icoPESA

2023 the 7th International Conference on

POWER ENERGY SYSTEMS AND APPLICATIONS

2023 年第七届电力能源系统与应用国际会议

Nanjing, China | February 24-26, 2023

中国，南京 | 2023 年 2 月 24-26 日

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Welcome Message

前言

On behalf of the conference committees, we are pleased to welcome you to 2023 the 7th International Conference on Power Energy Systems and Applications (ICoPESA), which will be held in Nanjing, China on February 24-26, 2023, co-sponsored by Nanjing University of Aeronautics and Astronautics and Singapore Institute of Electronics, hosted by Nanjing University of Aeronautics and Astronautics. We would like to invite you to participate in this international conference, to share your recent research outcome as well as taking this opportunity to meet academia, scientists and researchers from different parts of the world.

This event provides a unique opportunity for international scholars, researchers and practitioners working in a wide variety of scientific areas with a common interest in power energy systems and applications to get the theoretical grounding, practical knowledge, and personal contacts needed to build a long term, profitable and sustainable connection among each other.

It's our great pleasure to invite 12 prestigious experts and professors to deliver the latest information in their respective expertise areas, they are:
Prof. Xinbo Ruan, Nanjing University of Aeronautics and Astronautics, China
Prof. Loi Lei Lai, Guangdong University of Technology, China
Prof. Guan-Jun Zhang, Xi'an Jiaotong University, China
Prof. Fushuan Wen, Zhejiang University, China
Prof. Donglian Qi, Zhejiang University, China
Prof. Jun Jiang, Nanjing University of Aeronautics and Astronautics, China
Prof. Jianning Yin, Xi'an University of Technology, China
Prof. Soteris A. Kalogirou, Cyprus University of Technology, Cyprus
Prof. Gianfranco Chicco, Politecnico di Torino, Italy
Prof. Xuzhen Huang, Nanjing University of Aeronautics and Astronautics, China
Prof. Haoran Zhao, Shandong University, China
Prof. Xin Dai, Chongqing University, China

We'd like to express our sincere gratitude to everyone who has contributed to ICoPESA 2023 as its success could have only been achieved through a team effort. Additionally, our special thanks go to all the conference committees, for putting the conference together; as well as to all the technical committee members and reviewers for their excellent work in reviewing the papers and their other academic support efforts. Finally, we are particularly grateful to all the authors and presenters of the papers as well as all the attendees for their contributions to this wonderful conference.

Finally, we hope you have a fruitful and memorable experience at ICoPESA 2023!

With Warmest Regards,
Conference Organizing Committees

Conference Schedule

会议日程

February 24th (Friday, GMT+8) | 2 月 24 日（周五）

Onsite Meeting 南京线下会议签到		
10:00-17:00	Registration & Collecting Conference Material | 1 楼酒店大厅	
Online Meeting Test 线上会议测试		
Zoom Link	https://us02web.zoom.us/j/84094281163	https://us02web.zoom.us/j/83131556021
10:00-12:00	Special Session 1C, 1D, 1E	Special Session 1F, 1G, 1H
14:00-16:00	Session 2B, Session 3B, Workshop	Session 1, Session 2, Session 3
17:00-18:00	Conference Speakers, Session Chairs	Best Paper Competitions

February 25th (Saturday, GMT+8) | 2 月 25 日（周六）

Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅	
Zoom Link	https://us02web.zoom.us/j/84094281163	
Speech Host	Jun Jiang, Nanjing University of Aeronautics and Astronautics, China	
9:20-9:30	Opening Remarks	Prof. Chaohai Zhang, Nanjing University of Aeronautics and Astronautics, China
9:30-10:00	Keynote	Prof. Xinbo Ruan, Nanjing University of Aeronautics and Astronautics, China
10:00-10:30	Keynote	Prof. Loi Lei Lai, Guangdong University of Technology, China
10:30-11:00	Group Photo & Coffee Break	
11:00-11:30	Keynote	Prof. Guan-Jun Zhang, Xi'an Jiaotong University, China
11:30-12:00	Keynote	Prof. Fushuan Wen, Zhejiang University, China
12:00-13:30	Lunch	
Speech Host	Jin Li, Tianjin University, China	
13:20-13:50	Keynote	Prof. Donglian Qi, Zhejiang University, China
13:50-14:20	Keynote	Prof. Jun Jiang, Nanjing University of Aeronautics and Astronautics, China
14:20-14:50	Keynote	Prof. Jianning Yin, Xi'an University of Technology, China
14:50-15:00	Coffee Break	
Speech Host	Vladimir Terzija, Skolkovo Institute of Science and Technology, Russia	
15:00-15:30	Keynote	Prof. Soteris A. Kalogirou, Cyprus University of Technology, Cyprus
15:30-16:00	Keynote	Prof. Gianfranco Chicco, Politecnico di Torino, Italy
16:00-16:10	Coffee Break	
16:10-18:30	Best Student Paper Competition A SA0451, SA1831, SA1892, SA0421, SA1014, SA0843, SA1971	
Online Meeting 线上会议		
Zoom Link	https://us02web.zoom.us/j/84094281163	https://us02web.zoom.us/j/83131556021
16:10-18:10	Best Student Paper Competition B SA004, SA1671, SA1601, SA1571, SA006, SA1503	Best Industrial Paper Competition SA1364, SA1462, SA0291, SA2091, SA0625
18:10-20:00	Conference Dinner	

February 26th (Sunday, GMT+8) | 2 月 26 日（周日）

Room	Dong Shan Hall (2nd Floor) | 2 楼东山厅	
Zoom Link	https://us02web.zoom.us/j/84094281163	
Speech Host	Linlin Zhong, Southeast University, China	
8:30-9:00	Keynote	Prof. Xuzhen Huang, Nanjing University of Aeronautics and Astronautics, China
9:00-9:30	Keynote	Prof. Haoran Zhao, Shandong University, China
9:30-10:00	Keynote	Prof. Xin Dai, Chongqing University, China
10:00-10:0	Break	

Room	Dong Shan Hall (2nd Floor) | 2 楼东山厅	Mo Lin Hall (2nd Floor) | 2 楼秣陵厅
10:10-11:40	Special Session 1A SA1661, SA1611, SA0431, SA0813, SA1214, SA1621	Special Session 2A SA1004, SA1314, SA0391, SA0833, SA1901, SA1194
12:00-13:30	Lunch & Break	
13:30-15:00	Special Session 1B SA1044, SA1104, SA1711, SA1801, SA1352, SA1395	Special Session 3A SA0933, SA0304, SA0721, SA0363, SA1591, SA1174
15:00-15:30	Coffee Break	
15:30-16:30	Poster Session SA0903, SA0441, SA2021, SA0463, SA1452, SA0661, SA1335, SA1405	
17:30-19:00	Conference Dinner	

	Online Meeting 线上会议			
Zoom Link	https://us02web.zoom.us/j/83131556021	https://us02web.zoom.us/j/89249120204	https://us02web.zoom.us/j/82537439224	https://us02web.zoom.us/j/84037960352
10:10-12:25	Special Session 1C SA0681, SA1244, SA1254, SA1961, SA0913, SA0953, SA1741, SA1325, SA1523	Special Session 1D SA2061, SA1553, SA1422, SA2104, SA1731, SA2051, SA1533, SA1821, SA007	Special Session 2B SA0783, SA1124, SA0691, SA0943, SA0635, SA0793, SA0493, SA1294, SA2081	Special Session 3B SA0773, SA2011, SA1751, SA1771, SA1701, SA0873, SA1094, SA0351
12:00-13:30	Break			
13:30-15:30	Special Session 1E SA1432, SA002, SA0513, SA1641, SA1442, SA1761, SA0994, SA003, SA1054	Special Session 1F SA1921, SA1114, SA1412, SA1134, SA0853, SA0751, SA0731, SA1931, SA1513	Session 1 SA1084, SA2041, SA1991, SA1274, SA1064, SA0483, SA0411, SA005	Session 2 SA0503, SA1564, SA1483, SA1721, SA301, SA0655, SA0923, SA0984
15:30-16:00	Break			
16:00-18:15	Special Session 1G SA1865, SA1164, SA0963, SA1473, SA1875, SA1024, SA0645, SA1691, SA1681	Special Session 1H SA0863, SA0761, SA0701, SA2001, SA001, SA0535, SA0555, SA0883, SA0374	Workshop SA0401, SA1631, SA0711, SA0565, SA1651, SA1781, SA1811, SA10021	Session 3 SA4001, SA0823, SA1034, SA2031, SA4003, SA0973, SA1885, SA0525, SA1791
Zoom Link	https://us02web.zoom.us/j/84094281163			
18:30-18:50	Closing Ceremony & Awards | 闭幕式 & 会议颁奖（线上） Host: Vladimir Terzija, Skolkovo Institute of Science and Technology, Russia			

Session Information
分会场信息

Best Student Paper Competition A
New Power Electronic System and Key Application Technology
新型电力电子系统及关键应用技术

Best Student Paper Competition B
New Intelligent Power Equipment: Design, Control and Development
新型智能电力设备：设计，控制与开发

Best Industrial Paper Competition
Research and Development Trend of Integrated Power System with High Renewable Energy Penetration
高可能再生能源渗透率集成电力系统现状研究及发展趋势

Special Session 1
Advanced Modeling, Optimization and Control Technologies for Power Systems with High Renewable Energy Penetration
高可再生能源渗透电力系统的先进建模、优化和控制技术

Special Session 2
Insulation Testing, Modeling and Simulation of Power Equipment
电力设备绝缘测试、建模与仿真

Special Session 3
The Integration Technology of "Load-storage-transformation-network-detection" Integrated System for Electrical Equipment
电气设备“负载-存储-转换-网络-检测”集成系统集成技术

Workshop
Real-Time Digital Simulation and Hardware-in-the-loop Testing of Power and Energy Systems
电力和能源系统的实时数字仿真和硬件在环测试

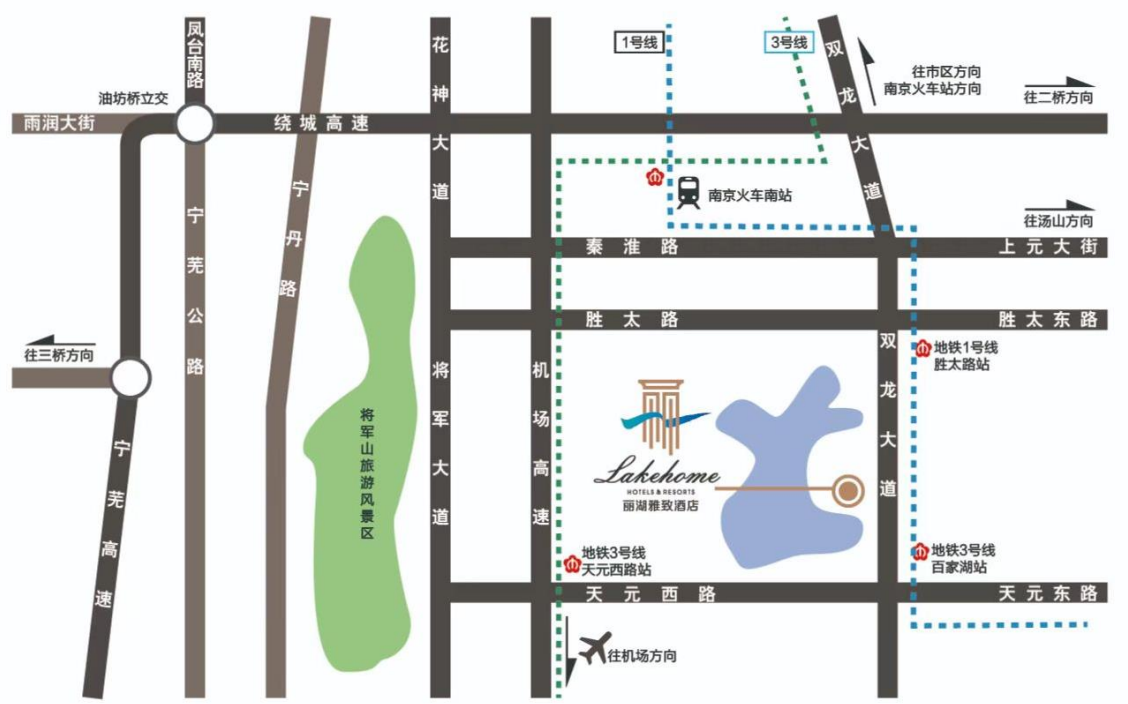
Session 1
Fault Diagnosis and Condition Monitoring in Intelligent Power System
智能电力系统中的故障诊断与状态监测

Session 2
New Power System Configuration and Management
新型电力系统配置与管理

Session 3
System Control and Data Analysis in Power Systems
电力系统中的系统控制与数据分析

Local Information

会场须知



丽湖雅致会展中心酒店

地址：中国南京市江宁区双龙大道 1528 号（近凤凰广场）

签到地点 | 酒店 1 楼大厅

酒店总机订房电话：025-52108111

订房：卢经理，电话：15190476658 | 高级房：380（无早）；440（单早）

现场参会的嘉宾请报会议名称“2023 年第七届电力能源系统与应用国际会议”，享受住宿优惠。

会场注意事项

1. 注意安全防范，妥善保管好个人财物、资料，休息或离开房间时务必锁好房门。
2. 请各位嘉宾根据日程安排按顺序报告，并关注临时通知。
3. 会场多媒体设备由会务组统一提供，报告者可通过拷入 U 盘的方式，提前备好演讲文稿电子版（PPT/PDF）用于试场、报告等；每位演讲者报告时长包括演讲和提问交流时间。
4. 本次会议凭借胸卡进入会场，凭餐券用餐，请随身携带。
5. 遵守会场秩序，会议开始前请将手机调至静音，保持会场安静。

Online Guideline
线上会议须知

Test before Formal Meeting 会前设备测试

Date: 24th February
Before the formal meeting, presenters shall join the test room to ensure everything is good.

Time Zone 时区

Beijing Time (GMT+8)
You're suggested to set up the time on your laptop in advance.

Equipment & Environment Needed 报告环境须知

- A laptop with stable internet connection and camera
- Headphones
- A quiet place
- Proper lighting and background

Software 会议软件

ZOOM Download:

- https://zoom.us/download
- For Chinese Users: https://zoom.com.cn/download

Presentation Tips 报告指南

- Competition Timing: a maximum of **20 minutes** in total, including 3 minutes for Q&A.
- Parallel Presentation Timing: a maximum of **15 minutes** in total, including 3 minutes for Q&A.
- It is suggested that the presenter email a copy of his/her video presentation to the conference email as a backup in case any technical problem occurs.

Conference Recording 会议录制

- The whole conference will be recorded. We appreciate you proper behavior and appearance.
- The recording will be used for conference program and paper publication requirements. The video recording will be destroyed after the conference and it cannot be distributed to or shared with anyone else, and it shall not be used for commercial nor illegal purpose. It will only be recorded by the staff and presenters have no rights to record.

Organizing Committees

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Chunjuan Jia, Shandong University, China
Jinyu Wang, Nanyang Technological University, Singapore
Diego Bellan, Politecnico di Milano, Italy
Zhengshuo Li, Southeast University, China
Qilong Huang, Nanjing University of Science and Technology, China
Fang Liu, Hefei University of Technology, China
Ping Ji, Wanjiang University of Technology, China

Keynote Speaker
专家报告

Prof. Xinbo Ruan
Nanjing University of Aeronautics and Astronautics, China
IEEE Fellow
阮新波，南京航空航天大学教授，长江学者/国家杰青

Beijing Time:	9:30-10:00, Feb. 25th, 2023	Onsite Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Second Harmonic Current Reduction Techniques for Two-Stage Single-Phase Power Converters

两级式单相功率变换器的二次谐波电流抑制技术

BIO Xinbo Ruan (Fellow, IEEE) received the B.S. and Ph.D. degrees in electrical engineering from the Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China, in 1991 and 1996, respectively. In 1996, he joined the College of Automation Engineering, NUAA, where he became a Professor in 2002. From 2008 to 2011, he was also with the College of Electrical and Electronic Engineering, Huazhong University of Science and Technology, Wuhan, China. He is the author or coauthor of 13 books and more than 300 technical papers published in journals and conferences. His main research interests include soft-switching power electronic converters, power electronic system integration, and renewable energy generation system.,Dr. Ruan is currently the Vice-President of China Power Supply Society. He is currently an Editor for IEEE Journal of Emerging and Selected Topics on Power Electronics and an Associate Editor for IEEE Transactions on Power Electronics, IEEE Transactions on Circuits and Systems II, and IEEE Open Journal of Industrialelectronics Society.

ABSTRACT In the two-stage single-phase power factor correction ac–dc converter, the input power pulsates at twice the line frequency; while in the two-stage single-phase dc–ac inverter, the output power pulsates at twice the output frequency. Meanwhile, in the two kinds of single-phase converters, the dc port holds constant power. Consequently, the pulsating power will result in second harmonic current (SHC) in the ac–dc converter and dc–ac inverter. The SHC will propagate into the dc-dc converter, the input dc voltage source or the dc load, leading to the degradation of the conversion efficiency of the dc-dc converter, the reduction of the energy conversion efficiency of the input dc voltage source, and shortened lifetime of the input dc voltage source or the dc load. To overcome these drawbacks, it is of necessity to suppress the SHC in the dc-dc converter, the dc voltage source or the dc load.

This report will firstly reveal the generating and propagating mechanism of the SHC in the two-stage single-phase converters. Then, a series of control schemes to suppress the SHC in the dc-dc converter while improving the dynamic response of the system are proposed. Besides, the electrolytic capacitor-less SHC compensator will also be presented, with which the undesired electrolytic capacitor can be removed so as to prolong the lifetime of the overall system.

Keynote Speaker
专家报告

Prof. Loi Lei Lai
Guangdong University of Technology, China
Editor-in-Chief of the IEEE Smart Cities Newsletter
IEEE Life Fellow, IET Fellow
赖来利，广东工业大学教授

Beijing Time:	10:00-10:30, Feb. 25th, 2023	Onsite Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Smart Energy for Applications in Smart Cities

BIO Loi Lei Lai is University Distinguished Professor, Guangdong University of Technology, Guangzhou China. He was Pao Yue Kong Chair Professor with Zhejiang University, Hangzhou China, and Chair of Electrical Engineering with City, University of London. His current research areas are in smart cities and smart energy. He was awarded an IEEE Third Millennium Medal, the IEEE Power and Energy Society (IEEE/PES) UKRI Power Chapter Outstanding Engineer Award in 2000, a special award from City, University of London in 2005 and is its honorary graduate, the IEEE/PES Energy Development and Power Generation Committee Prize Paper in 2006 and 2009, IEEE Systems, Man, and Cybernetics Society (IEEE/SMCS) Outstanding Contribution Award in 2013 and 2014, Most Active Technical Committee Award in 2016, and his research team received a Best Paper Award in the IEEE International Smart Cities Conference in 2020 and the 2022 Meritorious Service Award from IEEE/SMCS for "meritorious and significant service to IEEE SMC Society technical activities and standards development". He is Editor-in-Chief of the IEEE Smart Cities Newsletter, and Chair of the IEEE/SMCS Standards Committee. He was Director of Research and Development Center, State Grid Energy Research Institute, China; IEEE/SMCS Vice President for Membership and Student Activities; a Fellow Committee Evaluator for the IEEE Industrial Electronics Society and IEEE/PES Lifetime Achievement Award Assessment Committee Member. He is an IET Fellow and IEEE Life Fellow.

ABSTRACT Smart energy is the process of adopting intelligent devices such as smart sensors for increasing energy efficiency. It focuses on large-scale sustainable renewable energy sources that promote greater eco-friendliness while reducing costs and increasing reliability. To accommodate for ever-increasing data, the application of smart devices to human lifestyles and services, secure computer systems that meet the needs of smart cities are essential. This includes new architecture, concepts, algorithms in machine learning and artificial intelligence. Smart energy networks require fast and intelligent decisions, which will only be possible with the help of intelligent and complex computer systems. Urban energy networks are becoming increasingly linked and integrated. This is crucial for cities aiming to achieve energy efficiency and environmental sustainability.

In addition to this, there are ongoing advances in renewables and energy storage systems, along with innovative information, communication and control technologies. Thus, there are opportunities and challenges emerging in the design, planning, and operation of more distributed energy system architectures with significant amount of local energy consumptions. The enabling technologies and methodologies aimed at

addressing complex challenges include decentralized computing, self-organizing sensor networks, proactive control, and holistic computing frameworks.

There are various challenges facing on power system operation and planning due to increased penetration of many new technologies of diversified properties. On one hand, system operators and many other participants have to deal with increased uncertainties and risks involved in daily operation and planning activities. On the other hand, applications of many new metering and measurement devices, capable of closely monitoring and sensing grid operation in real-time, result in over whelming amount of measurement data of high precision and resolution. By far, how to make the best use of the massive data remains quite a challenging task facing power system researchers and practitioners. The availability of the high-quality data could potentially facilitate risk hedging and decision making in system operation and planning, of which the prerequisite calls for innovative informatics approaches that are intelligent, data driven, and capable of handling various complex problems.

This keynote covers few important topics ‘derived’ from smart energy such as transportation, health, and standards development. To achieve net-zero emissions by 2050/2060, preserve biodiversity and mitigate global warming, people need to have a better and more sustainable world. Smart energy will play a key role in a carbon-neutral society. Major environmental, economic and technological challenges such as climate change, economic restructuring, pressure on public finances, digitalization of the retail and entertainment industries, and growth of urban and ageing populations have generated huge interest for cities to be run differently and smartly. Some current international research and development activities will be reported, and future directions will be discussed.

Keynote Speaker
专家报告

Prof. Guan-Jun Zhang
Xi'an Jiaotong University, China
张冠军，西安交通大学教授，国家杰青

Beijing Time:	11:00-11:30, Feb. 25th, 2023	Onsite Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Partial Discharge Diagnostics: from Single Power Equipment to Whole Substation
局部放电诊断：从单台电力设备到整个变电站

BIO Guan-Jun Zhang was born in Weifang, Shandong, China in 1970. He received B.S., M.S. and Ph.D. degrees in electrical engineering from Xi'an Jiaotong University (XJTU), Xi'an, China, in 1991, 1994 and 2001, respectively. He is currently a leading-scholar professor at School of Electrical Engineering, XJTU, China, and the director of Center for Advanced High Voltage and Plasma Technology. His main interests cover high voltage insulation and discharge characteristics, fault diagnosis and condition maintenance for power equipment, discharge plasmas and multi-disciplinary applications, etc. He has been visiting researcher at Tokyo Institute of Technology (Japan), visiting scientist at Plasma Physics Laboratory, Princeton University (USA), JSPS fellow at Saitama University (Japan), and visiting professor at University of Southampton (UK). He has published 300 papers and held 30+ patents. Prof. Zhang received Distinguished Young Scholar of NSFC, IEEE ISDEIV Chatterton Young Investigator, Fok Ying Tong Research Award for University Young Teachers, and National Top 100 Excellent Doctoral Dissertation Award of China, etc.

ABSTRACT Partial discharge (PD) measurement and interpretation is regarded as an effective approach for assessing the condition of high-voltage power equipment such as transformer, gas insulated switchgear (GIS) and others, and avoiding equipment failure due to insulation defects. In this speech, considering the situation of PD defect sources existing inside a transformer or GIS, 35kV and 110kV actual transformers and 252kV GIS experimental platforms embedded with multiple PD defects are constructed. Different PD signals of pulse current, ultra-high-frequency (UHF) electromagnetic radiation and ultrasonic wave, are collected, and complicated algorithms for multi-source signal separation, positioning and pattern identification are investigated. Moreover, the UHF detection technology is extended to the movable UHF antenna array, which is used for the PD measurement of all power equipment in a whole substation. Compared with traditional PD diagnostics of power equipment single by single, the movable strategy suitable for whole substation greatly promotes the PD detection efficiency and also significantly reduces the cost of PD system configuration. Besides quantities of laboratory experiments and algorithm optimization, on-site application cases prove the availability of PD diagnostics in this speech, and two kinds of diagnostic strategies behave a good complementary relation.

Keynote Speaker
专家报告

Prof. Fushuan Wen
Zhejiang University, China
IEEE Fellow
文福拴，浙江大学教授

Beijing Time:	11:30-12:00, Feb. 25th, 2023	Onsite Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Resilience-enhancement Oriented Distribution System Design
以增强弹性为导向的配电系统设计

BIO Professor Fushuan Wen joined the faculty of Zhejiang University in 1991, and has been a full professor and the director of the Institute of Power Economics and Information since 1997, and the director of Zhejiang University-Insigma Joint Research Center for Smart Grids since 2010. He has also been a full professor in the Hainan Institute, Zhjiang University, Sanya, China, since 2022. He has been undertaking various teaching, research and visiting appointments in Singapore, Hong Kong, Australia, Brunei, Estonia, Denmark. He has published 200+ SCI-indexed papers, 670+ EI-indexed papers, and 770+ Scopus-indexed papers. His publications have been cited for 17500+ times. He has completed and is undertaking more than 200 grants and projects. He received many awards, including the most prestigious National Natural Science Award of China. He has been listed in "Most Cited Chinese Researchers" in seven consecutive years since 2015 by Elsevier, and is the author of one of the China's 100 Most Influential Domestic Academic Papers in 2016. He is the editor-in-chief of Energy Conversion and Economics (SPERI, IET, Wiley), the deputy editor-in-chief of Journal of Automation of Electric Power Systems, a subject editor in power system economics of IET Generation, Transmission and Distribution. He was elected to IEEE Fellow for contributions to fault diagnosis in power grids.

ABSTRACT In this speech, a new design method is presented for a distribution system to reinforce its resilience against high-impact and low-probability events. The line hardening and the deployment of remote-controlled switches are employed as two powerful measures for resilience enhancement. The hardening of tie lines and the deployment of bilateral tie switches are particularly emphasized as important parts of the resilience-enhancement oriented design. A progressive detection mechanism is devised to estimate the potential propagation of outages and identify surviving nodes outside of the minimum outage area after intentional islanding. The presented resilience-enhanced distribution system design problem is formulated as a mixed-integer linear programming (MILP) model, and the nested column-and-constraint generation algorithm is customized to solve the MILP model. Numerical results are presented to demonstrate the effectiveness and the superiority of the proposed resilience-enhancement oriented design method for distribution systems.

Keynote Speaker
专家报告

Prof. Donglian Qi
Zhejiang University, China
齐冬莲，浙江大学教授

Beijing Time:	13:20-13:50, Feb. 25th, 2023	Onsite Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

High Efficiency Distributed Coordination and Cyber-Physical Security Control Strategy of Microgrid CPS

微电网 CPS 分布式高效协同与信息物理安全控制方法

BIO Donglian Qi received her Ph.D. degree in control theory and control engineering from Zhejiang University, Hangzhou, China, in March 2002. Since then, she has been with the College of Electrical Engineering, Zhejiang University where she is currently a Professor. Her current research interests include the basic theory and application of cyber physical power system (CPPS), digital image processing, artificial intelligence, and electric operation and maintenance robots. She is an Editor for the Clean Energy, the IET Energy Conversion and Economics, and the Journal of Robotics, Networking and Artificial Life.

ABSTRACT Microgrid CPS, which can integrate a great many of distributed renewable generators, is regarded as a promising solution to the challenge of increasing demand and environmental concerns. However, the uncertainties of renewable energies and interactions between power grid and cyber system can bring about diverse emerging operation and control issues. Besides, the deep involvement of cyber systems also makes microgrid CPSs more vulnerable to cyber-physical security risks, such as time delay, cyber failures, malicious attacks, etc. Therefore, how to achieve efficient coordinated control of distributed renewable generators and increase cyber-physical security of microgrid CPS is of great importance. In this lecture, some trigger-based distributed control algorithms for the secondary control of microgrids will be shared. With these trigger-based control, the communication and computation burden of the distributed control system can be greatly reduced, and hence the system efficiency can be improved. Furthermore, some attack-resilient distributed secondary control will be introduced as well. Protected by these methods, the system can still maintain stability event when being attacked, and hence the cyber-physical security of microgrid CPS can be significantly improved.

Keynote Speaker
专家报告

Prof. Jun Jiang
Nanjing University of Aeronautics and Astronautics
江军，南京航空航天大学研究员

Beijing Time:	13:50-14:20, Feb. 25th, 2023	Onsite Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Optical Sensing Techniques for High Voltage Power Apparatus
高压电力设备的光学传感技术研究

BIO Jun Jiang is a Professor with the Jiangsu Key Laboratory of New Energy Generation and Power Conversion, Nanjing University of Aeronautics and Astronautics, China. He received the B.E. degree in electrical engineering and automation from China Agricultural University (CAU) in 2011 and PhD degree in high voltage and electrical insulation from North China Electric Power University (NCEPU) in 2016. During 2019-2020, He worked as an Academic Visitor/Honorary Staff in Department of Electrical & Electronic Engineering, School of Engineering, The University of Manchester, UK.

At present, he is an IEEE Senior Member, CIGRE member, also a representative for CIGRE JWG D1/A2.77 (Liquid Tests for Electrical Equipment). He has published more than 60 peer-reviewed papers including more than 50 journal articles. As well, more than 21 patents have been granted. He was granted as Young Researcher Award by International Symposium on High Voltage Engineering (ISH) and Outstanding Reviewers Award by High Voltage.

His research interests are optical fiber sensing, condition monitoring of power apparatus and more-electric-aircraft.

ABSTRACT Transformers are one of the most important equipment in a power grid. Its health index can significantly impact both the reliability and functionality of the power grid. However, partial in-service transformers worldwide have already reached or exceed their design life expectancy. Thus, real-time online monitoring and assessment have been prioritized on the agenda among utilities around the globe to allow for a timely maintenance action and avoid any potential catastrophic failures. Many new detection tools are being investigated continuously by researchers and engineers in the field. In particular, with advances in optical engineering and communications technology, the last few decades have witnessed the emergence and development of a new generation of optical approaches for power apparatus condition monitoring. Since the inherent advantages of fibre optic sensors include lightweight, compatibility, passivity, low attenuation, low power, immunity to electromagnetic interference (EMI), high sensitivity, wide bandwidth and environmental ruggedness. These advantages are utilized to compromise for its high cost and unfamiliarity to the consumer. Therefore, they have become commonly used and applied in high voltage applications.

Keynote Speaker
专家报告

Assoc. Prof. Jianning Yin
Xi'an University of Technology
尹健宁，西安理工大学副教授

Beijing Time:	14:20-14:50, Feb. 25th, 2023	Onsite Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Arc Characteristics and Breaking Technology of Low-Voltage Circuit Breaker for New Energy System

新能源系统用低压断路器电弧特性及开断技术

BIO Jianning Yin (Member, IEEE) received the Ph.D. degree in Electrical Engineering in 2019 from Xi'an Jiaotong University. Currently, he is an Associate Professor with the School of Electrical Engineering, Xi'an University of Technology. His research interests include optimization design and intelligence of high and low voltage circuit breakers, advanced interruption technology for DC circuit breakers, MHD simulation of switching arc, switching arc plasma and its application.

ABSTRACT Under the development trend of global clean energy and environmental protection, the installed capacity of new energy power generation such as wind power and photovoltaic power generation has maintained a rapid growth. At the same time, higher requirements have been put forward for low-voltage circuit breakers that play a protective and control role in the new energy power generation system. In the wind power generation system, the circuit breaker is required to break the short circuit current in a wide frequencies; In the photovoltaic power generation system, the circuit breaker is required to be able to break the DC short circuit current of higher voltage (>1500V), and at the same time, the circuit breaker can be more miniaturized. Based on, the research group has carried out simulation and experimental research on arc characteristics at different frequencies. The research providing theoretical reference for the design of broadband circuit breakers. At the same time, the evolution characteristics of DC arc under high voltage are simulated and studied by the MHD simulation .Based on the simulation, the high-efficiency arc breaking technology is put forward. Through the matching design of structural parameters of arc extinguishing chamber, the arc dynamic characteristics can be coordinated regulation. This break technology has been applied to the design of DC circuit breaker products. The high-voltage DC arc has been successfully interrupted and the miniaturization of circuit breaker products has been realized. By applying this technology, high-performance DC circuit breaker products have been developed and widely used in new energy power generation systems. It effectively serving the healthy development of the new energy power generation in China.

Keynote Speaker
专家报告

Prof. Soteris A. Kalogirou
Cyprus University of Technology, Cyprus
Editor-in-Chief of Renewable Energy and Deputy Editor-in-Chief of Energy
Fellow of the European Academy of Sciences, IEEE Fellow

Beijing Time:	15:00-15:30, Feb. 25th, 2023	Onsite Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Status of Renewable Energy Systems in the World and Prospects

BIO Professor Soteris Kalogirou, D.Sc. is at the Department of Mechanical Engineering and Materials Sciences and Engineering of the Cyprus University of Technology, Limassol, Cyprus. He is currently the Dean of the School of Engineering and Technology. He is a Fellow of the European Academy of Sciences and Founding Member of the Cyprus Academy of Sciences, Letters and Arts. For more than 35 years, he is actively involved in research in the area of solar energy and particularly in flat plate and concentrating collectors, solar water heating, solar steam generating systems, desalination, photovoltaics, geothermal energy and absorption cooling. He has a large number of publications in books, book chapters, international scientific journals and refereed conference proceedings. He is Editor-in-Chief of Renewable Energy and Deputy Editor-in-Chief of Energy, and Editorial Board Member of another twenty journals. He is the editor of the book McEvoy's Handbook of Photovoltaics, published by Academic Press of Elsevier and author of the books Solar Energy Engineering: Processes and Systems, and Thermal Solar Desalination: Methods and Systems, published by Academic Press of Elsevier.

ABSTRACT This presentation examines the current status of renewables in the world. The presentation starts with some facts about climate change, global warming, and the effects of human activities, such as the burning of fossil fuels on the climate problem. It then outlines of the status of renewables in the world, which includes their shares with respect to conventional fuel use for power and for electricity production alone, and their social dimension in terms of jobs created. Then the basic forms of renewables are examined in some detail, which include solar thermal, both for low and high temperature applications, photovoltaics, hydro power, onshore and offshore wind energy systems and biomass/biofuels. In all these the basic technology is presented followed by the current status, the installed capacity in the last decade, which reveals their upward trend, as well as the prospects of the technology and some new research findings.

Keynote Speaker
专家报告

Prof. Gianfranco Chicco
Politecnico di Torino, Italy

Editor-in-Chief of Sustainable Energy, Grids and Networks
IEEE Fellow, Vice-Chair of the IEEE Italy Section

Beijing Time:	15:30-16:00, Feb. 25th, 2023	Onsite Room	Tang Shan Hall (2nd Floor) | 2 楼汤山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Effectiveness of the Clustering Methods for The Categorization of The Electrical Demand

BIO Gianfranco Chicco holds a PhD in Electrotechnics Engineering and is a Full Professor of Power and Energy Systems at Politecnico di Torino (POLITO) in Torino, Italy. He is a Fellow of the IEEE and the vice-Chair of the IEEE Italy Section. He received the title of "Doctor Honoris Causa" from the University Politehnica of Bucharest (Romania) and from the Technical University "Gheorghe Asachi" of Iasi (Romania) in 2017 and 2018, respectively. He participated in the various European Projects with POLITO and the Italian Consortium ENSIEL. He is the Editor-in-Chief of the journal Sustainable Energy, Grids and Networks (Elsevier), a Subject Editor of Energy (Elsevier), and an Editor of IEEE Open Access Journal of Power and Energy, IET Renewable Power Generation, and Energies (MDPI). He was the Chair of the International Conferences 55th UPEC (2020), 7th IEEE PES ISGT Europe (2017) and 6th WESC (2006) and is the Chair of the 20th IEEE EUROCON (2023). His research activities include Power System Analysis, Distribution System Analysis and Optimization, Electrical Load Management, Multi-Energy System Flexibility, Data Analytics, and Power Quality.

ABSTRACT Clustering algorithms are typically used for the categorization of the electrical demand. The application of the clustering algorithms is incorporated in a structured approach that includes a pre-clustering phase, the execution of the clustering algorithm, and a post-clustering phase. The pre-clustering phase contains various activities dedicated to the definition of the macro-categories of users, the choice of the representative days, the bad data detection and cleaning, and the choice of the features to be used for clustering, with the corresponding normalization aspects. The choice of the clustering algorithm is a key point that depends on the purpose of clustering (creating uniform groups, or identifying outliers). The post-clustering phase forms the final groups of users and the load profiles associated to these groups, while clustering validity assessment techniques can be applied to check the effectiveness of the clustering results.
The presentation provides a discussion on the main points of the whole structured approach indicated above. A specific focus is set on the role of the expert of the electricity domain in selecting appropriate features, choosing an effective method for clustering analysis, and interpreting the clustering results. A significant point is the different treatment needed for handling residential and non-residential users. For individual residential users, there is a strong dependence of the power curves of the residential demand on many unpredictable aspects linked to the consumers' lifestyle. Because of that, the use of classical metrics such as the Euclidean distance in the clustering algorithms could be ineffective. For non-residential users, the grouping based on the load curves is not connected with the categorization of the activities based on the type of activity. The use of clustering algorithms is then essential to obtain a categorization of the users based on the shape of the electrical demand patterns.

Keynote Speaker
专家报告

Prof. Xuzhen Huang
Nanjing University of Aeronautics and Astronautics, China
黄旭珍，南京航空航天大学教授，国家优青

Beijing Time:	8:30-9:00, Feb. 26th, 2023	Onsite Room	Dong Shan Hall (2nd Floor) | 2 楼东山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Key Technology of Multi-Mover Permanent Magnet Linear Motor System
多动子直线电机系统的关键技术

BIO Huang Xuzhen, professor, College of Automation Engineering, Nanjing University of Aeronautics and Astronautics. She graduated from Harbin University of Technology in the major of Electrical Engineering in 2012. She focuses on the research of permanent magnet linear motor system. She was supported by the National Science Fund for Excellent Young Scholars. She has presided over and participated in a number of projects entrusted by enterprises such as the National Natural Science Fund, the National Instrument Development, CASC and AVIC. She has published more than 60 high-level papers and has more than 20 national invention patents.

ABSTRACT Compared with the traditional single-mover linear motor system, the multi-mover permanent magnet synchronous linear motor system has the characteristics of large capacity, modularization, flexibility and intelligence. It is one important part of the material transmission system of the future intelligent production line. Its application will bring revolutionary changes to the automatic production line and greatly improve the efficiency and quality of production and processing. This report mainly introduces relevant key technologies, including: Different topological structures and performance characteristics of multi-mover permanent magnet linear motor system; thrust ripper reduction and optimization of permanent magnet linear motor and arc motor; distributed driver technology and high precision current and speed control; cable-less position detection technology; high-speed data communication and multi-mover coordinated motion control technology. In the report, the prototype system and test results involved in the above technologies will be shown.

Keynote Speaker
专家报告

Prof. Haoran Zhao
Shandong University, China
赵浩然，山东大学教授，电气工程学院副院长

Beijing Time:	9:00-9:30, Feb. 26th, 2023	Onsite Room	Dong Shan Hall (2nd Floor) | 2 楼东山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

Research and Application of Digital Twin technology in Wind Power
风电数字孪生技术研究及应用

BIO Haoran Zhao is currently a National Distinguished Professor (selected in 2017), doctoral supervisor, Qilu Young Scholar (selected in 2016) and the Deputy Dean of the School of Electrical Engineering of Shandong University. Prof. Zhao received his bachelor, master and Ph.D. degrees from Shandong University (SDU), Technische Universität Berlin (TUB), and Technical University of Denmark (DTU) in 2001, 2010, and 2014, respectively. He got the national scholarship for outstanding overseas students in 2014. He has worked for State Grid Shandong Electric Power Company, Younicos AG of Germany, DIgSILENT of Germany and the Power Energy Center of the Technical University of Denmark. In October 2017, he joined the School of Electrical Engineering of Shandong University full-time. 2019-2020 concurrently served as Deputy Director of the Construction Office of Shandong University Longshan Campus (Chuangxin Port). He is currently a senior member of IEEE, member of CIGRE Working Group C6.C1.33, CIGRE C4.56, and IEC SC Expert of working Group 8A, Vice president of Shandong Energy Research Association, member of Distribution Network Control and Operation Special Committee of Electrical Engineering Society, member of Artificial Intelligence and Electrical Application Special Committee of Electrical Engineering Society, member of Digital Twin Committee of Integrated Energy of Simulation Society, member of Integrated Energy Special Committee of Renewable Energy Society. Prof. Zhao currently serve as the Associate Editor of IEEE Transactions on Sustainable Energy, IET Renewable Power Generation/Journal of Engineering and other international journals, as well as a youth editor for power protection and control, and invited to serve as the Associate Editor of the IEEE Transactions on Energy Conversion special issue, the International Journal of Electrical Power& Energy Systems special issue Editor-in-chief.

ABSTRACT Under the dual carbon goals, wind power will play an essential role in the new energy supply. Wind power's increasing scale and permeability have brought about many urgent problems, including wind power grid connection, wind farm operation, and wind turbine design. Digital twin technology is an effective means to solve these problems. This report proposes a systematic solution for implementing digital twin systems in wind farms. The research content focuses on the core issues such as high-precision modelling, real-time simulation algorithm, virtual-real data fusion, and mining. A real-time wind farm simulation software and hardware platform with independent intellectual property rights are developed on this basis. The research results of this project will be used as an essential tool to assist power grid companies, power generation companies, and wind power equipment manufacturers in realizing large-scale wind power grid connections, wind farm intelligent operation, and full-digital design of wind turbines, which will bring enormous economic and social benefits to the wind power industry and have an extensive application prospect.

Keynote Speaker
专家报告

Prof. Xin Dai

Chongqing University, China

戴欣，重庆大学教授，自动化学院副院长

Beijing Time:	9:30-10:00, Feb. 26th, 2023	Onsite Room	Dong Shan Hall (2nd Floor) | 2 楼东山厅
ZOOM ID:	840 9428 1163	ZOOM Link:	https://us02web.zoom.us/j/84094281163

TBA

BIO He received his Ph.D. degree in control science and engineering from Chongqing University, Chongqing, China, in 2006. He is currently the Professor of the School of Automation, Chongqing University, Chongqing, China, and the Associate Director of National International Research Center of Wireless Power Transfer.

Professor Dai is a leading researcher in Wireless Power Transfer (WPT) and nonlinear control in Power Electronics, significantly contributing to both Wireless Power Transfer theory methods and engineering applications. He is very active as associate editors for top IEEE journals, including IEEE Transactions on Power Electronics, IEEE Transactions on Industrial Electronics, IEEE Transactions on Magnetics. As a scientific leader in the field of systems and control, he has been serving on various national and international technical committees.

Prof. Dai has made original contributions in Wireless Power Transfer technology with real world applications, which can be assessed by his publications (over 100 papers) in prestigious international journals, including IEEE T-IE, IEEE T-PE. He authored/co-authored 2 books in the field of Wireless Power Transfer. He also held 50 patents, some of which have gone through technology transfer with an estimate market value of over $10 million. He has given many keynote talks and invited talks, chaired numerous conferences.

ABSTRACT TBA

Best Student Paper Competition A

New Power Electronic System and Key Application Technology

新型电力电子系统及关键应用技术

Session Chairs: Meng Huang, North China Electric Power University
Jun Jiang, Nanjing University of Aeronautics and Astronautics, China

Beijing Time: 16:10-18:30, 25th Feb. 2023 Room: Thang Shan Hall | 2 楼汤山厅

SA0451 16:10-16:30	A Coordinated Control Strategy of Flywheel-Battery Hybrid Energy Storage System for Participating in Grid Frequency Regulation **Dongzhi Cao**, Liangzhong Yao, Siyang Liao, Jian Xu, Beilin Mao, Bo Xie Wuhan University, China
SA1831 16:30-16:50	Robust Optimization for Energy Transactions in Microgrid Cluster(MC) Considering Electric Vehicle(EV) **Fei Feng**, Du Xin Shanghai University, China
SA1892 16:50-17:10	Calculation of Transformer Bushing Surface Temperature Considering Dielectric Loss and Solar Radiation **Jinfeng Liu**, Dezhi Cui, Bo Li, Sicheng Zhao, Jun Jiang, Chaohai Zhang Nanjing University of Aeronautics and Astronautics, China
SA0421 17:10-17:30	Robust Network-Secure Operating Envelope for Aggregators Bidding in Wholesale Market **Congcong Liu**, Zhengshuo Li Shandong University, China
SA1014 17:30-17:50	Study on Cascaded STATCOM with Energy Storage Applied for Impulse Power Compensation **Yunxiang Tian**, Liuwei Xu, Yanan Wu, Jing Lu, Jun Li, Huafeng Mao, Haiyang Liu, Shiwei Zhao Hefei Institutes of Physical Science, Chinese Academy of Sciences, China
SA0843 17:50-18:10	Optimal Design of Iron Core Loss for Ultra-high-speed Motor Based on Kriging Surrogate Model **Weifeng Zhang**, Yan Yu, Ke Zhang, Ming Zhou Tsinghua University, China
SA1971 18:10-18:30	Nonlinear Fitting of Ring-Down Time for the Fabry-Perot Cavity in FPGA Devices **Hao-nan Lv**, An-hao Jiang, Xin-ran Zhang, Chao-hai Zhang Nanjing University of Aeronautics and Astronautics, China

Best Student Paper Competition B

New Intelligent Power Equipment: Design, Control and Development

新型智能电力设备：设计，控制与开发

Session Chair: Zhu Min, Nanjing University of Aeronautics and Astronautics, China

Beijing Time: 16:10-18:10, 25th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/84094281163

SA004 16:10-16:30	Bearing Fault Detection of Induction Motor based on High-order Multisynchrosqueezing Transform **Yu Wang**, Chidong Qiu, Yaxin Yu Dalian Maritime University, China
SA1671 16:30-16:50	Harmonic Suppression of Open-Winding PMSM System with Common DC Bus based on Improved PIR Control **Shirui Xie**, Xinpeng Feng, Pingping Gu, Wei Zhang, Ziqi Lei, Chaohui Zhao Shanghai Dianji University, China
SA1601 16:50-17:10	Study on Wireless Power Transfer Techniques in Structural Health Monitoring Applications **Zhiming Sun**, Kexue Cui, Dashan Wang Ningbo University, China
SA1571 17:10-17:30	DC Filter Protection Based on Digital Twin **Taixin Chen**, Jinghan He, Meng Li, Ming Nie, Xiangmin Kong Beijing Jiaotong University, China
SA006 17:30-17:50	Electromagnetic Footstep Energy Harvester using Hybrid Stepper Motor with Maximum Power Point Tracking Algorithm **Jazz Ryan V. Dungaran**, Gerard Ang Mapua University, Philippines
SA1503 17:50-18:10	Research on Power Forecasting Model of Wave Energy Generation Based on GRU Neural Network **Xiangyu Teng**, Zhisheng Zhang Qingdao University, China

Best Industrial Paper Competition

Research and Development Trend of Integrated Power System with High Renewable Energy Penetration

高可能再生能源渗透率集成电力系统现状研究及发展趋势

Session Chair: Shimin Li, Nanjing University of Aeronautics and Astronautics, China

Beijing Time: 16:10-17:50, 25th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/83131556021

SA1364 16:10-16:30	Accuracy Improved Dispatch Method for Distribution Networks with Battery Energy Storage Systems Based on Dynamic State Estimation Xinpeng Yin, **Yingjie Tan**, Li Chen, Yule Liang, Hui Huang Yunfu Power Supply Bureau China Southern Power Grid Co., Ltd, China
SA1462 16:30-16:50	Research on the Mechanism and Evaluation Method of DC Side Harmonic Oscillation of LCC HVDC System Yinsheng Su, **Qingming Xin**, Runbin Cao, Huifan Xie, Hongtao Liu, Xiaobin Zhao, Long Guo, Kang Qin Electric Power Research Institute, CSG, China
SA0291 16:50-17:10	Research on Adaptive Droop Control Strategy of DC Active Power and Voltage in DC Microgrid Wei Wang, Xiaoben Lei, Bin Wei, Kailin He, **Peihao Yang** Xi'an Thermal Power Research Institute Co., Ltd., Xi'an, China
SA2091 17:10-17:30	Analysis and Prevention Countermeasures of Insulation Breakdown Caused by Foreign Body Fault of 800 kV GIS Disconnector **Shangpeng Sun**, Feiyue Ma, Bo Wang, Bo Niu, Lei Chen, Hui Ni, Ying Wei Electric Power Research Institute, State Grid Ningxia Power Co., Ltd., China
SA0625 17:30-17:50	A Robustly Real-Time Economic Dispatch Strategy of Microgrids Considering Uncertainties Wei-feng Xu, **Li-guo Weng**, Rong Yu, De-qiang Lian, Hao-han Ying, Man Luo State Grid Hangzhou Xiaoshan Power Supply Company, China

Special Session 1A

Advanced Modeling, Optimization and Control Technologies for Power Systems with High Renewable Energy Penetration

高可再生能源渗透电力系统的先进建模、优化和控制技术

Session Chair: Yu Huang, Nanjing University of Posts and Telecommunications, China

Beijing Time: 10:10-11:40, 26th Feb. 2023 Room: Dong Shan Hall 2 楼东山厅

SA1661 10:10-10:25	Transient Voltage Control Strategy Considering Dynamic Reactive Power Supporting of Wind Farms Dajun Jiang, Xin Sun, **Qi Chen** Shandong University, China
SA1611 10:25-10:40	Power Asymmetry Characteristic and Stability Analysis of Grid-Connected Inverter under Weak Grid Condition Fang Liu, **Gengtao Yuan**, Guoqing He, Dan Liu Hefei University of Technology, China
SA0431 10:40-10:55	High-Side Supply Design with High Reliability for a 20MHz 90V GaN Gate Driver **Yifan Hu**, Yong Wang, Ying Wang, Ling Peng, Ying Kong Beijing Microelectronic Technology Institute, China
SA0813 10:55-11:10	A Coordinated Control Strategy of Flywheel-Battery Hybrid Energy Storage System for Arc Simulation of High Voltage DC Molded Case Circuit Breaker Jianning Yin, **Xiaojian Lang**, Yongyong Zhao, Wei Zhang, Shuhua Liang Xi'an University of Technology, China
SA1214 11:10-11:25	Static Voltage Stability Assessment Considering the Impact of Active Distribution Networks **Weijia Li**, Wen Zhang, Yuxin Xie Shandong University, China
SA1621 11:25-11:40	Self-Synchronization Voltage Sources Control Method of New Energy Grid-Connected Inverter Fang Liu, **Yunyu Xu**, Dan Liu, Guoqing He Hefei University of Technology, China

Special Session 2A

Insulation Testing, Modeling and Simulation of Power Equipment
电力设备绝缘测试、建模与仿真

Session Chair: Jianning Yin, Xi'an University of Technology, China

Beijing Time: 10:10-11:40, 26th Feb. 2023 Room: Mo Lin Hall | 2 楼秣陵厅

SA1004 10:10-10:25	Modeling and Simulation of Complex Electromechanical system of More-Electric Aircraft Based on Distributed Simulation Technology Dan Qian, **Xiangyu Zhai**, Jiadan Wei Nanjing University of Aeronautics and Astronautics, China
SA1314 10:25-10:40	Differential Characteristics of Dissolved Acetylene Gas Threshold Value in Transformer Oil Rui Liu, Tianhe Yang, Qing He, Yu Zhang, Yalong Tu, Yunxiao Zhang, **Meng Huang** North China Electric Power University, China
SA0391 10:40-10:55	The Decoupled Network Feedforward Control of Weinberg Converter **Debin Zhang**, Xinjie Wu, Chenhao Wu, Guangrui Zhou, Leilei Shi, Suliang Wu Shanghai Institute of Space Power-Sources (SISP), China
SA0833 10:55-11:10	3D Magnetic Field Simulation of Generator Circuit Breaker Contact Structure Jianning Yin, **Yongyong Zhao**, Qian Chen, Xiaojian Lang, Jiandong Duan Xi'an University of Technology, China
SA1901 11:10-11:25	Tunable Three-band Vanadium Dioxide Metamaterial Absorber for Terahertz Nondestructive Testing **Ying Zhao**, Zijian Zhu, Chaohai Zhang Nanjing University of Aeronautics and Astronautics, China
SA1194 11:25-11:40	Investigation of the Core's Vibration Characteristics of A Distribution Transformer **Xiao Chen** Shenzhen Power Supply Co., Ltd.

Special Session 1B

Advanced Modeling, Optimization and Control Technologies for Power Systems with High Renewable Energy Penetration

高可再生能源渗透电力系统的先进建模、优化和控制技术

Session Chair: Debin Zhang, Shanghai Institute of Space Power-Sources (SISP), China

Beijing Time: 13:30-15:00, 26th Feb. 2023 Room: Dong Shan Hall | 2 楼东山厅

SA1044 13:30-13:45	Coordinated Stochastic Scheduling of Electric Vehicles and Distributed Renewable Energy in Power Grid Baoyu Hou, Zhanglei Zheng, Yang Yu, Xiao Hua, Hui Zheng, **Qilong Huang** Nanjing University of Science and Technology, China
SA1104 13:45-14:00	Analysis of Resonance Characteristics of AC Side of Flexible DC Transmission System Hong-gang Jia, Zhe Wang, Na Yan, **Wei-lan Li** Southwest Jiaotong University, China
SA1711 14:00-14:15	An Aggregation Approach of Load Side Resource Considering Complementary Characteristics and Scenario Requirements **Hangping Yang**, Jian Geng, Wenduo Sun, Fei Wang, Yiyuan Chen, Junfang Zhang Nanjing University of Science and Technology, China
SA1801 14:15-14:30	Research on the Characteristic of An Arc Device Equivalent to the Fire Source of the Cable Outer Sheath **Jing Ziyang**, Wu Shuqun, Wang Zixin Nanjing University of Aeronautics and Astronautics, China
SA1352 14:30-14:45	Deep Reinforcement Learning -based Energy Management Strategy for a Microgrid with Flexible Loads **Bin Zhang**, Zhe Chen, Amer M. Y. M. Ghias Aalborg University, Denmark
SA1395 14:45-15:00	Safety Analysis and Test of a New 24 Pulse Transformer Rectifier **Pan Kuangming**, Hu Yinxiao, Li Wenchen, Shi Yanbo, Pan Yichen, Ge Hongjuan Nanjing University of Aeronautics and Astronautics, China

Special Session 3A

The Integration Technology of "Load-storage-transformation-network-detection" Integrated System for Electrical Equipment

电气设备“负载-存储-转换-网络-检测”集成系统集成技术

Session Chairs: Xiao Han, Nanjing Institute of Technology, China
Chao Dai, Hohai University, China

Beijing Time: 13:30-15:00, 26th Feb. 2023 Room: Mo Lin Hall | 2 楼秣陵厅

SA0933 13:30-13:45	A Data Storage Method of Intelligent Substation Based on Physical Model Shidan Liu, Qian Tan, Jianglei Suo, Xiaowa Chen, Shaolin Jiao, Feng Wang, Yiquan Li, **Qianshuo Gu** Shangdong University, China
SA0304 13:45-14:00	The Influence for Different Input Models of the Deep Belief Network In Fault Diagnosis of Transformers **Zhongqi Guo**, Shunli Lv, Jinbo Li, Xin Luo, Bing Zhang, Haibin Zhang NARI Technology Co .Ltd, China
SA0721 14:00-14:15	Research on Cohesive and Linkage Mechanism of Electricity Market-Carbon Market-Green Certificate Market He Xinying, **Dai Qingzhao**, Zeng Ming, Wang Xin, Guo Ke, Zhang Xiaochun North China Electric Power University, China
SA0363 14:15-14:30	Research on Construction Design and Technical Path of Intelligent Coal-fired Power Plants under Digital Transformation Background **Shan Lu**, Zhang Hailong, Kong Zhen State Grid Electric Power Research Institute, China
SA1591 14:30-14:45	Research on Control Optimization for Dynamic Voltage Restorer Using Fuzzy Adaptive PI Control **Pengfei Wang**, Liuwei Xu, Jing Lu, Yanan Wu, Jie Yang, Jun Li, Bin Xu, Rui He Hefei Institutes of Physical Science Chinese Academy of Sciences, China
SA1174 14:45-15:00	Optimal Planning of Integrated Energy System Considering Dynamics of Heat and Gas Networks **Qian Wang**, YiQian Wang, Qi Zhao Shandong University, China

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2023 the 7th International Conference on Power Energy Systems and Applications

2023年第七届电力能源系统与应用国际会议

Nanjing, China | February 24-26, 2023

Online Meetings

Special Session 1C

Advanced Modeling, Optimization and Control Technologies for Power Systems with High Renewable Energy Penetration

高可再生能源渗透电力系统的先进建模、优化和控制技术

Session Chair: Wenyuan Li, Huai Rou Laboratory, China

Beijing Time: 10:10-12:25, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/83131556021

SA0681 10:10-10:25	Airports Integrated Multi-Energy Complementary Energy System Design and Multi-Scenario Application Analysis **Qin Jia**, Jing-Lei Yu and Zan Tao China Academy of Civil Aviation Science and Technology, China
SA1244 10:25-10:40	The Fault Current Limitation Method for Cascaded Hybrid HVDC **Yuqiao Jia**, Jingbo Zhao, Zheng Li, Ke Xu, Dajiang Wang, Bing Xie Research Institute Ltd of State Grid Jiangsu Electric Power Co., China
SA1254 10:40-10:55	Coordinated Planning of Generation and Transmission Network Considering Distributed Frequency Security Constraints **Haowen Cheng**, Lu Liu, Cai Yizhu Shanghai Jiaotong University, China
SA1961 10:55-11:10	Optimization of Multi-Microgrid Operation Based on Blockchain Technology and Multi-Agent Reinforcement Learning **Zhonghao Sun**, Ran Hao, Tianguang Lu, Mingqiang Wang Shandong University, China
SA0913 11:10-11:25	A Distributionally Robust Energy Storage Planning Model for Wind Integrated Power System Based on Scenario Probability **Shunyu Tang**, Gengfeng Li, Zitong Wang, Yinguo Yang, Qiuyu Lu, Pingping Xie, Yue Chen Xi'an Jiaotong University, China
SA0953 11:25-11:40	Microgrid Cluster Division and Optimal Allocation Method Considering Cooperative Increment Hongbin Zhang, Weisheng Liu, Shumin Sun, Peng Yu, **Chuanzhi Cui** YanShan University, China
SA1741 11:40-11:55	Unit Commitment Model Considering Wind Power Uncertainties for Wind Power Bundled with Thermal Power Transmitted by DC Transmission Line **Songbo Chen**, Mengyuan Zhou, Taoliang Tan, Gang Wu, Wenbo Luo, Chuangxin Guo, Zhejiang University, China
SA1325 11:55-12:10	Frequency Modulation Strategy of Wind Power Generation in Power System of High Renewable Penetration **Chengbin Chi**, Shan Liu, Qi Liu, Fan Li State Grid Smart Grid Research Institute CO..LTD., China
SA1523 12:10-12:25	Operation Optimization Scheduling of Multi-energy System Based on Combined Power Supply of Cold, Heat and Electricity Siqi Ye, Jinman Luo, Jiankun Hu, **Yu Tang**, Hongjian Ding North China Electric Power University, China

Special Session 1D

Advanced Modeling, Optimization and Control Technologies for Power Systems with High Renewable Energy Penetration

高可再生能源渗透电力系统的先进建模、优化和控制技术

Session Chair: Xiaohan Li, State Grid Jiangsu Electric Power Co. Ltd., China

Beijing Time: 10:10-12:25, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/89249120204

SA2061 10:10-10:25	A DDPG Algorithm Based Reinforcement Learning Controller for Three-Phase DC-AC Inverters **Jian Ye**, Sen Mei, Huanyu Guo, Yingjie Hu, Xinan Zhang Harbin Institute of Technology, Shenzhen, China
SA1553 10:25-10:40	Analytical Model of Flux Reversal Machines with Different Grade Halbach Array **Youyuan Ni**, Xin Zhang, Zhiwei Qiu Hefei University of Technology, China
SA1422 10:40-10:55	Equivalent Models and Identification of Performance Parameters for Primary Frequency Regulation of a TPP Unit **Ziqi Liu**, Xingwei Xu, Yi Shen, Kefei Wang, Yixuan Su, Weidong Li Dalian University of Technology, China
SA2104 10:55-11:10	Research on Power Fluctuation Control of Photovoltaic Generator Sets Considering the Harmonic Distortion Rate **Hu Yan**, Kaihui Feng, Bibin Huang, Li Nana, Jing Hu, Zihan Mengo State Grid Energy Research Institute Co., Ltd., China
SA1731 11:10-11:25	Short-Term Wind Power Prediction Based on Wind Speed Interval Division and TimeGAN for Gale Weather **Weisi Deng**, Zhongfu Dai, Xianzhuo Liu, Ruofan Chen, Haohuai Wang, Baorong Zhou, Weida Tian, Siyu Lu, Xudong Zhang Huazhong University of Science and Technology, China
SA2051 11:25-11:40	A TD3 Algorithm Based Reinforcement Learning Controller for DC-DC Switching Converters **Jian Ye**, Huanyu Guo, Sen Mei, Yingjie Hu, Xinan Zhang Harbin Institute of Technology, Shenzhen, China
SA1533 11:40-11:55	Bi-Level Joint Planning of Transmission Network and Energy Storage System to Enhance Flexibility Xiangfei Meng, Yi Sun, **Shihao Zou**, Yongji Cao, Hengxu Zhang, Rui Liu, Xian Wang, Yao Wang Shandong University, China
SA1821 11:55-12:10	Consider the Way of Gathering Network Tariff for High Frequency Distributed Electricity Trading in Distribution Networks Haiwei Wang, Yangjunran Zhou, Xiaolong Chen, Jianfeng Hong, **Wu Wenqiang** Southeast University, China
SA007 12:10-12:25	An Optoacoustic Sensor System for Simultaneous Detection of Power Equipment Voiceprint and Discharge Peifeng Shen, **Ting Chen**, Yong Li, Debao Tang, Sen Qian, Yan Wang State Grid Taizhou Power Supply Company, China

Special Session 2B

Insulation Testing, Modeling and Simulation of Power Equipment

电力设备绝缘测试、建模与仿真

Session Chair: Shuaibing Li, Lanzhou Jiaotong University, China

Beijing Time: 10:10-12:25, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/82537439224

SA0783 10:10-10:25	Design of the Opening and Closing Manipulator for Portable High Voltage Ring Main Unit **Yuyan Xiao**, Zewen Li, Xing Liu, Shuai Wang, Qian Wu, Ruiqi Zou Changsha University of Science & Technology, China
SA1124 10:25-10:40	Space Charge Characteristics of Different Oil-immersed Papers under Polarity Reversal Voltage Jianyi Wang, Yuanxiang Zhou, Zhaowei Wang, Jiantao Sun, Xingjin Zhang, Song Bai, Jiyu Huang, **Jianning Chen** Tsinghua University, China
SA0691 10:40-10:55	A Year-ahead Prediction Method of Monthly Wind Power Generation **Tianyu Cao**, Weidong Li, Hanlin Yu Dalian University of Technology, China
SA0943 10:55-11:10	Energy Efficiency Analysis of Ultra-supercritical Thermal Power Plant Based on Aspen Plus Modeling **Zhiyuan Wang**, Chao Zhang Shandong University of Science and Technology, China
SA0635 11:10-11:25	Degradation Behavior and Mechanism of E-mode Cascode GaN HEMTs under Hydrogen Environment Pengfei Zhao, **Zhiwei Zha**, Qingzhong Xiao, Jian Chen, Jianyuan Zhu, Zhiwei Fu, Yiqiang Chen Xiamen University of Technology, China
SA0793 11:25-11:40	Design of Intelligent Monitoring System for Energy Storage Power Station Based on Infrared Thermal Imaging **Xing Liu**, Zewen Li, Yuyan Xiao, Qian Wu Changsha University of Science and Technology, China
SA0493 11:40-11:55	Research on the Detuning Identification Method of Double Tuned Filter Based on Harmonic Impedance Offset Characteristicse Guowei Zhou, Xin Chen, Jie Yang, Hui Zou, Jialei Xing, Lintao Sun, **Qihe Sun** North China Electric Power University, China
SA1294 11:55-12:10	Effect of Vulcanization Temperature on Properties of Ceramifiable Silicone Rubber and Its Ceramic Bulk Hongchuan Tang, Qian Wang, Shengfang Li, Jing Zhao, Guangming Wang, Jingqi Qiao, **Mingyuan Yang** Chongqing University, China
SA2081 12:10-12:25	Bidirectional Coupling of Electromagnetic and Temperature Fields for Power Electronic Transformer **Shihu Zhang** Guangdong Guangye Investment Group Co., Ltd, China

Special Session 3B

The Integration Technology of "Load-storage-transformation-network-detection" Integrated System for Electrical Equipment

电气设备“负载-存储-转换-网络-检测”集成系统集成技术

Session Chair: Jianfeng Hong, Dalian University of Technology, China

Beijing Time: 10:10-12:10, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/84037960352

SA0773 10:10-10:25	Experimental Study on Vibration Characteristics of GIS Equipment Under Typical Mechanical Defects **Xu Hui**, Zhang Jing, Li Mengqi, Liu Mengna, Luo Chuanxian, Huang Licai Wuhan Nari Limited Liability Company of State Grid Electric Power Research Institute, China
SA2011 10:25-10:40	Development of a PID Control for A Supercapacitor-Based Energy Storage System Using A Dual Active Bridge (DAB) Converte **Karen Herrera**, Ángel Hidalgo, Carlos Quinatoa Universidad Tecnica De Cotopaxi, Ecuador
SA1751 10:40-10:55	A Lightweight Design on Mobile Power Supply with Fuel Cell Energy Storage Based on Modular Multilevel Converter Guanglin Sha, Yao Zhang, Jian Gao, Yunzhao Wu, Xiaofan Guo, **Yuzhuo Pan** Beijing Key Laboratory of Distribution Transformer Energy-saving Technology China Electric Power Research Institute, China
SA1771 10:55-11:10	Study on Evaluation Method of Substitution Effect for Grid-side Functional Alternative Energy Storage **Zihan Meng**, Dengzheng Wang, Nana Li, Feng Zhao, Bibin Huang, Jing Hu State Grid Energy Research Institute Co., Ltd., China
SA1701 11:10-11:25	Excitation Current on the Influence of Radial Electromagnetic Waves of Tangential Magnetizing Parallel Structure Hybrid Excitation Synchronous Motor **Wendong Zhang**, Liang Pang, Huoda Hu, Qinhai Hong, Chaohui Zhao Shanghai Dianji University, China
SA0873 11:25-11:40	Effect of Inverter-Type Distributed Power Supply Access on The Zero Sequence Current Distribution of AC Lines Zhengxu Qian, Wulue Pan, Ruizhi Ma, Feng Xu, Wenbin Cao, **Zanzan Zhang**, Zhile Xu, Minghao Wen Huazhong University of Science and Technology, China
SA1094 11:40-11:55	Analytical Optimization of Slotless Surface-Mounted Halbach Magnet Machines **Youyuan Ni**, Zhiwei Qiu, Junhua Chen Hefei University of Technology, China
SA0351 11:55-12:10	Comprehensive Treatment of Power Quality of Ladle Refining Furnace Power Distribution System **Li Jun**, Song Fengsheng, Chen Lezhu Anhui University of Technology, China

Special Session 1E

Advanced Modeling, Optimization and Control Technologies for Power Systems with High Renewable Energy Penetration

高可再生能源渗透电力系统的先进建模、优化和控制技术

Session Chair: Sohrab Mirsaeidi, Beijing Jiaotong University, China

Beijing Time: 13:30-15:45, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/83131556021

SA1432 13:30-13:45	Energy Consumption Prediction Model of Wastewater Treatment Plant Based on Stochastic Configuration Networks **Cheng Bowen**, Huang Liang, Li Xinyu Wuhan University of Technology, China
SA002 13:45-14:00	Research on Harmonic Source Analysis and Harmonic Transfer in Power System Li Jiang, Ya Huang, Hong Lei, Ge Gao, Jie Zhang, Zhengyi Huang, **Hong Lei** Hefei Institutes of Physical Science, Chinese Academy of Sciences, China
SA0513 14:00-14:15	PODA: Positive Active Power Outlier Detection based on Auto Machine Learning Sheng Yu, Fuxing Huang, Meng Sun, Jiachen Zhong, Peisen Yuan, **Jiachen Zhong** Nanjing Agricultural University, China
SA1641 14:15-14:30	Study on the Working Mode and Impedance-Based Stability Criterion of Generalized Electric Spring **Xiaohu Wang**, Yubin Duan, Xinyuan Chen, Zhun Huang, Yi Wei, Chaohui Zhao Shanghai DianJi University, China
SA1442 14:30-14:45	Study on Optimization of Household Power Consumption Considering Photovoltaic Access **Junshuang Li**, Saiyu Xu Northwest Institute of Nuclear Technology, China
SA1761 14:45-15:00	Research on the Automatic Control Method of Energy Storage for Wind Power Consumption **Zihan Meng**, Yu Zhang, Shanshan Shi, Chenhui Song, Xinchi Wei and Jing Hu State Grid Energy Research Institute Co., Ltd., China
SA0994 15:00-15:15	Frequency Characteristics Analysis of Isolated Power Grid Based on VSC Droop Controller Weijie Qiu, Qiang Yang, Tingbang Yang, Xin Ma, Xiaobing Xiao, Hujun Shi, Yuanliang Zhao, Qihong Shi, **Shuai Liang** Wuhan University, China
SA003 15:15-15:30	Fault detection of Bearing in Induction Motor Using Improved Variational Nonlinear Chirp Mode Decomposition **Jiaheng Li**, Chidong Qiu, Yu Wang Dalian Maritime University, China
SA1054 15:30-15:45	An Engineering Approach for Short-Circuit Current Calculation Considering WTG Integrated **Yiran Dong**, Hengchu Shi, Dezhi Kong, Hao You, Jing Chen, Shoudong Xu, Jinfu Chen Huazhong University of Science and Technology, China

Special Session 1F

Advanced Modeling, Optimization and Control Technologies for Power Systems with High Renewable Energy Penetration

高可再生能源渗透电力系统的先进建模、优化和控制技术

Session Chair: Chao Deng, Nanjing University of Posts and Telecommunications, China

Beijing Time: 13:30-15:45, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/89249120204

SA1921 13:30-13:45	Planning of Distributed Photovoltaic in Distribution Network Based on Green Certificate Trading Mechanism **Meng Yuqing**, Han Aoyang, Liu Tongtong, Wei Zhen, Zhang Zhisheng Qingdao University, China
SA1114 13:45-14:00	Impact of Snow Weather on PV Power Generation and Improvement of Power Forecasting **Xuejiao Fu**, Xiaoxiao Wang, Yu Gong, Yu Wang, Yangfan Zhang State Grid Jibei Electric Power Research Institute, China
SA1412 14:00-14:15	Wind Power Ramp Event Identification Based on Parameter Adaptive Swinging Door Algorithm Qi Weizhi, Che Jianfeng, **Xiong Yuhan**, Huo Xuesong, Hao Yuchen, Dai Qiangsheng Huazhong University of Science and Technology, China
SA1134 14:15-14:30	Economic Optimization of Green Methanol Production by Coupling Wind Power Generation with Biomass Power Generation **Chao Gao** Goldwind Low-Carbon Energy Design & Research Institute (Chengdu) Co., Ltd., China
SA0853 14:30-14:45	A Hybrid Energy Storage System based on Wavelet Packet Decomposition Technology for Photovoltaic Power Smoothing **Li-guo Weng**, Xing-long Feng, Di-jun Jin, Hao-han Ying, Shi-hong Yue State Grid Hangzhou Xiaoshan Power Supply Company, China
SA0751 14:45-15:00	Interactive Derivation of Distributed Power Trading and Distribution Network Operation Considering Dynamic Network Tariffs Haiwei Wang, Yangjunran Zhou, Xiaolong Chen, Jianfeng Hong, **Wenqiang Wu** Southeast University, China
SA0731 15:00-15:15	Modeling and Stability Analysis for Inverter-Based Stand-Alone Grids: Examining Grid-Forming Methods and the Interactions **Chenyang Li**, Yongzhang Huang, Xinyue Zhang, Weikai Zhong North China Electric Power University, China
SA1931 15:15-15:30	Photovoltaic Power Forecasting Model Based on the Fusion of Bagging Algorithm and Generalized Regression Neural Networks Han Aoyang, Liu Tongtong, Wei Zhen, **Meng Yuqing** Qingdao University, China
SA1513 15:30-15:45	Assessment of the Large-Scale Low-Pressure Distributed Energy Cluster Response Potential Based on The Combination of Subjective and Objective Methods **Gang Chen**, Bo Li, Jianping Wu, Ruiqi Deng, Liang Guo, Jin Yi Jiangmen Power Supply Bureau of Guangdong Power Grid Company, China

Session 1

Fault Diagnosis and Condition Monitoring in Intelligent Power System

智能电力系统中的故障诊断与状态监测

Session Chair: Feng Bin, Changsha University of Science & Technology, China

Beijing Time: 13:30-15:30, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/82537439224

SA1084 13:30-13:45	Short Circuit Fault Characteristics of Low Frequency AC Transmission System Based on Modular Multilevel Matrix Converter **Zexin Zhao**, Bin Han, Guoliang Zhao, Yunfei Xu, Zhengang Lu, Nianwen Xiang, Shulai Wang China Electric Power Research Institute, China
SA2041 13:45-14:00	Research on Online Monitoring of Wind Turbine Blade Damage based on Working Mode Analysis **Yu Wang**, Hui Liu, Feng Gao, Yangfan Zhang, Yaohan Wang, Kai Liang Electric Power Research Institute of State Grid Jibei Eletric Power, China
SA1991 14:00-14:15	Research on Cooperative fault ride-through Strategy of Offshore Wind Power Grid-connected System via VSC-HVDC System Dajiang Wang, Qiang Li, **Jianwei Wang** North China Electric Power University, China
SA1274 14:15-14:30	An Improved Artificial Neural Network Based Parameter Fault Diagnosis for Dual Boost Rectifier Zhihua Ding, Yubo Sun, Yingfeng Huang, **Jiaqiao Chen** Powerchina Fujian Electric Power Engineering Co., LTD, China
SA1064 14:30-14:45	A Sensor Fault Diagnosis Method for Rectifier Used in Traction Systems Yunjun Yu, **Yunquan Song**, Hongwei Tao Nanchang University, China
SA0483 14:45-15:00	Faulty Feeder Selection Method for High Resistance Grounding Fault in Active Flexible Grounding Distribution Network Ziqiang Xu, Tairan Ye, **Zixiong Wan**, Baowen Liu Hohai University, China
SA0411 15:00-15:15	Feature Impacts on Coal Power Plant Reliability Ezile Mnukwa, **Patrick S. Pouabe Eboule**, Jan Harm C. Pretorius University of Johannesburg, South Africa
SA005 15:15-15:30	A Fault Detection Approach of Bearing in Induction Motor Based on Improved Variational Mode Extraction **Yaxin Yu**, Chidong Qiu, Jiaheng Li Dalian Maritime University, China

Session 2

New Power System Configuration and Management

新型电力系统配置与管理

Session Chair: Shangpeng Sun, State Grid Ningxia Power Co., Ltd., China

Beijing Time: 13:30-15:30, 26th Feb., 2023 ZOOM Link: https://us02web.zoom.us/j/84037960352

SA0503 13:30-13:45	Research and Practice of Grid Data Security Classification and Grading **Jinqiang Fan**, Yonggang Xu, Jing Ma, Yaming Cao, Chen Zheng, Jing Yang State Grid Siji network security technology (Beijing) Co., China
SA1564 13:45-14:00	Low-Power CoAP for Data Uploads in Next-Generation Power Systems **Zheng Tongyi**, Chen Liming, Zhao Yuming, Wang Tao, Wang Jing, Zhong Han Electric Power Research Institute, CSG, China
SA1483 14:00-14:15	Equivalence of Scarcity Pricing and Reliability Options in Guiding Generation Investment Zhen Dong, Aiqiang Pan, **Hui Qu** Shanghai Jiao Tong University, China
SA1721 14:15-14:30	Research of EV Participation in Grid Peak Load Shaving Interaction based on V2G Incentive Price Tao Wang, Yuming Zhao, **Mingyu Ma**, Wenmeng Zhao, Jing Wang, Tian Mao, Zijun Liu Electric Research Institute, CSG, China
SA301 14:30-14:45	Demand Response Operation Mechanism and Day-ahead Market Optimal Scheduling of Flexible Load Aggregators Mingquan Ba, Zhigang Song, Quan'e Zhang, **Daqi Zhang**, Yongqiang Kang, Shuaibing Li Lanzhou Jiaotong University, China
SA0655 14:45-15:00	Research on Battery Module Equalization Strategy for Wireless Power Transfer System **Dali Zheng**, Miao Zhang, Yue Li, Zehang Huang, Jianhang Lu, Shaoli Deng, Chunshou Feng Guangdong University of Technology, China
SA0923 15:00-15:15	Parking Lot Charging Pile Configuration based on Monte Carlo Power Prediction **Senyong Fan**, Yan Bao, Guangyu Shi, Ziming Song Beijing Jiaotong University, China
SA0984 15:15-15:30	Research on New Power System Safety Protection System **Jinqiang Fan**, Yonggang Xu, Jing Ma, Yaming Cao, Chen Zheng, Jing Yang State Grid Siji Network Security Technology (Beijing) Co., China

Special Session 1G

Advanced Modeling, Optimization and Control Technologies for Power Systems with High Renewable Energy Penetration

高可再生能源渗透电力系统的先进建模、优化和控制技术

Session Chair: Junjun Xu, Nanjing University of Posts and Telecommunications, China

Beijing Time: 16:00-18:15, 26th Feb., 2023 ZOOM Link: https://us02web.zoom.us/j/83131556021

SA1865 16:00-16:15	Multi-objective Optimization Control Strategy for PV-Storage-Charging Stations for Peak Shaving of Distribution Network Zhixin Cong, Ji Zhao, Wei Xiao, Weidong Zhong, **Jun Jia** Tsinghua Sichuan Energy Internet Research Institute, China
SA1164 16:15-16:30	Chance-Constrained Optimal Power Flow for an Integrated Transmission and Distribution Network **Gang Liu**, Zhengshuo Li Shandong University, China
SA0963 16:30-16:45	A Simple Reconfigurable WPT System Employed Half Bridge Drive with Constant Current and Constant Voltage **Jianzhi Xue**, Yunhu Yang, Dazhuang Liang, Weina Jia, Yu Li, Zhi Yang Anhui University of Technology, China
SA1473 16:45-17:00	Electricity Generation Mix Considering Carbon Prices and Inter-Regional Power Import Aiqiang Pan, Zhen Dong, **Hui Qu** Shanghai Jiao Tong University, China
SA1875 17:00-17:15	Integrated Load Consumption and PV Output Forecasting of Net-zero Energy Buildings Considering KNN-GAN Data Augmentation **Hou-Wang Iao**, Keng-Weng Lao University of Macau, China
SA1024 17:15-17:30	Black-Start Control Strategy of the Wind-Storage Combined Power System Under Isolated Island Condition **Pengfei Dang**, Rong Jia, Zhongmei Pan, Ge Cao, Zeyu Guo Xi'an University of Technology, China
SA0645 17:30-17:45	Renewable Energy Credible Capacity Evaluation Method Based on EFC Wenjuan Niu, Guiyuan Xue, Chen Chen, Yin Wu, Xiaojun Zhu, **Weihan Hu** Economic and Technical Research Institute of State Grid Jiangsu Electric Power Company, China
SA1691 17:45-18:00	Two-timescale Scheduling and Control of Wind Plant with Advanced Adiabatic Compressed Air Energy Storage **Jiayu Bai**, Weijie Qian, Chongbiao Zhang, Wei Wei, Shengwei Mei Tsinghua University, China
SA1681 18:10-18:15	Research on State Estimation of Distribution Networks Based on Multi-source Data Fusion Technology with PMU Measurement Ruiqi Deng, Gang Chen, Bo Li, Jianping Wu, Guangyong Zheng, Jinhong Chen, **Jiarui Zhang** Jiangmen Power Supply Bureau of Guangdong Power Grid Company, China

Special Session 1H

Advanced Modeling, Optimization and Control Technologies for Power Systems with High Renewable Energy Penetration

高可再生能源渗透电力系统的先进建模、优化和控制技术

Session Chair: Yuanxing Xia, Hohai University, China

Beijing Time: 16:00-18:00, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/89249120204

SA0863 16:00-16:15	Efficiency Analysis Based on Electrical Network Theory for a Multi-load WPT System **Yu Li**, Yunhu Yang, Dazhuang Liang, Weina Jia, Jianzhi Xue Anhui University of Technology, China
SA0761 16:15-16:30	A Two-Stage Stochastic Unit Commitment Considering Shared Energy Storage and Renewable Energy Sources Li Li, Qinglei Zhang, Xiaosheng Zhang, Ziyu Zhang, Miao Yang, **Botao Gao**, Tao Ding Xi'an Jiaotong University, China
SA0701 16:30-16:45	A Microgrid Protection Scheme Based on Distributed Generator Control Cooperation **Wenming Guo**, Feng Zhou Changsha university, China
SA2001 16:45-17:00	Optimal Operation of Low-carbon Power Substation Considering Multiple Flexible Resources Chang Wang, Chaoyang Xu, Bei Qi, **Feilong Fan**, Jiaqian Chen, Shile Weng Shanghai Jiao Tong University, China
SA001 17:00-17:15	Analysis and Design of the Feedforward Strategy for Inverters in the Weak Grid with Sequence Impedance Model **Chenxi Bai**, Te Peng, Xuan Song, Shanxu Duan Huazhong University of Science and Technology, China
SA0535 17:15-17:30	Self-healing Power Supply Method Based on Topology Reconfiguration for Active Distribution System with Photovoltaic Generation Penetration Bin Yu, **Li-guo Weng**, Guo-hua Zhou, Da Hong, Man Luo, Hao-han Ying State Grid Hangzhou Xiaoshan Power Supply Company, China
SA0555 17:30-17:45	Optimal of Energy Storage Power Station Considering N-1 Fault and Analysis of Constraint Sensitivity Liuzhu Zhu, Rui Zhang, **Aobo Zhang**, Shengyu Kuai, Xuli Wang, Qing Liu, Shenghu Li Hefei University of Technology, China
SA0883 17:45-18:00	Bi-level Optimization Model for Coordinated Operation of Wind Power and Energy Storage System **Jingjing Wang**, Liangzhong Yao, Jun Wang, Siyang Liao, Jian Xu , Beilin Mao, Bo Xie Wuhan University, China
SA0374 18:00-18:15	Collaborative Optimization Strategy of Urban Rail Train Operation Curve Based on Regenerative Braking Energy Utilization Meiyu Song, **Xiangwen Shi**, Xiaobo Wu, Donglei Sha, Fei Lin and Zhongping Yang Beijing Jiaotong University, China

Workshop

Real-Time Digital Simulation and Hardware-in-the-loop Testing of Power and Energy Systems

电力和能源系统的实时数字仿真和硬件在环测试

Session Chairs: Amjad Anvari-Moghaddam, Aalborg University, Denmark
Arman Oshnoei, Aalborg University, Denmark

Beijing Time: 16:00-18:00, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/82537439224

SA0401 16:00-16:15	Short-Circuit Power Transmission Line Analysis for a Nine-Phase Transmission Line Using Phase Frame Method **Patrick.S Pouabe Eboule**, Jan Harm C Pretorius University of Johannesburg, South Africa
SA1631 16:15-16:30	Power Quality Disturbances Classification Based on WOA-SVM Algorithm **Ping Ji**, Quan Zhu Wanjiang University of Technology, China
SA0711 16:30-16:45	Test Method for Torsional Oscillation Mode Identification of DFIG Based on Voltage Excitation **Yaohan Wang**, Yitong Chai, Yangfan Zhang, Zhanbiao Liu, Kai Liang, Xuekun Cheng, Linlin Wu, Chao Gong North China Electric Power Research Institute, China
SA0565 16:45-17:00	Research on the Influence of Fault Grounding Resistance on Electrical Energy Information Under Single-Phase Grounding Fault **Gang Liu**, Qilin Li, Jinsong Li, Jinhua Liu, Cheng Chen The State Grid Sichuan Electric Power Corporation Metering Canter, China
SA1651 17:00-17:15	Measurement Noise Suppression of IPMSM Speed Loop Based on Fuzzy Linear Extend State Observer **Xinpeng Feng**, Shirui Xie, Pingping Gu, Ziqi Lei, Wei Zhang, Chaohui Zhao Shanghai Dianji University, China
SA1781 17:15-17:30	Research on Operation Mode and Parameter of a Multiple Ports Power Router for Industrial Park Guanglin Sha, Lu Liu, Wenyuan Ma, Yunzhao Wu, Qing Duan, Wei Zhao, Xiaofeng Sun, **Chengle Sun** Beijing Key Laboratory of Distribution Transformer Energy-saving Technology China Electric Power Research Institute, China
SA1811 17:30-17:45	An Overall Error Detection Method Based on “Semi-Digital” Metering Mode **Lei Luo**, Diqiu Shen, Wu Xia, Ming Lei, Wenxing Lu, Junhua Liang EHV Power Transmission Company, China Southern Power Grid Co., Ltd., China
SA10021 17:45-18:00	Temperature Field Simulation Analysis of Distribution Transformers Based on Fluid-Temperature Field Coupling Ning Ling, Xudong Du, Wangcheng An, Jinlian Wu, **Xinchen Li**, Shuaibing Li Lanzhou Jiaotong University, China

Session 3

System Control and Data Analysis in Power Systems

电力系统中的系统控制与数据分析

Session Chair: Dardan Klimenta, University of Priština in Kosovska Mitrovica, Serbia

Beijing Time: 16:00-18:15, 26th Feb. 2023 ZOOM Link: https://us02web.zoom.us/j/84037960352

SA4001 16:00-16:15	Optimal Scheduling of Wind-thermal-bundled Combined Energy Clusters with Multiple Constraints and Multiple Decisions Yongfeng Gao, **Busheng Zhang**, Haitang Bu, Lin Ye, Huan Xie, Xue Xia China Agricultural University, China
SA0823 16:15-16:30	Impacts of Control Parameters on Small-Signal Stability in a Hybrid-Synchronization-Based Grid-Connected Inverter System **Haojin Lin**, Xiaoyan Qiu, Xing Yan, Yi Zhou, Yiwei Qiu, Buxiang Zhou, Gang Chen Sichuan University, China
SA1034 16:30-16:45	A Generalized Extended State Observer-Based Frequency Controller of VSC-HVDC Systems **Nianqi Yi**, Weiyu Wang, Yijia Cao Changsha University of Science and Technology, China
SA2031 16:45-17:00	Deviation analysis of Impulse Grounding Resistance Based on Impulse Coefficient **Hongtao Ren**, Ying Zhang HuaDong Engineering Corporation Limited, China
SA4003 17:00-17:15	Dynamic Analysis of Heat Pump Assisted Photovoltaic/Thermal Cogeneration System **Yang Liu**, Chenzhe Hang, Haiyun Zhang, Dinghua Xu, Guanfu Pan National Institute of Metrology, China
SA0973 17:15-17:30	Autonomous Diagnosis Method for Defects of Cable Accessories Based on YOLOv3 and Mean-Shift Algorithm by Infrared Images **Yuru Cai**, Jing Zhang, Chuanxian Luo, Xinliang Xing, Mengqi Li, Nian Wu Wuhan NARI Co Ltd., State Grid Electric Power Research Institute NARI Group Corporation/State Grid Electric Power Research, China
SA1885 17:30-17:45	Time-segment Photovoltaic Prediction Method Based on Multi-objective Slime Mold Algorithm to Improve Support Vector Machine Chao Zhang, **Mingyan Xu** Shandong University of Science and Technology, China
SA0525 17:45-18:00	Research on Optimization Design of Cable Joint for Improving Cable Reliability Chenhui Li, Hao Qin, Jie Wang, Tuofu Zhu, Changhai Sun, **Kai Shi** Dalian University of Technology, China
SA1791 18:00-18:15	Power Loss and Thermal Temperature Calculation of IGBT Module by Mathematical Equations **Macit Aydin**, Ersoy BEŞER İnform Elektronik, Turkey

Poster Session

Beijing Time: 15:30-16:30, 26th Feb. 2023 Room: Dong Shan Hall | 2 楼东山厅

P01 **SA0903**	An Inductive Power Transfer System with A Clamp Circuit Versus Coupling Variations **Binshan Zhang**, Bin Yang, Zeheng Zhang and Yang Chen Southwest Jiaotong University, China
P02 **SA0441**	Ground Circulating Current Suppression of Flexible Interconnection System of Distribution Station Area based on Three-Phase Four-Leg Converter **Xiaoming Zeng** and Zhigang Wang NARI Group Corporation, China
P03 **SA2021**	Power System Transient Stability Control Considering HVDC Modulation and Load Shedding Coordination **Cunzhe He**, Xiaohan Shi, Zhiyuan Lu, Xinlin Sun, Xiaolei Wang and Boxi Zhou Shandong University, China
P04 **SA0463**	A High-Efficiency Wireless Power Transfer Converter with Integrated Power Stages **Yuan Shao**, Zhaotian Yan and Ruikun Mai Southwest Jiaotong University, China
P05 **SA1452**	Voltage Harmonic Suppression Method of Power Conversion System Based on CLCR Filter **Liang Peng**, Jiangjing Wang, Hanwen Chen, Luyu Gui and Lei Chen Ningbo Power Supply Company, China
P06 **SA0661**	Design of Standard Electricity Metering Device Based on Low Current Condition **Yiqin Jiang**, Jingfen Bai and Jing Meng China Electric Power Resesrch Institute (CEPRI), China
P07 **SA1335**	Statistical Analysis of Substation Defect Rules and Characteristics Based on Word Frequency Analysis Zhi Lv, **Shuai Ren**, Xiaohua Lv and Guofeng Liu State Grid Nanjing Power Supply Company, China
P08 **SA1405**	Research on a New Type of 36 Pulse Aviation Variable Voltage Rectification Technology **Wang Qingyun**, Jin Hui, Tu Wenhao, Pan Yichen, Ge Hongjuan, Chen Xinran Nanjing University of Aeronautics and Astronautics, China

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2023 the 7th International Conference on Power Energy Systems and Applications

2023年第七届电力能源系统与应用国际会议

Nanjing, China | February 24-26, 2023

Closing & Awards

18:30-18:50

26th February 2023

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