

TYSAN 2022



International Symposium on **T**hermal **H**ydraulics and **S**afety of **A**dvanced **N**uclear Energy Systems **2022**



November 4 - 5, 2022

Sun Yat-sen University, Zhuhai, Guangdong, China

Online and Onsite



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About TYSAN

Nuclear energy is one of the most important energy sources to achieve the strategic goal of "carbon peaking and carbon neutrality", and it plays an irreplaceable role in environmental protection and stable energy supply. In order to promote the technological development of nuclear engineering thermal hydraulics, strengthen exchanges and cooperation between domestic and foreign units and disciplines, and build an important communication platform for the majority of nuclear energy researchers, Sun Yat-sen University holds this International Symposium on Thermal Hydraulics and Safety of Advanced Nuclear Energy Systems 2022 [Online and Onsite Conference]. We hope this symposium will be a bridge for all the attendees and researchers.

Symposium Organization

General Chairs

Prof. Koji MORITA (Kyushu University)

Prof. Xuewu CAO (Shanghai Jiao Tong University)

Prof. Wenxi TIAN (Xi'an Jiaotong University)

Organizer

Sun Yat-sen University

Undertaker

Sino-French Institute of Nuclear Engineering & Technology (IFCEN), Sun Yat-sen University

Contact Information

Assoc. Prof. Songbai Cheng

Email: chengsb3@mail.sysu.edu.cn

Assoc. Prof. Kai Wang

Email: wangk326@mail.sysu.edu.cn

Technical Program Committee

Liangming PAN	Long GU	Jiyun ZHAO	Shuichiro MIWA
Shanfang HUANG	Mikio SAKAI	Bin ZHANG	Jinbiao XIONG
Songbai CHENG	Xiaoxing LIU	Kai WANG	Luteng ZHANG
Biao SHEN	Guojun HU	Zaiyong MA	Yuan ZHOU
Tenglong CONG	Wenhai QU	Hui LIANG	Hui CHENG

General Information

Symposium Site

The symposium will be held at Sun Yat-sen University, Zhuhai, Guangdong, China on November 4th (Friday) and 5th (Saturday). All events will be held online (Zoom meeting) and onsite (Zhuhai Campus of Sun Yat-sen University).

There will be two Zoom meeting rooms and one onsite meeting room:

Zoom meeting room:

Room A:

<https://u-tokyo-ac->

[jp.zoom.us/j/81970626551?pwd=VkJjYWd0bng4dVFQWEphUUxiOUNCdz09](https://u-tokyo-ac-jp.zoom.us/j/81970626551?pwd=VkJjYWd0bng4dVFQWEphUUxiOUNCdz09)

ID: 819 7062 6551

Password: 542768

Room B:

[https://us06web.zoom.us/j/82396434996?pwd=bVgvc21STUZyMWxVMlIwbEZ](https://us06web.zoom.us/j/82396434996?pwd=bVgvc21STUZyMWxVMlIwbEZ0bDR3dz09)

[0bDR3dz09](https://us06web.zoom.us/j/82396434996?pwd=bVgvc21STUZyMWxVMlIwbEZ0bDR3dz09)

ID: 823 9643 4996

Password: 487871

Onsite meeting room:

Room 606, Chemistry Building, Zhuhai Campus of Sun Yat-sen University

Presentation Guidelines

There will be three sessions on both days:

Distinguished Speaker Session:

25 minutes in total for each speech

Recommended: 20 minutes presentation + 5 minutes Q & A session

Talented Scholar Session:

20 minutes in total for each speech

Recommended: 15 minutes presentation + 5 minutes Q & A session

Young Researcher Session:

15 minutes in total for each speech

Recommended: 10 minutes presentation + 5 minutes Q & A session

Daily Program

4 November (Friday) 2022			
Session 1	Distinguished Speaker (Room A)		
Session Chair	Koji MORITA and Songbai CHENG		
Time (GMT+8)	Title	Speaker	Time (JST)
8:40-8:50	Welcome Remarks	Dean Wei WANG	9:40-9:50
8:50-9:00	Opening Remarks	Chair Koji MORITA Chair Wenxi TIAN	9:50-10:00
9:00-9:25	Development of a Passive Reactor Shutdown Device to Prevent Core Disruptive Accidents in Fast Reactors	Prof. Koji MORITA (Kyushu Univ.)	10:00-10:25
9:25-9:50	Experimental Study of Two-phase Flow Parameters and CHF Characteristics in Rectangular Channel	Prof. Liangming PAN (Chongqing Univ.)	10:25-10:50
9:50-10:15	Latest Progress of Offshore Stationary Lead-based Reactor	Prof. Long GU (Lanzhou Univ.; Chinese Academy of Sciences)	10:50-11:15
10:15-10:25	Coffee Break		11:15-11:25
Session Chair	Long GU and Kai WANG		
10:25-10:50	Heat Pipe Cooled Reactor	Prof. Wenxi TIAN (Xi'an Jiaotong Univ.)	11:25-11:50
10:50-11:15	Advanced Numerical Simulations for Granular and Multi-phase Flows	Prof. Mikio SAKAI (The Univ. of Tokyo)	11:50-12:15
11:15-11:40	Research Activities on Thermal Hydraulics and Safety of Advanced Nuclear Energy Systems at Sun Yat-sen University	Prof. Songbai CHENG (Sun Yat-sen Univ.)	12:15-12:40
11:40-13:30	LUNCH		12:40-14:30
Session 2	Talented Scholar (Room A)		
Session Chair	Xiaoxing LIU and Biao SHEN		
13:30-13:50	Towards Building Strong Bubble Traps: A Study of Nucleate Boiling on Surfaces with Heterogeneous Integral Structures	Biao SHEN (The Univ. of Tsukuba)	14:30-14:50
13:50-14:10	Multiscale Analysis on Thermohydraulics in Steam Generators	Tenglong CONG (Shanghai Jiao Tong Univ.)	14:50-15:10
14:10-14:30	Numerical Simulation of Aerosol Generation by Cutting Fuel Debris and Aerosol Removal by Spray Droplets during Fukushima Decommissioning	Hui LIANG (Harbin Engineering Univ.)	15:10-15:30
14:30-14:50	Research on the Interfacial Drag in Bubbly and Slug Flow in Rectangle Channel	Luteng ZHANG (Chongqing Univ.)	15:30-15:50

14:50-15:10	CFD Simulations of High Temperature Heat Pipes and Water Heat Pipes in HPRs	Dali YU (INEST, Chinese Academy of Sciences)	15:50-16:10
15:10-15:30	Coffee Break		16:10-16:30
Session 3	Young Researcher		
Group 1 (Room A)			
Session Chair	Hui CHENG and Luteng ZHANG		
15:30-15:45	Numerical Simulation for a Large-scale Gas-solid-liquid Flow in Nuclear Engineering	Rui LI (The Univ. of Tokyo)	16:30-16:45
15:45-16:00	Analytical Study on Mechanism of Heat Transfer from Molten Pool to Duct Wall in EAGLE ID1 In-pile Test	Yao YAO (Kyushu Univ.)	16:45-17:00
16:00-16:15	LASSO Theory and Demonstration for Inverse Estimation on Radioactive Source Distributions inside Building Rooms	Wei SHI (The Univ. of Tokyo)	17:00-17:15
16:15-16:30	High-temperature Steam Oxidation Behavior of Cr-coated Zr Alloy Cladding	Dong WANG (Xi'an Jiaotong Univ.)	17:15-17:30
16:30-16:40	Coffee Break		17:30-17:40
16:40-16:55	Development and Validation of a Simplified CDA Bubble Model	Zeren ZOU (Kyushu Univ.)	17:40-17:55
16:55-17:10	Experimental Investigation on the Effect of Jet Cross Section Shape on Fragmentation Characteristics of Molten Fuel Using Simulant Materials	Shaojie TAN (Sun Yat-sen Univ.)	17:55-18:10
17:10-17:25	Research on Adaptive RBF Neural Network Prediction Method for Core Thermal-hydraulic Parameters of Fast Reactor	Nan JI (Univ. of South China)	18:10-18:25
17:25-17:40	Experimental Study on Local Heat Transfer of Hydrogen in A Round Tube	Yuliang FANG (Xi'an Jiaotong Univ.)	18:25-18:40
17:40-17:55	Thermal Hydraulic Analysis of Scaled Model of Spent Fuel Dry Storage System Based on CFD Conjugate Heat Transfer	Z. Q. WANG (Chongqing Univ.)	18:40-18:55
Group 2 (Room B)			
Session Chair	Tenglong CONG and Hui LIANG		
15:30-15:45	Experimental Study on Aerosol Transport and Deposition Behavior in Severe Reactor Accident	Md. Iqbal HOSAN (Kyushu Univ.; Univ. of Dhaka)	16:30-16:45
15:45-16:00	CFD Studies on Nuclear Thermal Hydraulics	Jundi HE (The Univ. of Sheffield)	16:45-17:00
16:00-16:15	Thermal-hydraulic Analysis of Wire-wrapped Rod Bundle in Lead-based Fast Reactor with Non-uniform Heat Flux	Kejian DONG (City Univ. of Hong Kong)	17:00-17:15
16:15-16:30	Research on Design and Test of High-Performance Alkali-Metal High Temperature Heat Pipes	Jiarui ZHANG (Xi'an Jiaotong Univ.)	17:15-17:30

16:30-16:40	Coffee Break		17:30-17:40
16:40-16:55	A Quantitative Research of B4C-SS Eutectic Reactions	Zhenhan HONG (The Univ. of Tokyo)	17:40-17:55
16:55-17:10	Study on Fission Product Distribution and Damage Leakage Behavior of Pb Bi Fuel Elements	Jijun HE (Xi'an Jiaotong Univ.)	17:55-18:10
17:10-17:25	Molecular Dynamics Study of Nanoscale Boiling with Bipilic Designs	Wei DENG (City Univ. of Hong Kong)	18:10-18:25
17:25-17:40	Experimental Investigation on Pressure-buildup Characteristics of a Water Lump Immersed in a Molten Lead Pool	Zijian DENG (Sun Yat-sen Univ.)	18:25-18:40
17:40-17:55	Stress Calculation and Analysis of Spent Fuel Dry Storage System	K. CHEN (Chongqing Univ.)	18:40-18:55

5 November (Saturday) 2022			
Session 1	Distinguished Speaker (Room A)		
Session Chair	Xuewu CAO and Bin ZHANG		
Time (GMT+8)	Title	Speaker	Time (JST)
8:30-8:55	Multi Physics Coupling in Nuclear Engineering	Prof. Shanfang HUANG (Tsinghua Univ.)	9:30-9:55
8:55-9:20	Development of Mechanism Failure Model for Reactor Pressure Vessel Lower Head in Severe Accidents	Prof. Bin ZHANG (Xi'an Jiaotong Univ.)	9:55-10:20
9:20-9:45	High-fidelity Experiment Instrumentation for High-fidelity Simulation	Prof. Jinbiao XIONG (Shanghai Jiao Tong Univ.)	10:20-10:45
9:45-10:00	Coffee Break		10:45-11:00
Session Chair	Jiyun ZHAO and Shuichiro MIWA		
10:00-10:25	CHF and Boiling Heat Transfer Enhancement with Advanced Surface Structures	Prof. Jiyun ZHAO (City Univ. of Hong Kong)	11:00-11:25
10:25-10:50	Experimental Investigation of High-performance Steam Injector and Thermal-hydraulic Model Development	Prof. Shuichiro MIWA (The Univ. of Tokyo)	11:25-11:50
10:50-11:15	Bubble Generation, Dispersion, Separation and Characterization	Prof. Junlian YIN (Shanghai Jiao Tong Univ.)	11:50-12:15
11:15-11:40	Multi-Physics Modeling & Simulation of Heat Pipe Cooled Micro Reactor	Prof. Guojun HU (Univ. of Science and Technology of China)	12:15-12:40
11:40-13:30	LUNCH		12:40-14:30
Session 2	Talented Scholar (Room A)		
Session Chair	Guojun HU and Zaiyong MA		
13:30-13:50	CMT Direct Contact Condensation Model Development and Verification	Zaiyong MA (Chongqing Univ.)	14:30-14:50
13:50-14:10	SCO2 Nuclear Energy System-critical Flow and Decompression	Yuan ZHOU (Sichuan Univ.)	14:50-15:10
14:10-14:30	An Introduction of the Turbulent Heat Flux Model for Lead-bismuth Eutectic	Zhaojun YUAN (China Nuclear Power Technology Research Institute)	15:10-15:30
14:30-14:50	Experimental Study in an Entrance Blocked Narrow Rectangular Channel	Wuhai QU (Shanghai Jiao Tong Univ.; Nuclear Power Institute of China)	15:30-15:50

14:50-15:10	Simulation Methodology and Scaling Method for CCFL in Downcomer during the Discharge Phase of LOCA with RELAP5 Code	Wan SUN (Chongqing Univ.)	15:50-16:10
15:10-15:30	Coffee Break		16:10-16:30
Session 3	Young Researcher		
Group 1 (Room A)			
Session Chair	Yuan ZHOU and Wenhai QU		
15:30-15:45	The Diffusion of Fission Products of a Nuclear Ramjet Reactor in Underwater Disintegration Accident	Yongjiang WEN (Xi'an Jiaotong Univ.)	16:30-16:45
15:45-16:00	Development of a Thermal-hydraulic Analysis Code Aiming at the Flow Blockage Scenarios in the Lead Cooled Fast Reactor	Xiao LUO (Univ. of Science and Technology of China)	16:45-17:00
16:00-16:15	Development of Reduced-order Thermal Stratification Model for Upper Plenum of a Lead-Bismuth Fast Reactor Based on CFD	Tao YANG (Univ. of South China)	17:00-17:15
16:15-16:30	VITARS: A Visual Interactive Transient Analysis Platform for Reactor System	Penghui ZHANG (Xi'an Jiaotong Univ.)	17:15-17:30
16:30-16:40	Coffee Break		17:30-17:40
16:40-16:55	Development of Steady Thermal Hydraulic Program for Heat Pipe	Shuang WEN (Chongqing Univ.)	17:40-17:55
16:55-17:10	Experimental Study on the Effect of NaOH and Na ₃ PO ₄ on Nanofluid Saturated Pool Boiling CHF	Jian YU (Xi'an Jiaotong Univ.)	17:55-18:10
17:10-17:25	Research on Core Power Maximization Method of Natural Circulation Lead-bismuth Cooled Fast Reactor	Yingjie XIAO (Univ. of South China)	18:10-18:25
Group 2 (Room B)			
Session Chair	Zhaojun YUAN and Wan SUN		
15:30-15:45	Design and Test of the Curved Sodium Heat Pipe for NUSTER Concept	Zhixing TIAN (Xi'an Jiaotong Univ.)	16:30-16:45
15:45-16:00	Experimental Investigation on Liquid Lead-bismuth Eutectic Cross Flow Heat Transfer around Tube Bundles	J.T. HUANG (Shenzhen Univ.)	16:45-17:00
16:00-16:15	Three-Dimensional Numerical Simulation of the Release and Migration Behavior of Fission Gas Bubbles in Lead-cooled Fast Reactor Pool Under Severe Accident	Zijun MAI (Sun Yat-sen Univ.)	17:00-17:15
16:15-16:30	Radial Basis Function Surrogate Model-based Optimization of Small Light-weight Lead-bismuth Reactor Core	Qiong LI (Univ. of South China)	17:15-17:30
16:30-16:40	Coffee Break		17:30-17:40

16:40-16:55	Research on Two Phase Flow Instability in the 14-Channel Helical Coil Tube Steam Generator	GuanHua QIAN (Univ. of South China)	17:40-17:55
16:55-17:10	PANDA: A Particle Method Software Platform for Nuclear Reactor Thermal-Hydraulic Safety Analysis	Qinghang CAI (Xi'an Jiaotong Univ.)	17:55-18:10
17:10-17:25	Numerical Simulation on the Operating Characteristics of Flow Diverter of Lead-bismuth Flowmeter Calibration Facilities	Yucheng ZHU (Chinese Academy of Sciences; Advanced Energy Science and Technology Guangdong Laboratory; Univ. of Chinese Academy of Sciences)	18:10-18:25
17:25-17:40	Closing Remarks	Chair Koji MORITA Chair Xuewu CAO Chair Wenxi TIAN	18:25-18:40