

**[MA\_P] Poster Session 1****Session Date** June 3 (Mon.), 2024**Session Time** 13:30-15:00**Session Room** Lobby**Session Chair(s)****[MA\_P\_01]****13:30-15:00****A Design Method of Biplanar Coils Based on Magnetic Shielding Rooms**Shuai Yuan, Minxia Shi, Leran Zhang, Jianzhi Yang, Teng Li, and Yuzheng Ma  
*Beihang University, China***[MA\_P\_02]****13:30-15:00****Study on Numerical Calculation Method of Magnetic Induction Heating of CF Dry Cloth Using Integral Equations**Yoshikazu Tanaka<sup>1</sup>, Rikuto Miyake<sup>1</sup>, Tomoyoshi Horie<sup>2</sup>, Daiki Matsuyama<sup>3</sup>, Kiyoka Takagi<sup>3</sup>, and Nobuyuki Kamihara<sup>3</sup><sup>1</sup>*Hiroshima University, Japan*, <sup>2</sup>*Kyushu Institute of Technology, Japan*, <sup>3</sup>*Mitsubishi Heavy Industries, Ltd., Japan***[MA\_P\_03]****13:30-15:00****Improving Beam Commissioning by Fast Computation of Magnetic Field of Accelerator Magnets Considering Magnetic Hysteresis**Yoshitake Onchi<sup>1</sup>, Kengo Sugahara<sup>1</sup>, Akira Ahagon<sup>2</sup>, Yoshihiro Ishi<sup>3</sup>, and Yoshiki Hane<sup>4</sup><sup>1</sup>*Kindai University, Japan*, <sup>2</sup>*JSOL Corporation, Japan*, <sup>3</sup>*Kyoto University, Japan*, <sup>4</sup>*Tohoku University, Japan***[MA\_P\_04]****13:30-15:00****Calculation and Experimental Study of Floating Potential on Metal Shielding in Wireless Power Transfer System**Lihua Zhu<sup>1</sup>, Xiaoxuan Song<sup>1</sup>, Xian Zhang<sup>2</sup>, Shuai Zhao<sup>3</sup>, and Jianying Hao<sup>1</sup><sup>1</sup>*Tianjin University of Technology, China*, <sup>2</sup>*Hebei University of Technology, China*, <sup>3</sup>*Tiangong University, China***[MA\_P\_05]****13:30-15:00****Reduced Order Modeling of Rectangular Wires in a Magneto-Quasi-Static Field for Integral Formulation**Shingo Hiruma<sup>1</sup>, Luca Di Rienzo<sup>2</sup>, and Carlo de Falco<sup>2</sup><sup>1</sup>*Kyoto University, Japan*, <sup>2</sup>*Politecnico di Milano, Italy***[MA\_P\_06]****13:30-15:00****Complementary Formulations for Electroquasistatics**Antonino Vacalebri, Aldi Hoxha, and Ruben Specogna  
*University of Udine, Italy*

**[MA\_P\_07]****13:30-15:00****Design and Analysis of Linear Haptic Motor with Pure Magnetic Spring**ZhiXiong Jiang<sup>1</sup>, DanPing Xu<sup>2</sup>, KyeongTak Park<sup>1</sup>, and SangMoon Hwang<sup>1</sup><sup>1</sup>Pusan National University, Korea, <sup>2</sup>Shanghai University, China**[MA\_P\_08]****13:30-15:00****Electromagnetic-Mechanical Model Consideration of High-Speed Train High Voltage Traction Motor**Sarbjit Paul<sup>1</sup>, Pil-Wan Han<sup>1</sup>, and Junghwan Chang<sup>2</sup><sup>1</sup>Korea Electrotechnology Research Institute, Korea, <sup>2</sup>Dong-A University, Korea**[MA\_P\_09]****13:30-15:00****An Investigation of Coupling Effects by the Soil in Grounding Systems**Alex B. Tronchoni<sup>1</sup>, Daniel S. Gazzana<sup>1</sup>, Arturo S. Bretas<sup>2</sup>, and Marcos Telló<sup>3</sup><sup>1</sup>Federal University of Rio Grande do Sul, Brazil, <sup>2</sup>Pacific Northwest National Laboratory, USA, <sup>3</sup>Vör Electric, Brazil**[MA\_P\_10]****13:30-15:00****Anisotropic 3D Thermal Modeling for a Racetrack Foil Coil**

Gan Fu, Mitrofan Curti, and Elena A. Lomonova

*Eindhoven University of Technology, The Netherlands***[MA\_P\_11]****13:30-15:00****Fast Calculation Method of Magnetic Field in Transformer Core Based on Circuit-Magnetic Coupling Model**Pengning Zhang<sup>1</sup>, Quanjiang Li<sup>1</sup>, Zheng Zhao<sup>2</sup>, Xiaohong Li<sup>1</sup>, Jian Zhang<sup>3</sup>, and Jiqing Gao<sup>4</sup><sup>1</sup>China University of Mining and Technology, China, <sup>2</sup>State Grid Corporation of Zhejiang Province, China, <sup>3</sup>China Electric Power Research Institute, China, <sup>4</sup>Shandong Energy Group Electric Power Group Co., Ltd, China**[MA\_P\_12]****13:30-15:00****Hybrid Boundary Element – Physics Informed Neural Network Formulation for Electromagnetics Problems**Sami Barmada<sup>1</sup>, Mauro Tucci<sup>1</sup>, Alessandro Formisano<sup>2</sup>, Paolo Di Barba<sup>3</sup>, and Maria Evelina Mognaschi<sup>3</sup><sup>1</sup>University of Pisa, Italy, <sup>2</sup>University of Campania Luigi Vanvitelli, Italy, <sup>3</sup>University of Pavia, Italy**[MA\_P\_13]****13:30-15:00****Model Order Reduction of Transient Magnetic Field Based on POD and DEIM Methods**

Shengwei Wu and Lin Li

*North China Electric Power University, China***[MA\_P\_14]****13:30-15:00****Nonlinear MOR of Induction Motor with Reduced Representation of Airgap Harmonics**

Tetsuji Matsuo, Toshihiro Ozeki, Miwa Tobita, Shingo Hiruma, and Takeshi Mifune

*Kyoto University, Japan*

**[MA\_P\_15]****13:30-15:00****Application of the Deep Operator Network (DeepONet) to Electromagnetic Simulations**

Ali Akbarzadeh-Sharbat, Jakob Rylo, and Dennis Giannacopoulos

*McGill University, Canada***[MA\_P\_16]****13:30-15:00****AI Based Design Optimization Environment for EV DWPT Chargers**

Rakan Almazmomi and Abd Arkadan

*Colorado School of Mines, USA***[MA\_P\_17]****13:30-15:00****Multi-Level Optimization Based on Approximate Models for Double-Sided Linear Flux Switching Permanent Magnet Motors**Qiankai Zhao<sup>1</sup>, Cheng Wen<sup>2</sup>, Lei Huang<sup>1</sup>, and Yuan Li<sup>1</sup>*<sup>1</sup>Southeast University, China, <sup>2</sup>Shijiazhuang Tiedao University, China***[MA\_P\_18]****13:30-15:00****Multi-Objective Topology Optimization of Synchronous Reluctance Motor with Autoencoder Simultaneously Considering Material Selection and Shape Change**Masahiro Kishi<sup>1</sup>, Sinji Wakao<sup>1</sup>, Noboru Murata<sup>1</sup>, Hiroaki Makino<sup>2</sup>, Katsutoku Takeuchi<sup>2</sup>, and Makoto Matsushita<sup>2</sup>*<sup>1</sup>Waseda University, Japan, <sup>2</sup>Toshiba Infrastructure Systems & Solutions Corporation, Japan***[MA\_P\_19]****13:30-15:00****Artificial Neural Network Based Electro-Thermal Optimization of Induction Machine for EV Applications**

Omolbanin Taqavi, Alexandre J. Bourgault, Ze Li, and Narayan C. Kar

*Centre for Hybrid Automotive Research and Green Energy (CHARGE), University of Windsor, Canada***[MA\_P\_20]****13:30-15:00****Optimal Design of SPMSM for Robot Joint Using Least Square Boosting Assisted Multi Objective Optimization Algorithm**

Jong-Min Ahn and Dong-Kuk Lim

*University of Ulsan, Korea***[MA\_P\_21]****13:30-15:00****Combination of Extra Random Trees and Genetic Algorithm for Optimal Design of SPMSM for Robot Joints**

Min-Su Kwon and Dong-Kuk Lim

*University of Ulsan, Korea***[MA\_P\_22]****13:30-15:00****Surrogate-Based Optimization of SMT Inductors**Christian Riener<sup>1,2</sup>, Alice Reinbacher-Köstinger<sup>2</sup>, Thomas Bauernfeind<sup>1,2</sup>, Samuel Kvasnicka<sup>1,2</sup>, Klaus Roppert<sup>1,2</sup>, and Manfred Kaltenbacher<sup>1,2</sup>*<sup>1</sup>TU-Graz SAL GEMC Lab, Silicon Austria Labs, Austria, <sup>2</sup>Institute of Fundamentals and Theory in Electrical Engineering, Graz University of Technology, Austria*

**[MA\_P\_23]** **13:30-15:00****Effective Design Method of Axial Flux Permanent Magnet Synchronous Motor for Electric Vehicle Using Initial State Finite Element Analysis and Machine Learning**

Min-Su Kwon and Dong-Kuk Lim

*University of Ulsan, Korea***[MA\_P\_24]** **13:30-15:00****Topology Optimization of Magnetic Microstructures for Eddy Current Loss and Permeability**

Shuli Yin and Hajime Igarashi

*Hokkaido University, Japan***[MA\_P\_25]** **13:30-15:00****Data-Efficient Machine Learning Methods for Electric Motor Surrogate Models**Bingnan Wang<sup>1</sup> and Yusuke Sakamoto<sup>2</sup><sup>1</sup>*Mitsubishi Electric Research Laboratories (MERL), USA,* <sup>2</sup>*Mitsubishi Electric Corporation, Japan***[MA\_P\_26]** **13:30-15:00****Modeling and Simulations of Semiconductor Structures at Highest Frequencies**

Mario Kupresak, Jasmin Smajic, and Juerg Leuthold

*Institute of Electromagnetic Fields (IEF), ETH Zurich, Switzerland***[MA\_P\_27]** **13:30-15:00****An Implementation Method of Incorporating Hysteretic Material Models into Electromagnetic FEA**Shuaichao Yue<sup>1</sup>, Yating Li<sup>1</sup>, Ruiying Chen<sup>1</sup>, Ming Yang<sup>1</sup>, Philip Anderson<sup>2</sup>, and Yongjian Li<sup>1</sup><sup>1</sup>*Hebei University of Technology, China,* <sup>2</sup>*Cardiff University, UK***[MA\_P\_28]** **13:30-15:00****Data-Driven Finite Element Mesh Generation Expert System Based on BP Neural Network**

Yufeng Niu, Shuhong Wang, Nana Duan, Naming Zhang, Yilun Wang, and Zhenggang He

*Xi'an Jiaotong University, China***[MA\_P\_29]** **13:30-15:00****Improving Electrically Evoked Compound Action Potential Based on Electrical Field Imaging and Electrode Interfaces**

Charles T. M. Choi, Chun Ting Ke, Jelani Lawrence, and Alexander C. C. Wang

*National Yang Ming Chiao Tung University, Taiwan ROC***[MA\_P\_30]** **13:30-15:00****Efficient Electric Field Evaluation of a Point Source near the Infant Torso**Anna A. Varvari<sup>1</sup>, Dimitrios I. Karatzidis<sup>1</sup>, Theodoros T. Zygidis<sup>2</sup>, Christos S. Antonopoulos<sup>1</sup>, and Nikolaos V. Kantartzis<sup>1</sup><sup>1</sup>*Aristotle University of Thessaloniki, Greece,* <sup>2</sup>*University of Western Macedonia, Greece***[MA\_P\_31]** **13:30-15:00****Elliptical Loop-Microstrip Array for Focus Brain Lobe Imaging with 11.4 Teslas MRI System**

Daniel Hernandez, Taewoo Nam, Eunwoo Lee, Yeji Han, Yeunchul Ryu, and Kyoung-Nam Kim

*Gachon University, Korea*

**[MA\_P\_32]****13:30-15:00****Using Point Clouds for Material Properties Smoothing in Low-Frequency Numerical Dosimetry Simulations**Norman Haussmann, Steven Stroka, Shaghayegh Mazaheri Kalahroudi, and Markus Clemens  
*University of Wuppertal, Germany***[MA\_P\_33]****13:30-15:00****Dynamic Multi-Physical Field Coupling Analysis for Enhanced Electromagnetic Driving Devices**

Rongge Yan and Haokai Zhao

*State Key Laboratory of Reliability and Intelligence of Electrical Equipment, Hebei University of Technology, China***[MA\_P\_34]****13:30-15:00****Novel Microspeaker Design for Smartwatches with Integrated Woofer and Tweeter Units**

KyeongTak Park, ZhiXiong Jiang, YeongIn Oh, and SangMoon Hwang

*Pusan National University, Korea***[MA\_P\_35]****13:30-15:00****Analysis of a Field Modulation Multi-Port Generator for Wave Power Generation**

Yuan Li, Lei Huang, Minshuo Chen, and Minqiang Hu

*Southeast University, China***[MA\_P\_36]****13:30-15:00****Electromagnetic Design Process of Limited Angle Actuator for Wrist Applications of Industrial Robot**Sarbjit Paul<sup>1</sup>, Imjae Lee<sup>2</sup>, and Junghwan Chang<sup>2</sup>*<sup>1</sup>Korea Electrotechnology Research Institute, Korea, <sup>2</sup>Dong-A University, Korea***[MA\_P\_37]****13:30-15:00****Performance Improvement of WFSM for EV Propulsion Applying Grain Oriented Electrical Steel**

Ho-Jin Oh, Jae-Hoon Cho, Young-Ho Hwang, Yongmin Kim, Seok-Won Jung, and Sang-Yong Jung

*Sungkyunkwan University, Korea***[MA\_P\_38]****13:30-15:00****Semi-Implicit Time Integration Method for a FEM-Parameterized Plant Model of a Permanent Magnet Synchronous Motor**Kota Takagi<sup>1</sup>, Yasuhito Takahashi<sup>1</sup>, Akira Ahagon<sup>2</sup>, Tetsuji Matsuo<sup>3</sup>, and Koji Fujiwara<sup>1</sup>*<sup>1</sup>Doshisha University, Japan, <sup>2</sup>JSOL Corporation, Japan, <sup>3</sup>Kyoto University, Japan***[MA\_P\_39]****13:30-15:00****Design of a High Reliability and High Performance Permanent Magnet Synchronous Motor Used in Oil-Submersible Electric Pump System**Peng Zhou<sup>1</sup>, Yanliang Xu<sup>1</sup>, and Wenji Zhang<sup>2</sup>*<sup>1</sup>Shandong University, China, <sup>2</sup>Shengli Oil Field Shengli Pump Industry Co., Ltd., China***[MA\_P\_40]****13:30-15:00****Novel Salient Stator Pole-Shoe Structure for Reducing the Shaft Voltage of the PMSM**Ji-Sung Lee<sup>1</sup>, Jong-Min Ahn<sup>1</sup>, Dong-Kuk Lim<sup>1</sup>, and Kyungjin Kang<sup>2</sup>*<sup>1</sup>University of Ulsan, Korea, <sup>2</sup>LG Magna, Korea*

**[MA\_P\_41]****13:30-15:00****Hardware-in-the-Loop (HIL) System for Cubesat ADCS Testing**Felipe Costa Juliano<sup>1</sup>, Xisto Lucas Travassos Junior<sup>1</sup>, and Nathan Ida<sup>2</sup><sup>1</sup>Federal University of Santa Catarina, Brazil, <sup>2</sup>The University of Akron, USA**[MA\_P\_42]****13:30-15:00****Investigation of Dual-Side Consequent-Pole Permanent Magnet Machine with Improved Magnetic Field Modulation Effect**

Shaoshuai Wang, Jianzhong Zhang, Ning Wang, and Yongbin Wu

*Southeast University, China***[MA\_P\_43]****13:30-15:00****A Study on Shaft Voltage of IPMSM Applying Tapering for Reducing Cogging Torque**Ji-Sung Lee<sup>1</sup>, Jong-Min Ahn<sup>1</sup>, Dong-Kuk Lim<sup>1</sup>, and Kyungjin Kang<sup>2</sup><sup>1</sup>University of Ulsan, Korea, <sup>2</sup>LG Magna, Korea**[MA\_P\_44]****13:30-15:00****Mitigation of AC Copper Loss via Transposition Method Considering Circulating Current in Large Ship Propulsion Motors**Nam-Ho Kim<sup>1</sup>, Chang-Hyun Wang<sup>1</sup>, JinHwan Lee<sup>2</sup>, Seok-Won Jung<sup>1</sup>, and Sang-Yong Jung<sup>1</sup><sup>1</sup>Sungkyunkwan University, Korea, <sup>2</sup>Chonnam National University, Korea**[MA\_P\_45]****13:30-15:00****Design and Analysis of Broadband Vibrational Energy Harvester Based on Switchable Dynamical System Using Electropermanent Magnet**

Masayuki Kato and Fumiya Kitayama

*Ibaraki University, Japan***[MA\_P\_46]****13:30-15:00****The Analytical Analysis of a Novel Brushless Power Fed Permanent Magnet Adjustable Speed Drive with a Copper Cage Rotor**Yibo Li<sup>1</sup>, Gang Wang<sup>1</sup>, Da Jiang<sup>1</sup>, and Heyun Lin<sup>2</sup><sup>1</sup>Nanjing Institute of Technology, China, <sup>2</sup>Southeast University, China**[MA\_P\_47]****13:30-15:00****On the Equivalence of Working Volumes in Undermoded Reverberation Chambers**Anett Kenderes<sup>1,2</sup>, Szabolcs Gyimóthy<sup>1</sup>, and Péter Tamás Benkő<sup>2</sup><sup>1</sup>Budapest University of Technology and Economics, <sup>2</sup>Automotive Electronics–Electromagnetic Compatibility, Robert Bosch Kft., Hungary**[MA\_P\_48]****13:30-15:00****Design and Analysis of Novel Multiple Magnetic Source Axial Flux Modulation Machines**

Pengcheng Sun, Shaofeng Jia, Zhidong Yuan, and Deliang Liang

*State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China*

**[TM\_P] Poster Session 2****Session Date** June 4 (Tue.), 2024**Session Time** 11:20-12:30**Session Room** Lobby**Session Chair(s)****[TM\_P\_01]****11:20-12:30****Higher-Order Frequency Derivatives of Electroquasistatic System**

Seung Eun Rho, Jong Oh Park, and Il Han Park

*Sungkyunkwan University, Korea***[TM\_P\_02]****11:20-12:30****Convolutional Physics-Informed Neural Networks for Fast Prediction of Core Losses in Axisymmetric Transformers**

Philipp Brendel, Vlad Medvedev, and Andreas Roskopf

*Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany***[TM\_P\_03]****11:20-12:30****PEEC Based Fast 3D Litz Wire Model**Tianming Luo<sup>1</sup>, Mohamad Ghaffarian Niasar<sup>1</sup>, and Peter Vaessen<sup>1,2</sup>*<sup>1</sup>Delft University of Technology, The Netherlands, <sup>2</sup>KEMA Laboratories, The Netherlands***[TM\_P\_04]****11:20-12:30****Modal Analysis for Induced Currents in Metallic Plates**Alessandro Formisano<sup>1</sup>, Sami Barmada<sup>2</sup>, and Ehsan Akbari Sekehravani<sup>1</sup>*<sup>1</sup>The University of Campania Luigi Vanvitelli, Italy, <sup>2</sup>University of Pisa, Italy***[TM\_P\_05]****11:20-12:30****Physics-Informed Neural Network for 2D Magneto-Quasi-Static Problems in Time Domain**

Ziqing Guo and Ruth V. Sabariego

*KU Leuven, Belgium***[TM\_P\_06]****11:20-12:30****The Analytical Calculation and Measurements of the Magnetic Force between Permanent Magnet and Rotor Yoke of a Large-Scale Permanent Magnet Synchronous Generator**Woo-Sung Jung<sup>1</sup>, Hyo-Seob Shin<sup>2</sup>, Kyung-Hun Shin<sup>3</sup>, and Jang-Young Choi<sup>1</sup>*<sup>1</sup>Chungnam National University, Korea, <sup>2</sup>Hyundai Mobis, Korea, <sup>3</sup>Changwon National University, Korea***[TM\_P\_07]****11:20-12:30****Comparison of Electromagnetic Vibration and Noise of Sensorless Control with Pulsating Voltage Injection**Daohan Wang<sup>1</sup>, Shuang Xu<sup>2</sup>, Yonghua Huang<sup>3</sup>, Cheng Xu<sup>4</sup>, Xiaoji Wang<sup>3</sup>, and Xiuhe Wang<sup>3</sup>*<sup>1</sup>Shenzhen Research Institute of Shandong University, China, <sup>2</sup>Qingdao Power Supply Company, Shandong Electric Power Company State Grid, China, <sup>3</sup>Shandong University, China, <sup>4</sup>Shandong Luruan Digital Technology Co., Ltd., China*

**[TM\_P\_08]****11:20-12:30****Crack Propagation of Ground Insulation Failure for Large Motor End-Winding Based on Electromechanical Coupling Phase Field Model**Xiaobo Wu<sup>1</sup>, Haijun Zhang<sup>1</sup>, Bolong Wang<sup>1</sup>, and Guowen Cao<sup>2</sup>*<sup>1</sup>Hubei Key Laboratory of Power System Design and Test for Electrical Vehicle Hubei University of Arts and Science, China, <sup>2</sup>Xiangyang CRRC Motor Technology Co., Ltd., China***[TM\_P\_09]****11:20-12:30****An Improved Time Period FEM for Numerical Analysis of Electromagnetic Fields of Power Transformers under DC Bias**Xiaowen Xu<sup>1</sup>, Shiyong Yang<sup>1</sup>, Guoping Zou<sup>2</sup>, and Cancan Rong<sup>3</sup>*<sup>1</sup>Zhejiang University, China, <sup>2</sup>China Jiliang University, China, <sup>3</sup>China University of Mining and Technology, China***[TM\_P\_10]****11:20-12:30****Self-Consistent Model of Low-Pressure Plasma Column Sustained by Electromagnetic Surface Waves**Ivan Ganachev<sup>1,2</sup>, Haruka Nakano<sup>1</sup>, and Keiji Nakamura<sup>2</sup>*<sup>1</sup>Shibaura Mechatronics Corporation, Japan, <sup>2</sup>Chubu University, Japan***[TM\_P\_11]****11:20-12:30****A Domain Decomposition Finite Element Method for the Magneto-Thermal Field Analysis of Electric Machines**Yunpeng Zhang<sup>1</sup>, Jinpeng Cheng<sup>1</sup>, Xinsheng Yang<sup>2</sup>, Qibin Zhou<sup>1</sup>, and Weinong Fu<sup>3</sup>*<sup>1</sup>Shanghai University, China, <sup>2</sup>Hebei University of Technology, China, <sup>3</sup>Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China***[TM\_P\_12]****11:20-12:30****Design and Analysis of PM-Assisted Synchronous Reluctance Machines Considering Rotor Structural Integrity**Jaesung Choi<sup>1</sup>, Sangwon Min<sup>1</sup>, Gilsu Choi<sup>1</sup>, and Jihyun Kim<sup>2</sup>*<sup>1</sup>Inha University, Korea, <sup>2</sup>Stellantis, USA***[TM\_P\_13]****11:20-12:30****Coupled Electromagnetic-Fluid-Thermal Analysis in Large Scale Water-Hydrogen-Hydrogen Cooled Generator-Condenser under Different Operations**Weili Li<sup>1</sup>, Yalei Li<sup>1</sup>, Tianhuai Qiao<sup>1</sup>, Chunsun Tian<sup>2</sup>, Mingyang Liu<sup>2</sup>, and Yang Xiao<sup>3</sup>*<sup>1</sup>Beijing Jiao Tong University, China, <sup>2</sup>Electric Power Research Institute of State Grid Henan Electric Power Company, China, <sup>3</sup>China Electric Power Research Institute Company Ltd., China***[TM\_P\_14]****11:20-12:30****Research on Vibration and Noise Characteristics of 110kV Three-Phase Three-Column Transformer**Pengning Zhang<sup>1</sup>, Wenjie Liao<sup>1</sup>, Xueqian Zhao<sup>2</sup>, Yajin Yang<sup>1</sup>, Jian Zhang<sup>3</sup>, and Jiqing Gao<sup>4</sup>*<sup>1</sup>China University of Mining and Technology, China, <sup>2</sup>State Grid Beijing Electric Power Company Electric Power Science Research Institute Beijing, China, <sup>3</sup>China Electric Power Research Institute, China, <sup>4</sup>Shandong Energy Group Co., Ltd., China*

**[TM\_P\_15]****11:20-12:30****Mesh Error Estimation Using Graph Neural Networks**

Jakob Rylo and Dennis Giannacopoulos  
*McGill University, Canada*

**[TM\_P\_16]****11:20-12:30****Analysis of Coordinate Transformation in Permanent Magnet Motors**

Zekun Wu<sup>1</sup>, Baocheng Guo<sup>1</sup>, Yanchen Wu<sup>1</sup>, and ZhiXiong Jiang<sup>2</sup>  
*<sup>1</sup>Nanjing Normal University, China, <sup>2</sup>Pusan National University, Korea*

**[TM\_P\_17]****11:20-12:30****Finite Element Models for High Voltage Cables with Large Cross Sections Using Dimensional Reduction and Homogenization**

Albert Piwonski<sup>1</sup>, Julien Dular<sup>2</sup>, Rodrigo Silva Rezende<sup>1</sup>, and Rolf Schuhmann<sup>1</sup>  
*<sup>1</sup>Technical University of Berlin, Germany, <sup>2</sup>CERN (TE-MPE-PE), Switzerland*

**[TM\_P\_18]****11:20-12:30****Fuel Cell Stack Magnetic Tomography with Adjoint Method**

Leonard Freisem<sup>1</sup>, Olivier Chadebec<sup>1</sup>, Gilles Cauffet<sup>1</sup>, Yann Bultel<sup>2</sup>, and Sebastien Rosini<sup>3</sup>  
*<sup>1</sup>University Grenoble Alpes, CNRS, Grenoble INP, G2ELab, France, <sup>2</sup>University Grenoble Alpes, University Savoie-Mont Blanc, CNRS Grenoble INP, LEPMI, France, <sup>3</sup>University Grenoble Alpes CEA LITEN, France*

**[TM\_P\_19]****11:20-12:30****Electromagnetic Performance Improvement of Asymmetric Hybrid PM Motor Considering Various Operating Conditions**

Chen Yunyun, Lu Mingjie, Xu Yushan, and Cai Tongle  
*Yangzhou University, China*

**[TM\_P\_20]****11:20-12:30****A Novel Multi-Layer Coupler with High Efficiency and High Misalignment Tolerance**

Wei Wang, Kairui Li, Mingrong Duan, Chenjin Xu, Siyuan Sheng, and Zheng Lu  
*Nanjing Normal University, China*

**[TM\_P\_21]****11:20-12:30****Comprehensive Optimization Design of Axial-Flux Permanent Magnet Synchronous Machine for Large-Capacity Flywheel Energy Storage System**

Mingxin Sun and Yanliang Xu  
*Shandong University, China*

**[TM\_P\_22]****11:20-12:30****An Optimization Method for Coil Design Problems Based on Physarum Polycephalum Algorithm and Evolutionary Computation**

Takahiro Sato<sup>1</sup>, Kengo Sugahara<sup>2</sup>, and Yuki Hidaka<sup>3</sup>  
*<sup>1</sup>Muroran Institute of Technology, Japan, <sup>2</sup>Kindai University, Japan, <sup>3</sup>Nagaoka University of Technology, Japan*

**[TM\_P\_23]****11:20-12:30****Utilizing an Efficient Magnetic Equivalent Circuit Model and Manifold Mapping Method for Two-Level Optimization of Axial Flux Machine**

Gensheng Li and Yanliang Xu

*Shandong University, China***[TM\_P\_24]****11:20-12:30****Use of an Inference Technique for Sensitivity Analysis of RL Parameters of Wound Inductors Extracted from the Finite Element Method**Geoffrey Lossa<sup>1</sup>, Olivier Deblecker<sup>2</sup>, and Zacharie De Grève<sup>3</sup>*<sup>1</sup>Institut Supérieure Pédagogique et Technique de Kinshasa, D.R. Congo, <sup>2</sup>University of Mons, Belgium***[TM\_P\_25]****11:20-12:30****Electromagnetic Field Analysis Using Physics Informed Neural Network Considering Eddy Current**

Ji-Hoon Han, Jong-Hoon Park, Seung-Min Song, and Sun-Ki Hong

*Hoseo University, Korea***[TM\_P\_26]****11:20-12:30****A New Hybrid Algorithm Based on PSO and Fireworks Algorithm for Optimal Design of Metasurface Absorber in RF Energy Harvesting**Na Chen<sup>1</sup>, Shiyong Yang<sup>1</sup>, and Siguang An<sup>2</sup>*<sup>1</sup>Zhejiang University, China, <sup>2</sup>China Jiliang University, China***[TM\_P\_27]****11:20-12:30****Surrogate Model-Based Synthesis of NFC-Transponders**Christoph Koger<sup>1</sup>, Eniz Museljic<sup>1</sup>, Thomas Bauernfeind<sup>1,2</sup>, and Alice Reinbacher-Köstinger<sup>1</sup>*<sup>1</sup>Institute of Fundamentals and Theory in Electrical Engineering, Graz University of Technology, Austria, <sup>2</sup>TU-Graz SAL GEMC Lab, Silicon Austria Labs, Austria***[TM\_P\_28]****11:20-12:30****Novel Wedge-Less Stator to Reduce the Shaft Voltage in the IPMSM for EV Propulsion Simplifying Manufacturing Process**Han-Joon Yoon<sup>1</sup>, Jin-Hwan Lee<sup>2</sup>, Seok-Won Jung<sup>1</sup>, and Sang-Yong Jung<sup>1</sup>*<sup>1</sup>Sungkyunkwan University, Korea, <sup>2</sup>Chonnam National University, Korea***[TM\_P\_29]****11:20-12:30****Conductor Design Method Considering AC Resistance for High Efficiency of PMSM Using High Fill Factor Winding**Kyoung-Soo Cha<sup>1</sup>, Soon-O Kwon<sup>1</sup>, and Myung-Seop Lim<sup>2</sup>*<sup>1</sup>Korea Institute of Industrial Technology, Korea, <sup>2</sup>Hanyang University, Korea***[TM\_P\_30]****11:20-12:30****2-Step Monte Carlo Tree Search for Optimal Design of High-Frequency Toroidal Inductors in Power Electronics Circuits**

Nobuto Misono, Tomoki Hirosawa, Yuki Sato, and Matsumoto Hirokazu

*Aoyama Gakuin University, Japan*

**[TM\_P\_31]****11:20-12:30****Modeling and Analysis of a Hybrid Excitation Electromagnetic Lead Screw Based on the Equivalent Magnetic Circuit Method**Yuanhang Li<sup>1</sup>, Lixun Zhu<sup>1</sup>, Wei Li<sup>2</sup>, Weimin Wu<sup>1</sup>, and Chang-seop Koh<sup>3</sup><sup>1</sup>Shanghai Maritime University, China, <sup>2</sup>Tongji University, China, <sup>3</sup>Chungbuk National University, Korea**[TM\_P\_32]****11:20-12:30****Estimating Parameters of Synchronous Generator Using Sudden Three Phase Short Circuit Test**

Junki Park, Peter Nkwocha Harmony, and Jeihoon Baek

*Korea University of Technology and Education, Korea***[TM\_P\_33]****11:20-12:30****Estimation of Fluxgate Magnetometer PSD in High-Performance and Large-Scale MSR**

Zhilong Zou

*Harbin Institute of Technology, China***[TM\_P\_34]****11:20-12:30****Analysis of a Linear-Rotary Generator with Magnetic Gears for Wave Power Generation**

Yuan Li, Lei Huang, Minshuo Chen, and Minqiang Hu

*Southeast University, China***[TM\_P\_35]****11:20-12:30****Dynamic Process Modeling in Induction Heating Considering Temperature-Dependent Magnetic Properties**Xiaohan Kong<sup>1</sup>, Keito Kubo<sup>1</sup>, Toshihito Shimotani<sup>2</sup>, Sanga Takagi<sup>2</sup>, Eiji Hashimoto<sup>2</sup>, Hiroyuki Imanari<sup>2</sup>, and Hajime Igarashi<sup>1</sup><sup>1</sup>Hokkaido University, Japan, <sup>2</sup>Toshiba Mitsubishi-Electric Industrial Systems Corporation, Japan**[TM\_P\_36]****11:20-12:30****Shape Optimization of Synchronous Motors for Torque Ripple Reduction Using Continuum Sensitivity Analysis**

Eunchae Jung, Kyungsik Seo, Yunjung Hwang, and Il Han Park

*Sungkyunkwan University, Korea***[TM\_P\_37]****11:20-12:30****Multi-Objective Optimization Design of an AFFMPM Machine Based on SVM and NSGA-II Algorithm**Shuai Wang<sup>1</sup>, Mingyao Lin<sup>1</sup>, and C. C. Chan<sup>2</sup><sup>1</sup>Southeast University, China, <sup>2</sup>The University of Hong Kong, Hong Kong S.A.R.**[TM\_P\_38]****11:20-12:30****Development of Magnetic Eddy Current Testing for Opposite-side Defect Detection in Ferromagnetic Steel Pipeline Inspection**Seung Ahn Chae<sup>1</sup>, Dae Yong Um<sup>2</sup>, and Gwan Soo Park<sup>1</sup><sup>1</sup>Pusan National University, Korea, <sup>2</sup>Newcastle University, UK

**[TM\_P\_39]****11:20-12:30****Design of Anti-Saturated Coil for Robust Wireless Power Transfer in Magnetic Latching System**Yujun Shin<sup>1</sup> and Bumjin Park<sup>2</sup><sup>1</sup>Keimyung University, Korea, <sup>2</sup>Samsung Electronics Co., Ltd., Korea**[TM\_P\_40]****11:20-12:30****Disturbance-Observer-Based Sliding Mode Speed Control for Variable Flux Memory Machines Considering Magnetization State Manipulations**

Yuxiang Zhong, Heyun Lin, and Yang Hui

*Southeast University, China***[TM\_P\_41]****11:20-12:30****A Novel Electromagnetic Voltage Transformer Based on Magnetic Valve**Jiaxin Yuan<sup>1</sup>, Guangchen Ma<sup>1</sup>, Hang Zhou<sup>1</sup>, Jingwen Hou<sup>1</sup>, Yanhui Gao<sup>2</sup>, and Kazuhiro Muramatsu<sup>3</sup><sup>1</sup>Wuhan University, China, <sup>2</sup>Oita University, Japan, <sup>3</sup>Saga University, Japan**[TM\_P\_42]****11:20-12:30****Comparison of Characteristics according to Permanent Magnet Arrangement of Permanent Magnet Linear Synchronous Generator**Cheol Han<sup>1</sup>, Kyung-Hun Shin<sup>2</sup>, and Jang-Young Choi<sup>3</sup><sup>1</sup>Hanon Systems, Korea, <sup>2</sup>Chonnam National University, Korea, <sup>3</sup>Chungnam National University, Korea**[TM\_P\_43]****11:20-12:30****Estimation of Local Demagnetization in Ferrite Magnet Using Pinching-Type Sigmoid Function Based on Gradient Method (P-SiGrad)**

Shunsuke Yamaguchi, Narichika Nakamura, and Yoshifumi Okamoto

*Hosei University, Japan***[TM\_P\_44]****11:20-12:30****Efficient Digital Twin of SPM Based on FEA Enabling Drive Current Harmonics Elimination**

Antonios V. Sideris, Georgios K. Sakkas, and Antonios G. Kladas

*National Technical University of Athens, Greece***[TM\_P\_45]****11:20-12:30****Design of a Low-Cost PM Vernier Machine with Improved Electromagnetic Performance**

Abdur Rehman and Gilsu Choi

*Inha University, Korea***[TM\_P\_46]****11:20-12:30****Examination of Thickness Measurement Method for Hot Spring Scale inside Steel Pipes using Electromagnetic Force Vibration**

Ryota Takasugi, Shinya Shiota, Hiroyuki Ikusada, Shotaro Niwa, Yanhui Gao, and Yuji Gotoh

*Oita University, Japan***[TM\_P\_47]****11:20-12:30****Electromagnetic Performance Analysis and Multi-Objective Optimal Design of a Novel Magnet-Shifted PM Motor for Reducing Torque Ripple**Yonghua Huang<sup>1</sup>, Daohan Wang<sup>1,2</sup>, Zhipeng Li<sup>1</sup>, Xinchen Tu<sup>1</sup>, Jun Nie<sup>1</sup>, and Xiuhe Wang<sup>1</sup><sup>1</sup>Shandong University, China, <sup>2</sup>Shenzhen Research Institute of Shandong University, China

**[TA\_P] Poster Session 3****Session Date** June 4 (Tue.), 2024**Session Time** 14:00-15:30**Session Room** Lobby**Session Chair(s)****[TA\_P\_01]****14:00-15:30****Ion Flow Field Numerical Simulation Method of High-Altitude UHVDC Transmission Lines Based on Weibull-WSE-UFEM**Guohua Yue, Zhiye Du, Gen Li, Jingwen Huang, Yu Zhan, and Ziren Huang  
*Wuhan University, China***[TA\_P\_02]****14:00-15:30****Multidirectional Magnetic Field Decoupling Model Based on Particle Swarm Optimization**Leran Zhang, Minxia Shi, Jianzhi Yang, Ziyang Shi, Yuzheng Ma, and Ao Zhang  
*Beihang University, China***[TA\_P\_03]****14:00-15:30****A Technique for Predicting Magnetic Field Signal of Warship by Applying Spatial Permeability to Reduce Computational Resources**Hyunwon Jeong<sup>1</sup>, Youngmin Kim<sup>1</sup>, Chunghwan Kim<sup>1</sup>, Hyeunsoo Oh<sup>1</sup>, Shinyung Kim<sup>1</sup>, Sanghyeon Im<sup>2</sup>, and Hyangbeom Lee<sup>3</sup>  
*<sup>1</sup>Hanwha Ocean, Korea, <sup>2</sup>Dong-Eui University, Korea, <sup>3</sup>Soongsil University, Korea***[TA\_P\_04]****14:00-15:30****An Iterative Subproblem Technique for Accurate Thin Shell Finite Element Magnetic Models with the h-Conformal Formulations**Vuong Dang Quoc<sup>1</sup>, Hung Bui Duc<sup>1</sup>, Tu Pham Minh<sup>1</sup>, Dinh Bui Minh<sup>1</sup> and Christophe Geuzaine<sup>2</sup>  
*<sup>1</sup>Hanoi University of Science and Technology, Vietnam, <sup>2</sup>University of Liège, Belgium***[TA\_P\_05]****14:00-15:30****Effect of Building Modeling on Ion Flow Field of HVDC Transmission Lines**Jianhui Wang<sup>1</sup>, Li Xie<sup>2</sup>, Tiebing Lu<sup>1</sup>, Yifan Wang<sup>3</sup>, Ming Sun<sup>3</sup> and Mingquan Zeng<sup>3</sup>  
*<sup>1</sup>North China Electric Power University, China, <sup>2</sup>China Electric Power Research Institute, China, <sup>3</sup>State Grid Zhejiang Electric Power Co.Ltd. Research Institute, China***[TA\_P\_06]****14:00-15:30****Design of Shaft Voltage Reduction Shield Considering Eddy Current Loss of IPMSM**Jun-Hyeok Heo<sup>1</sup>, Jun-Kyu Kang<sup>1</sup>, Jun-Hyuk Im<sup>1</sup>, and Jin Hur<sup>1</sup>  
*<sup>1</sup>Incheon National University, Korea, <sup>2</sup>Daegu Mechatronics & Materials Institute, Korea***[TA\_P\_07]****14:00-15:30****State Space Modelling of Microstrip Lines**Lukas Quehenberger<sup>1,2</sup>, Christian Riener<sup>1,2</sup>, and Thomas Bauernfeind<sup>1,2</sup>  
*<sup>1</sup>Institute of Fundamentals and Theory in Electrical Engineering, Graz University of Technology, Austria, <sup>2</sup>TU-Graz SAL GEMC Lab, Silicon Austria Labs, Austria*

**[TA\_P\_08]****14:00-15:30****The Influence of Load Factors on Vibration and Noise Characteristics of 10kV Three-Phase Oil Immersed Transformer**

Zhuangzhuang Zhang, Donghui Wang, Songyang Zhang, Xu Tian, Haodong Feng, Weipo Liu, and Yuan Li

*State Grid Henan Electric Power Research Institute, China***[TA\_P\_09]****14:00-15:30****Accelerated 3D Analysis of Metasurfaces for RIS Applications by Characteristic Basis Functions**Botond Tamás Csathó<sup>1</sup>, Zsolt Badics<sup>1,2</sup>, József Pávó<sup>1</sup>, and Bálint Péter Horváth<sup>1</sup>*<sup>1</sup>Budapest University of Technology and Economics, Hungary, <sup>2</sup>Tensor Research, LLC, USA***[TA\_P\_10]****14:00-15:30****A Second-Order Split-Step Precise Integration Time Domain Method for Solving Maxwell's Equations and Its Numerical Analysis**

Mingjun Chi, Xikui Ma, Liang Ma, Xiaojie Zhu, and Ru Xiang

*Xi'an Jiaotong University, China***[TA\_P\_11]****14:00-15:30****Field Distribution Study for Microwave Processing Plasma Uniformity Enhancement**Keekon Kang<sup>1</sup>, Dohan Kim<sup>2</sup>, Chae-Hwa Shon<sup>1</sup>, Jong-Soo Kim<sup>1</sup>, and Seong-Tae Han<sup>1</sup>*<sup>1</sup>Korea Electrotechnology Research Institute, Korea, <sup>2</sup>Nagoya University, Japan***[TA\_P\_12]****14:00-15:30****Scattering Invariant Mode Wave Propagation in 3D Structure**Olivér Csernyava<sup>1</sup>, József Pávó<sup>1</sup>, and Zsolt Badics<sup>1,2</sup>*<sup>1</sup>Budapest University of Technology, Hungary, <sup>2</sup>Tensor Research, LLC, USA***[TA\_P\_13]****14:00-15:30****Study on the Effect of Different Tank Sizes on Transformer Noise Considering Propagation Paths**

Ziyuan Xin, Dezhi Chen, Haonan Bai, Xianghui Chang, Yuan Wang, and Yibo Zhao

*Shenyang University of Technology, China***[TA\_P\_14]****14:00-15:30****Transmission Line Modeling Method: Uncertainty Quantification on Grounding Systems**Alex Bernsts Tronchoni<sup>1</sup>, Arturo Bretas<sup>2</sup>, Marcos Telló<sup>3</sup>, Lucas Tupi Caldas Pulz<sup>1</sup>, and Daniel da Silva Gazzana<sup>1</sup>*<sup>1</sup>Federal University of Rio Grande do Sul, Brazil, <sup>2</sup>University Grenoble Alpes, CNRS Grenoble INP, G2Elab, France, <sup>3</sup>Vör Electric Porto Alegre, Brazil***[TA\_P\_15]****14:00-15:30****TLM-3D Considering Soil Ionization: Grounding Systems Analysis**Lucas Tupi Caldas Pulz<sup>1</sup>, Marcos Telló<sup>1</sup>, Alex B. Tronchoni<sup>1</sup>, Arturo S. Bretas<sup>2</sup>, and Daniel S. Gazzana<sup>1</sup>*<sup>1</sup>Federal University of Rio Grande do Sul, Brazil, <sup>2</sup>University Grenoble Alpes, CNRS Grenoble INP, G2Elab, France*

**[TA\_P\_16]****14:00-15:30****Magnetic Property Calibration for Vibrating Sample Magnetometers Based on Magnetic Field Analysis**Xiaohan Kong<sup>1</sup>, Yuji Uehara<sup>2</sup>, Naoya Terauchi<sup>3</sup>, Natsuko Sato<sup>3</sup>, Yoshibumi Matsuda<sup>3</sup>, Masanori Nagano<sup>3</sup>, and Hajime Igarashi<sup>1</sup><sup>1</sup>Hokkaido University, Japan, <sup>2</sup>Magnetic Device Laboratory Ltd., Japan, <sup>3</sup>TAIYO YUDEN Co., Ltd., Japan**[TA\_P\_17]****14:00-15:30****A Vector Extension of the D-D-D Hysteresis Model**Valerio De Santis<sup>1</sup> and Alessandro Giuseppe D'Aloia<sup>2</sup><sup>1</sup>University of L'Aquila, Italy, <sup>2</sup>Sapienza University of Rome, Italy**[TA\_P\_18]****14:00-15:30****Study of Magnetostrictive Characteristics Based on Dynamic J-A Model under DC Bias**Zhen Wang<sup>1</sup>, Runjie Yu<sup>1</sup>, Yanli Zhang<sup>1</sup>, Dezhi Chen<sup>1</sup>, Ziyang Ren<sup>1</sup>, and Chang Seop Koh<sup>2</sup><sup>1</sup>Shenyang University of Technology, China, <sup>2</sup>Chungbuk National University, Korea**[TA\_P\_19]****14:00-15:30****An Improved Thermodynamic Hysteresis Model for Electrical Steel Using Minimum of Magnetic Domain Energy to Compute Anhysteresis Magnetization**Xin Wu<sup>1</sup>, Yanli Zhang<sup>1</sup>, Ying Jing<sup>1</sup>, and Chang Seop Koh<sup>2</sup><sup>1</sup>Shenyang University of Technology, China, <sup>2</sup>Chungbuk National University, Korea**[TA\_P\_20]****14:00-15:30****Computer Simulation of Magnetic Properties of Fe-Ni System Bilayer Ribbons under Bending Stress**

Ryota Hirose, Shunsuke Nakashima, Takeshi Yanai, Akihiro Yamashita, Masaki Nakano, and Hirotohi Fukunaga

Nagasaki University, Japan

**[TA\_P\_21]****14:00-15:30****Permanent Magnet Motor Torque Waveform Prediction Using Learned Gap Flux**Yusuke Sakamoto<sup>1</sup>, Bingnan Wang<sup>2</sup>, Tatsuya Yamamoto<sup>1</sup>, and Yuki Nishimura<sup>1</sup><sup>1</sup>Mitsubishi Electric Corporation, Japan, <sup>2</sup>Mitsubishi Electric Research Laboratories (MERL), USA**[TA\_P\_22]****14:00-15:30****A Sensitivity-Region-Extended Robust Optimization Approach for Spoke-Type Permanent Magnet Synchronous Motor**

Jiqi Wu, Xiaoyong Zhu, and Zixuan Xiang

Jiangsu University, China

**[TA\_P\_23]****14:00-15:30****End Effect Calculation of Surface Mounted PM Machine Based on Mesh-Based 2D Magnetic Equivalent Circuit Model**Yanchen Wu<sup>1</sup>, Baocheng Guo<sup>1</sup>, Zekun Wu<sup>1</sup>, and ZhiXiong Jiang<sup>2</sup><sup>1</sup>Nanjing Normal University, China, <sup>2</sup>Pusan National University, Korea

**[TA\_P\_24]****14:00-15:30****Magnetization Estimation for Permanent Magnet Using Convolutional Neural Network**

Kazuki Igarashi, Hidenori Sasaki, Masahide Shioyama, and Yoshifumi Okamoto

*Hosei university, Japan***[TA\_P\_25]****14:00-15:30****Harmonic-Orientated Optimization of a Double-Rotor Flux-Modulated Permanent Magnet Motor**

Zixuan Xiang, Hucheng Qian, and Yuting Zhou

*Jiangsu University, China***[TA\_P\_26]****14:00-15:30****Magnetic Circuit Analysis of Hybrid Excitation Flux Switching Motor with Non-Uniform Auxiliary Air Gap**Daohan Wang<sup>1</sup>, Guangsheng Xu<sup>2</sup>, Cheng Xu<sup>3</sup>, Zhipeng Li<sup>4</sup>, Shuang Xu<sup>5</sup>, and Xiuhe Wang<sup>4</sup>*<sup>1</sup>Shenzhen Research Institute of Shandong University, China, <sup>2</sup>Laiwu Power Supply Company Shandong Electric Power Company State Grid, China, <sup>3</sup>Shandong Luruan Digital Technology Co., Ltd., China, <sup>4</sup>Shandong University, China, <sup>5</sup>Qingdao Power Supply Company Shandong Electric Power Company State Grid, China***[TA\_P\_27]****14:00-15:30****A Study on the Design of Novel Slotless Axial Flux Motor through Comparison With Radial Flux Motor for Collaborative Robot**Jun-Ho Kang<sup>1</sup>, Chae-Won Jo<sup>1</sup>, Cheol-Soon Park<sup>2</sup>, Sung-Hyun Yoon<sup>2</sup>, Chang-Sung Jin<sup>2</sup>, and Ju Lee<sup>1</sup>*<sup>1</sup>Hanyang University, Korea, <sup>2</sup>Wonkwang University, Korea***[TA\_P\_28]****14:00-15:30****Topology Optimization of Magnetic Structure for Electromagnetic Force Maximization Supported by Error Correction Method**Ryota Sawada<sup>1</sup>, Yoshifumi Okamoto<sup>1</sup>, and Akira Ahagon<sup>2</sup>*<sup>1</sup>Hosei University, Japan, <sup>2</sup>JSOL Corporation, Japan***[TA\_P\_29]****14:00-15:30****A Study on the Torque Characteristics of Permanent Magnet-Assisted Synchronous Reluctance Motor with Magnetic Neutral Point Movement**Jeongwon Kim<sup>1</sup>, Hyeon-Bin Hong<sup>1</sup>, Chae-Won Jo<sup>1</sup>, Hee-Won Koo<sup>1</sup>, Sol Kim<sup>2</sup>, and Ju Lee<sup>1</sup>*<sup>1</sup>Hanyang University, Korea, <sup>2</sup>Yuhan University, Korea***[TA\_P\_30]****14:00-15:30****Electromagnetic Design Optimization of a PMSG Using a Deep Neural Network Approach**Belen Campos<sup>1</sup>, Luis Diaz<sup>1</sup>, Concepcion Hernandez<sup>1</sup>, Marco Arjona<sup>1</sup>, and Jorge Lara<sup>2</sup>*<sup>1</sup>Laguna Institute of Technology, Mexico, <sup>2</sup>Lerdo Institute of Technology, Mexico***[TA\_P\_31]****14:00-15:30****Complete Characterization of EMI for ECMs with PEEC Method**

Abdullah Eroglu

*University of Massachusetts Boston, USA*

**[TA\_P\_32]****14:00-15:30****Study on High-Frequency Transformer Variable Inductance for Extending the Maximum Power Level of DAB Converter**Cheol-Woong Choi, Jae-Hyeon So, Jae-Sub Ko, and Dae-Kyong Kim  
*Sunchon National University, Korea***[TA\_P\_33]****14:00-15:30****A New Magnetic Design with Annular Sector Coils of an Inductive Angular Position Sensor**Dan-Ping Xu<sup>1</sup>, Silong Fang<sup>1</sup>, Yi Zhao<sup>1</sup>, Fanlin Zeng<sup>2</sup>, and Sang-Moon Hwang<sup>3</sup><sup>1</sup>Shanghai University, China, <sup>2</sup>Shanghai Zenidrive Technology Co., China <sup>3</sup>Pusan National University, Korea**[TA\_P\_34]****14:00-15:30****Modeling and Experimental Verification of Multilayer Winding Method for the Vibration Improvement of Electric Motor with Sub-Harmonics**Myung-Hwan Yoon, Ki-Doek Lee, Jae-Kwang Lee, and Jeong-Jong Lee  
*Korea Electronics Technology Institute, Korea***[TA\_P\_35]****14:00-15:30****Electromagnetic Force Analysis of Interior Permanent Magnet Synchronous Motors with T-Shaped Notching Rotor**Xinchen Tu<sup>1</sup>, Daohan Wang<sup>1,2</sup>, BingDong Wang<sup>1</sup>, Chengqi Wang<sup>1</sup>, Wenqiang Miao<sup>1</sup>, and Xiuhe Wang<sup>1</sup><sup>1</sup>Shandong University, China, <sup>2</sup>Shenzhen Research Institute of Shandong University, China**[TA\_P\_36]****14:00-15:30****Characteristic Analysis and Designing of 3kW E-Booster and Motor Drive**Eui-Jong Park and Yong-Jae Kim  
*Chosun University, Korea***[TA\_P\_37]****14:00-15:30****New BH Curve Tracking Method Based on Magnetic Contact Force**Chang-Hoon Seok, Jangho Seo, Gui-Hwan Kim, and Hong-Soon Choi  
*Kyungpook National University, Korea***[TA\_P\_38]****14:00-15:30****Experimental Verification for Electromagnetic and Thermal Characteristics of a High-Speed Permanent Magnet Motor with Two Different Rotors**Su-Min Kim<sup>1</sup>, Jong-Hyeon Woo<sup>2</sup>, Sang-Hyeop Kim<sup>1</sup>, Kyeong-Won Kwak<sup>1</sup>, Yong-Joo Kim<sup>1</sup>, Kyung-Hun Shin<sup>3</sup>, and Jang-Young Choi<sup>1</sup><sup>1</sup>Chungnam National University, Korea, <sup>2</sup>LG Electronics Inc., Korea, <sup>3</sup>Changwon National University, Korea**[TA\_P\_39]****14:00-15:30****Effect of Coil Shape on the Critical Load Resistance of Frequency Splitting Phenomenon in Magnetic Resonance Wireless Power Transfer**Min Seung Song, Ho Yeong Lee, and Gwan Soo Park  
*Pusan National University, Korea*

**[TA\_P\_40]****14:00-15:30****Thermal Analysis of SPMSM Based on Phase Change Material Cooling Method**Xuyang Hu, Zhanyang Yu, Yan Li, Jing Wang, and Pengzhe Zhuang  
*Shenyang University of Technology, China***[TA\_P\_41]****14:00-15:30****Detection and Location Estimate of External Surface Defects Using Velocity Effects from Double-Sided Quadrupole Permanent Magnets**Masafumi Kuromizu<sup>1</sup>, Akihiko Motoyama<sup>1</sup>, Kai Komatsubara<sup>1</sup>, Takaaki Nara<sup>2</sup>, and Yuji Gotoh<sup>1</sup>  
*<sup>1</sup>Oita University, Japan, <sup>2</sup>The University of Tokyo, Japan***[TA\_P\_42]****14:00-15:30****Study on Rotor Bar Loss due to Space Harmonics of Line Start Synchronous Reluctance Motor**Hyeonbin Hong<sup>1</sup>, Chaewon Jo<sup>1</sup>, Cheolsoo Park<sup>2</sup>, Jaehyeon Yu<sup>2</sup>, Sol Kim<sup>3</sup>, and Ju Lee<sup>1</sup>  
*<sup>1</sup>Hanyang University, Korea, <sup>2</sup>Wonkwang University, Korea, <sup>3</sup>Yuhan University, Korea***[TA\_P\_43]****14:00-15:30****Development of MR-Sensor-Based Measurement System for Weak Magnetic Field Derived from Fuel Cell and Its Application to Inverse Estimation of Current Density Distribution**Eiji Atsumi, Enoch Choi, Shunsuke Yamaguchi, and Yoshifumi Okamoto  
*Hosei University, Japan***[TA\_P\_44]****14:00-15:30****A Study on the 2D Demagnetization Analysis Error Caused by the 3D End Effect in an Interior Permanent Magnet Synchronous Motor**Sung Gu Lee<sup>1</sup> and Jaenam Bae<sup>2</sup>  
*<sup>1</sup>Dong-A University, Korea, <sup>2</sup>Dongyang Mirae University, Korea***[TA\_P\_45]****14:00-15:30****Development of High-Speed Magnetization Estimator with Multi-Estimation Points in Permanent Magnet**Yuto Hirose, Masahide Shioyama, and Yoshifumi Okamoto  
*Hosei University, Japan***[TA\_P\_46]****14:00-15:30****Performance Evaluation of Single Phase Flux Switching Reluctance Machine for Low Cost Turbo Machinery**Zhipeng Li<sup>1</sup>, Daohan Wang<sup>1,2</sup>, Guangsheng Xu<sup>3</sup>, Shuang Xu<sup>4</sup>, Yonghua Huang<sup>1</sup>, and Xiuhe Wang<sup>1</sup>  
*<sup>1</sup>Shandong University, China, <sup>2</sup>Shenzhen Research Institute of Shandong University, China, <sup>3</sup>Laiwu Power Supply Company Shandong Electric Power Company State Grid Shandong University, China, <sup>4</sup>Qingdao Power Supply Company Shandong Electric Power Company State Grid, China***[TA\_P\_47]****14:00-15:30****Variable Frequency Transformer Design for New Energy Microgrids and Grid Interconnections**Yifan Zhang<sup>1</sup>, Sheng Huang<sup>1</sup>, Bo Ma<sup>1</sup>, Jianguo Zhu<sup>2</sup>, and Gang Lei<sup>3</sup>  
*<sup>1</sup>Hunan University, China, <sup>2</sup>The University of Sydney, Australia, <sup>3</sup>University of Technology Sydney, Australia*



[TA\_P\_48]

14:00-15:30

### **A Study on the Characteristics of Electromagnetic Field of Twin-Inverter System Traction Motor**

Cheol-Min Kim, Chung-Ho Lee, Hong-Jae Jang, Tae-su Kim, Jae-Gak Shin, and Ki-Chan Kim  
*Hanbat National University, Korea*

[TA\_P\_49]

14:00-15:30

### **Dynamic Analysis of a Novel Arc Linear Permanent Magnet Synchronous Motor**

Ikhlaq Ahmad<sup>1</sup>, Mudassir Raza Siddiqi<sup>1</sup>, Hounng-Joong Kim<sup>2</sup>, and Jin Hur<sup>1</sup>  
*<sup>1</sup>Incheon National University, Korea, <sup>2</sup>KOVERY Motor Inc., Korea*

[TA\_P\_50]

14:00-15:30

### **DC-Link Voltage Control Strategy Considering Vessel Condition for Efficiency Improvement of IH Cooktops with PFC Rectifier**

Yun Seong Hwang, Hyeon Soo Kim, Seung Hyun Kang, Man Jae Kwon, and Byoung Kuk Lee  
*Sungkyunkwan University, Korea*

[TA\_P\_51]

14:00-15:30

### **Study on Arc Diagnostic Device for 1000V Class Electric Vehicle Systems**

Jun-Kyu Park, Hyun-Jae Jang, Ki-Dong Song, Yeon-Ho Oh, and Hyun-Mo Ahn  
*Korea Electrotechnology Research Institute, Korea*

**[WM\_P] Poster Session 4****Session Date** June 5 (Wed.), 2024**Session Time** 11:20-12:30**Session Room** Lobby**Session Chair(s)****[WM\_P\_01]****11:20-12:30****Electrostatic Field Analysis Using Physics Informed Neural Net and Partial Differential Equation Solver analysis**

Kart-Leong Lim

*Institute of Microelectronics, A\*STAR, Singapore***[WM\_P\_02]****11:20-12:30****Analysis on Conductive Screen Effects on Dual Air-Gap Surface Permanent Magnet Synchronous Motor**Tae Jun Ahn<sup>1</sup>, Do Hyun Kang<sup>2</sup>, and Gwan Soo Park<sup>1</sup>*<sup>1</sup>Pusan National University, Korea, <sup>2</sup>VAM, Korea***[WM\_P\_03]****11:20-12:30****Analytical Approach of Sideband Electromagnetic Vibration of PMSM Driven by Voltage Source Inverter with SVPWM Strategy**Daohan Wang<sup>1,2</sup>, Chengqi Wang<sup>2</sup>, Wenqiang Miao<sup>3</sup>, Guangsheng Xu<sup>4</sup>, Evarist P. Mwaigaga<sup>3</sup>, and Xiuhe Wang<sup>3</sup>*<sup>1</sup>Shenzhen Research Institute of Shandong University, China, <sup>2</sup>Shandong Luruan Digital Technology Co., Ltd, China, <sup>3</sup>Shandong University, China, <sup>4</sup>Laiwu Power Supply Company State Grid, China***[WM\_P\_04]****11:20-12:30****High Precision Calculation of Transformer Short-Circuit Impedance Based on Energy Method**

Mingyue Wang, Jiaocui Wan, Zhanyang Yu, and Yan Li

*Shenyang University of Technology, China***[WM\_P\_05]****11:20-12:30****A Lower Calculation Amount Algorithm of Electric Field Calculation of HV Semiconductor Device**

Zhaocheng Liu, Xuebao Li, Xiang Cui, and Zhibin Zhao

*North China Electric Power University, China***[WM\_P\_06]****11:20-12:30****Magnetic Force Calculation Using Virtual Air Gap Penetrating Finite Elements**

Gui-Hwan Kim, Hong-Soon Choi, and Chang-Hoon Seok

*Kyungpook National University, Korea*

**[WM\_P\_07]****11:20-12:30****A Magneto-Elastic Vector-Play Model under Rotating Fields and Multiaxial Stress States**Luiz Guilherme da Silva<sup>1,2</sup>, Laurent Bernard<sup>2</sup>, Laurent Daniel<sup>1</sup>, Floran Martin<sup>3</sup>, and Anouar Belahcen<sup>3</sup><sup>1</sup>Laboratory of Electrical Engineering and Electronics of Paris (GeePs), France, <sup>2</sup>Federal University of Santa Catarina, Brazil, <sup>3</sup>Aalto University, Finland**[WM\_P\_08]****11:20-12:30****Magnetostriction Model of Electrical Steel Sheet Considering Temperature Gradient**Zhen Wang<sup>1</sup>, Zheming Fan<sup>1</sup>, Yanli Zhang<sup>1</sup>, Dezhi Chen<sup>1</sup>, Ziyang Ren<sup>1</sup>, and Chang Seop Koh<sup>2</sup><sup>1</sup>Shenyang University of Technology, China, <sup>2</sup>Chungbuk National University, Korea**[WM\_P\_09]****11:20-12:30****Modeling of Magnetic Properties of Silicon Steel Sheets under DC Bias Based on Multi-Scale Dynamic Jiles–Atherton Model**Chao Feng<sup>1</sup>, Yanli Zhang<sup>1</sup>, Ying Jing<sup>1</sup>, and Chang Seop Koh<sup>2</sup><sup>1</sup>Shenyang University of Technology, China, <sup>2</sup>Chungbuk National University, Korea**[WM\_P\_10]****11:20-12:30****Comparison of the Finite Element Method and High-Order Isogeometric Analysis for Modeling Magnetic Vector Hysteresis**Bram Daniels<sup>1</sup>, Mitrofan Curti<sup>1</sup>, Timo Overboom<sup>2</sup>, and Elena Lomonova<sup>1</sup><sup>1</sup>Eindhoven University of Technology, The Netherlands, <sup>2</sup>Royal SMIT Transformers SGB-SMIT Group, The Netherlands**[WM\_P\_11]****11:20-12:30****Loss Calculation of Iron Core under DC Bias and Harmonic Disturbance Conditions**Yidan Hu<sup>1,2</sup>, Jiawen Yu<sup>1</sup>, Zhaoyu Zhang<sup>1</sup>, Xuanrui Zhang<sup>1</sup>, Junhao Li<sup>1</sup>, and Roberto Ottoboni<sup>2</sup><sup>1</sup>Xi'an Jiaotong University, China, <sup>2</sup>Politecnico di Milano, Italy**[WM\_P\_12]****11:20-12:30****Adaptive-Mesh-Generation Magnetic Network Model for Analysis of Hairpin PMSMs Combining with Convolution Neural Network**

Zhangwei Yang, Xiaoyong Zhu, and Deyang Fan

Jiangsu University, China

**[WM\_P\_13]****11:20-12:30****Moving Mesh Method for Semiconductor Device Simulations**Dan Wu<sup>1</sup>, Chijie Zhuang<sup>1,2</sup>, Bo Lin<sup>3</sup>, and Qingyuan Shi<sup>2</sup><sup>1</sup>Beijing Huairou Laboratory, China, <sup>2</sup>Tsinghua University, China, <sup>3</sup>National University of Singapore, Singapore**[WM\_P\_14]****11:20-12:30****Calculation Method of d-Axis Inductance Considering Magnetic Saturation and Cross Coupling Effects under Load Conditions**Kim Dong Su<sup>1</sup>, Lee Byeong Hwa<sup>2</sup>, Lim Myung Seob<sup>3</sup>, and Jung Jae Woo<sup>1</sup><sup>1</sup>Daegu University, Korea, <sup>2</sup>Korea Automotive Technology Institute, Korea, <sup>3</sup>Hanyang University, Korea

**[WM\_P\_15]****11:20-12:30****An AC Copper Loss Calculation Scheme of Synchronous Motor with Rectangular Conductors Considering Pulse Width Modulation Harmonics**Vu-Khanh Tran<sup>1</sup>, Jae-Gil Lee<sup>2</sup>, Pil-Wan Han<sup>2</sup>, and Yon-Do Chun<sup>2</sup><sup>1</sup>University of Science and Technology, Korea, <sup>2</sup>Korea Electrotechnology Research Institute, Korea**[WM\_P\_16]****11:20-12:30****Remaining Useful Life Prediction Model for Lithium-Ion Batteries Using Transfer Learnig Base on Long Short Term Memories**

Dong Hwan Kim, Jong-Hun Lim, Je-yeong Lim, and Byoung Kuk Lee

*Sungkyunkwan University, Korea***[WM\_P\_17]****11:20-12:30****Novel Hybrid 3-D Shape Optimization Method Combining Parameter and Topology Optimizations: Application to Permanent Magnet Motor**

Yoshitsugu Otomo and Takashi Abe

*Nagasaki University, Japan***[WM\_P\_18]****11:20-12:30****A Fast Calculation Method for Current-Carrying Capacity of Submarine Cables in J-Tube Sections**

Zhiye Du, Gen Li, Guohua Yue, and Yu Zhan

*Wuhan University, China***[WM\_P\_19]****11:20-12:30****Synthesis of Boundary Conditions in Magnetics: a Neural Network Approach**Paolo Di Barba<sup>1</sup>, Maria Evelina Mognaschi<sup>1</sup>, Sami Barmada<sup>2</sup>, Nunzia Fontana<sup>2</sup>, and Mauro Tucci<sup>2</sup><sup>1</sup>University of Pavia, Italy, <sup>2</sup>University of Pisa, Italy**[WM\_P\_20]****11:20-12:30****A Novel Hybrid Multi-Objective Optimization Algorithm and Its Application to Designs of Eletromagnetic Devices**Yilun Li<sup>1</sup>, Zhengwei Xie<sup>1</sup>, Shiyong Yang<sup>2</sup>, and Zhuoxiang Ren<sup>3</sup><sup>1</sup>Donghua University, China, <sup>2</sup>Zhejiang University, China, <sup>3</sup>Sorbonne University, France**[WM\_P\_21]****11:20-12:30****Simulation-Driven Machine Learning for Solving the Inverse Problem of PCB-Based Tilt-Inductive Position Sensors**

Antonino Vacalebre, Francesco Campagna, and Ruben Specogna

*University of Udine, Italy***[WM\_P\_22]****11:20-12:30****Topology Optimization of an IPMSM Rotor Considering the Torque Profile Enhancement**Bo Ma<sup>1</sup>, Jiaxiu Yu<sup>1</sup>, Jing Zheng<sup>1</sup>, Jianguo Zhu<sup>2</sup>, and Gang Lei<sup>3</sup><sup>1</sup>Hunan University, China, <sup>2</sup>The University of Sydney, Australia, <sup>3</sup>University of Technology Sydney, Australia

**[WM\_P\_23]****11:20-12:30****A Novel Permanent Magnet Synchronous Machine with Axial Sandwich Structure for Flux Regulating Capability**Daohan Wang<sup>1</sup>, Cheng Xu<sup>2</sup>, Shuang Xu<sup>3</sup>, Jun Nie<sup>4</sup>, Guangsheng Xu<sup>5</sup>, and Xiuhe Wang<sup>4</sup>*<sup>1</sup>Shenzhen Research Institute of Shandong University, China, <sup>2</sup>Shandong Luruan Digital Technology Co., Ltd., China, <sup>3</sup>Qingdao Power Supply Company Shandong Electric Power Company State Grid, China, <sup>4</sup>Shandong University, China, <sup>5</sup>Laiwu Power Supply Company Shandong Electric Power Company State Grid, China***[WM\_P\_24]****11:20-12:30****Electromagnetic Parameter Design and Finite Element Analysis of a Novel Dual-Stator Electric-Thermal Output Machine**Bin Peng<sup>1</sup>, Jiaxin Yuan<sup>1</sup>, Nuochun Liu<sup>2</sup>, Hao Wang<sup>1</sup>, Weizhe Zhang<sup>1</sup>, Jiawei Liu<sup>1</sup>, Xuzhe Li<sup>1</sup>, and Hang Zhou<sup>1</sup>*<sup>1</sup>Wuhan University, China, <sup>2</sup>State Grid Zhejiang Electric Power Company Hangzhou Power Supply Company, China***[WM\_P\_25]****11:20-12:30****Topology Optimization of Rotor Core Structure to Reduce Permanent Magnet Eddy Current Losses in Interior Permanent-Magnet Motor**

Kazuki Kashiwada and Yoshifumi Okamoto

*Hosei University, Japan***[WM\_P\_26]****11:20-12:30****Simplified Optimization of Curved Barrier in Synchronous Reluctance Motor**

Sung Chan Hong and Chaelim Jeong

*Tongmyong University, Korea***[WM\_P\_27]****11:20-12:30****3D FE Analysis of Magnet Segmentation for Reducing the Eddy Current of Arc Linear Servo Motor**Zuhair Abbas<sup>1</sup>, Mudassir Raza Siddiqi<sup>1</sup>, Hounng-Joong Kim<sup>2</sup>, and Jin Hur<sup>1</sup>*<sup>1</sup>Incheon National University, Korea, <sup>2</sup>KOVERY Motor Inc., Korea***[WM\_P\_28]****11:20-12:30****Comparative Analysis of Axial and Radial Flux Motors with Identical Size and Output Power**Cheol Han<sup>1</sup>, Jang-Young Choi<sup>2</sup>, and Jun-Won Yang<sup>2</sup>*<sup>1</sup>Hanon Systems, Korea, <sup>2</sup>Chungnam National University, Korea***[WM\_P\_29]****11:20-12:30****A Study on the Comparison of Electromagnetic Design according to the Application of CFRP Sleeve to IPMSM**

Mun-Seok Jang, Dong-Su Kim, and Jae-Woo Jung

*Daegu university, Korea*

**[WM\_P\_30]****11:20-12:30****Topological Design of a Novel Magnetically Saturated Bridge Arm Reactor With Controllable Inductance**Jiaxin Yuan, Wanting Zhang, Yudong Sun, Hang Zhou, Jiawei Liu, Yu Liu, and Jiefu Tan  
*Wuhan University, China***[WM\_P\_31]****11:20-12:30****Non-Invasive Insulation Resistance Measurement Using an Electromotive Force Excitator Allied with a Rogowski Coil Sensor**Songyi Dian<sup>1</sup>, Bingchen Wang<sup>1</sup>, Hongli Hu<sup>2</sup>, and Kaihao Tang<sup>1</sup>  
*<sup>1</sup>Sichuan University, China, <sup>2</sup>Xi'an Jiaotong University, China***[WM\_P\_32]****11:20-12:30****Design of Dual-Loop Magnetic Coil with High-Efficiency Wireless Charging and Attachment in Asymmetric Magnetic Latching System**Bumjin Park<sup>1</sup> and Dongwook Kim<sup>2</sup>  
*<sup>1</sup>Samsung Electronics Co., Ltd., Korea, <sup>2</sup>Yeungnam University, Korea***[WM\_P\_33]****11:20-12:30****High Fidelity Motor Modeling Method of Vector-Controlled Induction Motor Based on Frequency-Domain FEM Considering PWM Current Harmonics**In-Seok Song, DoHyun Jang, Seok-Won Jung, and Sang-Yong Jung  
*Sungkyunkwan University, Korea***[WM\_P\_34]****11:20-12:30****Inductance Derivation and Experimental Verification according to Operating Range of Interior Permanent Magnet Synchronous Motor**Kyeong-Won Kwak<sup>1</sup>, Su-Min Kim<sup>1</sup>, Sang-Hyeop Kim<sup>1</sup>, Yong-Joo Kim<sup>1</sup>, Kyung-Hun Shin<sup>2</sup>, and Jang-Young Choi<sup>1</sup>  
*<sup>1</sup>Chungnam National University, Korea, <sup>2</sup>Changwon National University, Korea***[WM\_P\_35]****11:20-12:30****Zero-Order Electromagnetic Vibration Reduction Method for Permanent Magnet Synchronous Motor with Harmonic Currents Injection**Bingdong Wang<sup>1</sup>, Daohan Wang<sup>1,2</sup>, Jun Nie<sup>1</sup>, Wenqiang Miao<sup>1</sup>, Chengqi Wang<sup>1</sup>, and Xiuhe Wang<sup>1</sup>  
*<sup>1</sup>Shandong University, China, <sup>2</sup>Shenzhen Research Institute of Shandong University, China***[WM\_P\_36]****11:20-12:30****A Drive-Charging Integrated System Based on a New AC Flux-Regulation Permanent Magnet Synchronous Motor**Xiaoji Wang<sup>1</sup>, Daohan Wang<sup>1,2</sup>, Evarist P. Mwaigaga<sup>1</sup>, Rongxiao Yan<sup>1</sup>, Zhipeng Li<sup>1</sup>, and Xiuhe Wang<sup>1</sup>  
*<sup>1</sup>Shandong University, China, <sup>2</sup>Shenzhen Research Institute of Shandong University, China***[WM\_P\_37]****11:20-12:30****Design of Asymmetric Consequent-Pole SPMSM for Reduction Torque Ripple**Chaewon Jo<sup>1</sup>, Heewon Koo<sup>1</sup>, Hyeonbin Hong<sup>1</sup>, Jongmin Kim<sup>2</sup>, Changsung Jin<sup>2</sup>, and Ju Lee<sup>1</sup>  
*<sup>1</sup>Hanyang University, Korea, <sup>2</sup>Wonkwang University, Korea*

**[WM\_P\_38]****11:20-12:30****Magnetic Field Analysis and Calculation of Slotless Axial Flux Permanent Magnet Motor with Sinusoidal Back EMF**Chengwu Diao<sup>1</sup>, Wenliang Zhao<sup>1</sup>, Longxuan Li<sup>1</sup>, Sunil Kumar<sup>2</sup>, and Byung-Il Kwon<sup>3</sup><sup>1</sup>Shandong University, China, <sup>2</sup>Ghulam Ishaq Khan Institute of Engineering Sciences and Technology, Pakistan, <sup>3</sup>Hanyang University, Korea**[WM\_P\_39]****11:20-12:30****Fast Computation of Steady-State Performance in Line-Start Synchronous Reluctance Motor Based on Equivalent Circuit and Finite Element Analysis**Hyunwoo Kim<sup>1</sup>, Chaewon Jo<sup>1</sup>, Heewon Koo<sup>1</sup>, Hyeonbin Hong<sup>1</sup>, Sol Kim<sup>2</sup>, and Ju Lee<sup>1</sup><sup>1</sup>Hanyang University, Korea, <sup>2</sup>Yuhan University, Korea**[WM\_P\_40]****11:20-12:30****Computation of Geometric Mean Distance through Monte Carlo Simulation to Predict Inductance of Circular Coil with Arbitrary Cross-Section**

Ho Yeong Lee and Gwan Soo Park

Pusan National University, Korea

**[WM\_P\_41]****11:20-12:30****Selection of Shared Rotors for Magnetic Geared Motor to Reduce Permanent Magnet Usage**Beom-Seok Byeon<sup>1</sup>, Eui-Jong Park<sup>1</sup>, Sang-Yong Jung<sup>2</sup>, and Yong-Jae Kim<sup>1</sup><sup>1</sup>Chosun University, Korea, <sup>2</sup>Sungkyunkwan University, Korea**[WM\_P\_42]****11:20-12:30****Performance Prediction Process of Outer Rotor PMSM through 3-D Flux Coefficient Using Equivalent 2-D FEA**Moo-hyun Sung<sup>1</sup>, Kyoung-soo Cha<sup>2</sup>, Young-hoon Jung<sup>3</sup>, Jae-han Sim<sup>4</sup>, Soon-o Kwon<sup>2</sup>, and Myung-Seop Lim<sup>1</sup><sup>1</sup>Hanyang University, Korea, <sup>2</sup>Korea Institute of Industrial Technology, Korea, <sup>3</sup>Yeungnam University, Korea, <sup>4</sup>LG Electronics Inc., Korea**[WM\_P\_43]****11:20-12:30****Study on Performance Changes of EV Traction Motor Applying CFRP Sleeve to IPMSM**

Si-Uk Jung, Dong-Su Kim, Jae-Seung Lee, and Jae-Woo Jung

Deagu University, Korea

**[WM\_P\_44]****11:20-12:30****Investigation of Machine Parameter Mismatch on Sensorless PMSM Drives**

Wenlong Li, Jin Zhang, Baojian Ji, Jian Guo, Yutao Jiang, and Haoran Liu

Nanjing University of Science and Technology, China

**[WM\_P\_45]****11:20-12:30****The Design and Research Analysis of HVAC System Three-Phase Energy-Draining Fault Current Limiter**

Jiawei Liu, Jiaxin Yuan, Hang Zhou, and Wanting Zhang

Wuhan University, China



[WM\_P\_46]

11:20-12:30

## **New Winding Structure for VR Resolver for Robustness and Fault Diagnosis**

Sung-Won Lee, Jun-Kyu Kang, Jun-Hyeok Heo, and Jin Hur

*Incheon National University, Korea*

[WM\_P\_47]

11:20-12:30

## **An Efficient Hybrid DC Circuit Breaker Based on Current Commutation with Mechanical and Power Electronics**

Hyun-Mo Ahn<sup>1</sup>, Jun-Kyu Park<sup>1</sup>, Hyun-Jae Jang<sup>1</sup>, Yeon-Ho Oh<sup>1</sup>, Sung-Chin Hahn<sup>2</sup>, and Ki-Dong Oh<sup>1</sup>

*<sup>1</sup>Korea Electrotechnology Research Institute, Korea, <sup>2</sup>Korea Electrical Manufacturers Association, Korea*

**[WA\_P] Poster Session 5**

<b>Session Date</b>	<b>June 5 (Wed.), 2024</b>
<b>Session Time</b>	<b>14:00-15:30</b>
<b>Session Room</b>	<b>Lobby</b>
<b>Session Chair(s)</b>	

**[WA\_P\_01]****14:00-15:30****Dynamic Analysis of Surface and Space Charge with Floating Conductor under Dielectric Liquid Discharge**

Yonghee Kim, Hyemin Kang, and Se-Hee Lee  
*Kyungpook National University, Korea*

**[WA\_P\_02]****14:00-15:30****Parametric Model Order Reduction of Darwin Model Considering Nonlinear Magnetic Materials**

Shingo Hiruma<sup>1</sup>, Yuki Sato<sup>2</sup>, and Tetsuji Matsuo<sup>1</sup>  
<sup>1</sup>*Kyoto University, Japan*, <sup>2</sup>*Aoyama Gakuin University, Japan*

**[WA\_P\_03]****14:00-15:30****Analytical Modeling of Inductance in Electric Thermal Storage Steam Supply System**

Jiaocui Wan, Yan Li, Zhanyang Yu, Mingyue Wang, and Shun Yu  
*Shenyang University of Technology, China*

**[WA\_P\_04]****14:00-15:30****Nondestructive Inverse Estimation Method of Permanent Magnet Magnetization Using No-Load BEMF of PMSM**

Hajime Suzuki and Yoshifumi Okamoto  
*Hosei University, Japan*

**[WA\_P\_05]****14:00-15:30****Numerical Analysis for Long-Term Negative Discharges in Air with Needle-Plane Electrode Configuration**

Minhee Kim, Ju Jin Son, and Yong Sung Cho  
*Korea Electrotechnology Research Institute, Korea*

**[WA\_P\_06]****14:00-15:30****AC Iron Loss Investigation with Consideration of a DC Bias Magnetisation in Non-Grain Oriented Electrical Steel Sheets**

Christoph Dobler<sup>1</sup>, Gilsu Choi<sup>2</sup>, Gereon Goldbeck<sup>1</sup>, Daniel Wöckinger<sup>1</sup>, and Gerd Bramerdorfer<sup>1</sup>  
<sup>1</sup>*Johannes Kepler University Linz, Austria*, <sup>2</sup>*Inha University, Korea*

**[WA\_P\_07]****14:00-15:30****Calculation of Iron Loss in Soft Magnetic Composites Using Neural Network-Based Dynamic Hysteresis Model under SVPWM Excitation**

Ying Jing<sup>1</sup>, Yanli Zhang<sup>1</sup>, Dianhai Zhang<sup>1</sup>, and Jianguo Zhu<sup>2</sup>  
<sup>1</sup>*Shenyang University of Technology, China*, <sup>2</sup>*University of Sydney, Australia*

**[WA\_P\_08]****14:00-15:30****Machine Learning to Predict Effective Conductivity of Composite Materials for Shielding Applications**A. Kameni<sup>1</sup>, D. Palessonga<sup>1,2</sup>, Z. Semmoumy<sup>1</sup>, and M. Bensetti<sup>1</sup><sup>1</sup>Laboratory of Electrical Engineering and Electronics of Paris (GeePs), France, <sup>2</sup>ESME Research Lab, France**[WA\_P\_09]****14:00-15:30****Acceleration of Waveform Control for Measurement of Magnetic Hysteresis Based on Single Sheet Tester Using Neural Network**Tatsuya Yamaguchi<sup>1</sup>, Yuki Kuroda<sup>1</sup>, Yoshifumi Okamoto<sup>1</sup>, Hidenori Sasaki<sup>1</sup>, and Koji Fujiwara<sup>2</sup><sup>1</sup>Hosei University, Japan, <sup>2</sup>Doshisha University, Japan**[WA\_P\_10]****14:00-15:30****Multi-Physics Analysis and Optimal Design of an Outer Rotor Surface Mounted Permanent Magnet Synchronous Motor for Coaxial Drone**Jae Beom Kang<sup>1,2</sup>, Ji Heon Lee<sup>2,3</sup>, Hyeong Jin Kim<sup>2</sup>, and Ji Young Lee<sup>1,2</sup><sup>1</sup>University of Science and Technology, Korea, <sup>2</sup>Korea Electrotechnology Research Institute, Korea, <sup>3</sup>Pusan National University, Korea**[WA\_P\_11]****14:00-15:30****Propagation Characteristics of End-Winding Insulation Fatigue Damage in Variable Frequency Motor under Multi-Field Coupling**Bangwei Zhang<sup>1</sup>, Haijun Zhang<sup>1</sup>, Jiashun Wang<sup>1</sup>, and Guowen Cao<sup>2</sup><sup>1</sup>Hubei Key Laboratory of Power System Design and Test for Electrical Vehicle Hubei University of Arts and Science, China, <sup>2</sup>Taiyuan University of Science and Technology, China**[WA\_P\_12]****14:00-15:30****Fatigue Propagation Analysis of Crack Failure in High Power IGBT Solder Based on Multiphysics Coupling Model and XFEM**

Jiashun Wang, Haijun Zhang, Bangwei Zhang, and Haifeng Kong

*Hubei Key Laboratory of Power System Design and Test for Electrical Vehicle Hubei University of Arts and Science, China***[WA\_P\_13]****14:00-15:30****Study on Transformer Core Vibration Noise Based on Low-Noise Electrical Steel Sheets**

Ziyuan Xin and Dezhi Chen

*Shenyang University of Technology, China***[WA\_P\_14]****14:00-15:30****Investigation of Convergence of Linear Solvers in Electromagnetic Finite Element Analysis with Electric Circuit**

Kota Watanabe and Naruki Tokunaga

*Muroran Institute of Technology, Japan*

**[WA\_P\_15]****14:00-15:30****A Fast Multiscale Numerical Algorithm for Coupling Dynamics of the Bubble in Insulating Oil under the Electric Field**Yanxin Ren<sup>1</sup>, Nana Duan<sup>1</sup>, Yulu Fan<sup>1</sup>, Weijie Xu<sup>2</sup>, and Shuhong Wang<sup>1</sup><sup>1</sup>*Xi'an Jiaotong University, China*, <sup>2</sup>*State Grid Shaanxi Electric Power Co., China***[WA\_P\_16]****14:00-15:30****Optimum Parameter Selection for Accurate FDTD Simulations in Dispersive Media**Theodoros T. Zygidis<sup>1</sup>, Stamatios Amanatiadis<sup>1</sup>, Tadao Ohtani<sup>2</sup>, Yasushi Kanai<sup>3</sup>, and Nikolaos Kantartzis<sup>4</sup><sup>1</sup>*University of Western Macedonia, Greece*, <sup>2</sup>*Independent Researcher, Japan*, <sup>3</sup>*Niigata Institute of Technology, Japan*, <sup>4</sup>*Aristotle University of Thessaloniki, Greece***[WA\_P\_17]****14:00-15:30****Analysis of Fire Propagation in Electrical Cable Tray Using the FLASH-CAT Model**Hyun-Min Kang<sup>1</sup>, Jaiho Lee<sup>2</sup>, Young-Seob Moon<sup>2</sup>, and Ho-Young Lee<sup>1</sup><sup>1</sup>*Changshin University, Korea*, <sup>2</sup>*Korea Institute of Nuclear Safety, Korea***[WA\_P\_18]****14:00-15:30****Analysis and Optimization Design of V-Type Permanent Magnet Motor with Harmonic-Injected Shaped Rotor for Improved Torque Characteristics**

Xinyang Chen, Deyang Fan, Xiaoyong Zhu, Li Quan, Wu Shan, Hongzuo Tian, and Jun Luo

*Jiangsu University, China***[WA\_P\_19]****14:00-15:30****Multiple Level and Objective Optimization of Double Stator Flux Switching Permanent Magnet Motor Considering Multi-Mode Operating Conditions**

Xiaolei Cai, Xiaoyong Zhu, Lei Xu, and Zixuan Xiang

*Jiangsu University, China***[WA\_P\_20]****14:00-15:30****Optimal Design of Dy-Free Permanent Magnet Motor for Irreversible Demagnetization through Experimental Design**

Sung-Hyun Yoon, Cheol-Soon Park, Jong-Min Kim, and Chang-Sung Jin

*Wonkwang University, Korea***[WA\_P\_21]****14:00-15:30****Accelerating Coil Path Optimization via Truncated Singular Value Decomposition Coupled with Adaptive Cross-Approximation**Takuma Koiso<sup>1</sup>, Kengo Sugahara<sup>1</sup>, and Akihiro Ida<sup>2</sup><sup>1</sup>*Kindai University, Japan*, <sup>2</sup>*Japan Agency for Marine-Earth Science and Technology, Japan***[WA\_P\_22]****14:00-15:30****An Improved Multi-Objective GA for Low Frequency Metamaterial Unit Robust Optimization under Uncertainty**

Yiyang Li, Xiaowen Xu, and Shiyong Yang

*Zhejiang University, China*

**[WA\_P\_23]****14:00-15:30****Structural Optimization and Simulation Analysis of Orthogonal Controllable Reactors**

Jiaxin Yuan, Jingwen Hou, Xianfeng Zheng, Hang Zhou, Guangchen Ma, and Xuzhe Li  
*Wuhan University, China*

**[WA\_P\_24]****14:00-15:30****Real-Time Design and Characterization of Inductive Position Sensors through AI-Driven DesSS**

Francesco Campagna, Francesco Trevisan, and Ruben Specogna  
*DPIA, EMCLab University of Udine, Italy*

**[WA\_P\_25]****14:00-15:30****Multiphysics Deep Learning for Topology Optimization of Permanent Magnet Motor**

Ryosuke Mikami, Hayaho Sato, Tamaki Kujimichi, and Hajime Igarashi  
*Hokkaido University, Japan*

**[WA\_P\_26]****14:00-15:30****Analysis and Design Of High Torque Density Robotic Joint Motors Based On Equivalent Magnetic Circuits**

Daohan Wang<sup>1</sup>, Cheng Xu<sup>2</sup>, Shuang Xu<sup>3</sup>, Jun Nie<sup>4</sup>, Guangsheng Xu<sup>5</sup>, and Xiuhe Wang<sup>4</sup>  
<sup>1</sup>Shenzhen Research Institute of Shandong University, China, <sup>2</sup>Shandong Luruan Digital Technology Co., Ltd., China, <sup>3</sup>Qingdao Power Supply Company Shandong Electric Power Company State Grid, China, <sup>4</sup>Shandong University, China, <sup>5</sup>Laiwu Power Supply Company Shandong Electric Power Company State Grid

**[WA\_P\_27]****14:00-15:30****Novel Design Optimization Strategy Using a Lumped Magnetic-Circuit Model for Surface Permanent-Magnet Machine with Step-Skewing Rotor**

Jin-Seok Kim<sup>1</sup>, Rae-Eun Kim<sup>1</sup>, Jae-Woo Kang<sup>1</sup>, and Jangho Seo<sup>2</sup>  
<sup>1</sup>Korea Electronics Technology Institute, Korea, <sup>2</sup>Kyungpook National University, Korea

**[WA\_P\_28]****14:00-15:30****Fast Estimation System of Permanent Magnet Magnetization Using 2D-Arrayed Hall Sensors Combined with Deep Neural Network**

Masahide Shioyama and Yoshifumi Okamoto  
*Hosei University, Japan*

**[WA\_P\_29]****14:00-15:30****Nondestructive Estimation of Permanent Magnet Magnetization Using Measured Value of Leakage Flux Originating from PMSM Rotor**

Narichika Nakamura, Masahide Shioyama, and Yoshifumi Okamoto  
*Hosei University, Japan*

**[WA\_P\_30]****14:00-15:30****A Novel Mesh-Based Reluctance Network Model for Magnetic Lead Screw**

Junfei Wu<sup>1</sup>, Lixun Zhu<sup>1</sup>, Wei Li<sup>2</sup>, Weimin Wu<sup>1</sup>, and Chang-seop Koh<sup>3</sup>  
<sup>1</sup>Shanghai Maritime University, China, <sup>2</sup>Tongji University, China, <sup>3</sup>Chungbuk National University, Korea

**[WA\_P\_31]****14:00-15:30****Evolution and Comparison of Two Axial-Flux PM Machines for All-Electric Aircraft Propulsion**Dingbang Long<sup>1</sup>, Honghui Wen<sup>1</sup>, Zhikang Shuai<sup>1</sup>, Yafei Lu<sup>2</sup>, and Bingjie Zhu<sup>2</sup><sup>1</sup>Hunan University, China, <sup>2</sup>National University of Defense Technology, China**[WA\_P\_32]****14:00-15:30****Comparative Research of Yokeless and Segmented Armature Axial Flux Motors with Surface-Mounted and Tangential Permanent Magnet Rotor**Wenjing Zhang<sup>1</sup>, Yanliang Xu<sup>1</sup>, and Feng Xin<sup>2</sup><sup>1</sup>Shandong University, China, <sup>2</sup>Shandong Institute for Product Quality Inspection, China**[WA\_P\_33]****14:00-15:30****Design Consideration of a Permanent Magnet Assist Synchronous Reluctance Motor Used in Oil-Submersible Electric Pump System**

Peng Zhou, Yanliang Xu, and Yang Chu

*Shandong University, China***[WA\_P\_34]****14:00-15:30****Optimal Design to Maximize Efficiency Map of a Hairpin Motor with Electrical Winding Changeover Technique for EV**

Young-Ho Hwang, Ho-Jin Oh, Hye-Won Yang, Seok-Won Jung, and Sang-Yong Jung

*Sungkyunkwan University, Korea***[WA\_P\_35]****14:00-15:30****Design and Research on Machine Modulation Ratio Effect for Power Factor Characteristics of the Permanent Magnet Linear Machine**Dingying Wu<sup>1</sup>, Jin Xu<sup>1,2</sup>, and Heyun Lin<sup>1</sup><sup>1</sup>Southeast University, China, <sup>2</sup>Naval University of Engineering, China**[WA\_P\_36]****14:00-15:30****Investigation of Winding Power Loss in Flux Modulated Permanent Magnet Machine Considering Multi-Physics Factors**

Shaoshuai Wang, Jianzhong Zhang, Yongbin Wu, and Ning Wang

*Southeast University, China***[WA\_P\_37]****14:00-15:30****Analysis of Magnetic Field Modulation Mechanism in Transverse Flux Cylindrical Linear Generator Used in Direct Drive Wave Energy Conversion**

Minshuo Chen, Lei Huang, Yuan Li, and Shuhua Fang

*Southeast University, China***[WA\_P\_38]****14:00-15:30****Study on the Rotor Bar Curvature to Increase Starting Torque in Cryogenic Induction Motor**

Younghyun Song, Seung Ahn Chae, and Gwan Soo Park

*Pusan National University, Korea*

**[WA\_P\_39]****14:00-15:30****Structural Design and Electromagnetic Performance Analysis of 50Mvar HTS Synchronous Condenser**Yue Liu<sup>1</sup>, Lin Li<sup>1</sup>, Jiahui Zhu<sup>2</sup>, and Panpan Chen<sup>2</sup><sup>1</sup>North China Electric Power University, China, <sup>2</sup>China Electric Power Research Institute, China**[WA\_P\_40]****14:00-15:30****A Magnetic Planetary Gear Permanent Magnet Machine with Double Blades for Offshore Marine Current Generation System**

Qinghai Qin, Shuhua Fang, Haitao Yu, Yulei Liu, and Qiongfang Zhang

Southeast University, China

**[WA\_P\_41]****14:00-15:30****Analytical Modeling and Dynamic Characterization of Radial Magnetic Couplings**

Xiao Liu, Shuo Qin, Shengxi Weng, Meng Lu, and Pingting Lin

Hunan University, China

**[WA\_P\_42]****14:00-15:30****Mechanical Field Calculation and Analysis of a High-Speed PMSM**Jun Che<sup>1</sup>, Fei Zhao<sup>1</sup>, Bin Chen<sup>2,3</sup>, Mengzhu Cao<sup>1</sup>, Jiwei Cao<sup>3</sup>, Qasim Ali<sup>4</sup>, and Shahid Atiq<sup>5</sup><sup>1</sup>Harbin Institute of Technology, China, <sup>2</sup>Zhuhai GREE Electrical Appliance Co., Ltd., Guangdong Provincial Key Laboratory of High-Speed and Energy-Saving Motor System Enterprises, China,<sup>3</sup>Guangdong Provincial Key Laboratory of High-Speed and Energy-Saving Motor System Enterprises, China, <sup>4</sup>Sukkur IBA University, Pakistan, <sup>5</sup>Khwaja Fareed University of Engineering & Information Technology, Pakistan**[WA\_P\_43]****14:00-15:30****Magnetic Field Simulation and Measurement of MMC Submodule under Dual Pulse Test**Hailin Li<sup>1,2,3</sup>, Zhonting Chang<sup>1</sup>, Shuhong Wang<sup>3</sup>, Yongjie Hu<sup>1</sup>, Zhilei Si<sup>1</sup>, Kepeng Xia<sup>1</sup>, Lulu Liu<sup>1</sup>, and Kun Liu<sup>1</sup><sup>1</sup>XJ Electric Co. Ltd., China, <sup>2</sup>Zhegzhou University of Light Industry, China, <sup>3</sup>Xi'an Jiaotong University, China**[WA\_P\_44]****14:00-15:30****Analysis of an Inductive Angular Position Sensor Using Eddy Current Effect**Dan-Ping Xu<sup>1</sup>, Guochao Ma<sup>1</sup>, Silong Fang<sup>1</sup>, Fanlin Zeng<sup>2</sup>, and Sang-Moon Hwang<sup>3</sup><sup>1</sup>Shanghai University, China, <sup>2</sup>Shanghai Zenidrive Technology Co., Ltd., China, <sup>3</sup>Pusan National University, Korea**[WA\_P\_45]****14:00-15:30****Efficiency Analysis of Delta Winding Connected BLDC Motor According to Occurrence of Circulating Current**Ho-Young Lee<sup>1</sup>, Kyoung-Soo Cha<sup>1</sup>, Seung-Young Yoon<sup>1</sup>, Chang-Hoon Seok<sup>3</sup>, Soon-O Kwon<sup>1</sup>, and Myung-Seop Lim<sup>2</sup><sup>1</sup>Korea Institute of Industrial Technology, Korea, <sup>2</sup>Hanyang University, Korea, <sup>3</sup>Kyungpook University, Korea



[WA\_P\_46]

14:00-15:30

## A Study on Reduction of AC Copper Loss According to Pole/Slot Combination of EV Traction Motor

Jin-uk Choi<sup>1</sup>, Ki-deok Lee<sup>1</sup>, Jae-Kwang Lee<sup>1</sup>, Jeong-Jong Lee<sup>1</sup>, Myung-Hwan Yoon<sup>1</sup>, Dong-Hoon Jeong<sup>2</sup>, and Ju Lee<sup>3</sup>

<sup>1</sup>Korea Electronics Technology Institute, Korea, <sup>2</sup>Halla University, Korea, <sup>3</sup>Hanyang University, Korea

[WA\_P\_47]

14:00-15:30

## A Comprehensive Design Approach to Minimize Position Error in Variable Reluctance Resolver

Jungmoon Kang and Gilsu Choi

*Inha University, Korea*

[WA\_P\_48]

14:00-15:30

## Study on Equivalent 2-D Finite Element Analysis Model for Axial Flux Permanent Magnet Motor Considering the End Effect in Radial Direction

Jae-Seung Lee, Dong-Su Kim, Si-Uk Jung, and Jae-Woo Jung

*Daegu University, Korea*