

# Technical Program Schedule – Poster Sessions

Monday, September 15 - 5:00 pm - 6:30 pm

## EAST

### Poster Session: Control Aspects in Smart Grids

Room: Exhibit Hall C - East

Chair: Qin Lei, Omer Onar

#### **P101 - Inverter Power Control to Support Distribution System Voltage Variability Mitigation**

*Xiao Liu, Aaron M. Cramer, University of Kentucky, United States*

#### **P102 - A Unified Controller for a Microgrid based on Adaptive Virtual Impedance and Conductance**

*Meiqin Mao, Zheng Dong, Yong Ding, Liuchen Chang, Hefei University of Technology, China; University of New Brunswick, Canada*

#### **P103 - Small Signal Impedance Measurement in Droop Controlled AC Microgrids**

*Malte John, Patricio A. Mendoza-Araya, Giri Venkataramanan, Leibniz Universität Hannover, Germany; University of Chile, Chile; University of Wisconsin-Madison, United States*

#### **P104 - Series-Connected HV-IGBTs using Active Voltage Control with Status Feedback Circuit**

*Shiqi Ji, Ting Lu, Zhengming Zhao, Hualong Yu, Liqiang Yuan, Tsinghua University, China*

#### **P105 - Independent Damping Control of Multimode Low-Frequency Oscillations using Shunt-Connected FACTS Devices in Power System**

*Mebtu Beza, Massimo Bongiorno, Chalmers University of Technology, Sweden*

#### **P106 - The Improved Sen Transformer – A New Effective Approach to Power Transmission Control**

*Jiaxin Yuan, Li Chen, Baichao Chen, Wuhan University, China*

#### **P107 - Independent Real and Reactive Power Flow Control without Sensing Receiving End Voltage in Transformer-Less Unified Power Flow Controller**

*Deepak Gunasekaran, Shao Zhang, Shuitao Yang, Fang Zheng Peng, Michigan State University, United States*

#### **P108 - A Line Impedance Conditioner to Improve Zigzag Transformer based Hybrid AC/DC Transmission under Unbalanced Line Impedance Conditions**

*Bo Liu, Xiaojie Shi, Fred Wang, Yalong Li, University of Tennessee, Knoxville, United States*

#### **P109 - Multi-Terminal DC Grid Control under Loss of Terminal Station**

*Nima Yousefpoor, Sungmin Kim, Subhashish Bhattacharya, Quanta Technology, United States; Seoul National University, Korea; North Carolina State University, United States*

#### **P110 - Control Concept Including Validation Strategy for an AC/DC Hybrid Link (Ultrahigh Voltage DC)**

*Volker Staudt, Andreas Steimel, Michael Kohlmann, Martin Kleine Jäger, Carsten Heising, Daniel Meyer, Klaus Vennemann, Eckhard Grebe, Klaus Kleinekorte, Ruhr-University Bochum, Germany; Avasition, Germany; Amprion, Germany*

#### **P111 - Suppression Strategy for Short-Circuit Current in Loop-Type DC Microgrid**

*Xiaoming Zha, Han Ning, Xiaoli Lai, Ying Huang, Fei Liu, Wuhan University, China*

**P112 - Cost-based Droop Scheme for DC Microgrid**

*Inam Ullah Nutkani, Wang Peng, Poh Chiang Loh, Frede Blaabjerg, Nanyang Technological University, Singapore; Aalborg University, Denmark*

**P113 - Droop Voltage Range Design in DC Micro-Grids Considering Cable Resistance**

*Fang Chen, Wei Zhang, Rolando Burgos, Dushan Boroyevich, Virginia Polytechnic Institute and State University, United States*

**P114 - Flexible Power Flow Control for Next-Generation Multi-Terminal DC Power Network**

*Kenji Natori, Hidemine Obara, Kouhei Yoshikawa, Bao Cong Hiu, Yukihiro Sato, Chiba University, Japan*

**P115 - Robust Control of a Single-Phase VSI with LCL Filter for Grid-Tie and Islanded Operation Modes Applied to PV Distributed Generation in Microgrids Environment**

*José C.U. Peña, Guilherme Melo, Carlos A. Canesin, Leonardo P. Sampaio, São Paulo State University, Brazil; Federal Technological University of Paraná, Brazil*

**P116 - Average Modeling of a Three-Phase Inverter for Integration in a Microgrid**

*Zeljko Jankovic, Bora Novakovic, Vijay Bhavaraju, Adel Nasiri, University of Wisconsin-Milwaukee, United States; Eaton Corporation, United States*

**P117 - Optimization of the Maximum Power Point Tracking Method for Peak-Current Controlled Flyback Micro-Inverter**

*Zhe Zhang, Wang Chen, Min Chen, Zhejiang University, China*

**P118 - Implementation of LVRT Techniques of Grid-Connected PCS with the Adaptive Low Pass Notch PLL Method**

*Dong-sul Shin, Jong-Pil Lee, Kyung-Jun Lee, Tae-Jin Kim, Dong-Wook Yoo, Pusan National University, Korea; KERI, Korea*

**P119 - Sub-Synchronous Resonance Analysis in DFIG-based Wind Farms: Definitions and Problem Identification – Part I**

*Hossein Ali Mohammadpour, Enrico Santi, University of South Carolina, United States*

**P120 - 8-Shaped Trajectory Control for Rugged Rural PV Inverters**

*Juan M. Galvez, Martin Ordonez, University of British Columbia, Canada*

**P121 - Management of the Wind Turbine Energy Delivered to the Grid based on the Flatness Control Method**

*Merzak Aimene, Alireza Payman, Brayima Dakyo, University of Le Havre, France*

**Poster Session: Transportation**

*Room: Exhibit Hall C - East*

*Chair: Jiaqi Liang, Burak Ozpineci*

**P301 - Parameter Identification of Wireless Power Transfer Systems using Input Voltage and Current**

*Deyan Lin, Jian Yin, S.Y. Ron Hui, University of Hong Kong, Hong Kong*

**P302 - Efficiency Improvement and Evaluation of Floating Capacitor Open-Winding PM Motor Drive for EV Application**

*Di Pan, Kum-Kang Huh, Thomas A. Lipo, GE Global Research, United States; University of Wisconsin-Madison, United States*

**P303 - Reducing the Impact of Source Internal Resistance by Source Coil in Resonant Wireless Power Transfer**  
*Yiming Zhang, Ting Lu, Zhengming Zhao, Tsinghua University, China*

**P304 - Analysis and Design of a Class D Rectifier for a Class E Driven Wireless Power Transfer System**  
*Patrick C.K. Luk, Samer Aldhafer, Cranfield University, United Kingdom*

**P305 - 7M-Off-Long-Distance Extremely Loosely Coupled Inductive Power Transfer Systems using Dipole Coils**  
*Bo H. Choi, Eun S. Lee, Ji H. Kim, Chun T. Rim, KAIST, Korea*

**P306 - Evolutionary Multi-Objective Optimization of  $H_{\infty}$  Controller for Inductive Power Transfer System**  
*Xin Dai, Yang Zou, Yue Sun, Zhihui Wang, Chunsen Tang, Aiguo Patrick Hu, Chongqing University, China; University of Auckland, New Zealand*

**P307 - A Resonant Compensation Method for Improving the Performance of Capacitively Coupled Power Transfer System**  
*Liang Huang, Aiguo Patrick Hu, Akshya Swain, University of Auckland, New Zealand*

**P308 - Optimization of Foil Conductor Layout in Inductive Power Transfer System Resonators**  
*Mohammad Etemadrezai, Srdjan M. Lukic, North Carolina State University, United States*

**P309 - Analysis, Design and Implementation of Phase-Shifted Series Resonant High-Voltage Capacitor Charging Power Supply and its Fuzzy Logic Controller**  
*Lei Lin, Heqing Zhong, Yu Deng, Yongfu Liao, Ao Li, Yu Chen, Li Peng, Huazhong University of Science and Technology, China*

**P310 - Hundreds kW Charging Stations for e-Buses Operating under Regular Ultra-Fast Charging**  
*Júlio C.G. Justino, Thiago M. Parreiras, Braz de J. Cardoso Filho, Federal University of Minas Gerais, Brazil*

**P311 - Battery Management System with Cell Equalizer for Multi-Cell Battery Packs**  
*Giovanna Oriti, Alexander L. Julian, Peter Norgaard, Naval Postgraduate School, United States; United States Navy, United States*

**P312 - Cell Selection through Two-Level Basis Pattern Recognition with Low/High Frequency Components Decomposed by DWT-based MRA**  
*Jonghoon Kim, Chosun University, Korea*

**P313 - Tethered Aerial Robots using Contactless Power Systems for Extended Mission Time and Range**  
*Su Y. Choi, Bo H. Choi, Seog Y. Jung, Beom W. Gu, Seung J. Yoo, Chun T. Rim, KAIST, Korea*

**P314 - Variable Frequency Generation System for Aircraft**  
*Denis Makarov, Sergey Kharitonov, Gennadiy Zinoviev, Dmitriy Korobkov, Andrey Sidorov, Novosibirsk State Technical University, Russian*

**P315 - High Power Density SRC for Low Voltage Battery Charger in xEV with Third Harmonic Operation Technique**  
*Jung-Hoon Ahn, Dong-Hee Kim, Won-Yong Sung, Seung-Hee Ryu, Byoung-Kuk Lee, Sungkyunkwan University, Korea*

## NORTH

### Poster Session: Non-Isolated DC-DC Converters

Room: Exhibit Hall C - North

Chair: Gui-Jia Su

#### **P501 - Further Reduction of Switching Loss for the Lossless Snubber based Converters**

*Beibei Wang, Trillion Q. Zheng, Jiepin Zhang, Beijing Jiaotong University, China*

#### **P502 - Voltage Controlled Variable Capacitor based Snubber for the Reduction of IGBT's Turn-Off Loss**

*Beibei Wang, Trillion Q. Zheng, Jiepin Zhang, Beijing Jiaotong University, China*

#### **P503 - A Quasi-Z-Source DC-DC Converter**

*LiQiang Yang, Dongyuan Qiu, Bo Zhang, GuiDong Zhang, Wenxun Xiao, South China University of Technology, China*

#### **P504 - Power Semiconductor Filter: Use of Series-Pass Device in Switching Converters for Input Filtering**

*Wing-to Fan, Kuen-faat Yuen, Henry Shu-hung Chung, City University of Hong Kong, Hong Kong*

#### **P505 - Master-Slave Technique with Direct Variable Frequency Control for Interleaved Bidirectional Boost Converter**

*A. Vazquez, M. Arias, A. Rodriguez, D.G. Lamar, S. Luri, University of Oviedo, Spain; IK4-IKERLAN, Spain*

#### **P506 - Design of a 2 MW DC Supply using a 4-Stage Interleaved DC-DC Converter**

*Yusi Liu, Chris Farnell, Juan Carlos Balda, H. Alan Mantooth, University of Arkansas, United States*

#### **P507 - 3D Printed Air Core Inductors for High Frequency Power Converters**

*Wei Liang, Luke Raymond, Juan Rivas, Stanford University, United States*

#### **P508 - Inductor Loss Analysis of Various Materials in Interleaved Boost Converters**

*Yuki Itoh, Shota Kimura, Jun Imaoka, Masayoshi Yamamoto, Shimane University, Japan*

#### **P509 - Voltage Balancing in an Interleaved High Gain Boost Converter**

*Jesús E. Valdez-Reséndiz, Abraham Claudio-Sánchez, Gerardo V. Guerrero-Ramírez, Alejandro Tapia-Hernández, Aldo N. Higuera Juárez, Adolfo R. López Núñez, Centro Nacional de Investigación y Desarrollo Tecnológico, Mexico*

### Poster Session: Multi-Phase Converters

Room: Exhibit Hall C - North

Chair: Jiangang Hu

#### **P701 - Virtual-Flux-based Power Predictive Control of Three-Phase PWM Rectifiers using Space-Vector Modulation**

*Yongsoo Cho, Kyo-Beum Lee, Ajou University, Korea*

#### **P702 - Zero Sequence Blocking Transformers for Multi-Pulse Rectifier in Aerospace Applications**

*Wenli Yao, Frede Blaabjerg, Xiaobin Zhang, Yongheng Yang, Zhaohui Gao, Northwest Polytechnical University, China; Aalborg University, Denmark*

**P703 - A Novel Three-Phase Current Source Rectifier with Delta-Type Input Connection to Reduce Device Conduction Loss**

*Ben Guo, Fred Wang, Eddy Aeloiza, University of Tennessee, United States; ABB Corporate Research, United States*

**P704 - Active Front End Rectifier Design Trade-Off between PWM and Direct Power Control Method**

*Lixiang Wei, Yogesh Patel, Murthy Csn, Rockwell Automation, United States; L&T Technology, United States*

**P705 - Three-Phase Four-Switch Partial Resonant Soft Switched Rectifier**

*Ankan De, Subhashish Bhattacharya, North Carolina State University, United States*

**P706 - Control Strategy of PV Inverter under Unbalanced Grid Voltage Sag**

*Huang Hao, Xu Yonghai, North China Electric Power University, China*

**P707 - Pulsed-Width Modulation Technique for Family of (3N+3)-Switch Converters**

*Kennedy A. Aganah, Olorunfemi Ojo, Tuskegee University, United States; Tennessee Technological University, United States*

**P708 - Modeling of Voltage Source Inverter having Active Split DC-Bus for Supply of Four-Wire Electrical Utility Systems**

*Alessandro Lidozzi, Giovanni Lo Calzo, Sabino Pipolo, Luca Solero, Fabio Crescimbin, Roma Tre University, Italy*

**P709 - High Reliability Capacitor Bank Design for Modular Multilevel Converter in MV Applications**

*Vahid Najmi, Jun Wang, Rolando Burgos, Dushan Boroyevich, Virginia Polytechnic Institute and State University, United States*

**P710 - Model Predictive Control of a Direct Three-to-Seven Phase Matrix Converter**

*Sk Moin Ahmed, Haitham Abu-Rub, Zainal Salam, Texas A&M University at Qatar, Qatar; University Technology Malaysia, Malaysia*

**P711 - A New Space Vector Modulation Strategy to Reduce Common-Mode Voltage for Quasi-Z-Source Indirect Matrix Converter**

*Xuyang You, Baoming Ge, Shuo Liu, Xinjian Jiang, Haitham Abu-Rub, Fang Z. Peng, Beijing Jiaotong University, China; Texas A&M University, United States; Tsinghua University, China; Texas A&M University at Qatar, Qatar; Michigan State University, United States*

**P712 - A Novel Medium-Frequency-Transformer Isolated Matrix Converter for Wind Power Conversion Applications**

*Chunyang Gu, Harish S. Krishnamoorthy, Prasad N. Enjeti, Yongdong Li, Tsinghua University, China; Texas A&M University, United States*

**P713 - Novel Matrix Converter Topologies with Reduced Transistor Count**

*S.M. Sajjad Hossain Rafin, Thomas A. Lipo, Byung-il Kwon, Hanyang University, Korea; University of Wisconsin-Madison, United States*

**P714 - Control of AC-Capacitor Clamped Three and Five Level Matrix Converter using Voltage and Current Modulation**

*Lin Qiu, Lie Xu, Yongdong Li, Tsinghua University, China*

**Poster Session: DC-DC Converters**

*Room: Exhibit Hall C - South*

*Chair: Lixiang Wei, Brian Welchko*

**P901 - A Digital Predictive Current Mode Controller using Average Inductor Current**

*Siyu He, John Y. Hung, Robert M. Nelms, Auburn University, United States*

**P902 - Phase-Shift Control of Isolated Bidirectional DC-DC Converters for Unidirectional Power Flow**

*Junjie Ge, Zhengming Zhao, Junchao Ma, Fanbo He, Liqiang Yuan, Ting Lu, Tsinghua University, China*

**P903 - Auto-Tuning and Self-Calibration Techniques for V2 Control with Capacitor Current Ramp Compensation using Lossless Capacitor Current Sensing**

*Pei-hsin Liu, Yingyi Yan, Fred C. Lee, Qiang Li, Virginia Polytechnic Institute and State University, United States; Linear Technology, United States*

**P904 - Band Separation in Linear-Assisted Switching Power Amplifiers for Accurate Wide-Bandwidth Envelope Tracking**

*Dongxue Li, Yuanzhe Zhang, Miguel Rodríguez, Dragan Maksimović, University of Colorado-Boulder, United States*

**P905 - Modeling and State-Space Feedback Control of a DC-DC Converter for Photovoltaic Systems**

*Darlan A. Fernandes, Márcia K. Vieira, Montiê A. Vitorino, Fabiano Fragoso Costa, Pollyana C. Ribeiro, Federal University of Paraíba, Brazil; Federal University of Campina Grande, Brazil; Federal University of Bahia, Brazil*

**P906 - Stability and Accuracy Considerations in the Design and Implementation of a Kilowatt-Scale DC Power Hardware-in-the-Loop Platform**

*Jonathan Siegers, Herbert L. Ginn, Enrico Santi, University of South Carolina, United States*

**P907 - A Method to Measure the DC bias in High Frequency Isolation Transformer of the Dual Active Bridge DC to DC Converter and its Removal using Current Injection and PWM Switching**

*Sumit Dutta, Subhashish Bhattacharya, North Carolina State University, United States*

**P908 - Fault Diagnosis in Unidirectional Non-Isolated DC-DC Converters**

*E. Ribeiro, A.J. Marques Cardoso, C. Boccaletti, University of Beira Interior, Portugal; Sapienza University of Rome, Italy*

**Poster Session: DC-AC and DC-AC Converters**

*Room: Exhibit Hall C - South*

*Chair: Lixiang Wei, Brian Welchko*

**P1101 - Parameter Design of the Three-Phase Four-Wire Testing Platform for New Energy Grid Connected Devices based on PRR Controller**

*Shuang Zhao, Fei Liu, Zha Xiaoming, Sun Jianjun, Hu Wei, Wuhan University, China*

**P1102 - Nonlinear Feedback Control of Compound Active-Clamp Soft-Switching Three-Phase PFC Converter base on Load Observer**

*Xin Guo, Hai-Peng Ren, Xi'an University of Technology, China*

**P1103 - Second Harmonic Current Reduction and Dynamic Performance Improvement in the Two-Stage Inverter: An Output Impedance Perspective**

*Li Zhang, Xinbo Ruan, Xiaoyong Ren, Nanjing University of Aeronautics and Astronautics, China*

**P1104 - Stationary Frame Control Strategy for Voltage Source Inverter under Unbalanced and Distorted Grid Voltage**

*Yipeng Song, Heng Nian, Zhejiang University, China*

**P1105 - Model Predictive Control of Nested Neutral Point Clamped (NNPC) Converter**

*Mehdi Narimani, Venkata Yaramasu, Bin Wu, George Cheng, Navid Zargari, Ryerson University, Canada; Rockwell Automation, Canada*

**P1106 - Power Loss Benchmark of Nine-Switch Converters in Three-phase Online-UPS Application**

*Zian Qin, Poh Chiang Loh, Frede Blaabjerg, Aalborg University, Denmark*

**P1107 - A New Control Method for Minimizing the DC-Link Capacitor Current of HEV Inverter Systems**

*Christian Sommer, Arvid Merkert, Axel Mertens, Leibniz Universität Hannover, Germany*

**P1108 - Resonant-Inductor-Voltage-Feedback Active Damping based Control for Grid-Connected Inverters with LLCL-Filters**

*Min Huang, Xiongfei Wang, Poh Chiang Loh, Frede Blaabjerg, Aalborg University, Denmark*

**Poster Session: Control of Power Converters**

*Room: Exhibit Hall C - South*

*Chair: Lixiang Wei, Brian Welchko*

**P1301 - Decentralized Voltage Sharing Control Strategy for Fully Modular Input-Series Output-Series High-Voltage System**

*Guangjiang Wang, Wu Chen, Yong Ke, Wei Jiang, Southeast University, China; WuHu Profession and Technology College, China*

**P1302 - A Novel Input Voltage Sharing Control Strategy for Input-Series Output-Parallel System with High Reliability**

*Wu Chen, Xu Zhu, Guangjiang Wang, Wei Jiang, Kai Yao, Southeast University, China; Nanjing University of Science and Technology, China*

**P1303 - Implementation of  $H^\infty$  Controller for Active Voltage Quality Regulator under Distorted Grid**

*Yong Lu, Guochun Xiao, Xuanlv Wu, Lifu Zheng, Jinjun Liu, Le Sun, Xi'an Jiaotong University, China*

**P1304 - Active Damping for Model Predictive Pulse Pattern Control**

*Peter Hokayem, Tobias Geyer, Nikolaos Oikonomou, ABB Corporate Research Center, Switzerland*

**P1305 - High Efficiency and Total Harmonic Distortion Improvement by Zero Current Prediction Technique for Transformer-Free Buck Power Factor Corrector**

*Che-Hao Meng, Chih-Wei Chang, Chao-Chang Chiu, Ke-Horng Chen, Ying-Hsi Lin, Tsung-Yen Tsai, Chao-Cheng Lee, National Chiao Tung University, Taiwan; Realtek Semiconductor Corp., Taiwan*

**P1306 - Variable-Speed IGBT Gate Driver with Loss/Overshoot Balancing for Switching Loss Reduction**

*Alexey Sokolov, Diego Mascarella, Geza Joos, McGill University, Canada*

**P1307 - New Current Control Scheme for the Vienna Rectifier in Discontinuous Conduction Mode**

*Michael Leibl, Johann W. Kolar, Josef Deuringer, ETH Zurich, Switzerland; Siemens AG Healthcare, Germany*

**P1308 - Synchronous Frame and Resonant Adaptive Observers as Disturbance Estimators and their Applications in Power Electronics**

*Vlatko Miskovic, Vladimir Blasko, Thomas M. Jahns, Robert D. Lorenz, Charles J. Romanesko, Haojiong Zhang, Danfoss Power Electronics, United States; University of Wisconsin-Madison, United States; United Technologies Research Center, United States*

**P1309 - Sliding Mode Controlled Half Bridge Audio Amplifier using Single Power Supply**

*Sridhar Joshi, Parthasarathi Sensarma, Indian Institute of Technology Kanpur, India*

**Poster Session: General Topics**

*Room: Exhibit Hall C - South*

*Chair: Peng Zhang*

**P1501 - Reconsideration of Loop Gain Measurement of DC/DC Converters**

*Chun Xiong, Xinbo Ruan, Peilin Chen, Xuehua Wang, Huazhong University of Science and Technology, China*

**P1502 - Simplified Electric Vehicle Models for use in Undergraduate Teaching and Research**

*John G. Hayes, University College Cork, Ireland*

**P1503 - AC/DC Converters with Open-End Grid for AC Machine Conversion Systems**

*João P.R.A. Mélo, Cursino B. Jacobina, Gregory A.A. Carlos, Nady Rocha, Federal University of Campina Grande, Brazil; Federal Institute of Alagoas, Brazil; Federal University of Paraíba, Brazil*

**P1504 - Energy Saving HVAC System Modeling and Closed Loop Control in Industrial and Commercial Adjustable Speed Drives**

*Kevin Lee, Ravishankar Rukke, Kyle Zheng, Bing Yang, Eaton Corporation, United States*

**WEST**

**Poster Session: Induction Machines**

*Room: Exhibit Hall C - West*

*Chair: Galina Mirzaeva*

**P1701 - Maximum Efficiency per Torque Direct Flux Vector Control of Induction Motor Drives**

*S.A. Odhano, R. Bojoi, A. Boglietti, S.G. Rosu, G. Griva, Politecnico di Torino, Italy; University "Politehnica" of Bucharest, Romania*

**P1702 - Electric Circuit Coupling of a Slotted Semi-Analytical Model for Induction Motors based on Harmonic Modeling**

*R.L.J. Sprangers, J.J.H. Paulides, B.L.J. Gysen, E.A. Lomonova, J. Waarma, Eindhoven University of Technology, Netherlands; Vostermans Ventilation B.V., Netherlands*

**P1703 - Soft Start and Voltage Control of Grid Connected Induction Motors using Floating Capacitor H-Bridge Converters**

*S. Leng, R. Ul Haque, N. Perera, A. Knight, J. Salmon, University of Alberta, Canada; University of Calgary, Canada*

**P1704 - Modeling and Parameter Estimation of Split-Single Phase Induction Motors**

*Burak Tekgun, Yilmaz Sozer, Igor Tsukerman, University of Akron, United States*



**P1705 - Thermal Design of High Power-Density Additively-Manufactured Induction Motor**

*Ram Ranjan, Jagadeesh Tangudu, United Technologies Research Center, United States*

**P1706 - Dynamics and Vector Control of Wound-Rotor Brushless Doubly Fed Induction Machines**

*Zhentao S. Du, Thomas A. Lipo, University of Wisconsin-Madison, United States*

**P1707 - The Doubly-Fed Induction Machine as an Aero Generator**

*Tom Feehally, Judith Apsley, University of Manchester, United Kingdom*

**P1708 - Start-Up Problem with an Induction Machine and a Permanent Magnet Gear**

*T.V. Frandsen, N.I. Berg, R.K. Holm, P.O. Rasmussen, Aalborg University, Denmark*

**Poster Session: Reluctance Machines**

*Room: Exhibit Hall C - West*

*Chair: Wen Ouyang*

**P1901 - Power Converter Rating for Switched Reluctance Motors**

*Howard C. Lovatt, CSIRO, Australia*

**P1902 - Control of Switched Reluctance Generators in Continuous Conduction Mode**

*W.U. Nuwantha Fernando, RMIT University, Australia*

**P1903 - Torque Ripple Minimization of Switched Reluctance Motors through Speed Signal Processing**

*Rakesh Mitra, Yilmaz Sozer, University of Akron, United States*

**P1904 - Synchronous Reluctance Motors with Toroidal Windings**

*Christopher Spargo, Barrie Mecrow, James Widmer, Newcastle University, United Kingdom*

**P1905 - Vector Control for Switched Reluctance Motor Drives using an Improved Current Controller**

*Noriya Nakao, Kan Akatsu, Shibaura Institute of Technology, Japan*

**P1906 - Magnetic Design of Two-Phase Switched Reluctance Motor with Bi-Directional Startup Capability**

*Lei Gu, Adam Clark, Wei Wang, Joseph Hearron, Babak Fahimi, University of Texas at Dallas, United States*

**P1907 - Design of a Synchronous Reluctance Motor with Non-Overlapping Fractional-Slot Concentrated Windings**

*Christopher Spargo, Barrie Mecrow, James Widmer, Newcastle University, United Kingdom*

**P1908 - Two Converter based Operation of a Brushless Doubly Fed Reluctance Machine**

*Ronald S. Rebeiro, Andrew M. Knight, University of Calgary, Canada*

**P1909 - Design Considerations for Reduction of Acoustic Noise in Switched Reluctance Drives**

*Chenjie Lin, Babak Fahimi, University of Texas at Dallas, United States*

**P1910 - Static Modeling of the Ultra High Speed Machine Rotor**

*B. Suttles, J. Mayor, A. Semidey, Georgia Institute of Technology, United States*

**Poster Session: Other Topics in Electrical Machines**

*Room: Exhibit Hall C - West*

Chair: Dan Ionel

**P2101 - A Magnetic Gearbox with an Active Region Torque Density of 239Nm/L**

*K.K. Uppalapati, J.Z. Bird, J. Wright, J. Pritchard, M. Calvin, W. Williams, University of North Carolina at Charlotte, United States*

**P2102 - Harmonics in Rotating Transformer Exciting Systems for Turbine Generators**

*Stefan Schmuelling, Christoph Schmuelling, Stefan Habel, TU Dortmund University, Germany*

**P2103 - 3-D Modeling of Shielding of Magnetic Stray Fields based on Superposition of 2-D Models**

*K.J.W. Pluk, J.W. Jansen, E.A. Lomonova, Eindhoven University of Technology, Netherlands*

**P2104 - Influences of CO<sub>2</sub> and FKL-Laser Cutting as well as Mechanical Cutting on the Magnetic Properties of Electric Steel Sheet S Determined by Epstein Frame and Stator Lamination Stack Measurements**

*Madeleine Bali, Annette Muetze, Graz University of Technology, Austria*

**P2105 - Numerical Magnetic Property Evaluation in Consideration of Power Semiconductor Property in Inverter with Play Model**

*Shunya Odawara, Keisuke Fujisaki, Tetsuji Matsuo, Toyota Technological Institute, Japan; Kyoto University, Japan*

**P2106 - Evaluation of Dielectric Fluids for Macro-Scale Electrostatic Actuators and Machinery**

*Baoyun Ge, Daniel C. Ludoi, University of Wisconsin-Madison, United States*

**P2107 - Parametric Design Optimization of a Novel Permanent Magnet Coupling using Finite Element Analysis**

*Stig Högberg, Nenad Mijatovic, Joachim Holbøll, Bogi Bech Jensen, Flemming Buus Bendixen, Technical University of Denmark, Denmark; University of the Faroe Islands, Faroe Islands; Sintex a/s, Denmark*

**P2108 - Analysis of Insulation Diagnosis and Failure in Stator Windings of Air-Cooled Gas Turbine Generator**

*Hee-Dong Kim, Tae-Sik Kong, Korea Electric Power Corporation (KEPCO), Korea*

**P2109 - Green Mode Control Strategy of a PMSM with Front-end SEPIC PFC Converter**

*Chiao-Chien Lin, Ying-Yu Tzou, National Chiao Tung University, Taiwan*

**P2110 - Thermomagnetic Liquid Cooling: A Novel Electric Machine Thermal Management Solution**

*Giti Karimi-Moghaddam, Darren D. Tremelling, Richard D. Gould, Subhashish Bhattacharya, North Carolina State University, United States; ABB Corporate Research, United States*

**Tuesday, September 16 – 10:00 am – 11:30 am**

**EAST**

**Poster Session: DFIG based Wind Systems**

*Room: Exhibit Hall C - East*

*Chair: Bilal Akin*

**P2301 - A No-Load Grid-Connected Strategy based on One-cycle Control for Doubly-Fed Wind Power System**

*Yanxia Shen, Zhicheng Ji, Tinglong Pan, Dinghui Wu, Jiangnan University, China*

**P2302 - Capability of DFIG WTS to Ride through Recurring Asymmetrical Grid Faults**

*Wenjie Chen, Frede Blaabjerg, Min Chen, Dehong Xu, Zhejiang University, China; Aalborg University, Denmark*

**P2303 - Model based methods for Rotor Position Detection of Doubly-Fed Induction Generator**

*Rongwu Zhu, Zhe Chen, Yunqian Zhang, Xiaojie Wu, Aalborg University, Denmark; University of Mining and Technology, China*

**P2304 - Sizing of the Series Dynamic Breaking Resistor in a Doubly Fed Induction Generator Wind Turbine**

*Hammam Soliman, Huai Wang, Dao Zhou, Frede Blaabjerg, Mostafa I. Marie, Aalborg University, Denmark; Ain Shams University, Egypt*

**P2305 - Shorted-Stator Mode Control of Doubly-Fed Induction Generator Connected to a Weak Grid**

*Adeola Balogun, Olorunfemi Ojo, Frank Okafor, University of Lagos, Nigeria; Tennessee Technological University, United States*

**Poster Session: Wave and Wind Generation Systems**

*Room: Exhibit Hall C - East*

*Chair: Seungdeog Choi*

**P2501 - Oscillating Water Column Power Conversion: A Technology Review**

*Nicola Delmonte, Davide Barater, Francesco Giuliani, Paolo Cova, Giampaolo Buticchi, University of Parma, Italy; University of Kiel, Germany*

**P2502 - Dynamic Emulation of Oscillating Wave Energy Converter**

*Samir Hazra, Ashish Sanjay Shrivastav, Akash Gujarati, Subhashish Bhattacharya, North Carolina State University, United States*

**P2503 - Wave Lab Testing of a Two-Body Autonomous Wave Energy Converter**

*Timothy M. Lewis, Bret Bosma, Annette von Jouanne, Ted K.A. Brekken, Oregon State University, United States*

**Poster Session: Converters for Solar PV Systems**

*Room: Exhibit Hall C - East*

*Chair: Ahmed Elasser*

**P2701 - Modeling and Digital Control of a High-Power Full-Bridge Isolated DC-DC Buck Converter Designed for a Two-Stage Grid-Tie PV Inverter**

*Paulo Sergio Nascimento Filho, Leonardo Ruffeil de Oliveira, Tarcio André dos Santos Barros, Marcelo Gradella Villalva, Ernesto Ruppert Filho, University of Campinas, Brazil*

**P2702 - A High Set-Up Quasi-Z-Source Inverter based on Voltage-Lifting Unit**

*Linlin Li, Yu Tang, Nanjing University of Aeronautics and Astronautics, China*

**P2703 - A New DC-DC Buck-Boost Modified Series Forward Converter for Photovoltaic Applications**

*D. López del Moral, A. Barrado, M. Sanz, A. Lázaro, P. Zumel, Carlos III of Madrid University, Spain*

**P2704 - Development of a Four Phase Floating Interleaved Boost Converter for Photovoltaic Systems**

*Christopher D. Lute, Marcelo Simões, Danilo Iglesias Brandão, Ahmed Al Durra, S.M. Muyeen, Colorado School of Mines, United States; The Petroleum Institute, United Arab Emirates*

**Poster Session: Smart Grid Components**

Room: Exhibit Hall C - East

Chair: Madhav Manjrekar, Luca Solero

**P2901 - Bridge-Type Fault Current Limiter for Asymmetric Fault Ride-Through Capacity Enhancement of Doubly Fed Induction Machine based Wind Generator**

*Gilmanur Rashid, Mohd. Hasan Ali, University of Memphis, United States*

**P2902 - LCL Filter Design and Inductor Ripple Analysis for 3-Level NPC Grid Interface Converter**

*Yang Jiao, Fred C. Lee, Virginia Polytechnic Institute and State University, United States*

**P2903 - A Unified Access Conditioner for Microgrid with Renewable Energy Sources**

*Chang Yuan, Xiangning Xiao, North China Electric Power University, China*

**P2904 - Alternate Arm Converter Operation of the Modular Multilevel Converter**

*M.M.C. Merlin, P.D. Judge, T.C. Green, P.D. Mitcheson, F. Moreno, K. Dyke, Imperial College London, United Kingdom; Alstom Grid, United Kingdom*

**P2905 - Impact of Frequency Modulation Ratio on Capacitor Cells Balancing in Phase-Shifted PWM based Chain-Link Statcom**

*Ehsan Behrouzian, Massimo Bongiorno, Remus Teodorescu, Chalmers University of Technology, Sweden; Chalmers University of Technology, Sweden; Aalborg University, Denmark*

**P2906 - A Full-Bridge AC Power Flow Controller with Reduced Capacitance Operated with both FFS (Fundamental Frequency Switching) and PWM**

*Takanori Isobe, University of Tsukuba, Japan*

**P2907 - Startup Strategy of VSC-HVDC System based on Modular Multilevel Converter**

*Fanqiang Gao, Zixin Li, Fei Xu, Zunfang Chu, Ping Wang, Yaohua Li, Chinese Academy of Sciences, China*

**P2908 - A Module based Self-Balanced Series Connection for IGBTs**

*Lei Yang, Peng Fu, Xiu Yao, Jin Wang, Chinese Academy of Science, China; Ohio State University, United States*

**P2909 - Turn-off Voltage Sharing of Field Stop IGBTs in Series Connection**

*Xueqiang Zhang, Xin Yang, Jin Zhang, Weiwei He, Patrick R. Palmer, University of Cambridge, United Kingdom*

**P2910 - Over-Current Protection Scheme for SiC Power MOSFET DC Circuit Breaker**

*Yuan Zhang, Yung C. Liang, National University of Singapore, Singapore*

**P2911 - A High Density Converter for Mid Feeder Voltage Regulation of Low Voltage Distribution Networks**

*Richard Silversides, Tim Green, Michael M.C. Merlin, Imperial College London, United Kingdom*

**P2912 - Analysis on Practical Design of Virtual-Air-Gap Variable Reactors for Tieline Reclosing in Microgrid**

*Yucheng Zhang, Praveen Devakota, Ruiyun Fu, South Dakota School of Mines and Technology, United States*

**P2913 - Wind Powered Smart Charging Facility for PHEVs**

*Preetham Goli, Wajiha Shireen, University of Houston, United States*

**P2914 - Supercapacitor Assisted Surge Absorber (SCASA) Technique: Selection of Supercapacitor and Magnetic Components**

*Jayathu Fernando, Nihal Kularatna, University of Waikato, New Zealand*

**P2915 - One and Two DC-Links Universal Active Power Filter without Series Isolation Transformer**

*P.L.S. Rodrigues, C.B. Jacobina, G.A. de A. Carlos, M.B.R. Correa, M.A. Vitorino, Federal University of Campina Grande, Brazil; Federal Institute of Alagoas, Brazil*

**Poster Session: Power Supplies**

*Room: Exhibit Hall C - East*

*Chair: Jean Luc Schanen, Shuo Wang*

**P3101 - Analyses of the Impact of Current Load Change on a Current-Mode Constant On-Time Buck Converter Regulator**

*Ming-Chuan Yen, Dan Chen, Sheng-Fu Hsiao, Yung-Jen Chen, National Taiwan University, Taiwan; Richtek Technology Corporation, Taiwan*

**P3102 - High Efficiency Point-of-Load and Bus Converter System using Built-in Converters**

*Won-Yong Sung, Chang-Yeol Oh, Jung-Hoon Ahn, Byoung-Kuk Lee, Yun-Sung Kim, Sungkyunkwan University, Korea*

**NORTH**

**Poster Session: Isolated DC-DC Converters**

*Room: Exhibit Hall C - North*

*Chair: Wei Qiao*

**P3301 - A Line and Load Independent Constant-Frequency Zero-Voltage-Switching Series Resonant Converter**

*Alireza Safaee, Konrad Woronowicz, Praveen Jain, Alireza Bakhshai, Bombardier Transportation Inc., Canada; Queen's University, Canada*

**P3302 - An Improved Start-Up Method for LLC Series Resonant Converter based on State-Plane Analysis**

*Dongdong Yang, Changsong Chen, Shanxu Duan, Jiuqing Cai, Huazhong University of Science and Technology, China*

**P3303 - Analysis of a Novel Interleaved CLL Resonant Converter for EV Battery Charger Applications**

*Erdem Asa, Kerim Colak, Dariusz Czarkowski, New York University, United States*

**P3304 - High Power LLC Battery Charger: Wide Regulation using Phase-Shift for Recovery Mode**

*Navid Shafiei, Martin Ordonez, Marian Cracium, Murray Edington, Chris Botting, University of British Columbia, Canada; Delta-Q Technologies, Canada*

**P3305 - Modular Snubberless Bidirectional Soft-Switching Current-Fed Dual 6-Pack (CFD6P) DC/DC Converter**

*Satarupa Bal, Akshay K. Rathore, Dipti Srinivasan, National University of Singapore, Singapore*

**P3306 - A Novel Interleaved LLC Resonant Converter with Phase Shift Modulation**

*Koji Murata, Fujio Kurokawa, Nagasaki University, Japan*

**P3307 - High Voltage Dual Active Bridge with Series Connected High Voltage Silicon Carbide (SiC) Devices**

*Kasunaidu Vechalapu, Arun Kumar Kadavelugu, Subhashish Bhattacharya, North Carolina State University, United States*

**P3308 - Piecewise Linear Modeling of Snubberless Dual Active Bridge Commutation**

*Babak Farhangi, Hamid A. Toliyat, Texas A&M University, United States*

**P3309 - Analysis and Comparison of Voltage-Source and Current-Source Asymmetric Dual-Active Half-Bridge Converters**

*Shiladri Chakraborty, Souvik Chattopadhyay, Indian Institute of Technology, India*

**Poster Session: Multi-Level Converters**

*Room: Exhibit Hall C - North*

*Chair: Pericle Zanchetta*

**P3501 - Capacitor Selection for Modular Multilevel Converter**

*Yuan Tang, Li Ran, Olayiwola Alatise, Philip Mawby, University of Warwick, United Kingdom*

**P3502 - An FPGA-based Real-Time Simulator for HIL Testing of Modular Multilevel Converter Controller**

*Wei Li, Luc-André Grégoire, Sisounthone Souvanlasy, Jean Bélanger, OPAL-RT Technologies, Canada*

**P3503 - A Carrier-based PWM Method for Neutral-Point Ripple Reduction of a 3-Level Inverter**

*June-Seok Lee, Kyo-Beum Lee, Ajou University, Korea*

**P3504 - A Detection Method for an Open-Switch Fault in Cascaded H-Bridge Multilevel Inverters**

*Hyun-Woo Sim, June-Seok Lee, Kyo-Beum Lee, Ajou University, Korea*

**P3505 - AC-DC-AC Three-Phase Converter based on Three Three-Leg Converters Connected in Series**

*Nustenil S.M.L. Marinus, Cursino B. Jacobina, Nady Rocha, Euzeli C. dos Santos Jr., Federal University of Campina Grande, Brazil; Federal University of Paraiba, Brazil; Federal Institute of the Ceará, Brazil; Indiana University-Purdue University Indianapolis, United States*

**P3506 - An Adaptive Backstepping Observer for Modular Multilevel Converter**

*Vahid Najmi, Hamed Nademi, Rolando Burgos, Virginia Polytechnic Institute and State University, United States; ABB Ltd., Norway*

**P3507 - Condition Monitoring for Submodule Capacitors in Modular Multilevel Converters**

*Yun-Jae Jo, Thanh Hai Nguyen, Dong-Choon Lee, Yeungnam University, Korea*

**P3508 - A New Five-Level Hybrid-Clamped Converter with Reduced Number of Clamping Devices**

*Kui Wang, Lie Xu, Zedong Zheng, Yongdong Li, Tsinghua University, China*

**P3509 - A Simple Capacitor Voltage Balancing Method for Nested Neutral Point Clamped Inverter**

*Kai Tian, Bin Wu, Mehdi Narimani, Dewei Xu, Zhongyuan Cheng, Navid Reza Zargari, Ryerson University, Canada; Rockwell Automation Canada, Canada*

**P3510 - A High Cell Count Cascade Full Bridge Converter for Wide Bandwidth Ultrasonic Transducer Excitation**

*Geoffrey R. Walker, Negareh Ghasemi, Mark A.H. Broadmeadow, Gerard F. Ledwich, Queensland University of Technology, Australia*

**P3511 - Improved Thermal Management of Multi-Level Converter Building Module to Realize Higher Power Density**

*Hidemine Obara, Yukihiko Sato, Chiba University, Japan*

**P3512 - THD Minimization of Modular Multilevel Converter with Unequal DC Values**

*Ghazal Falahi, Wensong Yu, Alex Q. Huang, North Carolina State University, United States*

**Poster Session: Passives and Converters**

Room: Exhibit Hall C - North

Chair: Jean Luc Schanen, Shuo Wang

**P3701 - Design and Analysis of 37.5% Energy-Recycling Flyback-Type Class-D Gate Driver IC with 5-to-15V Level-Conversion**

*Taewook Kang, Jaeha Kim, Seoul National University, Korea*

**P3702 - Optimization and Analysis of PwrSoc Buck Converter with Integrated Passives for Automotive Application**

*V. Šviković, J. Cortes, P. Alou, J. Oliver, J.A. Cobos, Universidad Politécnica de Madrid, Spain*

**P3703 - A 9-11 Bits Phase-Interpolating Digital Pulse-Width Modulator with 1000X Frequency Range**

*Yoontaek Lee, Taewook Kang, Jaeha Kim, Seoul National University, Korea*

**P3704 - A Transient Core Loss Analysis of Multiple-Gap Inductor Designed for the 2010 Prius**

*Masaki Wasekura, Chi-Ming Wang, Robert D. Lorenz, Toyota Motor Corporation, Japan; Toyota Research Institute of North America, United States; University of Wisconsin-Madison, United States*

**P3705 - Low AC Resistance Foil Cut Inductor**

*Weyman Lundquist, Vivien Yang, Carl Castro, West Coast Magnetics, United States*

**P3706 - Loss Minimization for Coupled Inductors with Significant Ac Flux**

*Zhemín Zhang, Milisav Danilovic, Khai D.T. Ngo, Jeff L. Nilles, Virginia Polytechnic Institute and State University, United States; Texas Instruments Inc., United States*

**P3707 - The Use of Dielectric Coatings in Capacitive Power Transfer Systems**

*Baoyun Ge, Daniel C. Ludois, Rodolfo Perez, University of Wisconsin-Madison, United States*

**P3708 - Litz Wire Pulsed Power Air Core Coupled Inductor**

*Victor Sung, W.G. Odendaal, Virginia Polytechnic Institute and State University, United States*

**P3709 - A 0.76W/mm<sup>2</sup> On-Chip Fully-Integrated Buck Converter with Negatively-Coupled, Stacked-LC Filter in 65nm CMOS**

*Minbok Lee, Yunju Choi, Jaeha Kim, Seoul National University, Korea*

**P3710 - Understanding dv/dt of 15 kV SiC N-IGBT and its Control using Active Gate Driver**

*Arun Kadavelugu, Subhashish Bhattacharya, Sei-Hyung Ryu, David Grider, Scott Leslie, Kamallesh Hatua, North Carolina State University, United States; Cree, Inc, United States; Powerex, Inc., United States; Indian Institute of Technology Madras, India*

**SOUTH**

**Poster Session: Grid-Connected Power Converters and Control**

Room: Exhibit Hall C - South

Chair: Jean Luc Schanen, Shuo Wang

**P3901 - Grid-Tie Switched Inductor with Voltage Multiplier Inverter**

*Omar Abdel-Rahim, Funato Hirohito, Junnosuke Haruna, Aswan University, Egypt; Utsunomiya University, Japan*

**P3902 - Voltage Droop Control of Dual Active Bridge for Integrating Battery Energy Storage to Utility Grid**

*Srinivas Bhaskar Karanki, David Xu, Ryerson University, Canada*

**P3903 - Performance Evaluation of a 3-Level ANPC Photovoltaic Grid-Connected Inverter with 650V SiC Devices and Optimized PWM**

*Davide Barater, Carlo Concari, Giampaolo Buticchi, Emre Gurpinar, Dipankar De, Alberto Castellazzi, University of Parma, Italy; University of Kiel, Germany; University of Nottingham, United Kingdom*

**P3904 - Active Damping Control of LLCL Filters based on Virtual Resistor for T-Type Three-Level PWM Converters**

*Payam Alemi, Dong-Choon Lee, Yeungnam University, Korea*

**P3905 - Coordinative Control of Active Power and DC-Link Voltage for Cascaded Dual-Active-Bridge and Inverter in Bidirectional Application**

*Yanjun Tian, Zhe Chen, Fujin Deng, Xiaofeng Sun, Yanting Hu, Aalborg University, Denmark; Yanshan University, China; Glyndwr University, United Kingdom*

**P3906 - The Impact of Gate-Driver Parameters Variation and Device Degradation in the PV-Inverter Lifetime**

*C. Sintamarean, H. Wang, F. Blaabjerg, F. Iannuzzo, Aalborg University, Denmark; University of Cassino and Southern Lazio, Italy*

**P3907 - Control of a 19 Level Cascaded H-Bridge Multilevel Converter Photovoltaic System**

*N.D. Marks, T.J. Summers, R.E. Betz, University of Newcastle, Australia*

**P3908 - A New DPWM Modulation for Three-Level Neutral Point Clamped Inverter with Assuming Balanced Neutral-Point Voltage**

*Tzung-Lin Lee, Tsung-Yu Hsieh, National Sun Yat-Sen University, Taiwan*

**Poster Session: Off-Grid Power Converters and Control**

*Room: Exhibit Hall C - South*

*Chair: Luca Zarri*

**P4101 - Decentralized Architecture and Control of Photovoltaic Generation System based on Cascaded AC Module Integrated Converter**

*Huan Hu, Xu She, Alex Huang, Texas Instrument, United States; GE Global Research, United States; North Carolina State University, United States*

**P4102 - A New Modulation Technique for Wide-Range Control of Output Voltage in Z-Source Inverters**

*M.S. Diab, A. Elserougi, A.S. Abdel-Khalik, A.M. Massoud, Shehab Ahmed, Alexandria University, Egypt; Qatar University, Qatar; Texas A&M University at Qatar, Qatar*

**P4103 - A Novel ZVS and ZCS Three-Port LLC Resonant Converter for Renewable Energy Systems**

*Jiang Tianyang, Qizheng Lin, Junming Zhang, Yousheng Wang, Zhejiang University, China; Pinghu Electronics Co., Ltd., China*

**P4104 - High Step-Up Tapped Inductor SEPIC Converter with Charge Pump Cell**

*Jia Yao, Alexander Abramovitz, Keyue Smedley, Southeast University, China; University of California, Irvine, United States*



**P4105 - Piezoelectric Energy Harvesting Circuit using Full-Wave Voltage Doubler Rectifier and Switched Inductor**  
*Yukito Kushino, Hiroataka Koizumi, Tokyo University of Science, Japan*

**P4106 - Model Predictive Control of DC/DC Converter for Ultracapacitors Energy Storage Union based on T-S Model**

*Jianfeng Liu, Qing Yan, Zhiwu Huang, Cheng Luo, Central South University, China*

**P4107 - A Droop Controller Achieving Proportional Power Sharing without Output Voltage Amplitude or Frequency Deviation**

*Yu Zeng, Qing-Chang Zhong, University of Sheffield, United Kingdom*

**P4108 - A Novel Distributed PV System with Ultra-High-Frequency-AC Bus for Residential Applications**

*Mengqi Wang, Qingyun Huang, Alex Q. Huang, Wensong Yu, Ruiyang Yu, North Carolina State University, United States*

**P4109 - Harmonics Analysis for a High-Frequency-Link (HFL) Inverter**

*Alireza Tajfar, Hossein Riazmontazer, Sudip K. Mazumder, Enphase Energy, United States; University of Illinois, United States*

## WEST

### Poster Session: PM Machines

*Room: Exhibit Hall C - West*

*Chair: Abraham Gebregergis, Akira Chiba*

**P4301 - Design of Consequent-Pole, Toroidal-Winding, Outer Rotor Vernier Permanent Magnet Machines**

*Dawei Li, Ronghai Qu, Jian Li, Wei Xu, Huazhong University of Science and Technology, China*

**P4302 - Design Process of Dual-Stator, Spoke-Array Vernier Permanent Magnet Machines**

*Dawei Li, Ronghai Qu, Wei Xu, Jian Li, T.A. Lipo, Huazhong University of Science and Technology, China; University of Wisconsin-Madison, United States*

**P4303 - Analysis of a PM Vernier Motor with Spoke Structure**

*Byungtaek Kim, Thomas A. Lipo, Kunsan National University, Korea; University of Wisconsin-Madison, United States*

**P4304 - A New Type of Harmonic Current Excited Brushless Synchronous Machine based on an Open Winding Pattern**

*Lizhi Sun, Xiaolong Gao, Fei Yao, Quntao An, Thomas Lipo, Harbin Institute of Technology, China; University of Wisconsin-Madison, United States*

**P4305 - Rotor Shape Optimization for Output Maximization of Permanent Magnet Assisted Synchronous Machines**

*Katsumi Yamazaki, Kazuya Utsuno, Kazuo Shima, Tadashi Fukami, Masato Sato, Chiba Institute of Technology, Japan; Kanazawa Institute of Technology, Japan*

**P4306 - Cancellation of Torque Ripple Accompanying Space Harmonics in SPMSM**

*Shingo Ehara, Shoji Shimomura, Shibaura Institute of Technology, Japan*

**P4307 - Study of Suitable Motor Structure for IPMSM with High Flux Density Material**

*Masashi Matsuhara, Masayuki Sanada, Shigeo Morimoto, Yukinori Inoue, Osaka Prefecture University, Japan*

**P4308 - Comparison of Optimized Permanent Magnet Assisted Synchronous Reluctance Motors with Three-Phase and Five-Phase Systems**

*Sai Sudheer Reddy Bonthu, Jeihoon Baek, Seungdeog Choi, University of Akron, United States; Korea Railroad Research Institute, Korea*

**P4309 - A Comparison between Maximum Torque/Ampere and Maximum Efficiency Control Strategies in IPM Synchronous Machines**

*James Goss, Mircea Popescu, Dave Staton, Rafal Wrobel, Jason Yon, Phil Mellor, Motor Design Ltd, United Kingdom; University of Bristol, United Kingdom*

**P4310 - Design of Several Un-Skewed Radial Flux Permanent Magnet Synchronous Motors with Asymmetric and Symmetric AC Windings – A Comparative Study**

*Y. Demir, M. Aydin, MDS Motor Design Ltd., Turkey; Kocaeli University, Turkey*

**P4311 - Optimal Design of Five-Phase Permanent Magnet Assisted Synchronous Reluctance Motor for Low Output Torque Ripple**

*Jeihoon Baek, Sai Sudheer Reddy Bonthu, Sangshin Kwak, Seungdeog Choi, Korea Railroad Research Institute, Korea; University of Akron, United States; Chung-Ang University, Korea*

**P4312 - Interior PM Generator for Portable AC Generator Sets**

*Wen L. Soong, Solmaz Kahourzade, Chong-Zhi Liaw, Paul Lillington, University of Adelaide, Australia; Radial Flux Laboratories Pty. Ltd., Australia*

**P4313 - Prediction of Magnetically Induced Vibration in a PMSM using Time Stretched Pulse Excitation**

*Doyeon Kim, Jeongyong Song, Gunhee Jang, Hanyang University, Korea*

**P4314 - Optimal Rotor Shape Design to Reduce the Vibration of IPMSM**

*Min-Chul Kang, Dong-Yeong Kim, Gyu-Tak Kim, Changwon National University, Korea*

**P4315 - Cogging Torque Reduction of Single-Phase Brushless DC Motor with a Tapered Air-Gap using Optimizing Notch Size and Position**

*Dae-kyong Kim, Young-un Park, Ju-Hee Cho, Suncheon National University, Korea; Korea Electronics Technology Institute, Korea*

**P4316 - Verification of a Novel 5-Axis Active Control Type Bearingless Canned Motor Pump Utilizing Passive Magnetic Bearing Function for High Power**

*Kazuya Miyamoto, Masatsugu Takemoto, Satoshi Ogasawara, Masao Hiragushi, Hokkaido University, Japan; SEIKOW Chemical Engineering and Machinery, Ltd., Japan*

**Poster Session: Control Issues in Electric Drives I**

*Room: Exhibit Hall C - West*

*Chair: Mahesh Swamy*

**P4501 - Sensorless Control Method using Differentiation Circuit for Switched Reluctance Motor**

*Satoshi Sumita, Kenta Deguchi, Yoshitaka Iwaji, Yuji Enomoto, Hitachi, Ltd., Japan*

**P4502 - Sensorless Control of PMSM in a Ultra High Speed Region taking Iron Loss into Account**

*Junwoo Kim, Ilsu Jeong, Kwanghee Nam, Jaesik Yang, Taewon Hwang, POSTECH, Korea; Hyundai Motor Company, Korea*

**P4503 - Implementation and Evaluation of Online System Identification of Electromechanical Systems using Adaptive Filters**

*Parag Kshirsagar, Dong Jiang, Zhendong Zhang, United Technologies Research Center, United States*

**P4504 - Control Strategy of a Permanent Magnet Synchronous Machine in the Flywheel Energy Storage System**

*Wei Guo, Yue Wang, Xi'an Jiaotong University, China*

**P4505 - Enhancement of Output Voltage using Current Shaping in Sensorless AC Machine Drive**

*Jin-Woong Kim, Jung-Ik Ha, Seoul National University, Korea*

**P4506 - Zero/Low Speed Magnet Magnetization State Estimation using High Frequency Injection for a Fractional Slot Variable Flux-Intensifying Interior Permanent Magnet Synchronous Machine**

*Chen-Yen Yu, Takashi Fukushige, Apoorva Athavale, Brent Gagas, Kan Akatsu, David Reigosa, Robert D. Lorenz, University of Wisconsin-Madison, United States; Nissan Motor Co., Ltd., Japan; Shibaura Institute of Technology, Japan; University of Oviedo, Spain*

**P4507 - Operation of Doubly Fed Induction Generator in Ocean Wave Energy Conversion System by Stator Phase Sequence Switching**

*Samir Hazra, Subhashish Bhattacharya, North Carolina State University, United States*

**P4508 - Nonlinear Analysis for Interleaved Boost Converters based on Monodromy Matrix**

*Haimeng Wu, Volker Pickert, Damian Giaouris, Newcastle University, United Kingdom; Centre for Research and Technology Hellas, Greece*

**Tuesday, September 16 – 3:30 pm – 5:00 pm**

**EAST**

**Poster Session: Solar PV Systems**

*Room: Exhibit Hall C - East*

*Chair: Dezso Sera*

**P4701 - Comparison of the Perturb and Observe and Simulated Annealing Approaches for Maximum Power Point Tracking in a Photovoltaic System under Partial Shading Conditions**

*S. Lyden, M.E. Haque, University of Tasmania, Australia*

**P4702 - Statistical Analysis of Ramp Rates of Solar Photovoltaic System Connected to Grid**

*Md Kamal Hossain, Mohd Hasan Ali, University of Memphis, United States*

**P4703 - Single-Phase ZVS Bidirectional AC-Link Converter for EV Batteries-Grid Integration**

*Gamal M. Dousoky, Mostafa Mosa, Haitham Abu-Rub, Minia University, Egypt; Aswan University, Egypt; Texas A&M University at Qatar, Qatar*

**P4704 - A High Performance Controller for a Single Phase Cascaded Multilevel Photovoltaic System**

*Huan Hu, Xu She, Alex Q. Huang, Texas Instrument Inc., United States; GE Global Research, United States; North Carolina State University, United States*

**Poster Session: Energy Storage Systems**

*Room: Exhibit Hall C - East*

*Chair: Adel Nasiri*

**P4901 - Balanced Supercapacitor Energy Storage Module based on Multifunctional ISOS Converter**

*Wei Jiang, Xiaogang Wu, Renjie Hu, Wu Chen, Southeast University, China*

**P4902 - Research of Multipurpose Optimization Control in Hybrid Energy Storage System**

*Wei Jiang, Renjie Hu, Wu Chen, Xiaodong Wang, Zhong Li, Yongbiao Yang, Jinming Wang, Southeast University, China; Changzhi Electric Power Supply Company, China; NARI Technology Co., Ltd., China*

**P4903 - A New Concept of Gas Turbine System: Motor-Assisted Gas Turbine with High-Speed Motor**

*Noriaki Hino, Aung Kothet, Naohiro Kusumi, Hitachi, Ltd., Japan*

**P4904 - A Unified Control Scheme of Battery Energy Storage System based on Cascaded H-Bridge Converter**

*Qiang Chen, Ning Gao, Rui Li, Xu Cai, Zhigang Lu, Shanghai Jiaotong University, China; Electric Power Research Institute, China*

**P4905 - State-of-Charge Balancing Control Strategy of Battery Energy Storage System based on Modular Multilevel Converter**

*Feng Gao, Lei Zhang, Qi Zhou, Mengxing Chen, Tao Xu, Shaogang Hu, Shandong University, China; State Grid Anshan Electric Power Supply Company, China*

**P4906 - The Impact of DC bias Current on the Modeling of Lithium Iron Phosphate and Lead-Acid Batteries Observed using Electrochemical Impedance Spectroscopy**

*Larry W. Juang, Phillip J. Kollmeyer, Ruxiu Zhao, T.M. Jahns, R.D. Lorenz, University of Wisconsin-Madison, United States*

**P4907 - Investigation of a Data-Driven SOC Estimator based on the Merged SMO and Degradation Mitigation for Series/Parallel-Cell Configured Battery Pack**

*Jonghoon Kim, Chosun University, Korea*

**Poster Session: Power Converters for Alternative Energy Systems**

*Room: Exhibit Hall C - East*

*Chair: Paolo Mattavelli, Ion Exteberria*

**P5101 - Modeling of Single-HB PWM Modulated Dual Active Bridge DC-DC Converter with Multifrequency Average Approach**

*Yuan Gao, Yue Wang, Jun Huang, Ming Li, Xu Yang, Xi'an Jiaotong University, China*

**P5102 - Modularized High Frequency High Power 3-Level Neutral Point Clamped PEBB Cell for Renewable Energy System**

*Sizhao Lu, Zhengming Zhao, Liqiang Yuan, Ting Lu, Yang Jiao, Mingkai Mu, Fred C. Lee, Tsinghua University, China; Virginia Polytechnic Institute and State University, United States*

**P5103 - A Novel TRIAC Dimming LED Driver by Variable Switched Capacitance for Power Regulation**

*Eun S. Lee, Jun P. Cheon, Duy N. Tan, Chun T. Rim, KAIST, Korea*

**P5104 - Analysis and Design Considerations of Two-Stage AC-DC LED Driver without Electrolytic Capacitor**

*Siyang Zhao, Xianmian Ge, Xinke Wu, Junming Zhang, Huajian Zhang, Zhejiang University, China; Inventronics (Hangzhou), Inc., China*

**Poster Session: Stability and Quality of Microgrids**

*Room: Exhibit Hall C - East*

*Chair: Norma Anglani, Feng Guo*

**P5301 - Fault-Decoupled Instantaneous Frequency and Phase Angle Estimation for Three-Phase Grid-Connected Inverters**

*G. De Donato, G. Scelba, F. Giulii Capponi, G. Scarcella, University of Rome "La Sapienza", Italy; University of Catania, Italy*

**P5302 - Fault Current and Overvoltage Calculations for Inverter-based Generation using Symmetrical Components**

*Laura Wieserman, T.E. McDermott, University of Pittsburgh, United States*

**P5303 - Power Quality Improvement of Single-Phase Photovoltaic Systems through a Robust Synchronization Method**

*Lenos Hadjidemetriou, Elias Kyriakides, Yongheng Yang, Frede Blaabjerg, University of Cyprus, Cyprus; Aalborg University, Denmark*

**P5304 - Prediction and Avoidance of Grid-Connected Converter's Instability caused by Wind Park Typical, Load-Varying Grid Resonance**

*F. Fuchs, A. Mertens, Leibniz Universität Hannover, Germany*

**P5305 - Grid Synchronization using Fixed Filtering with Magnitude and Phase Compensation**

*Bradford Trento, Leon M. Tolbert, Daniel Costinett, University of Tennessee, United States*

**P5306 - Finite-Time Frequency Synchronization in Microgrids**

*Ali Bidram, Ali Davoudi, Frank L. Lewis, University of Texas-Arlington, United States*

**P5307 - Quadrature Signal Generator based on All-Pass Filter for Single-Phase Synchronization**

*Cristian Blanco, David Reigosa, Fernando Briz, Juan M. Guerrero, University of Oviedo, Spain*

**P5308 - A DC Fault Clearance Method for Series Multiterminal HVDC System**

*Xiaobo Yang, Dawei Yao, Chunming Yuan, Chengyan Yue, Chao Yang, River Tin-Ho Li, ABB (China) Limited, China*

**P5309 - Virtual Impedance based Stability Improvement for DC Microgrids with Constant Power Loads**

*Xiaonan Lu, Kai Sun, Lipei Huang, Josep M. Guerrero, Juan C. Vasquez, Yan Xing, University of Tennessee, United States; Tsinghua University, China; Aalborg University, Denmark; Nanjing University of Aeronautics and Astronautics, China*

**P5310 - Analysis and Assessment of Microgrid Stability using the Nu Gap Approach**

*Abdulgafor Alfares, Ahmed Sayed-Ahmed, Marquette University, United States; Rockwell Automation, United States*

**P5311 - Comparison of Synchronous Condenser and STATCOM for Inertial Response Support**

*Yang Liu, Shuitao Yang, Shao Zhang, Fang Zheng Peng, Michigan State University, United States*

## NORTH

### Poster Session: Single-Phase AC-DC Converters

Room: Exhibit Hall C - North

Chair: Yogesh Patel

#### **P5501 - Direct AC/DC Rectifier with Mitigated Low-Frequency Ripple through Waveform Control**

*Sinan Li, Guorong Zhu, Siew-Chong Tan, S.Y.R. Hui, University of Hong Kong, Hong Kong; Wuhan University of Technology, China*

#### **P5502 - Design of Class E Resonant Rectifiers and Diode Evaluation for VHF Power Conversion**

*Juan A. Santiago-González, Khalil M. Elbaggari, Khurram K. Afridi, David J. Perreault, Massachusetts Institute of Technology, United States; University of Colorado-Boulder, United States*

#### **P5503 - Novel Zero-Voltage Transition Semi Bridgeless Boost PFC Converter with Soft Switching Auxiliary Switch**

*Wei Hu, Yong Kang, Xuehua Wang, Xiaoning Zhou, Huazhong University of Science and Technology, China; Wuhan Quanhua Optoelectronics Co. Ltd, China*

#### **P5504 - An Electrolytic-Free Offline LED Driver with a Ceramic-Capacitor-based Compact SSC Energy Buffer**

*Minjie Chen, Yu Ni, Curtis Serrano, Benjamin Montgomery, David Perreault, Khurram Afridi, Massachusetts Institute of Technology, United States; University of Colorado-Boulder, United States*

#### **P5505 - A Comparison Study of Boost and Buck-Boost Power Factor Corrector for Ultra-Wide Input Voltage Range Applications**

*Sheng-Yang Yu, Hung-Chi Chen, Texas Instruments Inc., United States; National Chiao Tung University, Taiwan*

#### **P5506 - Analysis on Ringing Effect of Auxiliary Winding in Primary Side Regulated Flyback Converter**

*Taizhi Zhang, Qinsong Qian, Manchao Xu, Weifeng Sun, Shengli Lu, Southeast University, China*

#### **P5507 - A Single-Phase Rectifier with a Neutral Leg to Reduce DC-Bus Voltage Ripples**

*Wen-Long Ming, Qing-Chang Zhong, Wanxing Sheng, University of Sheffield, United Kingdom; China Electric Power Research Institute, China*

#### **P5508 - Modelling and Simulation of Bridgeless PFC modified SEPIC Rectifier with Multiplier Cell**

*Ahmed M. Al Gabri, Abbas A. Fardoun, Esam H. Ismail, United Arab Emirates University, United Arab Emirates; College of Technological Studies, Kuwait*

### Poster Session: Single-Phase DC-AC Converters

Room: Exhibit Hall C - North

Chair: Marcello Pucci

#### **P5701 - A High Frequency Transformer Isolated Inverter Excepting No Duty Cycle Loss**

*Zibo Lv, Yan Deng, Hao Peng, Ying Wang, Xiangning He, Zhejiang University, China*

#### **P5702 - Active Buck-Boost Inverter with Coupled Inductors**

*Yu Tang, Yaohua He, Xianmei Dong, Nanjing University of Aeronautics and Astronautics, China*

#### **P5703 - A Systematic Method to Synthesize New Transformerless Full-Bridge Grid-Tied Inverter**

*Hongliang Wang, Sarah Burton, Yan-fei Liu, P.C. Sen, Josep M. Guerrero, Queen's University, Canada; Aalborg University, Denmark*

**P5704 - Phase-Shift Soft-Switching Power Amplifier with Lower EMI Noise**

*Ruxi Wang, Juan Sabate, Ying Mei, Jianguo Xiao, Song Chi, General Electric Global Research, United States*

**P5705 - SiC Full-Bridge Grid-Tied Inverter with ZVS-Switching**

*Guangcheng Hu, Yawen Li, Yenan Chen, Min Chen, Dehong Xu, Yasuhiko Arita, Seiki Igarashi, Tatsuhiko Fujihira, Zhejiang University, China; Fuji Electric Co., Ltd, Japan*

**P5706 - A Unified Switched Capacitor Converter**

*Bin Wu, Smedley Keyue, Singer Sigmond, University of California-Irvine, United States; Tel-Aviv University, Israel*

**P5707 - Improved Trans-Current-Fed Switched Inverter**

*Soumya Shubhra Nag, Santanu Mishra, Indian Institute of Technology Kanpur, India*

**P5708 - Compression of the Load Resistance Range in Constant Frequency Resonant Inverters**

*Milislav Danilovic, Khai D.T. Ngo, Zhemin Zhang, Virginia Polytechnic Institute and State University, United States*

**P5709 - Double Four-Quadrants Single-Phase Current Source Converter Sharing the Same DC-Bus**

*Montiê A. Vitorino, Maurício B.R. Corrêa, Louelson C. Costa, Lucas V. Hartmann, Darlan A. Fernandes, Federal University of Campina Grande, Brazil; Federal University of Paraíba, Brazil*

**P5710 - A Hybrid Inverter System for Medium Voltage Applications using a Low Voltage Auxiliary CSI**

*Savvas Papadopoulos, Mohamed Rashed, Christian Klumpner, Pat Wheeler, University of Nottingham, United Kingdom*

**Poster Session: Devices and Modules**

*Room: Exhibit Hall C - North*

*Chair: Tanya Gachovska, Angus Bryant*

**P5901 - Electrothermal Modeling and Characterization of SiC Schottky and Silicon PiN Diodes Switching Transients**

*Saeed Jahdi, Olayiwola Alatise, Petros Alexakis, Li Ran, Phil Mawby, University of Warwick, United Kingdom*

**P5902 - Static and Dynamic Characterization of High Power Silicon Carbide BJT Modules**

*Muhammad Nawaz, Nan Chen, Filippo Chimento, Liwei Wang, ABB Corporate Research, Sweden*

**P5903 - Analysis on Reverse Recovery Characteristics of SiC MOSFET Intrinsic Diode**

*Zhaohui Wang, Jiajia Ouyang, Junming Zhang, Xinke Wu, Kuang Sheng, Zhejiang University, China*

**P5904 - Analysis of Stray Inductance's Influence on SiC MOSFET Switching Performance**

*Zhaohui Wang, Junming Zhang, Xinke Wu, Kuang Sheng, Zhejiang University, China*

**P5905 - Design of Overcurrent Protection Circuit for GaN HEMT**

*Bo Huang, Yan Li, Trillion Q. Zheng, Yajing Zhang, Beijing Jiaotong University, China*

**P5906 - Insulated Gate Driver for eGaN FET**

*Johan Delaine, Pierre-Olivier Jeannin, David Frey, Kevin Guepratte, University Grenoble Alpes, France; Thales Systemes Aeroportes, France*

**P5907 - Physical Modeling and Optimization of a GaN HEMT Design with a Field Plate Structure for High Frequency Applications**

*D. Cucak, M. Vasic, O. Garcia, Y. Bouvier, J. Oliver, P. Alou, J.A. Cobos, A. Wang, S. Martin-Horcajo, F. Romero, F. Calle, Universidad Politecnica de Madrid, Spain*

**P5908 - Investigation of Soft-Switching Behavior of 600 V Cascode GaN HEMT**

*Weimin Zhang, Fred Wang, Leon M. Tolbert, Benjamin J. Blalock, Daniel Costinett, University of Tennessee-Knoxville, United States*

**P5909 - A Temperature Dependent Simple Spice based Modeling Platform for Power IGBT Modules**

*Georgios Sfakianakis, Muhammad Nawaz, Filippo Chimento, Eindhoven University of Technology, Netherlands; ABB Corporate Research, Sweden*

**P5910 - An Ultra-Fast SiC Phase-Leg Module in Modified Hybrid Packaging Structure**

*Zheng Chen, Yiyang Yao, Dushan Boroyevich, Khai Ngo, Wenli Zhang, Virginia Polytechnic Institute and State University, United States*

**P5911 - Effect of Pulse Width on Dynamic Characteristics of High Voltage IGBTs**

*John F. Donlon, Eric R. Motto, Eugen Wiesner, Eugen Stumpf, Shinichi Iura, Hitoshi Uemura, Powerex, Inc., United States; Mitsubishi Electric Europe B.V., Germany; Mitsubishi Electric Corp., Japan*

**P5912 - Next Generation Industrial IGBT Module**

*Eric R. Motto, John F. Donlon, Masaomi Miyazawa, Mitsuharu Tabata, Hiroki Muraoka, Tomohiro Hieda, Thomas Radke, Powerex Inc., United States; Mitsubishi Electric Corporation, Japan; Mitsubishi Electric Europe B.V., Germany*

**P5913 - The Next Generation 6.5kV IGBT**

*John F. Donlon, Eric R. Motto, Eugen Wiesner, Eckhard Thal, Kenji Hatori, Yasuhiro Sakai, Shuichi Kitamura, Tetsuo Motomiya, Kenji Ota, Yumie Kitajima, Shinichi Iura, Hiroshi Yamaguchi, Kazuhiro Kurachi, Powerex, Inc., United States; Mitsubishi Electric Europe B.V., Germany; Mitsubishi Electric Corp., Japan*

**P5914 - A Temperature-Dependent Thermal Model of IGBT Modules Suitable for Circuit-Level Simulations**

*Rui Wu, Huai Wang, Ke Ma, Pramod Ghimire, Francesco Iannuzzo, Frede Blaabjerg, Aalborg University, Denmark*

**P5915 - Sensing Power MOSFET Junction Temperature using Gate Drive Turn-On Current Transient Properties**

*He Niu, Robert D. Lorenz, University of Wisconsin Madison, United States*

**SOUTH**

**Poster Session: Control and Applications in Renewable Energy, EMI and EVs**

*Room: Exhibit Hall C - South*

*Chair: Tanya Gachovska, Angus Bryant*

**P6101 - An Electronically Isolated 12 Pulse Autotransformer Rectification Scheme to Improve Input Power Factor and Lower Harmonic Distortion in Variable Frequency Drives**

*Mahesh M. Swamy, Yaskawa America Inc., United States*

**P6102 - Three Level NPC Inverter dc Capacitor Sizing for a Synchronous Reluctance Machine Drive**

*Lesedi Masisi, Pragasen Pillay, Sheldon S. Williamson, Concordia University, Canada*



**P6103 - DG Control Strategies for Grid Voltage Unbalance Compensation**

*Jinghang Lu, Farzam Nejabatkhah, Yunwei Li, Bin Wu, University of Alberta, Canada; Ryerson University, Canada*

**P6104 - Design of LCL Filter for Improving Robustness of Grid-Connected Voltage Source Inverter**

*DongSul Shin, Hee-Je Kim, Jong-Pil Lee, Tae-Jin Kim, Dong-Wook Yoo, Pusan National University, Korea; Korea Electrotechnology Research Institute, Korea*

**P6105 - Neutral Current Mitigation using Controlled Electric Springs Connected to Microgrids within Built Environment**

*Krishnanand K.R., Syed Muhammad Farzan Hasani, Jayantika Soni, Sanjib Kumar Panda, National University of Singapore, Singapore*

**P6106 - Resonant-Repetitive Combined Control for Stand-Alone Power Supply Units**

*Alessandro Lidozzi, Chao Ji, Luca Solero, Pericle Zanchetta, Fabio Crescimbin, Roma Tre University, Italy; University of Nottingham, United Kingdom*

**P6107 - Convertible Static Transmission Controller (CSTC) System Model Validation by Controller Hardware-in-the-Loop-Simulation**

*Nima Yousefpoor, Babak Parkhideh, Ali Azidehak, Subhashish Bhattacharya, Quanta Technology, United States; North Carolina State University-Raleigh, United States; North Carolina State University-Charlotte, United States*

**P6108 - Isolated Flyback Half-Bridge OCC Micro-Inverter**

*Alexander Abramovitz, Mojtaba Heydari, Ben Zhao, Keyue Smedley, University of California-Irvine, United States*

**Poster Session: Selected Topics in Control of Power Converters**

*Room: Exhibit Hall C - South*

*Chair: Luca Zarri, Brian Welchko*

**P6301 - Optimal Algorithm of a Novel Infinite Impulse Response Digital Filter**

*Liqing Tong, Fangzheng Peng, Fudan University, China; Michigan State University, United States*

**P6302 - Output Impedance Analysis of Digitally Controlled DC-DC Converter**

*Hua Wang, Hua Lin, Xing Li, Xingwei Wang, Huazhong University of Science and Technology, China*

**P6303 - An Iteration Method for Determining Critical Stable Regions of Shunt Regulator with Multistage Hysteresis Control and its Complex Behaviors**

*Hong Li, Jianing Shang, Xiaojie You, Shiheng Wang, Beijing Jiaotong University, China; State Grid Beijing Changping Electric Power Supply, China*

**P6304 - An Analysis of False Turn-on Mechanism on Power Devices**

*Akihiro Nishigaki, Hirokatsu Umegami, Fumiya Hattori, Wilmar Martinez, Masayoshi Yamamoto, Shimane University, Japan*

**P6305 - PQ, DQ and CPT Control Methods for Shunt Active Compensators – A Comparative Study**

*Ali Mortezaei, Christopher Lute, M. Godoy Simões, Fernando P. Marafão, Alessandro Bogila, Colorado School of Mines, United States; UNESP, Brazil*

**P6306 - Comparison of the Gate Drive Parameter Space for Driving Power MOSFETs using Conventional and Cascode Configurations**

*Mark A.H. Broadmeadow, Geoffrey R. Walker, Gerard F. Ledwich, Queensland University of Technology, Australia*

**P6307 - Reduced-Order Multifrequency Averaging in Naturally Sampled PWM Converters**

*Fei Pan, Aaron M. Cramer, University of Kentucky, United States*

**P6308 - Stability Analysis and Voltage Control Method based on Virtual Resistor and Proportional Voltage Feedback Loop for Cascaded DC-DC Converters**

*Wen Cai, Babak Fahimi, Eva Cosoroaba, Fan Yi, University of Texas at Dallas, United States*

**P6309 - Control and Modulation of the Stacked Polyphase Bridges Inverter**

*Lebing Jin, Staffan Norrnga, Oskar Wallmark, Mojgan Nikouei Harnefors, KTH Royal Institute of Technology, Sweden*

**P6310 - Digitally Controlled Switch-Mode Power Driver for Active Magnetic Bearings**

*Tomer Ben Moha, Sergei Basovich, Mor Mordechai Peretz, Shai Arogeti, Ziv Brand, Ben-Gurion University of the Negev, Israel*

**P6311 - Modular Interleaved Single-Phase Series Voltage Injection Converter used in Small-Signal dq Impedance Identification**

*Jaksic Marko, Boroyevich Dushan, Burgos Rolando, Mattavelli Paolo, Shen Zhiyu, Cvetkovic Igor, Virginia Tech, United States; University of Padova, Italy*

**Poster Session: Reliability and Fault Diagnostics in Power Converters**

*Room: Exhibit Hall C - South*

*Chair: Luca Zarri, Brian Welchko*

**P6501 - Duty Cycle-based Start-Up Control for a ZVS Bidirectional DC-DC Converter**

*Chi Xu, Hongbin Yu, Yunjie Gu, Pengfei Sun, Wuhua Li, Xiangning He, Fengwen Cao, Zhejiang University, China; Suzhou Vocational University, China*

**P6502 - Reliability Evaluation Model of Wind Power Converter System Considering Variable Wind Profiles**

*Hui Li, Haiting Ji, Yang Li, Shengquan Liu, Dong Yang, Xing Qin, Li Ran, Chongqing University, China; Chongqing Three Gorges University, China*

**P6503 - Condition Monitoring and Failure Prognosis of IGBT Inverters based on On-Line Characterization**

*Andrew Babel, Annette Muetze, Roland Seebacher, Klaus Krischan, Elias G. Strangas, Michigan State University, United States; Graz University of Technology, Austria*

**P6504 - Reliability and Energy Loss in Full-Scale Wind Power Converter Considering Grid Codes and Wind Classes**

*Dao Zhou, Frede Blaabjerg, Toke Franke, Michael Tonnes, Mogens Lau, Aalborg University, Denmark; Danfoss Silicon Power GmbH, Germany; Siemens Wind Power A/S, Denmark*

**P6505 - Suppression of Real Power Back Flow of Non-Regenerative Cascaded H-Bridge Inverters Operating under Faulty Conditions**

*Le Sun, Zhenxing Wu, Fei Xiao, Xinjian Cai, Xi'an Jiaotong University, China; Naval University of Engineering, China*

**P6506 - Wide Bandwidth and Low Propagation Time Delay Current Sensor applied to a Laminated Bus Bar**

*Keiji Wada, Atsushi Yamashita, Tokyo Metropolitan University, Japan*

**P6507 - Comparison and Design of InterCell Transformer Structures in Fault-Operation for Parallel Multicell Converters**

*Sébastien Sanchez, Damien Risaletto, Frédéric Richardeau, Guillaume Gateau, University of Toulouse, France*

**P6508 - Dynamic Thermal Analysis of DFIG Rotor-Side Converter during Balanced Grid Fault**

*Dao Zhou, Frede Blaabjerg, Aalborg University, Denmark*

**WEST**

**Poster Session: Machine Diagnostics**

*Room: Exhibit Hall C - West*

*Chair: Pinjia Zhang*

**P6701 - Automatizing the Broken Bar Detection Process via Short Time Fourier Transform and Two-Dimensional Piecewise Aggregate Approximation Representation**

*George Georgoulas, Petros Karvelis, Chrysostomos D. Stylios, Ioannis P. Tsoumas, Jose Alfonso Antonino-Daviu, Vicente Climente-Alarcon, Technological Institute of Epirus, Greece; Siemens Industry Sector-Drive Technologies, Germany; Universitat Politècnica de València, Spain*

**P6702 - Detection of AC Machines Insulation Health State based on Evaluation of Switching Transients using Two Current Sensors and Eigenanalysis-based Parameter Estimation**

*C. Zoeller, Th. Winter, Th. Wolbank, M. Vogelsberger, Vienna University of Technology, Austria; Bombardier Transportation Austria GmbH, Austria*

**P6703 - Fault Diagnosis of Wind Turbine using Control Loop Current Signals**

*Jun Hang, Jianzhong Zhang, Ming Cheng, Southeast University, China*

**P6704 - Diagnosis of Stator Winding Short-Circuit Faults in an Interior Permanent Magnet Synchronous Machine**

*Jiangbiao He, Chad Somogyi, Andrew Strandt, Nabeel A.O. Demerdash, Marquette University, United States*

**P6705 - Detecting Faults in Inverter-Fed Induction Motors during Startup Transient Conditions**

*M. Dlamini, P.S. Barendse, A.M. Khan, University of Cape Town, South Africa*

**Poster Session: Machines for Automotive and Renewable Energy Applications**

*Room: Exhibit Hall C - West*

*Chair: Julia Zhang*

**P6901 - A Novel Magnetic Lead Screw Active Suspension System for Vehicles**

*Nick Ilsoe Berg, Rasmus Koldborg Holm, Peter Omand Rasmussen, Aalborg University, Denmark*

**P6902 - Design of an Outer Rotor Ferrite Assisted Synchronous Reluctance Machine (Fa-SynRM) for Electric Two Wheeler Application**

*Yateendra Deshpande, Hamid A. Toliyat, Texas A&M University, United States*

**P6903 - Investigation and Development of a New Brushless DC Generator System for Extended-Range Electric Vehicle Application**

*Zhuoran Zhang, Li Yu, Chao Dai, Yangguang Yan, Nanjing University of Aeronautics and Astronautics, China*

**P6904 - Dynamic Modeling of the Trans-Rotary Magnetic Gear for the Point-Absorbing Wave Energy Conversion Systems**

*Siavash Pakdelian, Hamid A. Toliyat, Texas A&M University, United States*

**Poster Session: Assorted Issues in Electric Drives II**

*Room: Exhibit Hall C - West*

*Chair: Fernando Briz*

**P7101 - Efficiency Improvement in Motor Drive System with Single Phase Diode Rectifier and Small DC-Link Capacitor**

*Yeongrack Son, Jung-Ik Ha, Seoul National University, Korea*

**P7102 - Ground Fault Location Self-Diagnosis in High Resistance Grounding Drive Systems**

*Jiangang Hu, Lixiang Wei, Jeffrey McGuire, Zhijun Liu, Rockwell Automation Inc., United States*

**P7103 - Single to Two-Phase Matrix Converter using GaN-based Monolithic Bidirectional Switch for Driving Symmetrical Two-Phase Motor**

*Yuji Kudoh, Kenji Mizutani, Nobuyuki Otsuka, Satoru Takahashi, Masahiko Inamori, Hiroto Yamagiwa, Tatsuo Morita, Tetsuzo Ueda, Tsuyoshi Tanaka, Daisuke Ueda, Toshimitsu Morizane, Panasonic Corporation, Japan; Kyoto Institute of Technology, Japan; Osaka Institute of Technology, Japan*

**P7104 - Low-Power Energy Conversion Systems with Two-Phase PM Machine and a Rectifier with Reduced Number of Controlled Switches**

*Cursino B. Jacobina, Victor F.M.B. Melo, Filipe A. da C. Bahia, Italo Roger F.M.P. da Silva, Federal University of Campina Grande, Brazil*

**P7105 - High Fidelity Nonlinear IPM Modeling based on Measured Stator Winding Flux Linkage**

*Dakai Hu, Yazan Alsmadi, Longya Xu, Ohio State University, United States*

**P7106 - Rogowski Current Sensor Design and Analysis based on Printed Circuit Boards (PCB)**

*Ruxi Wang, Satish Prabhakaran, William Burdick, Raymond Nicholas, General Electric Global Research, United States*

**P7107 - A Capacitor-Less Gate Drive Circuit using Two Parasitic Capacitors Suitable for Non-Insulating-Gate GaN FETs**

*Masataka Ishihara, Fumiya Hattori, Hirokatsu Umegami, Masayoshi Yamamoto, Shimane University, Japan*

**P7108 - Optimal Energy Saving Trajectories of Induction Motor with Suppression of Sudden Acceleration and Deceleration**

*Kaoru Inoue, Yuji Asano, Keito Kotera, Toshiji Kato, Doshisha University, Japan*

**P7109 - A High-Performance 2x27 MVA Machine Test Bench based on Multilevel IGCT Converters**

*Jie Shen, Stefan Schröder, Bo Qu, Yingqi Zhang, Kunlun Chen, Fan Zhang, Yulong Li, Yan Liu, Peng Dai, Richard Zhang, GE Global Research, Germany; GE Global Research, China; GE Power Conversion, China*

**P7110 - Performance Evaluation of Current Control Strategies in LCL-Filtered High-Power Converters with Low Pulse Ratios**

*Jingkui Shi, Jie Shen, Qingyun Chen, Stefan Schröder, Hanno Stagge, Rik W. De Doncker, GE Global Research, China; GE Global Research, Germany; Aachen, Germany*

**P7111 - Analysis and Design of Active Inductor as DC-Link Reactor for Lightweight Adjustable Speed Drive Systems**

*Dibyendu Rana, Bahaa Hafez, Pawan Garg, Somasundaram Essakiappan, Prasad Enjeti, Texas A&M University, United States*

**P7112 - A Novel Hysteresis Current Control Switching Method for Torque Ripple Minimization in Multi-Phase Motors**

*Jae-Bum Park, Matthew Johnson, Hamid A. Toliyat, Texas A&M University, United States*

**P7113 - Development of Integrated Bi-Directional Inverter for Switched Reluctance Motor Drive**

*Jianing Liang, Ming Chang, Guoqing Xu, Chinese Academy of Sciences, China; The Chinese University of Hong Kong, Hong Kong; Tongji University, China*

**P7114 - Influence of Machine Integration on the Thermal Behavior of a PM Drive for Hybrid Electric Traction**

*Christian Paar, Hendrik Kolbe, Annette Muetze, Magna Powertrain AG & Co KG, Austria; Graz University of Technology, Austria*