. degree in 2017 and is now working as a Research Scientist and a Technical Director at CPES. Igor is a member of IEEE, and his research interests include ac- and dc- electronic power distribution systems design and stability, as well as power electronics-based system-level modeling and control.*

Lunch 13:15 – 14:30

Tutorial 3: Hybrid switched-capacitor power converters

Time: 14:30 – 16:30

Robert Pilawa-Podgurski - *University of California, Berkeley*

Abstract. This tutorial will cover the topic of hybrid switched-capacitor (SC) power converters. This class of converters has received increased attention lately, owing to superior power density and efficiency compared to conventional approaches. Starting with a detailed overview and analysis of conventional SC power converters, the limitations and design constraints of SC converters will be highlighted. Moreover, derivation of the fast and slow switching limits, along with SC circuit analysis tools such as charge transfer analysis will be covered. The concept of soft charging in SC converters through current source behavior and resonant operation will be introduced, along with analytical techniques for determining which SC converter topologies are amenable to this hybrid mode of operation. Various methods for evaluating hybrid SC converter topologies along with figures of merit for different circuit topologies will be discussed, along with recent examples of high performance hardware prototypes. Finally, practical challenges such as gate driving and capacitor voltage balancing will be discussed, along with recent proposed techniques to mitigate such difficulties.

Robert Pilawa-Podgurski *is currently an Associate Professor in the Electrical Engineering and Computer Science Department at the University of California, Berkeley. Previously, he was an Associate Professor in Electrical and Computer Engineering at the University of Illinois Urbana-Champaign. He received his BS, MEng, and PhD degrees from MIT. He performs research in the area of power electronics. His research interests include renewable energy applications, electric vehicles, energy harvesting, CMOS power management, high density and high efficiency power converters, and advanced control of power converters. Dr. Pilawa-Podgurski received the Chorafas Award for outstanding MIT EECS Master's thesis, the Google Faculty Research Award in 2013, and the 2014 Richard M. Bass Outstanding Young Power Electronics Engineer Award of the IEEE Power Electronics Society, given annually to one individual for outstanding contributions to the field of power electronics before the age of 35. In 2015, he received the Air Force Office of Scientific Research Young Investigator Award, the UIUC Dean's Award for Excellence in Research in 2016, the UIUC Campus Distinguished Promotion Award in 2017, and the UIUC ECE Ronald W. Pratt Faculty Outstanding Teaching Award in 2017. Since 2014, he serves as Associate Editor for IEEE Transactions on Power Electronics, and for IEEE Journal of Emerging and Selected Topics in Power Electronics. He is co-author of eight IEEE prize papers.*

Tuesday 26th, 2018

Palazzo Bo, Main Hall *Galileo Galilei*

Keynote #1: Emerging Trends in Wide Bandgap Power Electronics

Time: 9:00 – 9:40

Alan Mantooth, *University of Arkansas*

Abstract. Economy and performance are benefits that come with high power density power electronics, just as in the case of VLSI electronics. High density power electronics require the heterogeneous integration of disparate technologies including power semiconductor devices, driver, protection and control circuitry, passives and voltage isolation techniques into single modules. One of the keys to advancing power electronic integration has been the commercial reality of wide bandgap power semiconductor devices made from silicon carbide and gallium nitride. The ability to design and manufacture wide bandgap integrated circuits as drivers, controllers, and protection circuitry allows them to be packaged in close proximity to the power device die to minimize parasitics that would adversely impact system performance. These impacts include excessive ringing, noise generation, power loss, and, potentially, self-destruction. This talk will describe emerging trends in silicon carbide analog and mixed-signal IC design for power electronic applications. Advanced 3D packaging techniques driven by multi-objective optimization techniques will also be described.

H. Alan Mantooth *is a Distinguished Professor of Electrical Engineering at the University of Arkansas and holder of the 21st Century Research Leadership Chair. Dr. Mantooth has 20 years of academic experience in addition to 8 years in industry. He has served in several leadership positions in both industry and academe, and currently serves as Executive Director for the NSF Research Center on GRid-connected Advanced Power Electronic Systems (GRAPES), the DoE Cybersecurity Center on Secure, Evolvable Energy Delivery Systems (SEEDS), and as Deputy Director for the NSF Engineering Research Center for Power Optimization of Electro-Thermal Systems (POETS). Since its inception in 2005 he has served as the Executive Director of the National Center for Reliable Electric Power Transportation (NCREPT) and overseen its research and building program, which includes a 6 MVA/15 kV test facility. Dr. Mantooth has published over 300 refereed articles and three books on modeling, design automation, power and analog circuit design and electronic packaging. He is an IEEE Fellow, has served on the IEEE PELS Advisory Committee since 2004 and was elected PELS President for 2017 and 2018.*

Keynote #2: Smart Solar Energy for the Smart Grid

Time: 14:30 – 15:10

Brad Lehman, *Northeastern University*

Abstract. This talk will introduce the recent developments on merging of traditional solar energy concepts with self-adaptation, machine learning and integrated power electronic fabrication. For example, a smart PV panel has been built that can self-heal and self-optimize to produce higher power. Specialized solar fuses can even communicate between themselves and the panels to give diagnostics for dangerous and previously undetectable faults using machine learning methods. Combined with new Maximum Power Point Tracking algorithms, the solar panels can achieve fast optimization in changing weather conditions, self-healing capabilities during faults or slowly adapt their performance during their long aging lifetimes. It is also possible to dynamically reconfigure the connections between solar panels to optimize energy yields. The new approaches lead to new controller and modeling problem statements that will also be discussed.

Prof. Brad Lehman *is presently a Professor in the Department of Electrical and Computer Engineering at* Northeastern University *(Boston, MA) and previously was a Hearin Hess Distinguished Assistant Professor at Mississippi State University. Dr. Lehman is Editor-in-Chief of the IEEE TRANSACTIONS ON POWER ELECTRONICS and is the recipient of the 2015 IEEE Power Electronics Society Modeling and Control Technical Achievement Award and a 2016 IEEE Standards Medallion. He has been listed in the inaugural edition of the book* The 300 Best Professors*, Princeton Review, 2012. Dr. Lehman performs research in power electronics and controls, with applications to solar energy, battery energy management systems, and reliability. Previous to becoming a professor, Brad was the head swimming and diving coach at Georgia Institute of Technology.*

Tuesday 26th, 2018

Palazzo Bo, Main Hall *Galileo Galilei*

Welcome Message 8:45 Vice Rector Prof. Alessandro Paccagnella

Opening 8:55 General Chair Prof. Luca Corradini

Technical session **T1 - High-Frequency Converters**

Chair: Daniel Costinett

N°	Paper ID	AUTHORS	TITLE	Time
T1.1	**Keynote 1**	**Alan Mantooth**	**Emerging Trends in Wide Bandgap Power Electronics**	**9:00**
T1.2	189	Brandon Regensburger, Ashish Kumar, Sreyam Sinha and Khurram Afridi	High-Performance 13.56-MHz Large Air-Gap Capacitive Wireless Power Transfer System for Electric Vehicle Charging	9:40
T1.3	181	Mausamjeet Khatua, Ashish Kumar, Dragan Maksimovic and Khurram Afridi	A High-Frequency LCLC Network Based Resonant DC-DC Converter for Automotive LED Driver Applications	10:05
T1.4	220	Lei Gu, Kawin Surakitbovorn, Grayson Zulauf, Sombuddha Chakraborty and Juan Rivas Davila	High-Frequency Resonant Converter with Synchronous Rectification for High Conversion Ratio and Variable Load Operation	10:30

Coffee break 10:55 – 11:15

Technical session **T2 - Soft Switching Converters**

Chair: Juan Rivas Davila

N°	Paper ID	AUTHORS	TITLE	Time
T2.1	13	Kevin Martin, Aitor Vazquez, Manuel Arias and Javier Sebastian	A very simple analog control for QSW-ZVS source/sink buck converter with seamless mode transition	11:15
T2.2	94	Weijian Han and Luca Corradini	Control Technique for Wide-Range ZVS of Bidirectional Dual-bridge Series Resonant dc-dc Converters	11:40
T2.3	209	Margaret Blackwell, Andrew Stillwell and Robert Pilawa-Podgurski	Dynamic Level Selection for Full Range ZVS in Flying Capacitor Multi-Level Converters	12:05
T2.4	221	Ashish Kumar, Saad Pervaiz and Khurram Afridi	Multimode Topology Morphing Control of Impedance Control Network Resonant DC-DC Converters	12:30

Lunch 12:55-14:30

Technical session **T3 - Control of Power Converters**

Chair: Dragan Maksimovic

N°	Paper ID	AUTHORS	TITLE	Time
T3.1	**Keynote 3**	**Brad Lehman**	**Smart Solar Energy for the Smart Grid**	**14.30**
T3.2	87	Jason Poon, Brian Johnson, Sairaj Dhople and Seth Sanders	Minimum Distortion Point Tracking: Optimal Phase Shifting for Input- or Output-Parallel Connected DC-DC Converters	15:10
T3.3	134	Hoejeong Jeong, Hyeun-Tae Cho, Yu-Chen Liu and Katherine Kim	A Scalable Unit Differential Power Processing System Design for Photovoltaic Applications	15:35
T3.4	171	Andreea Martin, Alex Hanson and David Perreault	Energy and Size Reduction of Grid-Interfaced Energy Buffers Through Line Waveform Control	16:00

Coffee break 16:25-16:45

Poster session **P1: Control and Modeling of Power Converters**
16:45-18:00

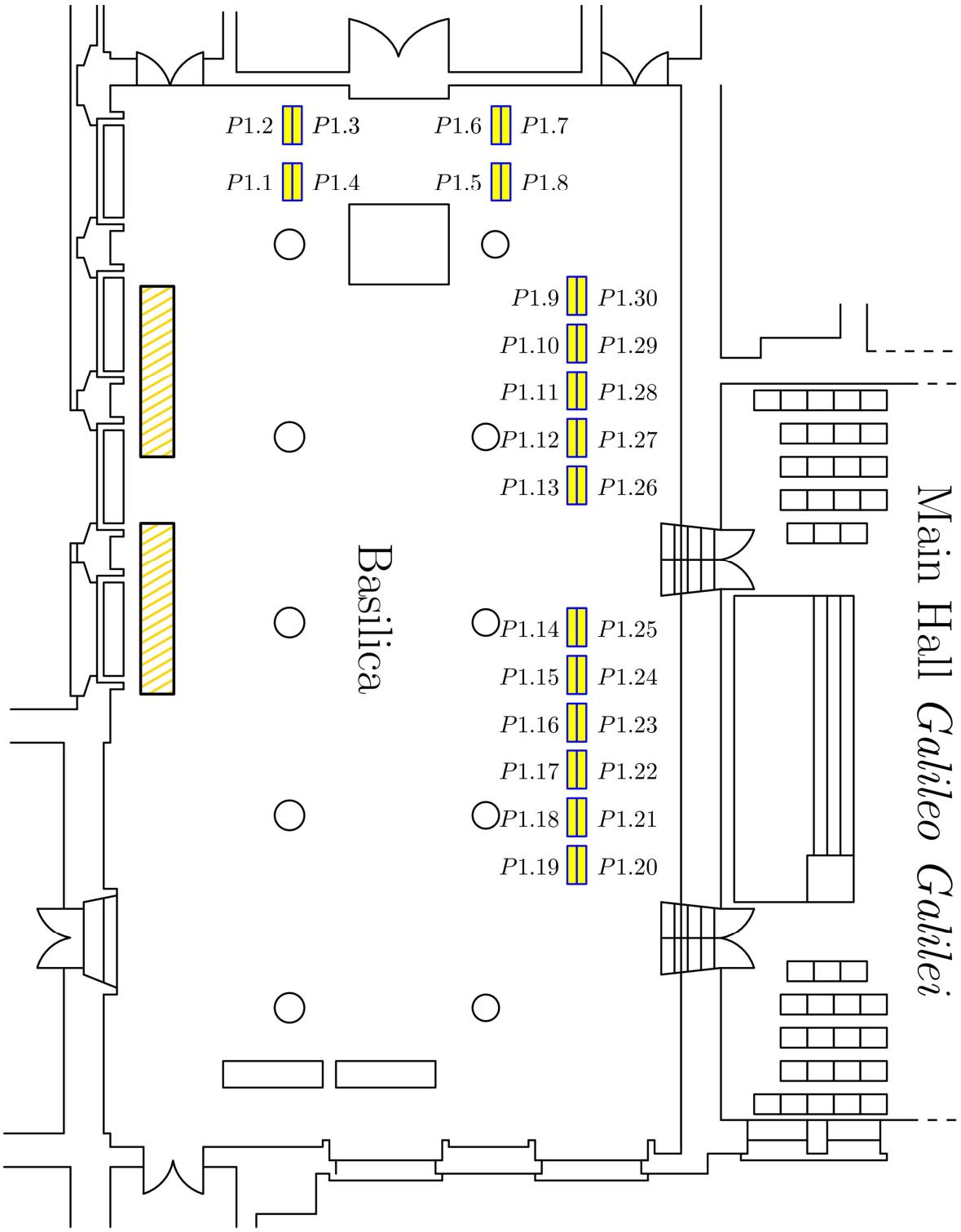
Chairs: Diego Lamar, Michael Merlin

N°	Paper ID	AUTHORS	TITLE	Location
P1.1	238	Qiong Wang and Rolando Burgos	A Method for Increasing Modulation Index of Three Phase Triangular Conduction Mode Converter	Basilica
P1.2	139	Ivan Todorovic, Ivana Isakov and Stevan Grabic	Safe Reactive Power Production Schemes For the Grid-Connected Converters Affected by the Voltage Unbalances	Basilica
P1.3	124	Javier Samanes and Eugenio Gubia	On the Limits of the Capacitor-Voltage Active Damping for Grid-Connected Power Converters with LCL Filter	Basilica
P1.4	13	Kevin Martin, Aitor Vazquez, Manuel Arias and Javier Sebastian	A very simple analog control for QSW-ZVS source/sink buck converter with seamless mode transition	Basilica
P1.5	14	Kevin Martin, Aitor Vazquez, Manuel Arias and Javier Sebastián	Optimization procedure of source/sink converters for DC power distribution nano-grids	Basilica
P1.6	5	Margarita Norambuena, Jose Rodriguez and Cristian Garcia	A Very Simple High Performance Torque and Flux Control of AC Machines using Predictive Control	Basilica
P1.7	225	Nathan C. Brooks, Zitao Liao and Robert C.N. Pilawa-Podgurski	A Digital Implementation of PLL-Based Control for the Series-Stacked Buffer in Front-End PFC Rectifiers	Basilica
P1.8	204	Zitao Liao, Danny J. Lohan, Nathan C. Brooks, James Allison and Robert C.N. Pilawa-Podgurski	Multi-Objective Optimization of Series-Stacked Energy Decoupling Buffers in Single-Phase Converters	Basilica
P1.9	48	Panrui Wang and Feng Gao	An Integrated Gate Driver with Active Delay Control Method for Series Connected SiC MOSFETs	Basilica
P1.10	80	Ping Liu, Yongheng Yang, Jing Yuan and Blaabjerg Frede	Model Predictive Control for Quasi-Z Source Inverters with Improved Thermal Performance	Basilica
P1.11	182	Prasanta Achanta, Brian Johnson and Dragan Maksimovic	Self-synchronizing Series-connected Inverters	Basilica

P1.12	131	Stefano Rocca, Fulvio Boattini and Luis Miguel de Paco Soto	Development of a control strategy for the 18 MW power converter of the CERN PS Booster accelerator	Basilica
P1.13	17	Toshiji Kato, Kaoru Inoue, Masaki Semasa and Naoki Minamino	Effective Time Delay Compensation for PWM Control of Grid-Connected Inverter with LCL Filter	Basilica
P1.14	58	Yufei Dong, Wuhua Li and Xiangning He	Capacitor Voltage Balance Control of Hybrid MMCs with 2nd-order Circulating Current Injection	Basilica
P1.15	240	Yuqing Zhang, Liangji Lu, Sheikh Ahsanuzzaman, Aleksandar Prodić, Giacomo Calabrese, Giovanni Frattini and Maurizio Granato	Multilevel Non-Inverting Buck-Boost Converter with Low-Frequency Ripple-Shaping Based Controller for Operating in Step-down/Step-up Transition Region	Basilica
P1.16	64	Cristino Salcines, Sourabh Khandelwal and Ingmar Kallfass	Characterization and modeling of the impact of the bulk potential in the dynamic and static behavior of power GaN-on-Si HEMTs	Basilica
P1.17	77	Diego Ochoa, Antonio Lazaro, Marina Sanz, Andres Barrado and Ramon Vazquez	Modeling, Control and Analysis of Input-Series-Output-Parallel-Output-Series architecture with Common-Duty-Ratio and Input Filter	Basilica
P1.18	68	Eduardo Verri Liberado, Fernando Pinhabel Marafão, José Antenor Pomilio, Elisabetta Tedeschi and Augusto Matheus Dos Santos Alonso	Three/Four-leg inverter current control based on generalized symmetrical components	Basilica
P1.19	195	Guoning Wang, Xiong Du, Haijiao Wang and Jian Sun	A Theory for Resonance-Generated Harmonics of Grid-Connected Converters	Basilica
P1.20	224	Ignacio Vieto and Jian Sun	Sequence Impedance Modeling and Converter-Grid Resonance Analysis Considering DC Bus Dynamics and Mirrored Harmonics	Basilica
P1.21	118	Heng Wu, Xiongfei Wang, Lukasz Kocewiak and Lennart Harnefors	AC Impedance Modeling of Modular Multilevel Converters and Two-Level Voltage-Source Converters: Similarities and Differences	Basilica
P1.22	153	Jan Rentmeister and Jason Stauth	Multi-Mode Operation of Resonant Switched Capacitor Converters for Optimized Efficiency	Basilica
P1.23	159	Jiale Xu, Lei Gu and Juan Rivas-Davila	Effect of Class 2 Ceramic Capacitor Variation on Resonant Switched Capacitor Converters	Basilica
P1.24	216	Ping Wang and Minjie Chen	A Power-Flow-Inspired Control Architecture for MIMO Power Electronics	Basilica
P1.25	66	Qing Liu, Tommaso Caldognetto and Simone Buso	Seamless Mode Transitions for Triple-Loop Controlled Interlinking Converters	Basilica
P1.26	113	Rodrigo Zenon Guzman Iturra and Peter Thiemann	Stability Analysis of Shunt Active Power Filter Based on Voltage Detection: A Delay Margin-Based Approach	Basilica
P1.27	241	Samuel Da Silva Carvalho, Michael Halamicek, Nenad Vukadinovic and Aleksandar Prodic	Emulated Dual Edge Digital PWM Scheme for Multi-Level Flying Capacitor Converters with Improved Output Resolution and Flying Capacitor Voltage Controller Stability	Basilica
P1.28	85	Sideng Hu, Zipeng Liang and Xiangning He	Modeling and Enhancement for the Current Dynamic Regulation in Energy Stored Quasi-Z-Source Inverter System	Basilica
P1.29	10	Thanh Lich Nguyen and Gerd Griepentrog	Modeling, Control and Stability Analysis for a DC Nanogrid System	Basilica
P1.30	107	Wayne Weaver and Rush Robinett III	Time-Optimal Input-Shaping Control of a Saturating Inductor DC-DC Converter	Basilica

Welcome Reception at Palazzo della Ragione (18:00 – 20:00)

Poster session 1 floor plan



Wednesday 27th, 2018

Ve Classroom, Department of Information Engineering (DEI)

Technical session **T4 - Modeling and Control**

Chair: Paolo Mattavelli

N°	Paper ID	AUTHORS	TITLE	Time
T4.1	201	Hongjie Wang, Tarak Saha and Regan Zane	Small Signal Phasor Modeling of Phase-shift Modulated Series Resonant Converters with Constant Input Current	8:30
T4.2	239	Liangji Lu, Yuqing Zhang, Sheikh Ahsanuzzaman, Aleksandar Prodić, Giacomo Calabrese, Giovanni Frattini and Maurizio Granato	Digital Average Current Programmed Mode Control for Multi-level Flying Capacitor Converters	8:55
T4.3	39	Pablo F. Miaja, Max V. Simmonds, Quentin Mannes, Marlon Alberto Granda, Cristina Fernandez, Arturo Fernandez and Pablo Zumel	Discrete-time modelling of pulse-width modulated DC-DC converters in sub-sampling conditions	9:20
T4.4	157	Mohammed Khan, Victor Purba, Yashen Lin, Mohit Sinha, Sairaj Dhople and Brian Johnson	A Reduced-order Aggregated Model for Parallel Inverter Systems Controlled with Virtual Oscillator Control	9:45

Coffee break 10:10 – 10:30

Technical session **T5 - Design of Passive Components**

Chair: José Cobos

N°	Paper ID	AUTHORS	TITLE	Time
T5.1	111	Bradley Reese, Rachel Joseph and Charles Sullivan	Improved Litz Wire Designs for the MHz Range	10:30
T5.2	226	Samantha Coday, Chritopher Barth and Robert Pilawa-Podgurski	Characterization and Modeling of Ceramic Capacitor Losses under Large Signal Operating Conditions	10:55
T5.3	208	Jaime Lopez-Lopez, Cristina Fernandez, Pablo Zumel, Seamus O'Driscoll and Cian O'Mathuna	Integrated inductor optimization for Power Supply on Chip	11:20
T5.4	228	Bingyao Sun and Rolando Burgos	Modeling and Optimization of High-Frequency Litz-Wire Transformer for 10 kW LLC Resonant Converter	11:45

Lunch 12:10 – 14:00

TC1 Committee meeting (Room DEI-D): 12:10-14:00

Technical session **T6 - Hybrid and Switched-Capacitor Converters**

Chair: Robert Pilawa-Podgurski

N°	Paper ID	AUTHORS	TITLE	Time
T6.1	43	Tim McRae, Aleksandar Prodic, Sombuddha Chakraborty, William McIntyre and Alvaro Aguilar	A Multi-Output Hybrid Divided Power Converter for LED Lighting Applications	14:00
T6.2	145	Yongjun Li, Lei Gu, Akinori Hariya, Yoichi Ishizuka, Juan Rivas Davila and Seth Sanders	A Wide Input Range Isolated Stacked Resonant Switched-Capacitor DC-DC Converter for High Conversion Ratios	14:25
T6.3	97	Hassan Kiani and Jason Stauth	Passive Component Modelling and Optimal Size Allocation for Hybrid-Resonant Switched Capacitor DC-DC Converters	14:50
T6.4	88	Jan S. Rentmeister and Jason T. Stauth	Modeling the Dynamic Behavior of Hybrid-Switched-Capacitor Converters in State Space	15:15

Coffee break 15:40 – 16:00

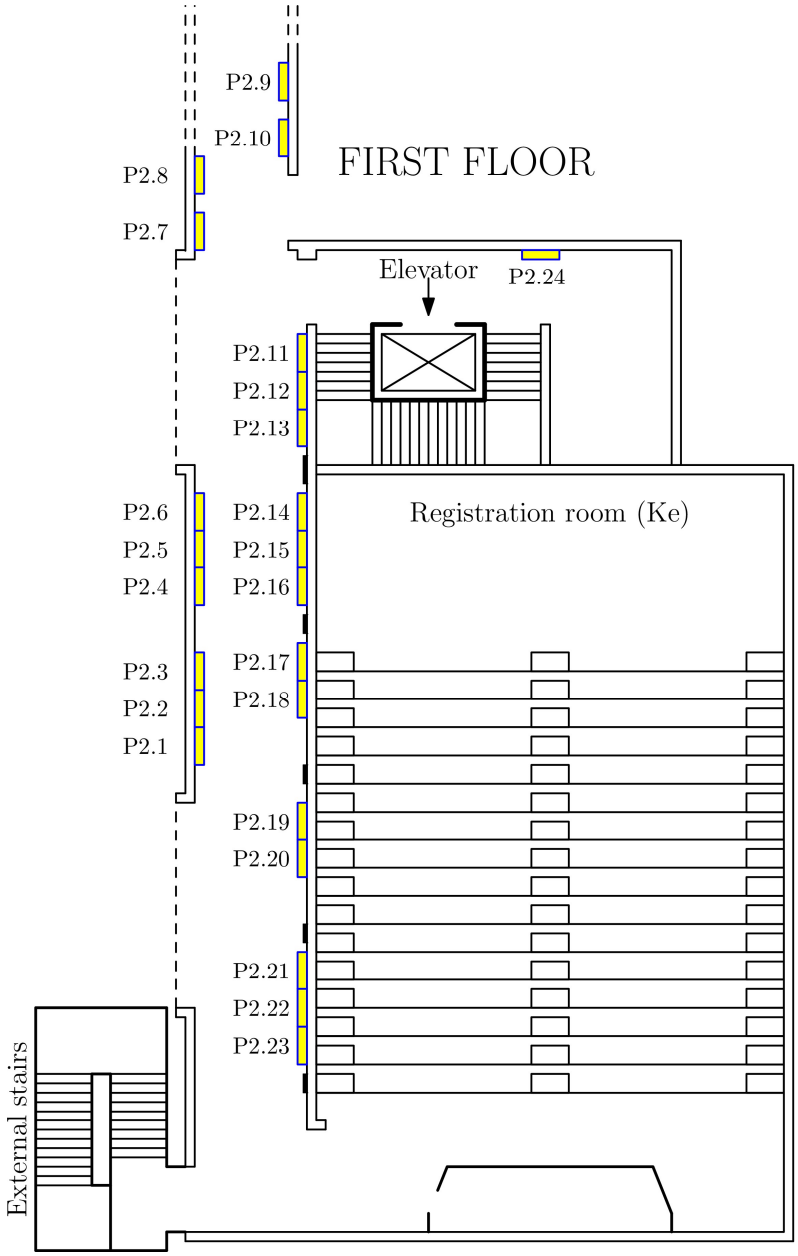
Poster session **P2a: Inverter Control and Microgrids Applications**
16:00-18:00

Chair: Francisco Azcondo

N°	Paper ID	AUTHORS	TITLE	Floor
P2.1	234	Ahmed Abdelhakim, Pooya Davari, Frede Blaabjerg and Paolo Mattavelli	Analysis and Design of the Quasi-Z-Source Inverter for Wide Range of Operation	Floor 1
P2.2	135	Ahmed Kadry Abdelsalam, Abdelrahman Farghaly and Ahmed Abdaullah Hossam Eldin	Enhanced Performance Four-Switch Three-Phase Buck-Boost Based Inverter	With drawn
P2.3	96	Andoni Urtasun, Pablo Sanchis and Luis Marroyo	Design of Virtual Inductor Emulation for Soft Transition from Islanded Mode to Grid-Connected Operation	Floor 1
P2.4	128	Anirudh Budnar Acharya, Dezso Sera, Lars Einar Norum and Remus Teodorescu	Frequency Adaptive Digital Filter Implementation of Proportional-Resonant Controller for Inverter Applications	Floor 1
P2.5	52	Duo Wang	A hybrid speed sensorless control of induction machine based on adaptive flux observer and high frequency injection method	Floor 1
P2.6	53	Duo Wang	An enhanced droop control algorithm for direct paralleled DC-AC inverters	Floor 1
P2.7	112	Cristian Garcia, Margarita Norambuena, Jose Rodriguez, Cesar Silva and Davood Arab Khaburi	Predictive Speed Control with Reduced Commutations and High Dynamic Response	Floor 1
P2.8	212	Jianghui Yu, Rolando Burgos and Dushan Boroyevich	EMI Study on Control Implementation in PEBB-based Converter	Floor 1
P2.9	69	Jing Yuan, Yongheng Yang, Ping Liu and Frede Blaabjerg	Model Predictive Control of An Embedded Enhanced Boost-inverter	Floor 1
P2.10	192	Keith Moffat, Mohini Bariya and Alexandra von Meier	Network Impedance Estimation For Time Varying AC Microgrid Control Using Noisy Synchrophasor Measurements	Floor 1

P2.11	59	Yang Jing and Feng Gao	Bipolar Cascaded Modular H7 Current Source Converter with Monopolar Grounding Fault Analysis	Floor 1
P2.12	104	Joel Guerreiro, Hildo Guillardi Jr. and José Pomilio	An Approach to the Design of Stable Distributed Energy Resources	Floor 1
P2.13	213	Jorge Rodrigo Massing, Fernanda De Morais Carnielutti, Rodrigo Padilha Vieira, André Miguel Nicolini, Alexandre Trevisan Pereira and Humberto Pinheiro	Discrete-Time Stability Analysis of Grid-Connected Converters Considering the PLL Dynamics	Floor 1
P2.14	46	Mohamed Diab, Ahmed Massoud, Shehab Ahmed and Barry Williams	A Modular Multilevel Converter with Integrated Shared Capacitor Sub-Module for MV Motor Drives Incorporating Symmetrical Six-Phase Machines	Floor 1
P2.15	176	Mohit Sharma, Carlos Hernandez and Mohamed Badawy	Application of Model Predictive Control in Modular Multilevel Converter for SOC balancing and MTPA Operation	Floor 1
P2.16	63	Joachim Steinkohl, Mads Kjeldal Graungaard, Xiongfei Wang, Frede Blaabjerg and Jean-Philippe Hasler	A Synchronization Method for Grid Converters with Enhanced Small-Signal and Transient Dynamics	Floor 1
P2.17	169	Hong Gong, Dongsheng Yang and Xiongfei Wang	Impact of the Synchronization Phase Dynamics on DQ Impedance Measurement	Floor 1
P2.18	83	Robert Smith, John Lukowski and Wayne Weaver	DC Microgrid Stabilization Through Fuzzy Control of Interleaved Heterogeneous Storage Elements	Floor 1
P2.19	73	Javier Samanes, Eugenio Gubía and Jesús López	MIMO Based Decoupling Strategy for Grid Connected Power Converters Controlled in the Synchronous Reference Frame	Floor 1
P2.20	45	Rodrigo Tambara, Lucas Scherer and Hilton Gründling	A discrete-time MRAC-SM applied to grid connected converters with LCL-filter	Floor 1
P2.21	30	Simon Round and Andrew Tuckey	An improved virtual synchronous generator control method for microgrid and grid-edge applications	Floor 1
P2.22	84	Umer Sohail, Hamed Nademi and Lars Einar Norum	A Reliable Modular Based PV-Battery Hybrid System with Peak Shaving Capability	Floor 1
P2.23	125	Alejandro Garces, Oscar Danilo Montoya Giraldo, Manuel Fernando Bravo Lopez and Carlos Bayer	Nonlinear Analysis for the Three-Phase PLL: A New Look for a Classical Problem	Floor 1
P2.24	210	Haijiao Wang, Ignacio Vieto and Jian Sun	A Method to Aggregate Turbine and Network Impedances for Wind Farm System Resonance Analysis	Floor 1

Poster session 2a floor plan



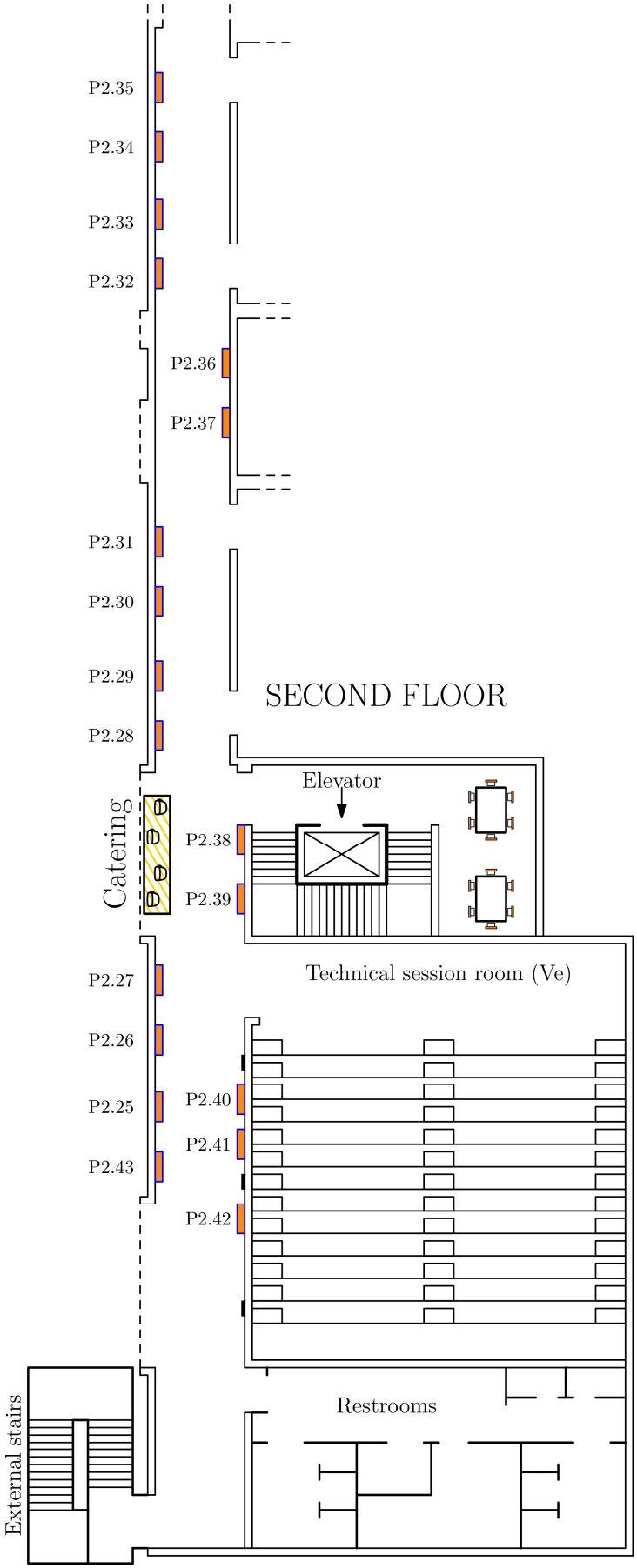
Poster session **P2b: DC-DC Converters, Modeling and Control I**
16:00-18:00

Chair: Jung-Ik Ha

N°	Paper ID	AUTHORS	TITLE	Floor
P2.25	65	Claudio Adragna	Design-oriented Small-signal Modeling of Primary-Side Regulated Flyback Converters	Floor 2
P2.26	8	Vahid Yousefzadeh	Stability Analysis of BOOST Voltage Regulators Connected to Constant Power Loads	Floor 2
P2.27	202	Vaishnavi Ravi and Lakshminarasamma N	Design and Implementation of Bipolar Bidirectional High Voltage Flyback Converter for Capacitive Loads	Floor 2

P2.28	191	Xiaofan Cui and Al-Thaddeus Avestruz	A New Framework for Cycle-by-Cycle Digital Control of Megahertz-Range Variable Frequency Buck Converters	Floor 2
P2.29	123	Maher Al-Greer, Matthew Armstrong and Jin Xu	Coordinate Descent Auto-Tuning Architecture for Multi Rail DC-DC Switch Mode Power Converters	Floor 2
P2.30	28	Martin Mellincovsky, Vladimir Yuhimenko, Mor Peretz and Alon Kuperman	A Novel Capacitor Sizing Method for Active DC Link Capacitance Reduction Circuit	Floor 2
P2.31	103	David Lopez Del Moral, Andres Barrado, Marina Sanz, Antonio Lazaro, Cristina Fernandez and Pablo Zumel	AFZ converter: a new DC-DC topology applied to photovoltaic panels	Floor 2
P2.32	160	Cristina Fernandez, Marlon Granda, Pablo Zumel, Marina Sanz, Antonio Lazaro and Andres Barrado	Identification system applied to the characterization of the input impedance of cascaded dc-dc converters	Floor 2
P2.33	105	Kewei Huang, Mladen Gagic and Bram Ferreira	Inter-Module Power Flow Control in a Modular Multilevel DC Converter	Floor 2
P2.34	198	Zhan Ma, Feng Gao, Xin Gu and Nan Li	An Online SOH Testing Method of MMC Battery Energy Storage System	Floor 2
P2.35	16	Jun Lin and George Weiss	Asymmetric backlash-based plug-and-play realization of the virtual infinite capacitor	Floor 2
P2.36	235	Bar Halivni, Michael Evzelman and Mor M. Peretz	Enabling Criteria and Circuits for Low-Power High-Density Off-Grid Converters	Floor 2
P2.37	236	Tom Urkin, Eli Abramov and Mor Mordechai Peretz	Enhanced Performance Fully-Synthesizable ΣΔ ADC for Efficient Digital Voltage-Mode Control	Floor 2
P2.38	180	Fahad Alhuwaishel, Ahmed Allehyani, Sinan Sabeeh and Prasad Enjeti	A New Medium Voltage DC Collection Grid for Large Scale PV Power Plants with SiC Devices	Floor 2
P2.39	199	Abel Taffese and Elisabetta Tedeschi	Simplified Modelling of the F2F MMC Based High Power DC-DC Converter Including the Effect of Circulating Current Dynamics	Floor 2
P2.40	20	Nicola Femia, Anna D'Alessio, Anita Tranzillo and Giulia Di Capua	Interactive MPPT-CPL Digital Control of DC-DC Power Converters Driving LED Arrays with Modulated Current Dimming for Photocatalyic Applications	Floor 2
P2.41	109	Hendrik Du Toit Mouton and Stephen Michael Cox	Small-signal Analysis of Asymmetrically-Regularly-Sampled PWM Control Loops	Floor 2
P2.42	187	Jason Galtieri and Philip Krein	Ripple Correlation Control with Capacitive Compensation for Photovoltaic Applications	Floor 2
P2.43	193	Sagar Mahajan, Dr.Sanjeevikumar Padmanaban, Frede Blaabjerg and Patrick William Wheeler	An Improved Multistage Switched Inductor Boost Converter (Improved M-SIBC) for Renewable Energy Applications: A key to Enhance Conversion Ratio	Floor 2

Poster session 2b floor plan



Poster session **P2c: Modeling and Control of Rectifiers**
16:00-18:00

Chair: Khurram Afridi

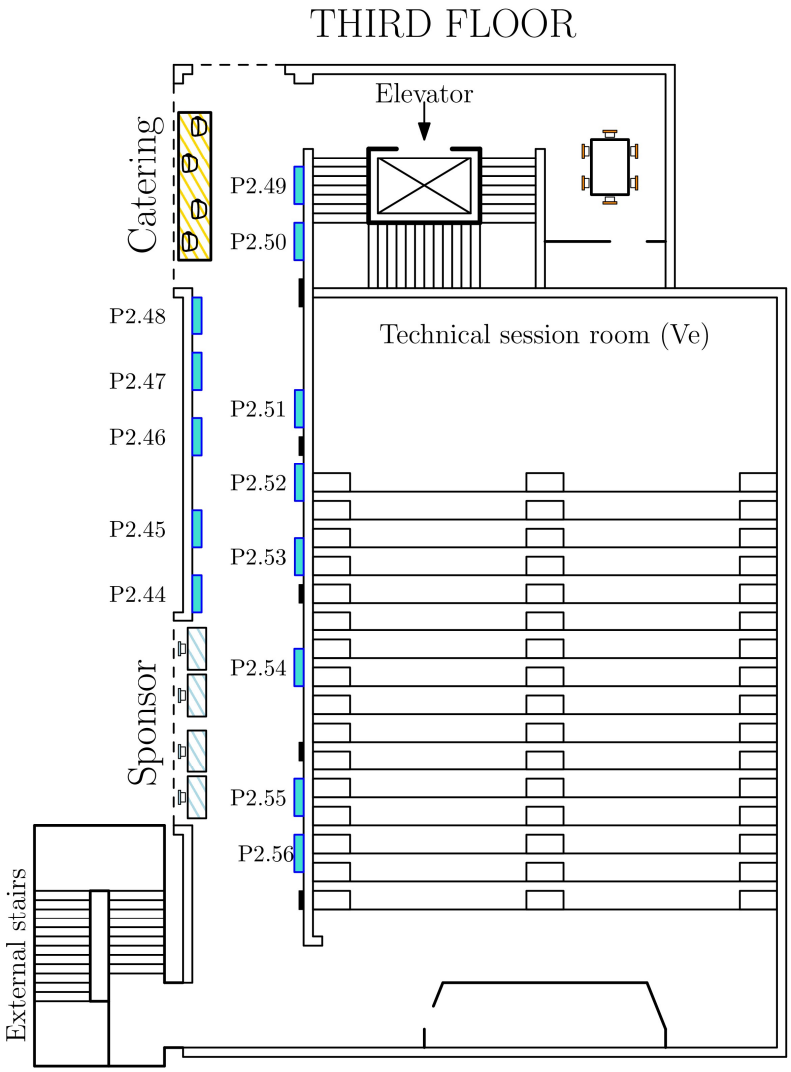
N°	Paper ID	AUTHORS	TITLE	Floor
P2.44	70	Eduardo Bayona, Francisco Javier Azcondo, Christian Brañas, Raquel Martínez, Mario Mañana, Rafael Mínguez, José Iván Rodríguez and Alberto Pigazo	Ferroresonance Mitigation Device in Voltage Transformers with a Flyback based Resistor Emulator	Floor 3
P2.45	22	Paula Lamo, Gustavo A. Ruiz, Felipe López, Alberto Pigazo and Francisco J. Azcondo	An Optimized Implementation of a Two-Sample Phase Locked Loop with Frequency Feedback for Single-Phase Sensorless Bridgeless PFCs	Floor 3
P2.46	62	Md Juel Rana, A Hussein, Mohammad Abido and M. Shafiul Alam	Transient Performance Improvement of Active Front End Rectifier Using Finite Set Model Predictive Control	Floor 3
P2.47	56	Md Shafquat Ullah Khan, Muhammad M. Roomi, Ali Iftekhar Maswood, Hossein Dehghani Tafti and Anshuman Tripathi	Application of Dynamic Voltage Restorer with Unity Power Factor Rectifier for Critical Loads in Microgrid	With drawn
P2.48	222	Spencer Cochran and Daniel Costinett	Control and Frequency Synchronization for a 6.78 MHz WPT Active Rectifier	Floor 3
P2.49	11	Hany Hamed, Fatima Al Mansoori and Ehab Bayoumi	A New Redistributed Dwell Time Method for Neutral Point Voltage Control of Multilevel Converters	Floor 3
P2.50	36	David Elizondo and Andoni Urtasun	Dual-Mode Soft-Transition Control for Single-Phase Grid-Connected Photovoltaic Inverters	Floor 3
P2.51	6	Lesan Wang, Mingyan Wang and Ben Guo	An Electric Load Simulator with Fast Dynamic Response Based on Matrix Converter	Floor 3
P2.52	35	Yin Sun and Erik Dejong	Adequacy Analysis of Overhead Line Model for Harmonic Stability Analysis of Grid-Connected Voltage-Source Converters	Floor 3
P2.53	71	Mariam Saeed Hazkial Gerges, José María Cuartas, Alberto Rodríguez, Manuel Arias and Fernando Briz	Energization and Start-up of Modular Three-stage Solid State Transformers	Floor 3
P2.54	147	Hao Tian and Yun Wei Li	Seven Level Hybrid Clamped (7L-HC) Converter in Medium Voltage Wind Energy Conversion Systems	Floor 3
P2.55	237	Rasool Heydari, Tomislav Dragicevic and Frede Blaabjerg	Coordinated Operation of VSCs Controlled by MPC and Cascaded Linear Controllers in Power Electronic Based AC Microgrid	Floor 3
P2.56	136	Dapeng Lu, Xiongfei Wang and Frede Blaabjerg	Investigation on the AC/DC Interactions in Voltage-Source Rectifiers and Current-Source Rectifiers	Floor 3

Industry presentation at room Ve (18:00 – 18:30)

Social Dinner at Botanical Garden (19:30 – 23:00)

Address: via Orto Botanico, 15

Poster session 2c floor plan



Thursday 28th, 2018

Ve Classroom, Department of Information Engineering (DEI)

Technical session **T7 - Design and Control of Power Converters**

Chair: Mohamed Badawy

N°	Paper ID	AUTHORS	TITLE	Time
T7.1	115	Tarak Saha, Anindya Chitta Bagchi, Hongjie Wang and Regan Zane	Analysis and Design of Wide Range Output Voltage Regulated Power Supply for Underwater Constant Input Current DC Distribution System	8:30
T7.2	200	Andrew Stillwell, Enver Candan and Robert Pilawa-Podgurski	Constant Effective Duty Cycle Control for Flying Capacitor Balancing in Flying Capacitor Multi-Level Converters	8:55
T7.3	95	Juan Rodriguez, Diego G. Lamar, Daniel G. Aller, Pablo F. Miaja and Javier Sebastian	Power-Efficient VLC Transmitter able to Reproduce Multi-Carrier Modulation Schemes by Using the Output Voltage Ripple of the HB-LED Driver	9:20
T7.4	91	Maria R. Rogina, Alberto Rodriguez, Aitor Vazquez, Diego G. Lamar and Marta M. Hernando	Event-focused control strategy for a SiC-based synchronous boost converter working at different conduction modes	9:45

Coffee break 10:10 – 10:30

Technical session **T8 - Topics in ac Microgrids**

Chair: Juri Jatskevich

N°	Paper ID	AUTHORS	TITLE	Time
T8.1	194	Ignacio Vieto, Guanghui Li and Jian Sun	Behavior, Modeling and Damping of a New Type of Resonance Involving Type-III Wind Turbines	10:30
T8.2	154	Dongsheng Yang, Xiongfei Wang, Fangcheng Liu, Kai Xin, Yunfeng Liu and Frede Blaabjerg	Complex-Vector PLL for Enhanced Grid Synchronization under the Weak Grid Condition	10:55
T8.3	248	Jian Sun	Passive Methods to Damp AC Power System Resonance Involving Power Electronics	11:20
T8.4	186	Aswad Adib, Fariba Fateh and Behrooz Mirafzal	Weak Grid Impacts on the Design of Voltage Source Inverters	11:45

Lunch 12:10 – 14:00

Technical session **T9 - Topics in dc Microgrids**

Chair: Jian Sun

N°	Paper ID	AUTHORS	TITLE	Time
T9.1	137	Kyle Goodrick and Dragan Maksimovic	Systematic Optimization of Multiple Voltage Domain DC Distribution Architectures	14:00
T9.2	185	Zhi Qu, Seyyedmilad Ebrahimi, Navid Amiri, Oleksandr Pizniur and Juri Jatskevich	Adaptive Method for Stabilizing DC Distribution Systems with Constant Power Loads Based on Active Damping	14:25
T9.3	205	Seyed Fariborz Zarei, Hossein Mokhtari, Mohammad Amin Ghasemi, Pooya Davari, Saeed Peyghami and Frede Blaabjerg	Characterization of Proportional-Integral-Resonant Compensator for DC Link Voltage Control	14:50
T9.4	197	Rohail Hassan, Hongjie Wang, Muhammad Muneeb Ur Rehman, Baljit Riar and Regan Zane	Nodal Impedance-Based Stability Analysis of DC Nanogrids	15:15

Coffee break 15:40 – 16:00

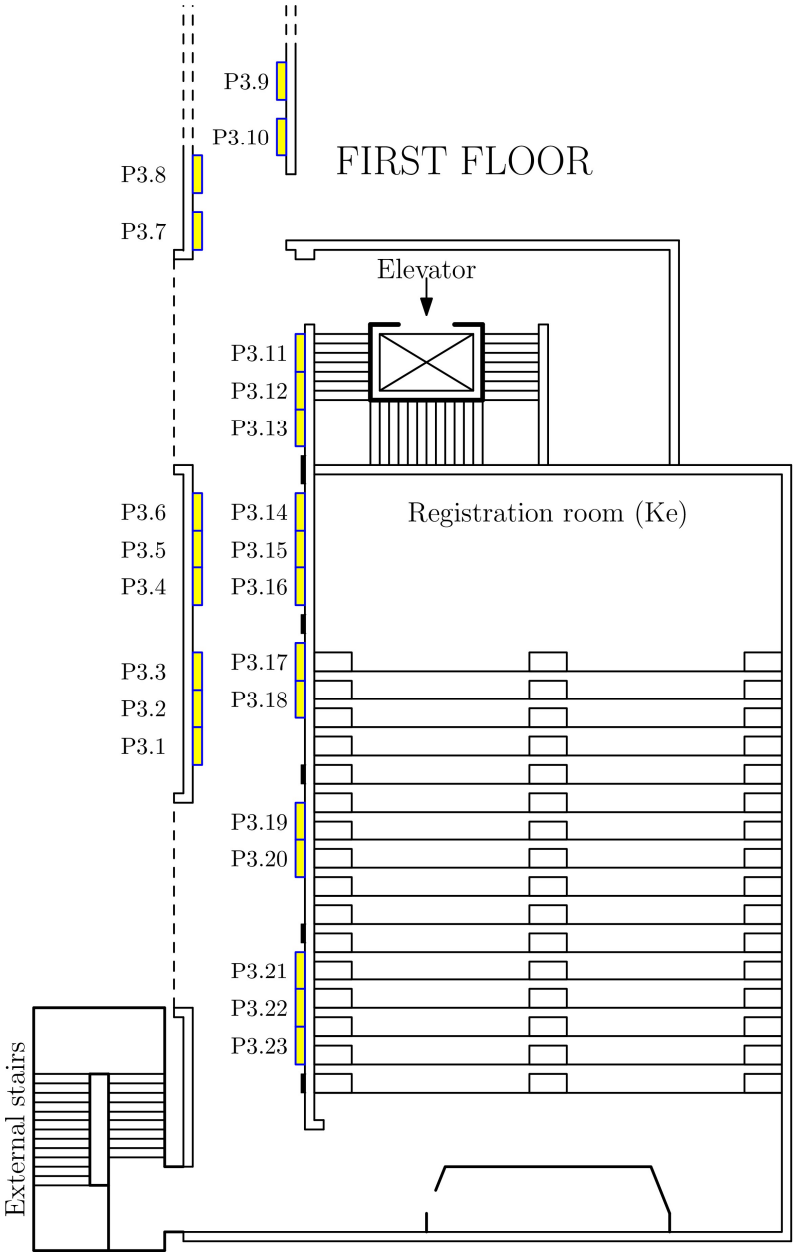
Poster session **P3a: DC-DC Converters, Modeling and Control II**
16:00-18:00

Chair: Daniel Costinett

N°	Paper ID	AUTHORS	TITLE	Floor
P3.1	163	Zikang Tong, Grayson Zulauf and Juan Rivas-Davila	A Study of Off-State Losses in Silicon-Carbide Schottky Diodes Used in High Frequency Power Converters	Floor 1
P3.2	196	Eslam Abdelhamid, Giovanni Bonanno, Luca Corradini, Paolo Mattavelli and Matteo Agostinelli	Stability Properties of the 3-Level Flying Capacitor Buck Converter Under Peak or Valley Current-Programmed-Control	Floor 1
P3.3	12	Ignacio Castro, Daniel G. Aller, Manuel Arias, Diego G. Lamar and Javier Sebastian	On supplying LEDs from very low dc voltages with high frequency AC-LED drivers	Floor 1
P3.4	92	Maria R. Rogina, Jaume Roig, Alberto Rodriguez, Diego G. Lamar, Piet Vanmeerbeek and Filip Bauwens	Novel Selection Criteria of Primary Side Transistors for LLC Resonant Converters	Floor 1
P3.5	179	Jianglin Zhu and Dragan Maksimovic	Discrete-time Modeling of a Switched-Capacitor-Based Quasi-Resonant Converter with Phase-Shift Control	Floor 1
P3.6	165	Usama Anwar and Dragan Maksimovic	A Unified Approach to Modeling Current Mode Controlled Pulse Width Modulated Switching Converters	Floor 1
P3.7	26	Katrin Hirmer, Dominic Korner and Klaus Hofmann	Improving the Efficiency of a Multistage Boost Converter with Parallel Inductor Charging	Floor 1
P3.8	86	Nicolò Zilio and Luca Corradini	Simple Digital Control Technique for a High-Frequency Quasi-Resonant Synchronous Buck DC-DC Converter	Floor 1
P3.9	23	Shaogui Fan, Li Sun, Jiandong Duan and Kaitao Bi	An Improved Interleaved DC-DC Converter with Zero Voltage Switching Operation	With drawn

P3.10	167	Reinhold Elferich	ZVS modelling of the LLC converter operating as unity power factor front end	Floor 1
P3.11	132	Nicolas Butzen and Michiel Steyaert	Proof of General Switched-Capacitor DC-DC Converter Law using Voltage-Domain Analysis	Floor 1
P3.12	79	Manuele Bertoluzzo, Fabio Bignucolo, Marco Bullo, Matteo Diantini, Fabrizio Dughiero, Matteo Lancerin, Elisabetta Sieni, Marco Vinante and Manuel Zordan	A buck-boost DC-DC converter for single module photovoltaic application to vehicle recharge	Floor 1
P3.13	81	Predrag Pejovic and Marija Glisic	Computer-Aided Analysis of Discontinuous Conduction Modes in Peak-Limiting Current Mode Controlled Switching Converters	Floor 1
P3.14	78	Andrija Stupar, Michael Halamicek, Tom Moiannou, Aleksandar Prodic and Josh A. Taylor	Efficiency Optimization of a 7-Switch Flying Capacitor Buck Converter Power Stage IC Using Simulation and Geometric Programming	Floor 1
P3.15	173	Saeed Peyghami, Pooya Davari, Huai Wang and Frede Blaabjerg	The Impact of Topology on the Reliability of Boost-type Converters in PV Applications	Floor 1
P3.16	75	Jin Xu, Matthew Armstrong and Maher Al-Greer	Parameter Estimation of DC-DC Converters Using Recursive Algorithms with Adjustable Iteration Frequency	Floor 1
P3.17	183	Anindya Chitta Bagchi, Tarak Saha, Abhilash Kamineni and Regan Zane	Analysis and Design of a Wireless Charger for Underwater Vehicles fed from a Constant Current Distribution Cable	Floor 1
P3.18	29	Christian Branas, David Anseán, Juan C. Viera, Rosario Casanueva and Francisco J. Azcondo	Design of a Two-Phase LCpCs Resonant Converter as a Current Source for Fast Charging High Power LiFePO4 Cells	Floor 1
P3.19	215	Juan Santiago-Gonzalez, David Otten and David Perreault	Light Load Efficiency Improvements in Dual Active Bridge Converters via Dead time Control	Floor 1
P3.20	175	Cheng Zhang and David Perreault	A systematic optimization method for miniaturized BCM boost converter design	Floor 1
P3.21	133	Euihoon Chung, Gyu Cheol Lim, Perreault David J. and Jung-Ik Ha	Resonant Converter Design Using Two-Port Passive Network: Single Frequency Design	Floor 1
P3.22	172	Jungwon Choi, Jia Le Xu, Rawad Makhoul and Juan Rivas-Davila	Design of a 13.56 MHz dc-to-dc resonant converter using an impedance compression network to mitigate misalignments in a wireless power transfer system	Floor 1
P3.23	116	Kawin Surakitbovorn and Juan Rivas-Davila	Design of a GaN-Based, Inductor-less, Wireless Power Transfer System at 40.68~MHz	Floor 1

Poster session 3a floor plan

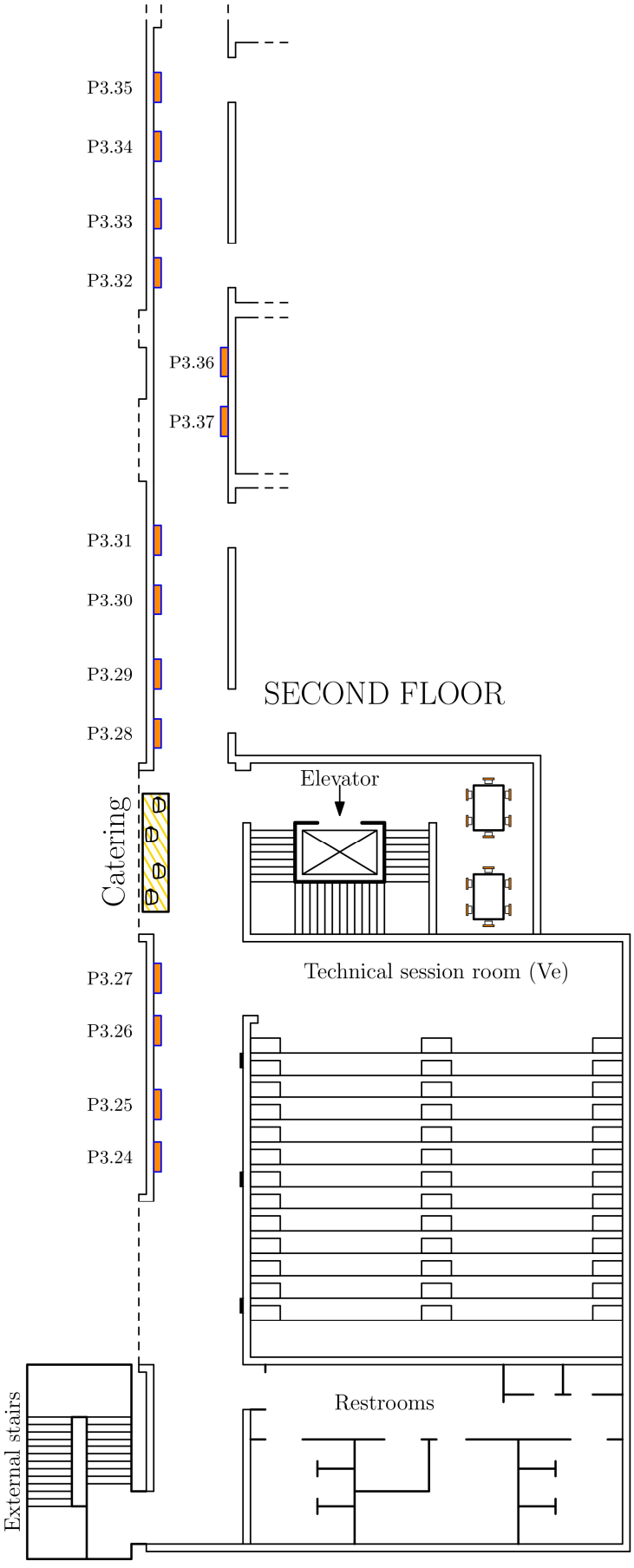


Poster session **P3b: Modeling and Design of Power Electronics Components**
16:00-18:00

Chair: Elisabetta Tedeschi

N°	Paper ID	AUTHORS	TITLE	Floor
P3.24	218	Bryson Galapon, Alex Hanson and David Perreault	Measuring Dynamic On Resistance in GaN Transistors at MHz Frequencies	Floor 2
P3.25	168	Phyo Aung Kyaw, Jizheng Qiu and Charles Sullivan	Thermal Modeling of Inductor and Transformer Windings and Litz Wire	Floor 2
P3.26	206	Aaron Stein, Phyo Aung Kyaw and Charles Sullivan	Scaling of parasitic capacitance with magnetic component physical size	Floor 2
P3.27	74	Dhawal Mahajan and Sourabh Khandelwal	Impact of p-GaN layer Doping on Switching Performance of Enhancement Mode GaN Devices	Floor 2
P3.28	151	Shilpi Mukherjee, Tristan Evans, Quang Le, Imam Al Razi, Amol Deshpande, Balaji Narayanasamy, Fang Luo, Steve Pytel, Yarui Peng, Tom Vrotsos and Alan Mantooth	Partial Discharge Reduction by Corner Correction in Power Module Layouts	Floor 2
P3.29	89	Sanghyeon Park, Grayson Zulauf and Juan Rivas-Davila	Estimating the Reliability of Series-Connected Schottky Diodes for High-Frequency Rectification	Floor 2
P3.30	21	Grayson Zulauf, Zikang Tong and Juan Manuel Rivas-Davila	Considerations for Active Power Device Selection in HF and VHF Power Converters	Floor 2
P3.31	245	Shahriyar Kaboli and Reza Farajidavar	Improvement of the Energy Method for Stray Capacitance Modelling of Transformer Winding in High Voltage Power Supplies	Floor 2
P3.32	72	Subhadra Tiwari, Tore Undeland and Ole-Morten Midtgård	An insight into geometry and orientation of capacitors for high-speed power circuits	Floor 2
P3.33	120	Guangzhuo Li, Yan Deng, Jie Ruan and Xiangning He	Advantages for embedding DC-link decoupling capacitance in high capacity power electronic converters	Floor 2
P3.34	108	Alberto Delgado, Guillermo Salinas, Jesús Oliver, Jose A. Cobos and Jorge Rodriguez	Finite Element Modelling of Litz Wire Conductors and Compound Magnetic Materials based on Magnetic Nano-particles by means of Equivalent Homogeneous Materials for Wireless Power Transfer Systems	Floor 2
P3.35	27	Erika Stenglein, Hans Rossmanith and Manfred Albach	Macroscopic Modeling of MnZn Ferrites for the Calculation of Eddy-Current Losses in the Frequency- and Time-Domain	Floor 2
P3.36	244	Pascal Niklaus, Dominik Bortis and Johann Walter Kolar	Next-Generation Measurement Systems with High Common-Mode Rejection	Floor 2
P3.37	243	Jannik Schäfer, Dominik Bortis and Johann Kolar	Design of Highly Efficient and Highly Compact PCB Winding Inductors	Floor 2

Poster session 3b floor plan



Poster session **P3c: Simulation and Modeling of Power Converters**
16:00-18:00

Chair: Mor Peretz

N°	Paper ID	AUTHORS	TITLE	Floor
P3.38	31	Panagiotis Mantzanas, Alexander Bucher, Daniel Kuebrich, Christian Hasenohr, Alexander Pawellek, Harald Hofmann and Thomas Duerbaum	A Fast and Accurate Calculation Method for Predicting the DC-link Voltage Ripple in Battery-fed PWM Inverter Systems	Floor 3
P3.39	121	David Velasco and Jesús López	Discrete-Time Domain Modeling of DQ-frame Current-controlled Systems through easy Implementation	Floor 3
P3.40	34	Malte John and Axel Mertens	Frequency-Domain Model of Voltage-Source Inverters with Closed-Loop Current Control	Floor 3
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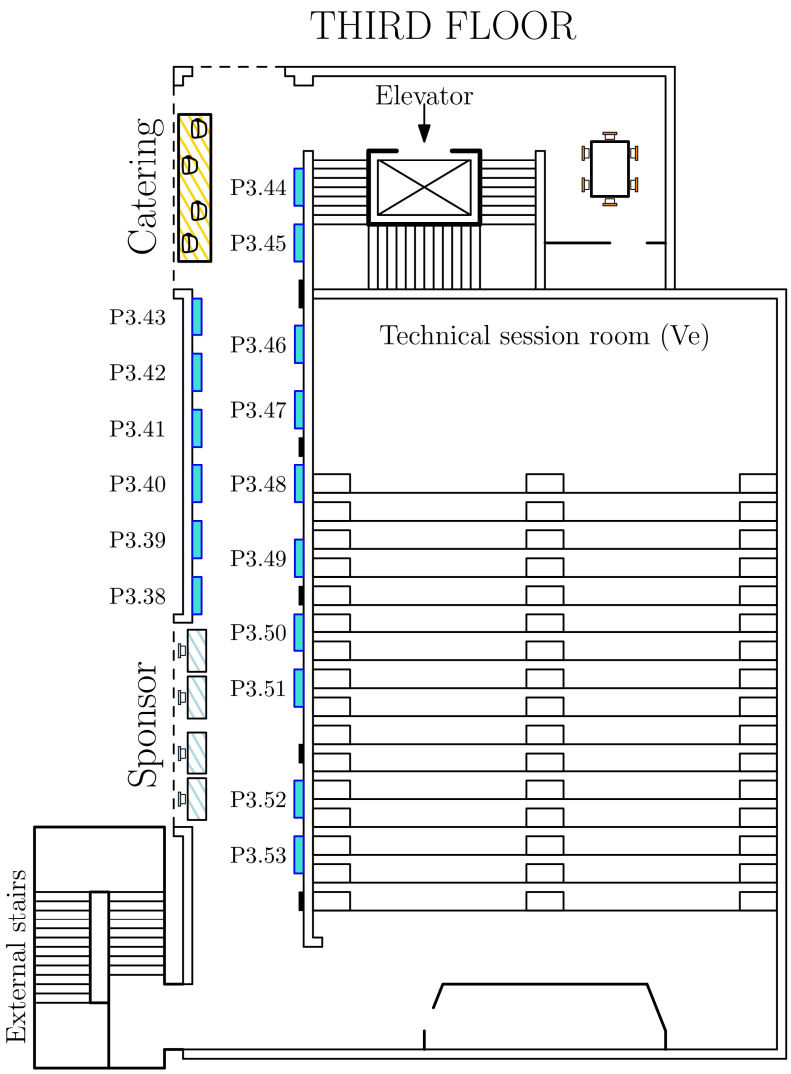

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