Special Session Proposal

Special Session Basic Information:

专栏题目 **Session Title**	中文：人工智能赋能的电-氢综合能源系统能量管理和风险评估方法 英文：AI-empowered Energy Management and Risk Evaluation of Power-Hydrogen Integrated Energy Systems

专栏介绍和征稿主题
Introduction and topics

中文：

构建以可再生能源和氢能为主要能源的电-氢综合能源系统是建设绿色低碳能源体系，实现“双碳目标”的关键举措。相比于传统电力系统，电-氢综合能源系统呈现运行特性复杂化、运行风险演化和扩散模式多样化等特点。电-氢综合能源系统的能量管理和风险评估面临大规模非凸组合优化问题的求解，计算复杂度随系统规模增加指数爆炸，传统方法难以适用。人工智能方法可从数据中挖掘函数关系，建立数据驱动的经验模型，实现输入-输出的直接映射。将人工智能的复杂函数逼近能力与电-氢综合能源系统的运行特点相结合，构建人工智能赋能的新范式是解决上述难题的有效方式之一。为此，我们设立此论坛，征集和探讨人工智能技术在电-氢综合能源系统能量管理和风险评估的最新进展和应用。

英文：

The establishment of power-hydrogen integrated energy systems (PH-IESs), primarily powered by renewable energy and hydrogen, is a critical initiative for establishing a green, low-carbon energy system and achieving the "dual-carbon" goals. Compared to traditional power system, PH-IESs are characterized by the complexity of operational characteristics, the diversified patterns of risk evolution and propagation. Consequently, the energy management and risk assessment of the PH-IES face challenges in solving large-scale non-convex combinatorial optimization problems, where computational complexity increases exponentially with system scale, rendering traditional methods inadequate. Artificial intelligence methods can extract functional relationships from data, establish data-driven empirical models, and enable direct input-output mapping. Combining the complex function approximation capability of AI with the operational characteristics of PH-IESs to construct an AI-empowered paradigm is one of the effective approaches to solve the above challenges. To this end, we set up this special session to solicit and discuss the latest advances and applications of AI technology in energy management and risk assessment of PH-IESs.

征稿主题包括但不限于：

1. 电-氢综合能源系统的大语言模型
2. 人工智能赋能的电-氢综合能源系统预测
3. 人工智能赋能的电-氢综合能源系统能量管理
4. 人工智能赋能的电-氢综合能源系统稳定性和控制
5. 人工智能赋能的电-氢综合能源系统风险评估

Special Session Chair(s):

姓名 Name	吴涛
称谓 Prefix	助理研究员
部门 Department	电气工程学院
单位 Organization	重庆大学
城市/地区 City/Region	重庆市

Organizer's Brief Biography

中文：

吴涛，2023 年毕业于美国南卫理公会大学，获哲学博士学位。2024 年入职重庆大学电气工程学院，隶属电力系统可靠性分析与优化课题组。研究兴趣主要包括电-氢综合能源系统、人工智能在电力系统的应用，弹性微电网等。主持国家自然科学基金青年基金、国家重点研发计划子课题等纵向项目/课题 2 项，国家电网指南项目课题等横向项目/课题 2 项，以第一/通讯作者在 IEEE Trans. on Smart Grid, IEEE Trans. on Neural Networks and learning systems、Applied energy 等期刊、国际会议发表 SCI/EI 论文 10 余篇，担任 IEEE TSG、IEEE TPWRS、IEEE TNNLS、Energy 等电力和人工智能领域知名期刊的审稿人。

英文：

Tao Wu received the Ph.D. degree from Southern Methodist University, Dallas, USA in 2023 in electrical engineering. He is currently an Assistant Research Fellow with the School of Electrical Engineering at Chongqing University, Chongqing, China. His research interests include AI applications to power systems, hydrogen integration, and resilient microgrids.

姓名 Name	苏一帆
称谓 Prefix	副教授
部门 Department	电气工程学院
单位 Organization	重庆大学
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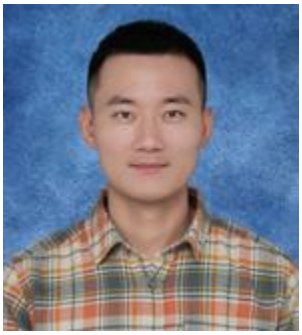
Organizer's Brief Biography

中文：

苏一帆，2019 年本科毕业于清华大学，获电气工程学士学位；2024 年博士毕业于清华大学，获电气工程博士学位，博士论文获评清华大学优秀博士论文。研究兴趣包括分布式能源的分布式能量管理、产消者的能量共享市场、需求侧响应等。2024 年 7 月入职重庆大学电气工程学院，隶属电力系统可靠性分析与优化课题组，任“弘深启航学者”，副教授，硕导。近年来发表 SCI/EI 论文 20 余篇，并担任 IEEE TSG、IEEE TPWRS、CSEE MPCE、CSEE JPES、IET RPG 等国内外知名期刊的审稿人。

英文：

Yifan Su received the B.Sc. and Ph.D. degrees in electrical engineering from Tsinghua University, Beijing, China, in 2019 and 2024, respectively. He is currently an Associate Professor with Chongqing University, Chongqing, China. His research interests include distributed energy management, energy sharing market, and robust dispatch in power systems.



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Organizer's Brief Biography

中文：

郑晓东博士分别于 2015 年、2020 年在华南理工大学获得工学学士、工学博士学位。曾在中国南方电网电力调度控制中心、新加坡南洋理工大学、南方电网科学研究院、西安交通大学、美国南卫理公会大学等机构开展学术研究和技术研发工作。目前研究兴趣主要包括大电网优化调度、储能建模与调控、新能源的消纳、分布鲁棒优化算法、量子计算等。主持或参与多项科研项目。近五年发表论文三十余篇，获发明专利授权十余项，获省部级和行业科技奖励数项。

郑晓东博士所在的“新能源电力系统”研究团队由华南理工大学陈皓勇教授（发展中国家工程技术院院士）牵头，专注于新能源电力系统的建模、分析、优化、控制、交易等相关理论和技术的创新。

英文：

Xiaodong Zheng received the B.S. and Ph.D. degrees in electrical engineering from the South China University of Technology, Guangzhou, China, in 2015 and 2020, respectively. He was a Post Doctoral Fellow with the Department of Electrical and Computer Engineering, Southern Methodist University, Dallas, TX, USA. He was a Postdoctoral Scholar with China Southern Power Grid, Company Ltd., Guangzhou, China, and Xi'an Jiaotong University, Xi'an, China, from 2020 to 2022,andaResearch Assistant with Nanyang Technological University, Singapore, from 2018 to 2019. He is currently an Associate Professor with the School of Electric Power Engineering, South China University of Technology, Guangzhou, China. His research interests include (distributionally) robust optimization, quantum computing, distributed optimization, game theory, statistical learning, and their applications in power system operations, renewable energy integration, modeling and control of energy storage, and electricity markets.