Special Session XVII

Special Session Basic Information:

专栏题目 Session Title	中文：量测设备及其元器件可靠性评估与失效机理研究 英文：Reliability Evaluation and Failure Mechanisms for Measurement Equipment and Components

专栏介绍和征稿主题
Introduction and topics

中文：随着新型电力系统、深空深海探测、极端环境作业、有人无人协同智能运维等场景的快速发展，量测设备及元器件面临强电磁干扰、宽温域交变、多应力耦合等严苛服役条件，同时集成化计量模组、新型敏感元件等新技术的规模化应用，带来了失效模式未知、退化机理不明确、现有可靠性评估方法适配性不足等行业共性难题。本专题论坛旨在分享量测设备及元器件可靠性评估与失效机理领域的最新理论成果、前沿试验技术、工程应用案例，破解多应力耦合下失效机理表征、小样本长周期可靠性评估等关键技术瓶颈。主题包括但不限于：

1） 量测设备可靠性加速试验方案设计与优化；

2） 量测设备系统可靠性评估方法；

3） 量测设备及核心元器件性能退化建模与失效机理分析；

4） 量测设备及其元器件寿命预测与剩余寿命估计；

5） 基于数据驱动和机器学习的量测设备故障诊断；

6） 实际案例研究及工业应用实践。

英文： With the rapid development of scenarios such as new power systems, deep space and deep sea exploration, extreme environment operations, and manned-unmanned collaborative intelligent operation and maintenance, measurement devices and components are facing severe service conditions such as strong electromagnetic interference, wide temperature range alternation, and multi-stress coupling. Meanwhile, the large-scale application of new technologies such as integrated measurement modules and novel sensitive elements has brought about common industry problems such as unknown failure modes, unclear degradation mechanisms, and insufficient adaptability of existing reliability assessment methods. This special forum aims to share the latest theoretical achievements, cutting-edge test technologies, and engineering application cases in the field of reliability assessment and failure mechanism of measurement devices and components, and to break through key technical bottlenecks such as failure mechanism characterization under multi-stress coupling and small sample long-term reliability assessment. The themes include but are not limited to:

1) Design and optimization of accelerated test schemes for the reliability of measurement equipment

2) Method for evaluating the reliability of measurement equipment system;

3) Modeling of performance degradation and failure mechanism analysis of measurement equipment and core components;

4) Life prediction and RUL estimation of measurement equipment and their components;

5) Fault diagnosis of measurement equipment based on data-driven and machine learning;

6) Case studies and industrial application practices.

Special Session Chair(s):

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Organizer's Brief Biography

中文：哈尔滨理工大学教授、博士生导师。哈尔滨理工大学传感器与可靠性工程研究所所长、黑龙江省高层次人才、“精密仪器及机械”黑龙江省专业技术领军人才梯队后备学科带头人，曾获黑龙江省科学技术进步二等奖、黑龙江省高校科技进步二等奖。兼任中国机械工程学会可靠性工程分会常务委员、中国仪器仪表学会电磁测量信息处理仪器分会委员、IEEE 标准委员会委员、IEEE PES 电动汽车技术委员会（中国）动力电池系统技术分委会委员、中国优选法统筹法与经济数学研究会工业工程分会理事、《电测与仪表》期刊青年编委。入选黑龙江省优秀青年教师基础研究支持计划，荣获中国机械工程学会“先进工作者”称号。

英文：Professor and Doctoral Supervisor at Harbin University of Science and Technology. He serves as the Director of the Institute of Sensor and Reliability Engineering at Harbin University of Science and Technology, a High-Level Talent of Heilongjiang Province, and the Reserve Academic Leader of the Heilongjiang Provincial Professional and Technical Leading Talent Echelon for Precision Instrument and Machinery. He has been awarded the Second Prize of the Heilongjiang Provincial Science and Technology Progress Award, and the Second Prize of the Science and Technology Progress Award for Heilongjiang Provincial Universities. His academic and professional appointments include: Member of the IEEE Standards Committee; Member of the Power Battery System Technology Subcommittee, Electric Vehicle Technology Committee (China) of the IEEE Power & Energy Society (IEEE PES); Standing Committee Member of the Reliability Engineering Branch of the Chinese Mechanical Engineering Society (CMES); Committee Member of the Electromagnetic Measurement and Information Processing Instrument Branch of the China Instrument and Control Society (CICS); Council Member of the Industrial Engineering Branch of the Chinese Society of Optimization, Overall Planning and Economic Mathematics (CSOOPEM); and Young Editorial Board Member of the journal Electrical Measurement & Instrumentation. He has been selected for the Heilongjiang Provincial Basic Research Support Program for Outstanding Young Teachers, and received the "Advanced Worker" honorary title from the Chinese Mechanical Engineering Society.

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Organizer's Brief Biography

中文：哈尔滨理工大学讲师、研究生导师。研究方向涵盖电力设备可靠性，电子元器件可靠性与失效机理。已发表SCI期刊论文20余篇。

英文：Lecturer and Master's Supervisor at Harbin University of Science and Technology. Her research interests cover reliability of power equipment, as well as reliability and failure mechanism of electronic components. She has published more than 20 peer-reviewed papers in SCI-indexed journals.

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Organizer's Brief Biography

中文：哈尔滨理工大学副教授、硕士研究生导师。主要研究方向为新能源储能器件可靠性研究、电路板极端环境可靠性分析、工业大数据建模与应用。IEEE PES电动汽车动力电池技术协会会员，中国超级电容产业联盟会员。先后赴美国南佛罗里达大学和新西兰奥克兰大学访学一年，近期发表可靠性相关论文10余篇。

英文：Associate professor and master's supervisor at Harbin University of Science and Technology. His main research areas include reliability studies of energy storage devices, reliability analysis of circuit board under extreme environments, and modeling and application of industrial big data. He is a member of IEEE PES Electric Vehicle Battery Technology Association and a member of the China Supercapacitor Industry Alliance. He has spent one year each on visiting studies at the University of South Florida in the United States and Auckland University in New Zealand. Recently, he has published over 10 papers related to reliability.