IEEE WPTC 2015 Technical Program

Wednesday, May 13

Time	Event
10:30-11:30 **Location: DLC**	***Special Early Event:*** *IEEE MTT DML* - **A Lucid View on What Role kQ Product Plays in Electric- and/or Magnetic-Coupling WPT Systems,** Prof. T. Ohira
1:00-1:15 **Old Main**	**Welcome and Introduction [Location: Old Main, Heritage Center]** Co-Chairs: Zoya Popovic and Khurram Afridi, Univ. Colorado, Boulder, US
1:15-2:00	***Opening Keynote: Wireless Power Transfer: From Directional Power to Omni-directional Power,*** Prof. Ron Hui, Imperial College London and Hong Kong Univ.
2:00-3:00	***Industry Panel 1:*** **Consumer Electronics Challenges & Opportunities.** Moderator: Dr. Kamil Grajski, Qualcomm Power: W-kW, commercialization, manufacturing, deployment, regulatory **Panelists:** EPC Corp., MediaTek, NuVolta Tech., Qualcomm, WiTricity
3:00-3:30	**Coffee Break**
3:30-5:00	**W1: Near Field WPT [Old Main]**
3:30-3:45	**W1.1: Layout Optimization of the Secondary Coils for WPT Systems,** S. Lee et al., KAIST, R. Korea
3:45-4:00	**W1.2: A Planar Positioning-Free Magnetically-Coupled Resonant WPT**, F. Jolani et al., Dalhousie Univ., Canada and Univ. of Chengdu (UEST), China
4:00-4:15	**W1.3: Simultaneously Tuning and Powering Multiple Wirelessly Powered Devices,** B. H. Waters et al., Univ. of Washington, Seattle, USA
4:15-4:30	**W1.4: A Novel Cubic Transmitter for Multi-Directional WPT**, N. V. Ha et al., Soongsil University, Seoul, R. Korea
4:30-4:45	**W1.5: Three-Phase Magnetic Field Design for Low EMI and EMF Automated Resonant WPT Charger for UAV,** C. Song et al., KAIST, R. Korea
4:45-5:00	**W1.6: Coil Design for High Efficiency and Low Magnetic Field Leakage of Wireless Charging System for Electric Vehicle,** H. Kim et al., KAIST, R. Korea
5:00-5:15	**Break**
5:15-6:25	**W2: Near Field WPT [Old Main]**
5:15-5:30	**W2.1: Capacitive Coupling Through a Hydrodynamic Journal Bearing to Power Rotating Electric Loads without Contact,** R. Knippel et al., Univ. Wisconsin-Madison, US
5:30-5:45	**W2.2: Investigation of Power Transfer Density Enhancement in Large Air-Gap Capacitive WPT Systems,** A. Kumar et al., Univ. Colorado, Boulder, US
5:45-5:55	**W2.3: Constructive Combination of Resonant Magnetic Coupling and Resonant Electrical Coupling,** R. D. Fernandes et al., IT, Aveiro, Portugal
5:55-6:05	**W2.4: 30 W Capacitive WPT Systems with 5.8 pF Coupling Capacitive**, C. Chang et al., Univ. Colorado, Boulder, US
6:05-6:15	**W2.5: Strong Resonant Coupling for Short-range WPT Applications Using Defected Ground Structures**, S. S. Hekal, Egypt-Japan University, Egypt, and Kyushu University, Japan.
6:15-6:25	**W2.6: X-Band WPT with Two-Stage High-Efficiency GaN PA/Rectifier**, S. Schafer et al., Univ. Colorado, Boulder, US
6:30 – 9:00	**Reception**

Thursday, May 14

Time	Event
8:30-9:30	T1: Far-Field WPT and Harvesting [Old Main]
8:30-8:45	**T1.1: UHF Power Transmission System for Multiple Small Self-rotating Targets and Verification with Batteryless Quadcopter having Rotors with Embedded Rectenna**, H. Nishikawa et al., Ritsumeikan University, Japan
8:45-9:00	**T1.2: Wireless Fair-Field Charging of Micro-UAV**, S. Dunbar et al., University of Colorado, Boulder, USA and ISAE, Toulouse, France
9:00-9:15	**T1.3: Experiments on Driving a Low-power DC Motor by WPT**, Y. Huang et al., Kyoto University, Japan
9:15-9:30	**T1.4: Far-Field Power Transmission by Exploiting Time-modulation in Linear Arrays**, D. Masotti et al., University of Bologna, Italy
9:30-10:10	T2: Far Field/Harvesting [Old Main]
9:30-9:40	**T2.1: Architecture for an Over-the-Horizon WPT System at 10.6 Microns Using Rectenna Power Converters**, T. Chang et al., Deep Phase Lab, NYIT, and NRL, USA
9:40-9:50	**T2.2: Bow-Tie Rectenna Arrays,** N. P. Basta et al., Georgia Tech and University of Colorado, Boulder, USA
9:50-10:00	**T2.3: A Compact 2.45 GHz Low Power Wireless Energy Harvester with a Reflector-Backed Folded Dipole Rectenna**, I. Ramos et al., University of Colorado, Boulder, USA
10:00-10:10	**T2.4: Exploiting Radar Waveforms for WPT**, D. G. Belo et al., University of Aveiro, Portugal
10:10-10:30	Coffee Break
10:30-11:30	T3: Harvesting / Basic Comp [Old Main]
10:30-10:45	**T3.1: A 2.4GHz Rectenna Screen-Printed on Polycotton for On-Body RF Power Transfer and Harvesting**, S.-E. Adami et al., Univ. of Bristol, UK
10:45-11:00	**T3.2: A Timer Based Boost Converter for RF Energy Harvesting**, J.F. Enworth et al., University of Washington, Seattle, USA
11:00-11:15	**T3.3: Design of Highly Sensitive CMOS RF Energy Harvester Using Ultra-Low Power Charge Pump**, D. A. Al-Shebanee et al., RWTH Aachen Univ., Germany
11:15-11:30	**T3.4: Transceiver Chip Design in High Voltage 0.25um CMOS Technology for Magnetic Resonance System**, H. Hsu et al., National Chung-Hsing Univ., Taiwan
11:30-12:00	T4: Basic Technologies
11:30-11:40	**T4.1: Tracking Load to Optimize Power Efficiency in RF to DC Rectifier Circuits**, S. Dehghani et al., University of British Colombia, Canada
11:40-11:50	**T4.2: Comparison of Current Driven Class-D and Class-E Half-Wave Rectifiers for 6.78MHz High Power IPT Applications**, G. Kkelis et al., Imperial College London, UK
11:50-12:00	**T4.3: 13.56MHz 1.5kW Resonant Converter with GaN FET for WPT**, J. Choi et al., Stanford Univ. and Daihen Corp., US
	T4.4: Withdrawn
12:00-1:15	**Lunch [Old Main, Heritage Center]**

Thursday, May 14

Time	Event
1:15-2:00 **Old Main**	***Keynote Talk:*** **Development of Sandwich Conversion Modules for Space Solar Power,** Dr. Paul Jaffe (NRL) and Dr. James McSpadden (Raytheon), USA
2:00-3:25	**T5: Near Field Medical/Safety [TC1]**
2:00-2:15	**T5.1: A Real-time Electrically Controlled Active Matching Circuit utilizing Genetic Algorithms for Biomedical WPT Applications**, J. Bito et al., Georgia Tech, USA
2:15-2:30	**T5.2: A 3D Resonant Wireless Charger for a Wearable Device and a Mobile Phone**, R. Kuo et al., University of Florida, USA
2:30-2:45	**T5.3: Propulsion and Control of Implantable Micro-Robot based on WPT**, D. Kim et al., KAIST, R. Korea
2:45-2:55	**T5.4: Influence of Exposure Guidelines on the Design of On-Body Inductive Power Transfer**, L. R. Clare et al., University of Bristol, UK
2:55-3:05	**T5.5: Numerical Analysis of EMF Safety and Thermal Aspects in a Pacemaker with a WPT System**, T. Campi et al., University of L'Aquila, Italy
3:05-3:15	**T5.6: SAR Distribution for a Strongly Coupled Resonant WPT System**, X. Shi et al., University of Washington, USA
	T5.7: Withdrawn
3:15-3:25	**T5.8: Magnetic Field Effects on Biology and Potential Health Effects Bellow the ICES and ICNIRP Reference Levels**, F. S. Barnes et al., Univ. Colorado, Boulder, USA
3:25-3:45	Walk from Old Main to DLC
3:45-6:00	***Poster Session*** **P1: Near-field WPT components** (9 posters) **P2: Near-field WPT emissions** (8 posters) **P3: Far-field WPT and harvesting** (7 posters) **P4: Basic technologies for WPT** (9 posters) **P5: Other related areas** (8 posters) **Student Demo Competition** **Location: DLC, Engineering Building**
6:00-6:15	Depart for Conference Dinner

Friday, May 15

Time	Event
8:30-9:30	**F1: WPT and Communications [Old Main]**
8:30-8:40	**F1.1: An Experimental Evaluation of WPT in Mobile Ad hoc Networks**, S. Nikoletseas et al., University of Pratas, Greece
8:40-8:50	**F1.2: Evaluation of Simultaneous WPT and Backscattering Data Communications through Multisine Signals**, A. S. Boaventura et al., University of Aveiro, Portugal
8:50-9:00	**F1.3: Investigation on Self-Jamming Supression in Passive RFID when using Multisines to Enhance WPT**, A. S. Boaventura et al., Univ. Aveiro, Portugal
9:00-9:10	**F1.4: Near Field WPT and Quadrature Amplitude Modulated (QAM) Communication Link for Near and Mid-Range Systems**, J. S. Besnoff et al., North Carolina State University, USA
9:10-9:20	**F1.5: Exploitation of a Dual-band Cell Phone Antenna for Near-Field WPT**, M. Del Prete et al., University of Bologna, Italy
9:20-9:30	**F1.6: The Application of Electromagnetic Surface Wave to WPT**, G. L. Peterson et al., Tesla Science Center at Wardenclyffe, USA
9:30-10:30	***Industry Panel 2:*** **Industrial, Scientific and Medical Challenges & Opportunities** Moderator: Dr. Kamil Grajski, Qualcomm Powers: µW-GW, commercialization, manufacturing, deployment, regulatory **Panelists:** Escape Dynamics, GE Global R&D, IMA (Italy), Solace Power
10:30-10:45	**Coffee Break**
10:45-11:45	**F2: Near Field WPT [Old Main]**
10:45-11:00	**F2.1: Optimal Operation Point Tracking Control for Inductive Power Transfer System**, T. Zhao et al., Eaton, USA
11:00-11:15	**F2.2: Misalignment–compensated Resonant Power Transfer System**, S. MN et al., GE, Bangalore, India
11:15-11:30	**F2.3: Experimental Study on the Termination Impedance Effects of a Resonator Array for Inductive Power Transfer in the kHz Range**, J. Alberto et al., University of Bologna, Italy
11:30-11:45	**F2.4: A Particle Swarm Optimizer for Tuning a Software-Defined, Highly Configurable Wireless Transfer Platform**, M. Schuetz et al., CTTC, Spain, and University of Erlangen –Nuremberg, Germany
11:45-12:45	**F3: Near Field WPT [Old Main]**
11:45-11:55	**F3.1: Multi-Objective Particle Swarm Optimization Applied to the Design of WPT Systems,** N. Hasan et al., Utah State Univ., USA and Mitos Med. Tech., Turkey
11:55-12:05	**F3.2: A Case Study on EV Usage and City Planning of Wireless Charging Station Installations**, H. Yang et al., University of Georgia, Athens, USA
12:05-12:15	**F3.3: Techno-Economic Feasibly and Environmental Impact of WPT Roadway Electrification**, J. C. Quinn et al., Utah State University, USA
12:15-12:25	**F3.4: Underwater WPT**, A. Askari et al., NSWC, USA
12:25-12:35	**F3.5: Underwater WPT for Maritime Applications**, V. Bana et al., SPAWAR, USA
12:35-12:45	**F3.6: Construction of a Secure Wireless Power Transfer System for Robot Fish,** R. Itoh et al., Ryukoku University, Japan
12:45-1:00	**Closing remarks**

Special Early Event, Wednesday 10:30am, Engineering Center DLC
IEEE MTT Distinguished Microwave Lecture

A Lucid View on What Role kQ Product Plays in Electric- and/or Magnetic-Coupling Wireless Power Transfer Systems

Professor Takashi Ohira, Toyohashi University of Technology

Harald Friis discovered the law of wave transfer via space in 1946. Claude Shannon revealed the law of data transfer via communication channel in 1949. There must be a certain law for any "transfer" via some medium. This special lecture explores what is the law of wireless power transfer via electric and magnetic couplers. We start with a basic exercise on how to find the maximum power transfer efficiency of a two-port black box that implies arbitrary contact-less coupling. Given that the box's immittance matrix is known, the input and output power are expressed in terms of the voltage vector. The efficiency, defined as output-to-input power ratio, is consequently expressed as a function of the voltage vector. One of Jacobian determinant zeros leads us to realization that product kQ exclusively dominates the maximum power transfer efficiency. We next touch on kQ for some typical electric and magnetic couplers to help the audience confirm their right understandings of the theory. Then, we introduce a convenient parameter called efficiency tangent. The parameter elegantly enables us to reach the law that we are looking for in this lecture. Finally, we see a couple of prototype WPT systems successfully optimized by employing the law. The lecture concludes with warm encouragement to every WTP engineers to exploit kQ, efficiency tangent, and the law we found as versatile pilotages for ongoing and future WPT system design and development.

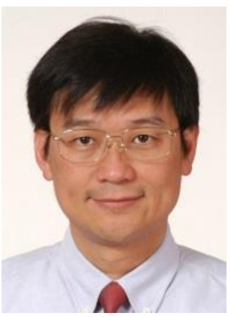
Prof. Takashi Ohira received the B.E. and D.E. degrees in communication engineering from Osaka University, Osaka, Japan, in 1978 and 1983. In 1983, he joined NTT Electrical Communication Laboratories, Yokosuka, Japan, where he was engaged in research on monolithic integration of microwave semiconductor devices and circuits. He developed GaAs MMIC transponder modules and microwave beamforming networks aboard multibeam communication satellites, Engineering Test Satellite VI (ETS-VI) and ETS-VIII, at NTT Wireless Systems Laboratories, Yokosuka, Japan. From 1999, he was engaged in research on microwave analog adaptive antennas (ESPAR antenna) and wave-engineered secret key generator devices at ATR Adaptive Communications Research Laboratories, Kyoto, Japan. Concurrently he was a Consulting Engineer for National Space Development Agency (NASDA) ETS-VIII Project in 1999 and an Invited Lecturer for Osaka University from 2000 to 2001. From 2005, he was Director of ATR Wave Engineering Laboratories, Kyoto, Japan. Currently, he is Professor of Toyohashi University of Technology. He is working on unified theory of Q factors in resonators and oscillators. He is also establishing an RF powering technology for running electric vehicles. He coauthored Monolithic Microwave Integrated Circuits (Tokyo: IEICE, 1997). Prof. Ohira was awarded the 1986 IEICE Shinohara Prize, the 1998 APMC Prize, the 2004 IEICE Electronics Society Prize, the 2012 CEATEC Semi Grand Prix, and the 2013 Nikkei Electronics Wireless Technology Award. He served as APMC International Steering Committee Chair, URSI Commission Chair, and IEICE Microwave Technical Committee Chair. He founded two regional chapters in IEEE MTT Society (Kansai Chapter in 2006 and Nagoya Chapter in 2010). He is an IEEE Fellow, and serves as IEEE Microwave Distinguished Lecturer.

Opening Keynote Talk, Wednesday 1:15pm – 2pm, Old Main (Heritage Center)

Wireless Power Transfer: From Directional Power to Omni-directional Power

Professor Ron Hui, Imperial College London and Hong Kong University

In traditional wireless power transfer applications, wireless power is usually directed to the targeted loads placed in well-defined locations or regions. The power flow is usually directional, meaning the wireless power is controlled to flow from the transmitter to the receiver in one direction. Recently, research in transmitting power wireless in all directions on the 2-D and 3-D planes has been addressed. Omni-directional wireless power transfer in the past has low energy efficiency. The speaker will describe a new way of achieving omni-directional wireless power in an efficient manner. In this presentation, a brief update of new techniques for directional wireless power transfer is firstly presented. Then various omni-directional wireless power transfer techniques reported in the literature and their limitations will be described. Then, the use of the "non-identical current control" for generating magnetic field in an omni-directional manner will be explained. This patent-pending technology can be used to wirelessly charged a multiple of loads placed anywhere in the proximity of the omni-directional wireless power transmitter. This omni-directional wireless power transfer technology has been successfully demonstrated in both 2-D and 3-D systems. Practical results and video demonstration will be presented. The successful implementation of 2-D and 3-D omni-directional power transfer will be illustrated in video demonstration.



Prof. Ron Hui obtained his Ph.D. degree at Imperial College London in 1987. He is currently Chair Professor of Power Electronics at both Imperial College London (ICL) and the University of Hong Kong (HKU). At HKU, he holds the Philip Wong Wilson Wong Endowed Professorship. He has published over 180 refereed journal papers. Over 55 of his patents have been adopted by industry. His inventions in planar wireless charging technology underpin key dimensions of "Qi", the world's first wireless power standard launched by the Wireless Power Consortium (comprising over 210 companies worldwide), with free-positioning and localized charging features. He was appointed IEEE Distinguished Lecturer by the IEEE Power Electronics Society twice. He received two IEEE Transactions Prize Paper Awards from the IEEE Power Electronics Society in 2009 and 2010. In 2010, he received the IEEE Rudolf Chope R&D Award from the IEEE Industrial Electronics Society and the Crompton Medal for Achievements in Power from the IET, UK. He is a Fellow of the Australian Academy of Technological Sciences & Engineering and is the recipient of the 2015 IEEE William E. Newell Power Electronics Award.

Keynote Talk, Thursday 1:15pm – 2pm, Old Main (Heritage Center)

Development of Sandwich Conversion Modules for Space Solar Power

Dr. Paul Jaffe, Naval Research Laboratory and Dr. James McSpadden, Raytheon, USA

Solar power satellites are proposed as a source of energy for terrestrial use. Architectures suggested vary in orbit selection, means of wireless power transmission, and energy generation method; though most have focused on the combination of geosynchronous orbit, microwave wireless power transmission, and photovoltaics. Recent approaches emphasize highly modular schemes to exploit improved economies of scale inherent in mass production. A key element in many of these architectures is the sandwich module, which performs in its layers three functions: sunlight-to-DC conversion, DC-to-microwave conversion, and microwave radiation. A sandwich module prototyping and testing effort provided insight into how these layers are integrated to address thermal concerns, and offered possible avenues for implementation of the layers and the module as a whole given state-of-the-art efficiency and performance constraints. Matching of solar array characteristics with electronics performance at expected operating temperatures and under projected solar illumination levels proved critical. Because of the layer interdependence of parameters such as efficiency, output power level, and operating temperature, modeling expected performance of an actual hardware implementation is challenging. Accordingly, the ability to test an integrated sandwich module while maintaining access to the separate interfaces between layers, under space-like environmental and illumination conditions, was important in allowing for the determination of optimal operating points. These results may be generalized to modules employing similar architectures. Suggestions for future areas sandwich module research are delineated.

Dr. Paul Jaffe is an electronics engineer, researcher, and integration and testing section head at the Naval Center for Space Technology at the United States Naval Research Laboratory (NRL). In over 20 years at the NRL, he has worked on dozens of missions for NASA, the U.S. Department of Defense, and other sponsors, including SSULI, STEREO, TacSat-1, and TacSat-4. He developed standards and lead spacecraft computer hardware development as part of the Department of Defense's Operationally Responsive Space effort. Paul served as a coordinator of the NRL's funded study of the military applications of Space-Based Solar Power, and as an editor of the study group's final report. He was the principal investigator for a four-year research effort involving the development and testing of modules for conversion of sunlight into microwaves. He received a Bachelor of Science in Electrical Engineering from the University of Maryland, College Park and a Master of Science in Electrical Engineering at the Johns Hopkins University, graduating with honors. He also earned a Ph.D. in Electrical Engineering at the University of Maryland, College Park.

Dr. McSpadden is an expert in microwave power transmission systems and rectenna design. Working for over 16 years in industry, he has led projects performing system analysis and technology development for various power transmission projects. Dr. McSpadden joined Raytheon in 2005 after 8 years with Boeing in Seattle. In both locations he has led several power beaming studies and experiments for various applications. Dr. McSpadden received his B.S.E.E, M.S.E.E, and Ph.D. diplomas, all from Texas A&M University, in 1989, 1993, and 1998, respectively. Dr. McSpadden has over 20 published papers in journals, conferences, and magazines on microwave power transmission.

Thursday, May 14, Poster Session, 3:45pm – 6:00pm

P1: Near-Field WPT Components
P1.1: Analysis of WPT System Using Rearranged Indirect-Fed Method for Mobile Applications, S. Kang et al., Seoul National Univ. Science, R. Korea
P1.2: WPT for Mobile Devices with the Consideration of Ground Effect, V. Nguyen et al., Seoul National Univ. Science, R. Korea
P1.3: Design of a Transmitter Coil for Use in Two WPT Standards, E. Noh, Gwangju Inst. of Science and Tech., R. Korea
P1.4: A Novel Parallel Double-layer Spiral Coil for Coupled Magnetic Resonance WPT, C. Yang et al., Chubu Univ., Kasugai, Japan
P1.5: Inductive Power Transfer in E-Textile Applications: Reducing the Effects of Coil Misalignment, D. Zhu et al., Univ. Southampton, and Univ. Bristol, UK
P1.6: Circularly Polarized Near-Field for Resonant WPT, J. Wu et al., Mitsubishi, Cambridge, USA
P1.7: Ultra-thin Printed Circuit Board Metamaterial for High Efficiency WPT, Y. Cho et al., KAIST and Soongsil Univ, R. Korea
P1.8: Design and Simulation of Printed Winding Inductors for Inductive Wireless Power Charging Applications, D. Jugieu et al., Continental Automotive F, and CNRS laas, Toulouse, France
P1.9: Design Considerations of Conformal SCMR System, K. Bao et al., Florida International Univ., Miami, Florida, USA
P2: Near-Field WPT emissions
P2.1: Magnetic Field Canceling Coil for WPT System, M. Ishida et al., Toyota Central Research and Development Lab Inc., Nagakute, Japan
P2.2: A Ferrite-Loaded Coil for Uniform Magnetic Field Distribution, N. Jeong, Qualcomm, San Diego, USA
P2.3: Spurious Electromagnetic Emissions from a Magnetic Field WPT Systems, J. S. McLean et al., TDK R&D Corp US and Japan
P2.4: Efficient Artificial Magnetic Conductor Shield for Wireless Power, J. Lawson et al., Imperial College London, UK
P2.5: Analysis of Electromagnetic Field Leaked from WPT System in Case-study House, K. Takagi et al., Panasonic System Networks R&D, Japan
P2.6: Leakage Emulator Intended for Electromagnetic Field Leaked from WPT System, Y. Kanasaki et al., Panasonic System Networks R&D, Japan
P2.7: Experimental Characterization Methods for the Electromagnetic Emission of Inductive Wireless Power Circuits, B. Minnaert et al., Ghent and KU Leuven, Belgium
P2.8: Magnetic Near-Field Focusing and Optimal WPT, H. Lang et al., Univ. Toronto, Canada
P3: Far-Field WPT and Harvesting
P3.1: Beamforming Power Emitter Design with 2x2 Antenna Array and Phase Control for Microwave/RF-based Energy Harvesting, S. Yang et al., National Cheng Kung Univ., and Delta Electronics Inc., Taiwan
P3.2: Harmonic Spaced Multisines for Efficient WPT, D. Belo, N.Carvalho, Univ. of Aveiro, Portugal
P3.3: Practical Applications for Radiative WPT, H. Pflug et al., Holst Center and Eindhoven Univ. of Technology, The Netherlands
P3.4: Can WPT Benefit from Large Transmitter Arrays?, S. Kashyap et al., Linkoping Univ. Sweden
P3.5: Study on Matching Condition of an Infinite Dipole Array Antenna with Reflector for Non-Leak MPT System, Y. Tsukamoto et al., Kyoto Univ., Japan
P3.6: Backscatter Radio Coverage Enhancements using Improved WPT Signal Waveform, R. J. Correia et al., IT Aveiro, Portugal and ISAS, Sagamihara, Japan
P3.7: Toward the Design of a RF-Harvesting EBG Ground Plane, H. J. Visser et al., Holst Center and Eindhoven Univ. of Technology, The Netherlands

P4: Basic Technologies for WPT
P4.1: Study on WPT System Using a Radio Wave Hose as a New Transmission Line, S. Ishino et al., Furuno Electric, Sanoh Ind., NLM, and Kyoto Univ., Japan
P4.2: Development of a Real-time Power and Impedance Sensor for WPT Systems, T. Minami et al., Daihen Corp, Japan
P4.3: Wireless Single Contact Power Delivery, C. W. Van Neste et al., Univ. Alberta, Edmonton, Canada
P4.4: Maximum Efficiency Point Tracking by Input Control for a WPT System with a Switching Voltage Regulator, Y. Narusue et al., Univ. Tokyo, Japan
P4.5: A High-Efficiency Class-E Power Amplifier with Wide-Range Load in WPT Systems, S. Liu et al., Shanghai Jiao Tong Univ., China
P4.6: ClassEF2 Inverters for WPT Applications, S. Aldhaher et al., Imperial College London, UK
P4.7: Multi-Capacitor Circuit Application for the WPT System Coils Resonant Frequency Adjustment, R. Saltanovs, TransfoElectric, Ogre, Latvia
P4.8: Design of a Novel Antenna System Intended for Harmonic RFID Tags in Paper Substrate, V. Palazzi et al., Univ. Perugia, Italy
P4.9: Three-Phase Resonant Inverter for WPT, M. Bojarski et al., NY Univ., USA
P5: Other Related Areas
P5.1: Withdrawn
P5.2: Optimization of a Magnetically Coupled Resonators System for Power Line Communication Integration, S. Barmada et al., DESTEC Univ. Pisa, Italy
P5.3: Thermal and Biofouling Effects on Underwater WPT, J. Oiler et al., SPAWAR, USA
P5.4: Inductive 3-coil WPT Improved by T-type Impedance Matching for Implanted Biomedical IC, C. Chang et al., National Cheng Kung Univ., Taiwan
P5.5: Performance Evaluation of a WPT System using Coupled 3D Finite Element-Circuit Model, A. O. Hariri et al., Florida International Univ., USA
P5.6: Study on High Efficiency WPT Underseas, D. Futagami et al., Ryukoku Univ. and Ryutech Corp., Japan
P5.7: WPT in Human Tissue via Conformal Strong Coupled Magnetic Resonance, H. Hu et al., Florida International Univ., USA
P5.8: Localization of Receivers using Phased-Array WPT, V. Ranganathan et al., Univ. Wash., USA
P5.9: A Coil Misalignment Compensation Concept for WPT Transfer Links in Biomedical Impants, F. Kong et al., Rutgers Univ. and Intersil Corp., USA