Special Session VII

Special Session Basic Information:

专栏题目 **Session Title**	中文：电气化设备的可靠性评估和剩余寿命预测 英文：Reliability Assessment and Remaining Useful Life Prediction for Electrified Equipment

专栏介绍和征稿主题
Introduction and topics

中文：随着“多电化、全电化”装备在航空航天、轨道交通、海洋运输等领域的高速发展，电子元器件、电子系统等电气化产品的可靠性和剩余寿命准确、可信评价是全球学术界长期关注但未能很好解决的关键技术。然而，现代电气化产品对可靠性和剩余寿命评价提出了低成本、低损伤、高准确的严苛需求，使传统方法面临新的挑战。本专题聚焦利用机理建模、大数据分析、数智赋能（AI）等科学方法和最新技术解决电气化设备可靠性和剩余寿命准确评价中的关键科学问题与工程难题，推动相关前沿技术的创新发展与应用转化。征稿主题包括但不限于电气化产品失效模式分析和失效机理建模、退化分析、可靠性评估、剩余寿命预测、可靠性优化设计等。

英文：With the rapid development of more-electric and all-electric systems in aerospace, rail transit, marine transportation, and related fields, accurate and reliable evaluation of the reliability and remaining useful life (RUL) of electrified products, including electronic components and systems, has become a key technical challenge that has long attracted global research attention yet remains inadequately addressed. However, modern electrified products impose stringent requirements on reliability and RUL evaluation, including low cost, low destructiveness, and high accuracy, posing new challenges to conventional methods. This special issue focuses on leveraging physics-based modeling, big data analytics, and artificial intelligence (AI)–enabled approaches to address key scientific problems and engineering challenges in the accurate evaluation of reliability and RUL of electrified equipment, and to promote the innovation and practical application of advanced technologies. Topics of interest include, but are not limited to, failure mode analysis and failure mechanism modeling of electrified products, degradation analysis, reliability assessment, RUL prediction, and reliability-oriented optimal design.

Special Session Chair(s):

姓名 **Name**	郑博恺 Bokai Zheng
称谓 **Prefix**	讲师 Lecturer
部门 **Department**	电气工程与自动化学院 College of Electrical Engineering and Automation
单位 **Organization**	福州大学 Fuzhou University
城市/地区 **City/Region**	福州/福建 Fuzhou/ Fu Jian

Organizer’s Brief Biography

中文：

郑博恺，2023 年在哈尔滨工业大学获得电气工程专业博士学位，现为福州大学电气工程与自动化学院讲师，曾于 2019-2020 年在米兰理工大学能源系访学。主持福建省中青年教师教育科研项目、校企重点合作等科研项目 4 项、发表学术论文 20 余篇、授权国家发明专利 10 余件，获国防科技进步二等奖。主要研究方向为电子系统的可靠性建模和剩余寿命预测。

英文：

Bokai Zheng is currently a lecturer at the College of Electrical Engineering and Automation, Fuzhou University. He received his doctoral degree in electrical engineering in 2023 from Harbin Institute of Technology, China. He was a visiting scholar with the Energy Department, Politecnico di Milano, from Jan. 2019 to Jan. 2020. He has led four research projects, including

Scientific Research Project for Middle-Aged and Young Teachers in Fujian Province and key industry–university collaboration projects, published more than 20 academic papers, and been granted over 10 national invention patents. He received the Second Prize of the National Defense Science and Technology Progress Award. His research interests include reliability modeling and remaining useful life prediction for electronic systems.

姓名 **Name**	陈昊 Hao Chen
称谓 **Prefix**	副研究员 Associate research fellow
部门 **Department**	电气工程及自动化学院 School of Electrical Engineering and Automation
单位 **Organization**	哈尔滨工业大学 Harbin Institute of Technology
城市/地区 **City/Region**	哈尔滨/黑龙江 Harbin/Heilongjiang

Organizer's Brief Biography

中文：

陈昊，2022 年在哈尔滨工业大学获得电机与电器专业博士学位，哈尔滨工业大学电气工程及自动化学院副研究员。长期从事电子元器件高可靠性高质量一致性设计制造基础理论和共性技术研究，主持国家部委预研重点基金项目、航天科技集团重点基金项目等 13 项、出版学术专著 1 部、发表 SCI 检索论文 30 余篇、授权国家发明专利 20 余件、制定航天科技标准 2 项，获国家科技进步二等奖、国家部委科技进步一等奖等奖励 4 项。

英文：

Hao Chen received his Ph.D. in Electrical Machines and Appliances from Harbin Institute of Technology in 2022. He is currently an Associate Research Fellow at the School of Electrical Engineering and Automation, Harbin Institute of Technology. His research focuses on the fundamental theories and generic technologies for the highly reliable, high-quality, and consistent design and manufacturing of electronic components. He has presided over 13 research projects, including pre-research funds from national ministries and China Aerospace Science and Technology Corporation. He has published more than 30 SCI-indexed papers, been granted over 20 national invention patents, and formulated 2 aerospace science and technology standards. He has received 4 scientific and technological awards, including the Second Class Prize of the National Science and Technology Progress Award and the First Class Prize of Science and Technology Progress awarded by national ministries.

姓名 **Name**	刘兰香 Lanxiang Liu
称谓 **Prefix**	副研究员 Associate Professor
部门 **Department**	电气工程及自动化学院 School of Electrical Engineering and Automation
单位 **Organization**	哈尔滨工业大学 Harbin Institute of Technology
城市/地区 **City/Region**	哈尔滨/黑龙江 Harbin/Heilongjiang

Organizer's Brief Biography

中文：

刘兰香，工学博士，副研究员，硕士生导师，入选国家引才计划、黑龙江省高层次人才。主持国家自然科学基金青年项目、国家博士后科学基金、黑龙江省博士后科学基金等国家、省部级项目 8 项；发表学术论文 20 余篇，获授权国家发明专利 10 件、转化应用 3 件；荣获全国博士后创新创业大赛金奖、全国大学生创新创业实践优秀案例。研究方向为高可靠电器质量一致性设计、优化与可靠性提升技术。

英文：

Lanxiang LIU, Ph.D. in Engineering, is an Associate Professor and Master's Supervisor. She has been selected for the National Talent Introduction Program and recognized as a High-level Talent of Heilongjiang Province. She has presided over eight national and provincial-level projects, including the National Natural Science Foundation of China Youth Program, the

National Postdoctoral Science Foundation, and the Heilongjiang Provincial Postdoctoral Science Foundation. She has published over 20 academic papers and holds 10 authorized national invention patents, 3 of which have been commercially implemented. Her achievements include winning the Gold Award in the National Postdoctoral Innovation and Entrepreneurship Competition and the National College Student Innovation and Entrepreneurship Practice Outstanding Case Award. Her research focuses on quality consistency design, optimization, and reliability enhancement technologies for highly reliable electrical appliances.

姓名 **Name**	徐玮骏 Weijun Xu
称谓 **Prefix**	博士候选人 PhD candidate
部门 **Department**	能源系 Department of Energy
单位 **Organization**	米兰理工大学 Politecnico di Milano
城市/地区 **City/Region**	意大利米兰 Milan/Italy

Organizer's Brief Biography

中文：

徐玮骏，米兰理工大学博士候选人，参与欧盟地平线项目“MOSAIC”、工信部专项，发表学术论文 10 余篇，多次获得美国预测与健康管理学会（PHM society PhD Grant）、欧洲 ESREL SRA-E 会议组委会 (PhD Travel Grant)、ICSRS 会议组委会、华为 (PhD Travel Grant)等组织和机构的资助。研究方向为剩余使用寿命预测、不确定性量化、随机过程、图神经网络等。

英文：

Weijun XU is a PhD candidate at Politecnico di Milano. He has participated in the EU Horizon project “MOSAIC” and a special project of the Ministry of Industry and Information Technology (MIIT). He has published more than 10 academic papers and has received multiple grants and sponsorships, including the PHM Society PhD Grant (USA), ESREL SRA-E Conference PhD Travel Grant (Europe), ICSRS Conference Travel Grant, and Huawei PhD Travel Grant. His research interests include remaining useful life (RUL) prediction, uncertainty quantification, stochastic processes, and graph neural networks.

姓名 **Name**	孙志刚 Zhigang Sun
称谓 **Prefix**	青年教授 Early-Career Professor
部门 **Department**	自动化学院 School of Automation
单位 **Organization**	南京理工大学 Nanjing University of Science and Technology
城市/地区 **City/Region**	南京/江苏 Nanjing/Jiangsu

Organizer's Brief Biography

中文：

孙志刚，博士即将毕业于哈尔滨工业大学（导师：翟国富教授），南京理工大学预聘青年教授，曾赴新加坡国立大学联合培养（导师：TANG Loon Ching 教授）。从事航天国防高端装备多余物自动检测技术研究，主持国家自然科学基金青年学生基础研究项目（博士研究生）、中央高校基本科研业务费专项资金等项目，以第一作者或通讯作者发表 SCI 论文 28 篇（ESI 热点&高被引论文 1 篇），获 2026 SRSE 最佳学生论文、2026 RAITS 最佳论文，入选中国科协青年科技人才培育工程博士生专项计划。

英文：

Sun Zhigang, who is about to graduate with a PhD from Harbin Institute of Technology (under the supervision of Professor Zhai Guofu), is a pre-hired young professor at Nanjing University of Science and Technology. He has also undergone joint training at the National University of Singapore (under the supervision of Professor TANG Loon Ching). He is engaged in

research on loose particle automatic detection technology for aerospace and defense high-end equipment, and has led projects such as the Basic Research Program for Young Students of the National Natural Science Foundation, Central University Basic Research Business Fee Special Fund Support, etc. He has published 28 SCI papers (1 ESI hot & highly-cited paper) as the first or corresponding author, winning the 2026 SRSE Best Student Paper and 2026 RAITS Best Paper, and was selected for the Doctoral Student Program of the Young S&T Talents Cultivation Project, CAST.

姓名 **Name**	郭久威 Jiuwei Guo
称谓 **Prefix**	工程师 Engineering
部门 **Department**	
单位 **Organization**	中国兵器工业集团航空弹药研究院有限公司 Norinco Group Air Ammunition Research Institute
城市/地区 **City/Region**	哈尔滨/黑龙江 Harbin/Heilongjiang

Organizer's Brief Biography

中文：郭久威，中国兵器工业集团航空弹药研究院有限公司工程师，2024 年博士毕业于哈尔滨工业大学电气工程专业，曾于 2021 年 3 月至 2022 年 3 月在加拿大阿尔伯塔大学联合培养。主要研究方向为电子产品的可靠性预计、可靠性优化等。

英文：Jiuwei Guo is currently an engineer at Norinco Group Air Ammunition Research Institute. He received his doctoral degree in electrical engineering in 2024 from Harbin Institute of Technology. He was a visiting scholar with University of Alberta in Canada from March 2021 to March 2022. His research interests include reliability prediction, reliability optimization of electronic products.