

Special Session X

Special Session Basic Information:

专栏题目 Session Title	中文：高比例新能源与电力电子主导型电力系统稳定分析与协同控制 英文：Stability Analysis and Coordinated Control of Highly Renewable and Power-Electronic-Dominated Power Systems
专栏介绍和征稿主题 Introduction and topics	
中文：随着可再生能源渗透率的不断提高以及电力电子设备的大规模应用，现代电力系统的动态特性正在发生深刻变化。随着传统同步电源逐步被基于变流器的电力电子设备替代或补充，电力系统正日益向电力电子主导型方向演变，呈现出更加复杂的动态特性、异构设备间更强的交互作用以及显著的多时间尺度特征。这些变化给电力系统稳定性带来了新的挑战，并可能引发传统方法难以准确刻画的新型稳定问题。在高比例新能源与电力电子主导型电力系统中，宽频振荡、电压失稳、以及频率稳定等稳定问题可能在不同时间尺度上出现，并相互耦合、相互影响。同时，日益复杂的系统运行工况和控制结构，也给稳定机理分明、稳定性评估以及稳定抑制措施带来了重大挑战。本专题旨在为研究人员和工程技术人员提供技术交流平台，探讨高比例新能源与电力电子主导型电力系统稳定机理分析、稳定评估与协同控制领域的最新研究进展。专题内容涵盖新型稳定现象、先进建模与分析方法、基于量测与数据驱动的稳定评估，以及涉及新能源、电力电子变流器、同步发电机和输电网络的协同控制策略。重点关注能够提升未来电力系统稳定性与安全运行水平的新理论、新方法及工程实践方案。 英文：With the increasing penetration of renewable energy and the widespread deployment of power-electronic-based equipment, the dynamic characteristics of modern power systems are undergoing profound changes. As conventional synchronous generation is increasingly replaced or complemented by converter-interfaced power-electronic resources, power systems are evolving toward power-electronic-dominated operation, featuring more complex dynamics, stronger interactions among heterogeneous devices, and pronounced multi-timescale characteristics. These changes pose new challenges to power system stability and may give rise to emerging stability issues that are difficult to accurately characterize using conventional approaches. In highly renewable and power-electronic-dominated power systems, stability issues such as wideband oscillations, voltage instability, and frequency stability may emerge across different time scales and interact with each other. Meanwhile, increasingly complex operating conditions and control structures pose significant challenges to the analysis of stability mechanisms, stability assessment, and stability enhancement and mitigation measures. This Special Session aims to provide a technical forum for researchers and practitioners to exchange recent advances in stability mechanism analysis, stability assessment, and coordinated control of highly renewable and power-electronic-dominated power systems. The session will cover emerging stability phenomena, advanced modeling and analytical methods, measurement- and data-driven stability assessment, as well as coordinated control strategies involving renewable energy resources, power electronic converters, synchronous generators, and transmission networks. Particular attention will be given to new theories, methodologies, and engineering solutions that can enhance the stability and secure operation of future power systems.	

Special Session Chair(s):

	姓名	王丽馨
	Name	Lixin Wang
	称谓	副教授
	Prefix	Associate Professor
	部门	电气工程学院
	Department	School of Electrical Engineering
	单位	东北电力大学
	Organization	Northeast Electric Power University
	城市/地区	吉林
	City/Region	Jilin

Organizer's Brief Biography

中文：1991年生，东北电力大学副教授，博士，博士生导师，新西兰奥克兰理工大学访问学者。长期从事新能源电力系统稳定分析与控制、数据驱动的电力系统态势感知与控制等研究。近年来，主持国家自然科学基金1项，作为参与单位负责人主持国家重点研发计划子课题1项，主持吉林省教育厅科学技术研究项目1项，广东省重点实验室开放基金项目1项，全国重点实验室开放课题2项，吉林省人才开发资金项目1项，承担其他横向科研项目8项，并作为项目主要参与人和技术骨干先后参与了国家重点研发计划项目、国家自然科学基金联合基金项目和青年基金项目、国家电网公司和南方电网公司科技计划项目等10余项。发表SCI/EI期刊论文40余篇，授权发明专利10项，获吉林省科技进步二等奖3项，吉林省研究生教学成果特等奖1项。目前担任《电力系统保护与控制》和《Protection and Control of Modern Power Systems》期刊的青年助理编辑，《电力建设》、《电测与仪表》、《山东电力技术》、《浙江电力》等期刊青年编委，连续获评《电力自动化设备》、《电力系统保护与控制》优秀审稿专家。

英文：Born in 1991, Lixin Wang is an Associate Professor and Ph.D. Supervisor at the School of Electrical Engineering, Northeast Electric Power University. She received her Ph.D. degree and has been a visiting scholar at Auckland University of Technology, New Zealand. Her research interests include stability analysis and control of renewable energy power systems, as well as data-driven situational awareness and control of power systems. In recent years, she has led one project funded by the National Natural Science Foundation of China (NSFC), one sub-project of the National Key R&D Program of China as the project leader from a participating institution, one research project funded by the Department of Education of Jilin Province, one project funded by an open research fund of a key laboratory in Guangdong Province, two open research projects funded by national key laboratories, one project funded by the Jilin Province Talent Development Fund, and eight other industry-sponsored research projects. She has also participated as a key member and technical backbone in more than ten research projects, including projects under the National Key R&D Program of China, NSFC Joint Funds and Young Scientists Fund, and science and technology programs of State Grid Corporation of China and China Southern Power Grid. She has published more than 40 SCI/EI-indexed journal papers and holds 10 granted invention patents. She has received three Second Prizes of the Jilin Provincial Science and Technology Progress Award and one Grand Prize of the Jilin Provincial Graduate Education Achievement Award. She currently serves as a Young Assistant Editor for Power System Protection and Control and Protection and Control of Modern Power Systems, and as a Young Editorial Board Member for Electric Power Construction, Electrical Measurement & Instrumentation, Shandong Electric Power Technology, and Zhejiang Electric Power. She has also been recognized as an Outstanding Reviewer by Electric Power Automation Equipment and Power System Protection and Control for multiple consecutive years.

	姓名	高晗
	Name	Han Gao
	称谓	副教授
	Prefix	Associate Professor
	部门	电气与电子工程学院
	Department	School of Electrical and Electronic Engineering
	单位	哈尔滨理工大学
	Organization	Harbin University of Science and Technology
	城市/地区	黑龙江

	City/Region	Heilongjiang
Organizer's Brief Biography		
中文：1995年生。哈尔滨理工大学副教授，博士，硕士生导师，主要从事新型电力系统稳定分析与控制理论、数据驱动与人工智能等方面的研究工作。博士学位论文获评2024年度“新时代龙江优秀博士学位论文”。主持黑龙江省自然科学基金项目1项，国家重点实验室、教育部重点实验室开放课题各1项，主持黑龙江省博士后面上项目1项，黑龙江省“优秀青年教师基础研究支持计划”资助项目1项，国网省公司科技项目2项，发表SCI/EI收录学术论文20余篇，获省部级科技进步二等奖1项。担任《电力系统保护与控制》青年助理编辑，《Renewable and Sustainable Energy》、《综合智慧能源》、《山东电力技术》青年编委。 英文：Born in 1995. She is an Associate Professor, PhD, and Master's Supervisor at Harbin University of Science and Technology. Her main research interests include stability analysis and control theory of new power systems, data-driven methods and artificial intelligence. Her doctoral dissertation was awarded the 2024 "Excellent Longjiang Doctoral Dissertation in the New Era". She presides over 1 project supported by the Natural Science Foundation of Heilongjiang Province, 1 open project of the State Key Laboratory and 1 open project of the Key Laboratory of the Ministry of Education, 1 Heilongjiang Postdoctoral General Program, 1 funded project under Heilongjiang "Basic Research Support Program for Outstanding Young Teachers", and 2 science and technology projects of State Grid provincial branch companies. She has published more than 20 SCI/EI-indexed academic papers and won one Second Prize of Provincial and Ministerial Science and Technology Progress Award. She serves as a Young Assistant Editor for 《Power System Protection and Control》, and a Young Editorial Board Member for 《Renewable and Sustainable Energy》, 《Integrated Intelligent Energy》, and 《Shandong Electric Power Technology》.		