Special Session 2

Special Session Basic Information:

专栏题目 **Session Title**	中文：面向新型电力系统的先进电能变换与智能控制技术 英文：Advanced Power Conversion and Intelligent Control Technologies for New-Type Power Systems

专栏介绍和征稿主题
Introduction and topics

中文：随着新能源大规模接入、储能与电动交通快速发展以及电力电子装备广泛应用，电力系统正呈现出高比例新能源、高比例电力电子化和源网荷储深度互动的新特征。先进电能变换技术作为新能源接入、储能变换、柔性互联和高效用能的重要基础，正在从单一能量变换功能向电网支撑、稳定控制和系统协同运行方向拓展。与此同时，智能控制、优化调度、人工智能和数据驱动方法的发展，也为提升新型电力系统的安全性、灵活性、经济性和可靠性提供了新的技术路径。

本专题会议面向新型电力系统中的先进电能变换与智能控制关键问题，旨在汇聚电力系统、电力电子、储能、电动交通与智能控制等领域的专家学者和工程技术人员，围绕电力电子化电力系统的装备设计、控制策略、稳定分析、协同优化和工程应用开展深入交流。征稿范围包括但不限于以下方向：

1. 新型电力系统运行控制与优化调度
2. 构网型变流器拓扑、控制策略与稳定性分析
3. 储能变流器、虚拟同步机与惯量支撑技术
4. 源网荷储协同控制与灵活资源互动
5. 电动汽车、充电设施与电网互动技术
6. 分布式能源系统、微电网与柔性互联技术
7. 电力电子化负荷、工业驱动系统及其电网支撑能力
8. 宽禁带半导体器件及高效电能变换技术
9. 人工智能与数据驱动的电力系统分析、预测和控制
10. 面向新型电力系统的高可靠电力电子装备设计与工程应用

英文：With the large-scale integration of renewable energy, the rapid development of energy storage and electric transportation, and the widespread deployment of power electronic equipment, new-type power systems are characterized by high renewable penetration, extensive power-electronics integration, and deep interactions among generation, grid, load, and storage resources. As a key enabling technology for renewable energy integration, energy storage conversion, flexible interconnection, and efficient energy utilization, advanced power conversion is evolving from conventional energy conversion toward grid support, stability control, and coordinated system operation. Meanwhile, intelligent control, optimal dispatch, artificial intelligence, and data-driven methods provide new technical approaches for enhancing the security, flexibility, economy, and reliability of new-type power systems.

This special session focuses on key issues related to advanced power conversion and intelligent control in new-type power systems. It aims to bring together researchers and engineers from power systems, power electronics, energy storage, electric transportation, industrial loads, and intelligent control to discuss equipment design, control strategies, stability analysis, coordinated optimization, and engineering applications in power-electronics-enabled power systems. Topics of interest include, but are not limited to:

1. Operation control and optimal dispatch of new-type power systems
2. Grid-forming converter topologies, control strategies, and stability analysis
3. Energy storage converters, virtual synchronous machines, and inertia support technologies
4. Source-grid-load-storage coordinated control and flexible resource interaction
5. Electric vehicles, charging infrastructure, and grid interaction technologies
6. Distributed energy systems, microgrids, and flexible interconnection technologies

7. Power-electronics-based loads, industrial drive systems, and their grid-support capabilities
8. Wide-bandgap semiconductor devices and high-efficiency power conversion technologies
9. AI- and data-driven power system analysis, forecasting, and control
10. Design and engineering applications of high-reliability power electronic equipment for new-type power sy stems

Special Session Chair(s):

姓名 Name	周博文（Bowen Zhou）
称谓 Prefix	教授（Professor）
部门 Department	信息科学与工程学院（School of Information Science and Engineering）；未来技术学院（School of Future Technologies）
单位 Organization	东北大学（Northeastern University）
城市/地区 City/Region	沈阳（Shen Yang）

Organizer's Brief Biography

中文：周博文，东北大学信息科学与工程学院教授、博士生导师，未来技术学院副院长，IEEE 高级会员，CEng 特许工程师。担任《Energy Exploration & Exploitation》《Sustainability》等期刊编委，中国能源学会专家委成员、IEEE PES 中国区技术委员会理事。主要从事电力系统运行与控制、电动汽车与电网互动、虚拟储能与需求响应、工业负荷智能控制等方面的教学和科研工作。近年来，主持各类项目 21 项，发表 SCI 论文 74 篇，获得国家授权发明专利 45 项、欧洲发明专利 1 项、软件著作权 7 项，参与制定国标、行标、团标共 5 项，出版学术专著 3 部。曾获省部级科技进步一等奖 4 项、二等奖 3 项（主持 1 项），中国专利优秀奖 1 项，国际发明展金奖 3 项，教学成果奖 3 项。

英文：Zhou Bowen is a Professor and Doctoral Supervisor at the School of Information Science and Engineering, Northeastern University, and also serves as the Deputy Dean of the School of Future Technologies. He is a Senior Member of IEEE and a Chartered Engineer (CEng). He holds editorial board positions for journals such as *Energy Exploration & Exploitation* and *Sustainability*, and is a member of the Expert Committee of the China Energy Society, as well as a council member of the IEEE Power & Energy Society (PES) Technical Committee in China. His research and teaching activities primarily focus on power system operation and control, electric vehicle-grid integration, virtual energy storage and demand response, and intelligent control of industrial loads. In recent years, he has led 21 research projects and published 74 SCI-indexed papers. He has obtained 45 authorized national invention patents, 1 European patent, and 7 software copyrights. Additionally, he has participated in the formulation of 5 national, industrial, and group standards, and has authored 3 academic books. His awards include 4 first-class and 3 second-class provincial/ministerial-level Scientific and Technological Progress Awards (one of the second-class awards was led by him), 1 China Outstanding Patent Award, 3 gold medals at international invention exhibitions, and 3 teaching achievement awards.

姓名 Name	李硕（Shuo Li）
称谓 Prefix	副教授（Associate Professor）
部门 Department	信息科学与工程学院（School of Information Science and Engineering）
单位 Organization	东北大学（Northeastern University）
城市/地区 City/Region	沈阳（Shen Yang）

Organizer's Brief Biography

中文：主要研究方向：高温超导直线电机、高温超导磁悬浮电机、交流损耗、永磁涡流柔性传动理论等。主持和参加了国家重点研发计划项目、国家自然科学基金面上项目、国家自然科学基金青年基金、国家重大科学工程等各类项目 20 余项。发表学术论文 SCI 检索论文 20 余篇，合作出版国家十四五规划教材 1 部（《电机原理及拖动（第四版）》）。主要学术成果为应用超导电性、基于最小磁能熵增法的超导交流损耗计算、超导交流损耗 Scaling-law 标度定律等。

英文：His representative academic contributions cover applied superconductivity, calculation of superconducting AC losses based on the minimum magnetic energy entropy increment method, and the scaling law of superconducting AC losses. He has presided over and participated in more than 20 research projects of various types, including the National Key R&D Program, General Program of the National Natural Science Foundation of China, Young Scientists Fund of the National Natural Science Foundation of China, and National Major Scientific Engineering Projects. He has published over 20 SCI-indexed academic papers and co-authored one textbook included in the National 14th Five-Year Plan, namely Principles and Drives of Electrical Machines (4th Edition).

姓名 Name	李广地（Guangdi Li）
称谓 Prefix	副教授（Associate Professor）
部门 Department	信息科学与工程学院（School of Information Science and Engineering）
单位 Organization	东北大学（Northeastern University）
城市/地区 City/Region	沈阳（Shen Yang）

Organizer's Brief Biography

中文：李广地，副教授，博士生/硕士生导师，毕业于浙江大学电气工程学院（师从汪槱生院士）。2020 年进入东北大学从事博士后研究（合作导师为张化光教授），长期致力于变换器拓扑与组合、新能源发电与分布式控制等方向的研究，并与加拿大工程院刘雁飞院士及清华大学、浙江大学、天津大学等国内外顶尖学者开展了深入的合作。在科研成果方面，他在《IEEE Transactions on Industrial Electronics》《IEEE Transactions on Power Electronics》《电工技术学报》等国内外电力电子顶级期刊发表 SCI/EI 论文 10 余篇，获授权国家发明专利 10 余项。此外，他还兼任 IEEE PES 智能电网与新技术委员会智能电网与人工智能技术分委会理事，以及多本国际权威学术期刊的论文审稿人。在教学方面，李老师主讲本科生课程《电路原理》，以及研究生课程《电网络分析与综合》《直流电源软开关技术》《人工智能与电力系统》，始终致力于将前沿科研成果与智慧教学深度融合。

英文：Guangdi Li received the B.E.E degree from the College of Information Science and Engineering, Northeastern University, Shenyang, China, in 2013, and the Ph.D. degree in power electronics and electric drive from the College of Electrical Engineering, Zhejiang University, in 2020. He is currently an associate professor with the College of College of Information Science and Engineering, Northeastern University, Shenyang, China. His current research interests include resonant DC-DC converters, renewable energy generation and its control technology. He has published more than 15 SCI or EI indexed papers. He is a member of IEEE PES Intelligent Grid & Emerging Technologies Satellite Committee – China. He is currently a member of IEEE. He has won the first prize of science and technology progress award of Chinese Association of Automation, the second prize of science and technology progress award of China Machinery Industry Federation. He is also an active reviewer of some peer reviewed journals and international conferences. His personal website: http://faculty.neu.edu.cn/liguangdi/zh_CN/index.htm

姓名 Name	李思（Si Li）
称谓 Prefix	副研究员（Associate Researcher）
部门 Department	信息科学与工程学院（School of Information Science and Engineering）
单位 Organization	东北大学（Northeastern University）

	城市/地区 **City/Region**	沈阳（Shen Yang）

Organizer's Brief Biography

中文：李思，东北大学信息科学与工程学院副研究员，博士毕业于哈尔滨工业大学，入选国家博士后研究人员资助计划、中国博士后特别资助计划。主要从事基于宽禁带器件的软开关电机驱动及其控制等方面的科研与教学工作。担任《IEEE Transactions on Power Electronics》《IEEE Journal of Emerging and Selected Topics in Power Electronics》等电力电子领域期刊审稿人。近年来，主持辽宁省博士科研启动项目 1 项，参与科技部/工信部国家重点研发计划、国家自然科学基金重点/面上等各类科研项目 5 项，曾获国际发明展金奖 2 项。发表 SCI/EI 论文 17 篇，授权/公开国家发明专利 13 项，多项研究成果实现产业转化。

英文：Si Li is an Associate Researcher at the School of Information Science and Engineering, Northeastern University. He earned his Ph.D. from Harbin Institute of Technology and was selected for the National Postdoctoral Researchers Grant Program and the China Postdoctoral Special Funding Program. His research and teaching primarily focus on soft-switching motor drives and control strategies based on wide-bandgap semiconductor devices. He also serves as a reviewer for several renowned journals in the field of power electronics, including *IEEE Transactions on Power Electronics* and *IEEE Journal of Emerging and Selected Topics in Power Electronics*. In recent years, he has led one Liaoning Provincial Doctoral Scientific Research Start-up Fund Project and participated in five other research projects, including the National Key R&D Program of China (supported by the Ministry of Science and Technology or the Ministry of Industry and Information Technology), Key and General Programs of the National Natural Science Foundation of China, among others. He has won two gold medals at international invention exhibitions. To date, he has published 17 SCI/EI-indexed papers, has been granted or publicly disclosed 13 Chinese invention patents, and has successfully transferred multiple research outcomes to industrial applications.