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# TECHNICAL PAPERS

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Location: Ballroom BC

March 30, 2017 11:30 - 14:00

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**Location: Ballroom BC**

**March 30, 2017 11:30 - 14:00**

**Session Chairs:** Khurram Afridi, *University of Colorado Boulder*

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## **Session D04: Power Electronics for Utility Interface**

**Location: Ballroom BC**

**March 30, 2017 11:30 - 14:00**

**Session Chairs:** Ali Khajehoddin, *University of Alberta*

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**Location: Ballroom BC**

**March 30, 2017 11:30 - 14:00**

**Session Chairs:** Navid Zargari, *Rockwell Automation*  
Yilmaz Sozer, *University of Akron*

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## **Session D06: Converter Topologies & Control**

**Location: Ballroom BC**

**March 30, 2017 11:30 - 14:00**

**Session Chairs:** Zheyu Zhang, *University of Tennessee*

Robert Balog, *Texas A&M University*

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## Session D07: Devices & Reliability

Location: Ballroom BC

March 30, 2017 11:30 - 14:00

Session Chairs: Yvan Avenas, *Univ Grenoble Alps*  
Christina Dimarino, *Virginia Polytechnic Institute and State University*

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## **Session D08: Devices & Components**

**Location: Ballroom BC**

**March 30, 2017 11:30 - 14:00**

**Session Chairs:** Jean-Luc Schanen, *University of Grenoble*  
Dong Cao, *North Dakota State University*

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**Location: Ballroom BC**

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**Location: Ballroom BC**

**March 30, 2017 11:30 - 14:00**

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**Location: Ballroom BC**

**March 30, 2017 11:30 - 14:00**

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**Location: Ballroom BC**

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## **Session D13: Control for Power Electronics & Energy Systems**

**Location: Ballroom BC**

**March 30, 2017 11:30 - 14:00**

**Session Chairs:** Hrishikesh Nene, *Texas Instruments, Inc.*

Indumini Ranmuthu, *Texas Instruments, Inc.*

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## Session D14: DC Renewable Energy

Location: Ballroom BC

March 30, 2017 11:30 - 14:00

Session Chairs: Xiaoqiang Guo, *Yanshan University*

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Location: Ballroom BC

March 30, 2017 11:30 - 14:00

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Hadi Malek, *Ford Motor Company*

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Location: Ballroom BC

March 30, 2017 11:30 - 14:00

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Jim Moss, *Texas Instruments, Inc.*

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**Location: Ballroom BC**

**March 30, 2017 11:30 - 14:00**

**Session Chairs:** Hoi Lee, *University of Texas at Dallas*  
Yingying Kuai, *Caterpillar Inc.*

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Pradeep S. Shenoy, <i>Texas Instruments, Inc., United States</i>	
Robert C.N. Pilawa-Podgurski, <i>University of Illinois at Urbana-Champaign, United States</i>	
<b>Analysis of a Low Power, High Voltage and High Gain Capacitor Charger with Output Sourcing Behavior .....</b>	<b>1640</b>
Ilya Zeltser, <i>Rafael Advanced Defense Systems Ltd., Israel</i>	
<b>A Battery Equalizer with Zero-Current Switching and Zero-Voltage Gap among Cells based on Three-Resonant-State LC Converters .....</b>	<b>1647</b>
Yunlong Shang, <i>Shandong University, China</i>	
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Chenghui Zhang, <i>Shandong University, China</i>	
<b>High Frequency GaN-based Ultrasound Pulse Generator for High Energy Delivery .....</b>	<b>1652</b>
Han Peng, <i>GE Global Research, United States</i>	
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<b>A Novel Dual Voltage Source Converter for Magnetic Material Characterization with Trapezoidal Excitation .....</b>	<b>1659</b>
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**Performance Comparison of Two Controllers for a Modular Voltage Balancing Circuit ..... 1667**

A. Tavakoli, *University of Alberta, Canada*  
I. Smith, *University of Alberta, Canada*  
S.A. Khajehoodin, *University of Alberta, Canada*  
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**Omnidirectional Wireless Power Transfer for Portable Devices ..... 1675**

Junjie Feng, *Virginia Polytechnic Institute and State University, United States*  
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**A Single Stage AC/RF Converter for Wireless Power Transfer Applications ..... 1682**

Ling Jiang, *University of Tennessee, United States*  
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**Impact of GaN HEMT Dynamic On-State Resistance on Converter Performance ..... 1689**

Yichen Cai, *University of Manchester, United Kingdom*  
Andrew J. Forsyth, *University of Manchester, United Kingdom*  
Rebecca Todd, *University of Manchester, United Kingdom*

**Session T01: Soft-switching DC-DC Converters**

**Location: Room 1&2**

**March 28, 2017 8:30 - 12:00**

**Session Chairs:** Khurram Afridi, *University of Colorado Boulder*  
Pradeep Shenoy, *Texas Instruments, Inc.*

**Sheppard-Taylor Isolated High Boost DC-DC Converter ..... 1695**

Andrii Chub, *Tallinn University of Technology, Estonia*  
Yam Siwakoti, *Aalborg University, Denmark*  
Dmitri Vinnikov, *Tallinn University of Technology, Estonia*  
Frede Blaabjerg, *Aalborg University, Denmark*

**A Low-Cost Soft-Switching High Step-Up Flyback Converter with Stacked Output Cells ..... 1700**

Morteza Moosavi, *Texas A&M University, United States*  
Ajay Morya, *Texas A&M University, United States*  
Hamid A. Toliyat, *Texas A&M University, United States*

**Single-Stage Switched-Resonator Converter Topology with Wide Conversion Ratio for Volume-Sensitive Applications ..... 1706**

Alon Cervera, *Ben-Gurion University of the Negev, Israel*  
Shmuel Ben-Yaakov, *Ben-Gurion University of the Negev, Israel*  
Mor Mordechai Peretz, *Ben-Gurion University of the Negev, Israel*

**A Family of Resonant Two-Switch Boosting Switched-Capacitor Converter with ZVS Operation and a Wide Voltage-Gain Range ..... 1713**

Shouxiang Li, *University of California, Irvine, United States*  
Yifei Zheng, *University of California, Irvine, United States*  
Keyue Ma Smedley, *University of California, Irvine, United States*  
Bin Wu, *University of Maryland, College Park, United States*

**A LLC Type Resonant Converter based on PWM Voltage Quadrupler Rectifier with Wide Output Voltage** ..... 1720  
Ming Shang, *ShanghaiTech University, China*  
Haoyu Wang, *ShanghaiTech University, China*

**Three-Phase Isolated Soft-Switching DC-DC Converter with Secondary Phase Shift Modulation** ..... 1727  
Tao Li, *Rensselaer Polytechnic Institute, United States*  
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Leila Parsa, *Rensselaer Polytechnic Institute, United States*

**Isolated Resonant Full-Bridge Converter with Magnetic Integration** ..... 1733  
Stefano Saggini, *Università degli Studi di Udine, Italy*  
Osvaldo Zambetti, *STMicroelectronics, Italy*  
Roberto Rizzolatti, *Università degli Studi di Udine, Italy*  
Alessandro Zafarana, *STMicroelectronics, Italy*  
Paolo Saccon, *STMicroelectronics, Italy*

**Analysis and Design of a Series Resonant Converter with Constant Current Input and Regulated Output Current** ..... 1741  
Hongjie Wang, *Utah State University, United States*  
Tarak Saha, *Utah State University, United States*  
Regan Zane, *Utah State University, United States*

**Detailed Analysis of a Current-Doubler Rectifier for an LLC Resonant Converter with High Output Current** ..... 1748  
Simon Nigsch, *University of Applied Sciences NTB Buchs, Switzerland*  
Manfred Schlenk, *Infineon Technologies AG, Germany*  
Kurt Schenk, *University of Applied Sciences NTB Buchs, Switzerland*

## **Session T02: AC-DC Converters I**

**Location: Room 18 & 19**

**March 28, 2017 8:30 - 12:00**

**Session Chairs:** Gerry Moschopoulos, *Western University*

**Adaptive Constant Power Control and Power Loss Analysis of a MHz GaN-based AC/DC Converter for Low Power Applications** ..... 1755  
Chengcheng Yao, *Ohio State University, United States*  
Yue Zhang, *Ohio State University, United States*  
Xuan Zhang, *Ohio State University, United States*  
He Li, *Ohio State University, United States*  
Huanyu Chen, *Ohio State University, United States*  
Jin Wang, *Ohio State University, United States*

**Adaptive Zero-Voltage-Switching Control and Hybrid Current Control for High Efficiency GaN-based MHz Totem-Pole PFC Rectifier** ..... 1763  
Qingyun Huang, *North Carolina State University, United States*  
Ruiyang Yu, *North Carolina State University, United States*  
Alex Q. Huang, *North Carolina State University, United States*  
Wensong Yu, *North Carolina State University, United States*

<b>A Conduction Band Control AC-DC Buck Converter for a High Efficiency and High Power Density Adapter .....</b>	<b>1771</b>
SangCheol Moon, <i>ON Semiconductor, Korea</i>	
BongGeun Chung, <i>ON Semiconductor, Korea</i>	
Gwanbon Koo, <i>ON Semiconductor, United States</i>	
Jason Guo, <i>ON Semiconductor, United States</i>	
Laszlo Balogh, <i>ON Semiconductor, United States</i>	
<b>A Novel Simplified Variable On-Time Method for CRM Boost PFC Converter .....</b>	<b>1778</b>
Zhehui Guo, <i>Nanjing University of Aeronautics and Astronautics, China</i>	
Xiaoyong Ren, <i>Nanjing University of Aeronautics and Astronautics, China</i>	
Yu Wu, <i>Nanjing University of Aeronautics and Astronautics, China</i>	
Zhiliang Zhang, <i>Nanjing University of Aeronautics and Astronautics, China</i>	
Qianhong Chen, <i>Nanjing University of Aeronautics and Astronautics, China</i>	
<b>Digital Controller with Integrated Valley Switching Control for Light Load Efficiency and THD Improvements in PFC Converter .....</b>	<b>1785</b>
Hrishikesh Nene, <i>Texas Instruments, Inc., United States</i>	
Chen Jiang, <i>Georgia Institute of Technology, United States</i>	
Shamim Choudhury, <i>Texas Instruments, Inc., United States</i>	
<b>High-Frequency Isolated AC-DC Converter with Stacked Architecture .....</b>	<b>1789</b>
Seungbum Lim, <i>Massachusetts Institute of Technology, United States</i>	
Saurav Bandyopadhyay, <i>Texas Instruments, Inc., United States</i>	
David J. Perreault, <i>Massachusetts Institute of Technology, United States</i>	
<b>Analysis and Design Considerations for an Improved BCM Buck AC-DC LED Driver with High Output Voltage and Low Total Harmonic Distortion .....</b>	<b>1797</b>
Haijun Lv, <i>Zhejiang University, China</i>	
Jinxu Yang, <i>Zhejiang University, China</i>	
Xinke Wu, <i>Zhejiang University, China</i>	
<b>Multi-Phase Coupled and Integrated Inductors for Critical Conduction Mode Totem-Pole PFC Converter .....</b>	<b>1804</b>
Yuchen Yang, <i>Virginia Polytechnic Institute and State University, United States</i>	
Zhengyang Liu, <i>Virginia Polytechnic Institute and State University, United States</i>	
Fred C. Lee, <i>Virginia Polytechnic Institute and State University, United States</i>	
Qiang Li, <i>Virginia Polytechnic Institute and State University, United States</i>	
<b>Universal Line Input Power Factor Preregulator using VFX Technique .....</b>	<b>1810</b>
Lei Gu, <i>Stanford University, United States</i>	
Wei Liang, <i>Stanford University, United States</i>	
Max Praglin, <i>Stanford University, United States</i>	
Sombuddha Chakraborty, <i>Texas Instruments, Inc., United States</i>	
Juan Rivas-Davila, <i>Stanford University, United States</i>	



## Session T03: Multilevel Converters for Utility Applications

Location: Room 20

March 28, 2017 8:30 - 12:00

Session Chairs: Yunwei Li, *University of Alberta*

Mohammed Agamy, *GE Global Research*

### **A Generalized Discontinuous PWM based Neutral Point Voltage Balancing Method for Three-Level NPC Voltage Source Inverter with Switching Losses Reduction** ..... 1816

Kai Li, *University of Electronic Science and Technology of China, China*

Min Wei, *University of Electronic Science and Technology of China, China*

Chuan Xie, *University of Electronic Science and Technology of China, China*

Fujin Deng, *Aalborg University, Denmark*

Josep M. Guerrero, *Aalborg University, Denmark*

Juan C. Vásquez, *Aalborg University, Denmark*

### **Capacitor Voltage Balancing Control of Modular Multilevel Converters with Energy Storage System by using Carrier Phase-Shifted Modulation** ..... 1821

Yajun Ma, *Huazhong University of Science and Technology, China*

Hua Lin, *Huazhong University of Science and Technology, China*

Zhe Wang, *Huazhong University of Science and Technology, China*

Tao Wang, *Huazhong University of Science and Technology, China*

### **Capacitor Voltage Ripple Reduction with State Trajectory Analysis for Modular Multilevel Converter** ..... 1829

Yadong Lyu, *Virginia Polytechnic Institute and State University, United States*

Chen Li, *Virginia Polytechnic Institute and State University, United States*

Yi-Hsun Hsieh, *Virginia Polytechnic Institute and State University, United States*

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

Qiang Li, *Virginia Polytechnic Institute and State University, United States*

Rong Xu, *Virginia Polytechnic Institute and State University, United States*

### **An Equivalent Power Test Scheme for Modular Multilevel Converters (MMCs)** ..... 1837

Junsong Tang, *Zhejiang University, China*

Yufei Dong, *Zhejiang University, China*

Heya Yang, *Zhejiang University, China*

Wuhua Li, *Zhejiang University, China*

Xiangning He, *Zhejiang University, China*

Jun Ma, *Shanghai Electric, China*

Guodong Chen, *Shanghai Electric, China*

Ye Tian, *Shanghai Electric, China*

Enxing Yang, *Shanghai Electric, China*

### **Unequal Damping of the Average Sub-Module Capacitor Voltages in Modular Multilevel Converters** ..... 1843

Teja Bandaru, *Indian Institute of Technology Kharagpur, India*

Tanmoy Bhattacharya, *Indian Institute of Technology Kharagpur, India*

Dheeman Chatterjee, *Indian Institute of Technology Kharagpur, India*

### **Methodology of Reliability and Power Density Analysis of SST Topologies** ..... 1851

Kuan Wang, *Arizona State University, United States*

Qin Lei, *Arizona State University, United States*

Chunhui Liu, *Arizona State University, United States*

**Modulation and Control of a Single-Stage HVDC/AC Solid State Transformer using Modular Multilevel Converter** ..... 1857  
Ashish Kumar Sahoo, *University of Minnesota, United States*  
Ned Mohan, *University of Minnesota, United States*

**Analysis and Experimental Validation of a Modular Multilevel Converter with 3-Level T-Type Submodules** ..... 1865  
Ashish Kumar Sahoo, *University of Minnesota, United States*  
Ned Mohan, *University of Minnesota, United States*

**Fault-Tolerant Operation of Multilevel Diode-Clamped Converters for a Device Open-Circuit Fault** ..... 1873  
Aparna Saha, *University of Akron, United States*  
Ali Elrayyah, *University of Akron, United States*  
Marina Sital-Dahone, *University of Akron, United States*  
Yilmaz Sozer, *University of Akron, United States*

## **Session T04: Control of Motor Drives I**

**Location: Room 21**

**March 28, 2017 8:30 - 12:00**

**Session Chairs:** Siavash Pakdelian, *University of Massachusetts Lowell*  
Julia Zhang, *Oregon State University*

**Model Predictive Control for Permanent Magnet Synchronous Motor Drives Considering Cross-Saturation Effects** ..... 1880  
Panagiotis Kakosimos, *Texas A&M University at Qatar, Qatar*  
Minos Beniakar, *ABB, Sweden*  
Yushan Liu, *Texas A&M University at Qatar, Qatar*  
Haitham Abu-Rub, *Texas A&M University at Qatar, Qatar*

**A Mini-Ripple Control Method for Doubly Salient Electromagnetic Motor Control System** ..... 1886  
Jia Wanying, *Nanjing University of Aeronautics and Astronautics, China*  
Xiao Lan, *Nanjing University of Aeronautics and Astronautics, China*  
Zhu Deming, *Electronic Technology Institute, China*

**New Sensorless Vector Control of PMSM by Discrete-Time Voltage Injection of PWM Carrier Frequency – Positive- and Negative-Phase Amplitudes Extraction Method** ..... 1891  
Ryu Hosooka, *Kanagawa University, Japan*  
Shinji Shinnaka, *Kanagawa University, Japan*  
Naoto Nakamura, *Kanagawa University, Japan*

**A Novel Commutation Correction Method for High-Speed PM Brushless DC Motor** ..... 1899  
Xiaoqing Shi, *Nanjing University of Aeronautics and Astronautics, China*  
Xiaolin Wang, *Nanjing University of Aeronautics and Astronautics, China*  
Cong Gu, *Nanjing University of Aeronautics and Astronautics, China*  
Zhiquan Deng, *Nanjing University of Aeronautics and Astronautics, China*

**Angle Compensation based Rotor Position Estimation for Sensorless Vector Control of the Permanent Magnet Synchronous Motor** ..... 1906  
Jeevan Adhikari, *National University of Singapore, Singapore*  
S.K. Panda, *National University of Singapore, Singapore*

**Voltage Error Phase Locked Loop (PLL) based Model Adaptive Sensorless Vector Control Algorithm for Induction Motors** ..... 1914  
Sadik Ozdemir, *Yildiz Technical University and University of Akron, Turkey and United States*  
Yilmaz Sozer, *University of Akron, United States*  
Nurettin Umurkan, *Yildiz Technical University, Turkey*

**An Active Front-End V/Hz Induction Machine Drive with a Tiny DC Link Capacitor** ..... 1921  
Mahima Gupta, *University of Wisconsin-Madison, United States*  
Giri Venkataramanan, *University of Wisconsin-Madison, United States*

**Torque Ripple Minimization of a Five-Phase Permanent Magnet Assisted Synchronous Reluctance Motor under Open Phase Faults** ..... 1928  
Akm Arafat, *University of Akron, United States*  
Seungdeog Choi, *University of Akron, United States*

**Power Factor Control for High Efficiency Operation of an Open-Ended Winding Motor using a Dual Inverter Drive with a Floating Bridge** ..... 1935  
Ian Smith, *University of Alberta, Canada*  
Reaz UI Haque, *University of Alberta, Canada*  
Atrin Tavakoli, *University of Alberta, Canada*  
John Salmon, *University of Alberta, Canada*

## **Session T05: Power Device Performance & Gate Drivers**

**Location: Room 22**

**March 28, 2017 8:30 - 12:00**

**Session Chairs:** Arun Kadavelugu, *ABB Inc.*

Qiang Li, *Virginia Polytechnic Institute and State University*

**Power Loss of GaN Transistor Reverse Diodes in a High Frequency High Voltage Resonant Rectifier** ..... 1942  
Sanghyeon Park, *Stanford University, United States*  
Juan Rivas-Davila, *Stanford University, United States*

**Dv/dt Immunization Limit of LV MOSFET in Cascode GaN FET and dv/dt Safe Chart for MOSFETs** ..... 1946  
Z. Chen, *ON Semiconductor, United States*  
Jaume Roig Guitart, *ON Semiconductor, Belgium*

**A Novel 4H-SiC Pinched Barrier Rectifier** ..... 1950  
Na Ren, *University of California, Los Angeles, United States*  
Kang L. Wang, *University of California, Los Angeles, United States*  
Zheng Zuo, *AZ Power Inc., United States*  
Ruigang Li, *AZ Power Inc., United States*  
Kuang Sheng, *Zhejiang University, China*

<b>Analytical and Experimental Optimization of External Gate Resistance for Safe Rapid Turn on of Normally off GaN HFETs</b> .....	1958
Ansel Barchowsky, <i>University of Pittsburgh, United States</i>	
Joseph P. Kozak, <i>Virginia Polytechnic Institute and State University, United States</i>	
Michael R. Hontz, <i>University of Toledo, United States</i>	
William E. Stanchina, <i>University of Pittsburgh, United States</i>	
Gregory F. Reed, <i>University of Pittsburgh, United States</i>	
Zhi-Hong Mao, <i>University of Pittsburgh, United States</i>	
Raghav Khanna, <i>University of Toledo, United States</i>	
<b>Characterization of High-Voltage High-Speed Switching Power Semiconductors for High Frequency Cryogenically-Cooled Application</b> .....	1964
Zheyu Zhang, <i>University of Tennessee, United States</i>	
Craig Timms, <i>University of Tennessee, United States</i>	
Jingyi Tang, <i>University of Tennessee, United States</i>	
Ruirui Chen, <i>University of Tennessee, United States</i>	
Jordan Sangid, <i>University of Tennessee, United States</i>	
Fred Wang, <i>University of Tennessee, United States</i>	
Leon M. Tolbert, <i>University of Tennessee, United States</i>	
Benjamin J. Blalock, <i>University of Tennessee, United States</i>	
Daniel J. Costinett, <i>University of Tennessee, United States</i>	
<b>Reducing Qrr in High-Voltage SuperJunction MOSFETs by using the Cascode Configuration</b> .....	1970
Juan Rodriguez, <i>University of Oviedo, Spain</i>	
Alberto Rodriguez, <i>University of Oviedo, Spain</i>	
Diego G. Lamar, <i>University of Oviedo, Spain</i>	
Jaume Roig, <i>ON Semiconductor, Belgium</i>	
Filip Bauwens, <i>ON Semiconductor, Belgium</i>	
<b>A Silicon based Multi-Tens MHz Gate Driver IC for GaN Power Devices</b> .....	1978
Takafumi Akagi, <i>Kyushu Institute of Technology, Japan</i>	
Shohei Miyano, <i>Kyushu Institute of Technology, Japan</i>	
Seiya Abe, <i>Kyushu Institute of Technology, Japan</i>	
Satoshi Matsumoto, <i>Kyushu Institute of Technology, Japan</i>	
<b>Shaping Switching Waveforms in a 650 V GaN FET Bridge-Leg using 6.7 GHz Active Gate Drivers</b> .....	1983
Jeremy J.O. Dalton, <i>University of Bristol, United Kingdom</i>	
Jianjing Wang, <i>University of Bristol, United Kingdom</i>	
Harry C.P. Dymond, <i>University of Bristol, United Kingdom</i>	
Dawei Liu, <i>University of Bristol, United Kingdom</i>	
Dinesh Pamunuwa, <i>University of Bristol, United Kingdom</i>	
Bernard H. Stark, <i>University of Bristol, United Kingdom</i>	
Neville McNeill, <i>University of Strathclyde, United Kingdom</i>	
Simon J. Hollis, <i>IBM Research, United States</i>	
<b>Isolated Gate Driver for SiC MOSFETs with Constant Negative off Voltage</b> .....	1990
Qinsong Qian, <i>Southeast University, China</i>	
Juzheng Yu, <i>Southeast University, China</i>	
Junjie Zhu, <i>Southeast University, China</i>	
Weifeng Sun, <i>Southeast University, China</i>	
Yangbo Yi, <i>Wuxi Chipown Microelectronics Co., Ltd., China</i>	

## Session T06: Control of DC-DC Converters

Location: Room 23

March 28, 2017 8:30 - 12:00

Session Chairs: Jaber Abu Qahouq, *University of Alabama*  
Hrishikesh Nene, *Texas Instruments, Inc.*

- Hardware Efficient Auto-Tuned Linear-Gain based Minimum Deviation Digital Controller for Indirect Energy Transfer Converters** ..... 1994  
Shadi Dashmiz, *University of Toronto, Canada*  
Behzad Mahdavihah, *University of Toronto, Canada*  
Aleksandar Prodic, *University of Toronto, Canada*  
Brent McDonald, *Texas Instruments, Inc., United States*
- Method for Online Battery AC Impedance Spectrum Measurement using DC-DC Power Converter Duty-Cycle Control** ..... 1999  
Zhiyong Xia, *University of Alabama, United States*  
Jaber A. Abu Qahouq, *University of Alabama, United States*
- Low-Complexity, High Frequency Parametric System Identification Method for Switched-Mode Power Converters** ..... 2004  
Harald Gietler, *Infineon Technologies AG, Austria*  
Christoph Unterrieder, *Infineon Technologies AG, Austria*  
Andreas Berger, *Infineon Technologies AG, Austria*  
Robert Priewasser, *Infineon Technologies AG, Austria*  
Michael Lunglmayr, *Johannes Kepler University Linz, Austria*
- A Constant-Frequency Parabolic-Modulation-based Sliding Mode Controller for Buck Converters** ..... 2010  
Wenlong Qi, *University of Hong Kong, Hong Kong*  
Sinan Li, *University of Hong Kong, Hong Kong*  
Siew-Chong Tan, *University of Hong Kong, Hong Kong*  
S.Y. Hui, *University of Hong Kong and Imperial College London, Hong Kong and United Kingdom*
- Novel Input Current Ripple Compensation Technique for Capacitor-Less Dual-Half-Bridge Converter** ..... 2015  
Changkyu Bai, *Pohang University of Science and Technology, Korea*  
Byeongcheol Han, *Pohang University of Science and Technology, Korea*  
Dong-Young Huh, *LG Innotek, Korea*  
Jung-Hwan Choi, *LG Innotek, Korea*  
Soo-Hong Kim, *LG Innotek, Korea*  
Jin S. Lee, *Pohang University of Science and Technology, Korea*  
Minsung Kim, *Pohang University of Science and Technology, Korea*
- Tightly Regulated Dual-Output Half-Bridge Converter using PFM-APWM Hybrid Control Method** ..... 2022  
HwaPyeong Park, *Ulsan National Institute of Science and Technology, Korea*  
Mina Kim, *Ulsan National Institute of Science and Technology, Korea*  
JeeHoon Jung, *Ulsan National Institute of Science and Technology, Korea*
- Digital Geometric-Sequence Control (GSC) Approach for Dual-Active-Bridge Converters** ..... 2027  
Iman Askarian, *University of Calgary, Canada*  
Majid Pahlevani, *University of Calgary, Canada*  
Alireza Bakhshai, *Queen's University, Canada*

**Hybrid Control Strategy to Extend the ZVS Range of a Dual Active Bridge Converter** ..... 2035  
Vishnu Mahadeva Iyer, *North Carolina State University, United States*  
Srinivas Gulur, *North Carolina State University, United States*  
Subhashish Bhattacharya, *North Carolina State University, United States*

**Fully-Integrated Digital Average Current-Mode Control 12V-to-1.xV Voltage Regulator Module IC** ..... 2043  
Timur Vekslender, *Ben-Gurion University of the Negev, Israel*  
Eli Abramov, *Ben-Gurion University of the Negev, Israel*  
Yevgeny Lazarev, *Ben-Gurion University of the Negev, Israel*  
Mor Mordechai Peretz, *Ben-Gurion University of the Negev, Israel*

## **Session T07: Converters for Renewable Energy**

**Location: Room 24**

**March 28, 2017 8:30 - 12:00**

**Session Chairs:** Xiong Li, *Texas Instruments, Inc.*

**A Resonant Double Stage Flyback Microinverter for PV Applications** ..... 2051  
Rasedul Hasan, *University of Malaya, Malaysia*  
Saad Mekhilef, *University of Malaya, Malaysia*

**A Three-Port Converter based DC Grid-Connected PV System with Autonomous Output Voltage Sharing Control** ..... 2057  
Yangjun Lu, *Nanjing University of Aeronautics and Astronautics, China*  
Hongfei Wu, *Nanjing University of Aeronautics and Astronautics, China*  
Xiaofeng Dong, *Nanjing University of Aeronautics and Astronautics, China*  
Yan Xing, *Nanjing University of Aeronautics and Astronautics, China*  
Kai Sun, *Tsinghua University, China*

**An Asymmetrical Three-Level Dual-Input Bidirectional DC/AC Converter with Improved Conversion Efficiency for Vehicle-to-Grid Application** ..... 2062  
Lei Zhu, *Nanjing University of Aeronautics and Astronautics, China*  
Hongfei Wu, *Nanjing University of Aeronautics and Astronautics, China*  
Tiantian Mu, *Nanjing University of Aeronautics and Astronautics, China*  
Fan Yang, *Nanjing University of Aeronautics and Astronautics, China*  
Xudong Ma, *Southeast University, China*

**Grid Tied Solar Micro-Converter with Optimizer-Mode Operation for Weak-Grid Operation** .... 2068  
Naila Ramzan, *Lahore University of Management Sciences, Pakistan*  
Zeinab Jamal Khan, *Lahore University of Management Sciences, Pakistan*  
Palwasha Naseer, *Lahore University of Management Sciences, Pakistan*  
Arooj Akbar, *Lahore University of Management Sciences, Pakistan*  
Nauman Zaffar, *Lahore University of Management Sciences, Pakistan*

**A Fast and Accurate Maximum Power Point Tracker for a Multi-Input Converter with Wide Range of Soft-Switching Operation for Solar Energy Systems** ..... 2076  
Kajanan Kanathipan, *York University, Canada*  
Sanjida Moury, *York University, Canada*  
John Lam, *York University, Canada*

**A Fixed-Frequency Bidirectional Resonant DC-DC Converter Suitable for Wide Voltage Range** ..... 2084  
Yanfeng Shen, *Aalborg University, Denmark*  
Huai Wang, *Aalborg University, Denmark*  
Frede Blaabjerg, *Aalborg University, Denmark*  
Ahmed Al Durra, *The Petroleum Institute, U.A.E.*  
Xiaofeng Sun, *Yanshan University, China*

**Parallel Balancing Converter for Serially Connected Batteries String** ..... 2091  
Or Kirshenboim, *Ben-Gurion University of the Negev, Israel*  
Yoav Dickstein, *Ben-Gurion University of the Negev, Israel*  
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**Session Chairs:** Olivier Trescases, *University of Toronto*  
Jeff Nilles, *Texas Instruments, Inc.*

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**Location: Room 1&2**

**March 29, 2017 8:30 - 10:10**

**Session Chairs:** Davide Giacomini, *Infineon Technologies*  
Xin Zhang, *IBM T.J. Watson Research Center*

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**March 29, 2017 8:30 - 10:10**

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Session Chairs: Tim McDonald, *Infineon*

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Location: Room 23

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Session Chairs: Jim Marinos, *Payton America Inc.*

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Session Chairs: Haoyu Wang, *ShanghaiTech University*

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## **Session T16: LED Applications**

**Location: Room 25**

**March 29, 2017 8:30 - 10:10**

**Session Chairs:** Jim Spangler, *Spangler Prototype Inc.*  
Sombuddha Chakraborty, *Texas Instruments, Inc.*

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**Location: Room 1&2**

**March 29, 2017 14:00 - 17:30**

**Session Chairs:** Olivier Trescases, *University of Toronto*  
Xin Zhang, *IBM T.J. Watson Research Center*

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<b>March 29, 2017 14:00 - 17:30</b>	
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## **Session T19: Multilevel Converters**

**Location: Room 20**

**March 29, 2017 14:00 - 17:30**

**Session Chairs:** Mohammed Agamy, *GE Global Research*  
Suman Debnath, *Oak Ridge National Laboratory*

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Robert C.N. Pilawa-Podgurski, *University of Illinois at Urbana-Champaign, United States*

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Yilmaz Sozer, *University of Akron, United States*  
Augustin Mpanda, *ESIEE Amiens, France*

## **Session T20: Grid-Connected Inverter Control**

**Location: Room 21**

**March 29, 2017 14:00 - 17:30**

**Session Chairs:** Ali Khajehoddin, *University of Alberta*

Babak Parkhideh, *University of North Carolina Charlotte*

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Location: Room 22

March 29, 2017 14:00 - 17:30

Session Chairs: Marco Meola, *Integrated Device Technology*  
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Yuta Nakamura, *Tokyo Institute of Technology, Japan*  
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Bilal Akin, *University of Texas at Dallas, United States*

## **Session T22: Control Strategies for Inverters & Motor Drives**

**Location: Room 23**

**March 29, 2017 14:00 - 17:30**

**Session Chairs:** Bilal Akin, *University of Texas at Dallas*  
Serkan Dusmez, *Texas Instruments, Inc.*

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## **Session T23: Renewable Energy System Considerations**

**Location: Room 24**

**March 29, 2017 14:00 - 17:30**

**Session Chairs:** Xiong Li, *Texas Instruments, Inc.*

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## Session T24: Medium/High Power Applications

Location: Room 25

March 29, 2017 14:00 - 17:30

Session Chairs: Kent Wanner, *John Deere*

Serkan Dusmez, *Texas Instruments, Inc.*

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Wei Hu, *State Grid Hubei Electric Power Company Electric Power Research Institute, China*

## **Session T25: DC-DC Converter Applications**

**Location: Room 1&2**

**March 30, 2017 8:30 - 11:20**

**Session Chairs:** Hoi Lee, *University of Texas at Dallas*  
Lingxiao Xue, *Navitas Semiconductor*

**A Novel PCB Winding Transformer with Controllable Leakage Integration for a 6.6kW 500kHz High Efficiency High Density Bi-Directional On-Board Charger** ..... 2917  
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Pradeep S. Shenoy, *Texas Instruments, Inc., United States*  
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Haibing Hu, *Nanjing University of Aeronautics and Astronautics, China*

Xudong Ma, *Southeast University, China*

**Session T26: Renewable Energy Using Advanced Devices**

**Location: Room 18 & 19**

**March 30, 2017 8:30 - 11:20**

**Session Chairs:** Laszlo Balogh, *ON Semiconductor*

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**Session Chairs:** Douglas Hopkins, *North Carolina State University*  
Jared Hornberger, *Wolfspeed, A Cree Company*

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**Session Chairs:** John Vigars, *Allegro Microsystems*  
Ernie Parker, *Crane Aerospace & Electronics*

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Location: Room 22

March 30, 2017 8:30 - 11:20

Session Chairs: Martin Ordonez, *University of British Columbia*

Marco Meola, *Integrated Device Technology*

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## Session T30: Control of Motor Drives II

Location: Room 23

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Session Chairs: Bulent Sarlioglu, *University of Wisconsin-Madison*  
Ali Bazzi, *University of Connecticut*

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Navid Zargari, *Rockwell Automation*

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**Location: Room 25**

**March 30, 2017 8:30 - 11:20**

**Session Chairs:** Mike Seeman, *Eta One Power*  
Hanh-Phuc Le, *University of Colorado Boulder*

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### **Session T33: Active Var & Harmonic Compensation**

**Location: Room 1&2**

**March 30, 2017 14:00 - 17:30**

**Session Chairs:** Yunwei Li, *University of Alberta*  
Martin Ordonez, *University of British Columbia*

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## **Session T34: DC-DC Converter Control Methods**

**Location: Room 18 & 19**

**March 30, 2017 14:00 - 17:30**

**Session Chairs:** Jason Stauth, *Dartmouth*

David Reusch, *Efficient Power Conversion Corporation*

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## **Session T35: Control Strategies for Power Converters**

**Location: Room 20**

**March 30, 2017 14:00 - 17:30**

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March 30, 2017 14:00 - 17:30

Session Chairs: Chris Bridge, *SIMPLIS Technologies, Inc.*

Sheldon Williamson, *University of Ontario Institute of Technology*

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## **Session T37: Control Applications**

**Location: Room 22**

**March 30, 2017 14:00 - 17:30**

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**Location: Room 23**

**March 30, 2017 14:00 - 17:30**

**Session Chairs:** Xiaoqiang Guo, *Yanshan University*

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## Session T39: High Power Charging & Control Technology for Vehicular Power Systems

Location: Room 24

March 30, 2017 14:00 - 17:30

Session Chairs: John Vigars, *Allegro Microsystems*  
Yingying Kuai, *Caterpillar Inc.*

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## **Session T40: Wireless Power Applications**

**Location: Room 25**

**March 30, 2017 14:00 - 17:30**

**Session Chairs:** Indumini Ranmuthu, *Texas Instruments, Inc.*

David Reusch, *Efficient Power Conversion Corporation*

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