特别专题题目：人工智能赋能核能安全与可靠性

Title of Special Session: AI-Enhanced Safety and Reliability Assurance for Nuclear Installations

Aim of Special Session: As a cornerstone of low-carbon energy, nuclear power is undergoing a digital transformation critical to achieving global dual-carbon goals. In the post-Fukushima era, the integration of the Industrial Internet of Things (IIoT), Big Data, Artificial Intelligence (AI), and Cloud Computing provides a transformative framework for nuclear safety. This special session aims to bridge the gap between theoretical research and industrial application on nuclear safety and operational resilience. Researchers and practitioners from academia, research institutes and nuclear utilities are invited to share innovations that enhance the reliability, controllability, and safety of next-generation nuclear systems. The goal is to foster a high-intelligence safety paradigm that ensures the long-term sustainability and high-quality development of the nuclear industry.

Topics of interest for submission include, but not limited to）
1. Big data and IoT applications in intelligent operation and maintenance for nuclear power plants
2. Prognostics and health management of nuclear equipment and systems
3. AI-enhanced decision support system for operational safety, alarm analysis, fault diagnosis, accident management, and emergency response
4. Reliability modeling and analysis of passive safety systems
5. Software verification, validation, and dependability analysis
6. Human-system integration for advanced digital control rooms
7. Cyber-physical security and integrated risk evaluation
8. Probabilistic risk assessment and risk monitor applications
9. Model fidelity, uncertainty quantification and sensitivity analysis
10. Nuclear fuel performance monitoring and safety assessment
11. Digitalization and standardization for advanced nuclear applications

二、联系人及联系方式

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Jun YANG received his Ph.D. degree in nuclear engineering from Harbin Engineering University, Harbin, China, in 2017. He is currently an associate professor with South China University of Technology, Guangzhou, China. His research interests include nuclear safety and simulation, dynamic reliability analysis and probabilistic risk assessment, prognostics and health management, big data analytics, and intelligent decision support system technologies.

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Bing Zhang received his M. S. degree in Nuclear Science and Engineering from Harbin Engineering University in 2007. He is a professor-level senior engineer and registered nuclear safety engineer with the State Key Laboratory of Nuclear Power Safety Monitoring Technology and Equipment, Shenzhen, China. He serves as a council member of the Severe Accident Specialty Committee under the Nuclear Safety Branch of the Chinese Nuclear Society. He been engaged in probabilistic safety assessment and reliability work for multiple domestic nuclear power projects as well as the UK Generic Design Assessment (GDA) project.

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Ming Yang received the B.S., M.S., and Ph.D. degrees in automation, energy science, as well as nuclear science and engineering in 1994, 2004 and 2012, respectively. From 2005-2020, he had been a professor with the College of Nuclear Science and Technology, Harbin Engineering University (2005-2017), and the School of Electric Power, South China University of Technology (2017-2020). Since 2021, he has been a professor with the College of Physics and Optoelectronics Engineering, Shenzhen University. He has published more than

160 academic papers and 3 books. His research interests include risk analysis, reliability engineering, digital I&C, human reliability, intelligent operation and maintenance in the field of nuclear power.

Hidekazu Yoshikawa received his Ph.D degree in Electrical Engineering from Kyoto University in 1971. He is currently an emeritus professor with Kyoto University and a Honorary Fellow of Symbio Community Forum in Japan. Prof. Hidekazu Yoshikawa specializes in instrumentation and control engineering areas for many years and he served in the research activities on human-machine systems at Atomic Energy Society Japan, Society of Instrument and Control Engineers, and Japanese Society of Electrical Engineers. He also cooperated in organizing many international conferences in the area of human interface researches such as IFAC-MMS, CSAPC, HCII, etc., and he especially had started new international conference series ISSNP in 2007 to promote research for symbiotic nuclear power system together with the publication of a new International Journal of Nuclear Safety and Simulation (IJNS) in 2010, as the Editor-in-Chief. He has published more than ten books and more than 400 articles in academic journals, and he got several best paper awards from several academic societies and international conferences. He was also awarded as a distinguished contributor of nuclear safety in 2005 by the Ministry of International Trade and Industry in Japan, for his long year contribution in developing full digital I&C and HMIT systems for nuclear power plants in Japan.

Takeshi Matsuoka received his Doctor of Engineering from the University of Tokyo in 1987. He is currently a professor with Utsunomiya University, Japan. With a specialization in Probabilistic Risk Assessment (PRA) for nuclear power plants, he has made foundational contributions to the field, most notably through the development of the GO-FLOW reliability analysis methodology. His pioneering work earned him the Minister of the Science and Technology Agency Prize in 1993 and the Minister of Transport Prize in 1998. Beyond academia, Professor Matsuoka has also played a critical role in national safety governance, serving as a Special Investigator for the National Diet of Japan's Fukushima Nuclear Accident Independent Investigation Commission (NAIIC) in 2011.