

## IV. 분과별 논제 및 발표자

### 제5분과A

### 원자력열수력 및 안전(Thermal Hydraulics and Safety) -열수력실험-I (Thermal Hydraulic Experiment-I)

좌 장 주인철(In Chul Chu), 방인철(In Cheol Bang)

발표장소 400

#### 일 정 | 5. 7(목)

- 09:00 Experiments of Pool Boiling Performance (Boiling Heat Transfer and Critical Heat Flux) on Designed Micro-Structures**  
Seol Ha Kim, Jun Young Kang, Gi Chol Lee, Moriyama Kiyofumi, Moo Hwan Kim, and Hyun Sun Park(POSTECH)
- 09:20 Observation of Boiling Structure and CHF Phenomena between Parallel Vertical Plates Submerged in a Pool**  
In-Cheol Chu, Dong Jin Euh, Chul-Hwa Song(KAERI)
- 09:40 Film Boiling on Porous Layered Brass Sphere during Quenching**  
Jun-young Kang, Seol Ha Kim, Hangjin Jo, Gi Cheol Lee, Moriyama Kiyofumi, and Hyun Sun Park(POSTECH)  
Moo Hwan Kim(KINS)
- 10:00 Experimental Study of CHF Enhancement Using  $\text{Fe}_3\text{O}_4$  Nanofluids at Subcooled Boiling Region**  
Young Jae Choi, Dong Hoon Kam, and Yong Hoon Jeong(KAIST)
- 10:20 Inside-pipe Hydrophobic Coating Method Promoting Dropwise Condensation in a Passive Cooling System**  
Joo Won Kang, Jun Young Kang, Kyoung Won Hwang, Hyun Sun Park, and Kiyofumi Moriyama(POSTECH)  
Moo Hwan Kim(KINS)
- 10:40 Coffee Break**
- 11:00 Experimental Investigation on the CHF in the Narrow Rectangular Channel under the Downward Flow Condition**  
Huiyung Kim, Byongjo Yun, and Jinyeong Bak(PNU)  
Jonghark Park, Heetaek Chae, and Cheol Park(KAERI)
- 11:20 Experimental Study of Condensation Heat Transfer in the Presence of Noncondensable Gas on the Vertical Tube**  
Yeong-Jun Jang, Dong-Jae, Choi, and Yeon-Gun Lee(JNU)  
Sin Kim(CAU)
- 11:40 Experimental Study of Silicon Oil Effect on Two-Phase Closed Thermosyphon**  
Jun Yeong Jung and Yong Hoon Jeong(KAIST)
- 12:00 Experimental Investigation on Heat Transfer Performance of Annular Flow Path Heat Pipe**  
In Guk Kim, Kyung Mo Kim, Yeung Shin Jeong, and In Cheol Bang(UNIST)
- 12:20 Development of an Electrical Sensor for Measurement of Void Fraction and Identification of Flow Regime in a Horizontal Pipe**  
Woo Yeon Won, Bo An Lee, and Yeon Gun Lee(JNU)  
Min Seok Ko and Sin Kim(CAU)

## 일 정 | 5. 7(목)

- 09:00 Evaluation for KAERI 6x6 Reflood Test Using TRACE Code**  
Byung Gil Huh, Chang-Yong Jin, Ae Ju Cheong, and Taesuk Hwang(KINS)
- 09:20 Hydraulic Simulation of In-vessel Downstream Effect Test Using MARS-KS Code**  
Young Seok Bang, Joon Soo Lee, and Seung Hoon Ryu(KINS)
- 09:40 Evaluation of Two-Phase Flow Parameters of a Subcooled Boiling Flow in SUBO Test Using TRACE Code**  
Chang-Yang Jin, Byung Gil Huh, Ae ju Cheong, and Taesuk Hwang(KINS)
- 10:00 Sensitivity Evaluation on the ROH Quality for the DBA Safety Analysis of Wolsong NPP Unit 1**  
Jong-Hyun Kim, Seong-Soo Choi, and Sang-Koo Han(ACT Co., Ltd.)  
Sung-Min Kim and Dong-Wook Kho(KHNP CRI)
- 10:20 LBLOCA Analysis and Its Sensitivity Study Using Coupling (CATHENA and RFSP) Method for Wolsong NPP Unit 1**  
Byung-Il Lee, Jong-Hyun Kim, Dai-Hai Chung, and Seong-Soo Choi(ACT Co., Ltd.)  
Sung-Min Kim and Dong-Wook Kho(KHNP CRI)
- 10:40 Coffee Break**
- 11:00 The Gravity Makeup on the LORHR Event during Mid-Loop Operation for APR1400**  
Cheol Woo Kim, Yong Hee Lee, Gyu Cheon Lee, and Shin Whan Kim(KEPCO E&C)
- 11:20 Evaluation of the Main Steam Line Break Accident for the APR+ Standard Design Using MARS-KS**  
M. H. Park, Y. S. Kim, Min Jeong Hwang, and S. K. Sim(En2T)  
Young Seok Bang(KINS)
- 11:40 Comparison of SPACE to MARS-KS under SUBO Experimental Conditions**  
Min-Gil Kim, Wonwoong Lee, and Jeong Ik Lee(KAIST)  
Young Seok Bang(KINS)
- 12:00 PCT Uncertainty Analysis Using Unscented Transform with Random Orthogonal Matrix**  
Douglas A. Fynan and Kwang-Il Ahn(KAERI)  
John C. Lee(Univ. of Michigan)
- 12:20 Development of a System Analysis Toolkit for Sensitivity Analysis, Uncertainty Propagation and Estimation of Parameter Distribution**  
Jaeseok Heo and Kyung Doo Kim(KAERI)

## IV. 분과별 논제 및 발표자

### 제5분과C

### 원자력열수력 및 안전(Thermal Hydraulics and Safety) -열수력해석-II (Thermal Hydraulic Analysis-II)

좌 장 이상용(Sang Yong Lee), 이정익(Jeong Ik Lee)

발표장소 401B

#### 일 정 | 5. 7(목)

- 09:00 Investigation of Wire Effect in Sub-Channels for 7-Pin Fuel Assembly**  
J. H. Jeong, J. Yoo, K. L. Lee, and K. S. Ha(KAERI)
- 09:20 Effects of Heat Transfer Coefficient Treatments on Thermal Shock Fracture Prediction for LWR Fuel Claddings in Water Quenching**  
Youho Lee, Jeong Ik Lee, and Hee Cheon NO(KAIST)
- 09:40 Prediction of ThAI TH-13 Experiment Using CFX User Defined Function**  
Jeong Hee HA and Soon Joon HONG(FNC Tech.)  
Chun Tae PARK(KAERI)
- 10:00 Modeling of Wall Effects on Drag and Lift Acting on Bubbles in Bubbly Flow**  
Dongjoo Kim(KINS)  
Jungwoo Kim(Seoultech)
- 10:20 Multi-Dimensional Verification of the Two-Fluid Momentum Equation on Dispersed Flows**  
Seung-Jun Lee, Byoung Jae Kim, Ik Kyu Park(KAERI)
- 10:40 Coffee Break**
- 11:00 Polygonal Prism Mesh in the Viscous Layers for the Polyhedral Mesh Generator, PolyGen**  
Sang Yong Lee, Chan Eok Park, and Kim Shin Whan(KEPCO E&C)
- 11:20 Influence of Chimney Flow Pattern on Natural Convection Heat Transfer of Open Channel Finned Plates**  
Seung-Hyun Hong and Bum-Jin Chung(KHU)
- 11:40 CFD Study of Dominant Effect in Combined DTHT by Using Hypothetical Boundary Conditions**  
Yohanes Setiawan Nietiadi and Jeong Ik Lee(KAIST)  
Yacine Addad(KUSTAR)
- 12:00 Analytical Assessment of Environmental Impact for APR1400DC UHS Cooling Tower**  
Jaiho Lee(KHNP CRI)

## 일 정 | 5. 7(목)

- 09:00 Analysis on the Effect of Risk from Containment Failure by Over-pressurization during the Operation of Containment Filtered Venting System**  
Jaehyun Ham and Hyun Gook Kang(KAIST)  
Soon Heung Chang(HGU)
- 09:20 Kinetic Behaviors of  $e_{aq}^-$  and  $\bullet OH$  Radical in Water Radiolysis**  
A Yeong Kim and Han-Chul Kim(KINS)  
Jun-Yeop Lee and Jong-Il Yun(KAIST)
- 09:40 In-Plant Fission Product Behavior in SGTR Accident with Long-Term SBO**  
Tae Woon Kim, Seok Jung Han, and Kwang Il Ahn(KAERI)
- 10:00 Introduction to Test Facility for Iodine Retention in Filtered Containment Venting System**  
Jaehoon Jung, Sang Mo An, Kwang Soon Ha, and Hwan Yeol Kim(KAERI)
- 10:20 Effects of Anchor Bolts Failures in Steam Explosion Analyses**  
Seung Hyun Kim and Yoon-Suk Chang(KHU)  
Sungchu Song and Yong-Jin Cho(KINS)
- 10:40 Coffee Break**
- 11:00 Effects of Water Pool Depth for Ex-Vessel Molten Core Coolability and Steam Explosion Loads**  
Kiyofumi Moriyama and Hyun Sun Park(POSTECH)
- 11:20 Review and Preliminary Evaluation of Pool Scrubbing Models**  
Hyun-Joung Jo, Kwang Soon Ha, Sang Mo An, and Hwan Yeol Kim(KAERI)  
Dong Soon Jang(CNU)
- 11:40 The Effect of Water Injection on the Fission Product Aerosol Behavior in Fukushima Unit 1**  
Sung Il Kim, Kwang Soon Ha, Dong Ha Kim, and Tae Woon Kim(KAERI)
- 12:00 Severe Accident Progression and Consequence Assessment Methodology Upgrades in ISAAC for Wolsong CANDU6**  
Y.M. Song and D.H. Kim(KAERI)  
Sunil Nijhawan(Prolet Inc.,)

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### 제5분과E

### 원자력열수력 및 안전(Thermal Hydraulics and Safety) -확률론적안전성평가-I (Probabilistic Safety Assessment-I)

좌 장 나장환(Jang Hwan Na), 강대일(Dae Il Kang)

발표장소 402B

#### 일 정 | 5. 7(목)

- 09:00 Establishment of Infrastructure for Domestic-Specific Level 3 PSA Based on MACCS2**  
Seung-Cheol Jang, Seok-Jung Han, Sun-Yeong Choi, and Seung-Jun Lee(KAERI)  
Wan-Seob Kim(KoRTS)
- 09:20 A Development of Domestic Food Chain Model Data for Chronic Effect Estimation of Off-Site Consequence Analysis**  
Seok-Jung HAN, Dong-Kwon KEUM, and Seung-Cheol JANG(KAERI)
- 09:40 Application of Korean Specific Data to Economic Cost Estimation by KOSCA-MACCS2**  
Sun Yeong Choi and Seung-Cheol Jang(KAERI)
- 10:00 Atmospheric Dispersion Simulation for Level 3 PSA at Ulchin Nuclear Site Using a PUFF Model**  
Seung Jun Lee, Seok-Jung Han, Hyojoon Jeong, and Seung-Cheol Jang(KAERI)
- 10:20 Methodology for Evaluating Multi-unit Site Risk**  
Seung-Cheol Jang and Kye-Min Oh(KAERI)
- 10:40 Coffee Break**
- 11:00 Case Study of Multi-Unit Risk: Multi-unit Station Black-Out**  
Kyemin Oh and Seung-cheol Jang(KAERI)  
Gyunyoung Heo(KHU)
- 11:20 A Methodology for Level 2 PSA Evaluation with Consideration of Specific Features for Low Power Shutdown Probabilistic Safety Assessment**  
Jae Gab Kim and Ho Seok(KEPCO E&C)
- 11:40 Post-Fukushima Probabilistic Safety Enhancements of Industry**  
Janghwan Na, Ho-Jun Jeon, and Hyun-Gyo Lee(KHNP CRI)
- 12:00 Safety Effect Analysis on a Large Scale of Design Changes in a Nuclear Power Plant**  
Eun-Chan Lee and Hyun-Gyo Lee(KHNP)
- 12:20 Evaluation Logic of Main Control Board Fire Risk**  
Dae Il Kang, Kilyoo Kim, and Ho Gon Lim(KAERI)

## 제5분과F

### 원자력열수력 및 안전(Thermal Hydraulics and Safety) -열수력실험-II (Thermal Hydraulic Experiment-II)

좌 장 박현식(Hyun-Sik Park), 정용훈(Yong Hoon Jeong)

발표장소 400

#### 일 정 | 5. 8(금)

- 09:00 An Overall Investigation of Direct Vessel Injection Line Break Accidents of the ATLAS Facility**  
Yeon-Sik Kim, Ki-Yong Choi, Seok Cho, and Bok-Deuk Kim(KAERI)
- 09:20 Experimental Study for the Effects of Fuel Relocation on the Rod Bundle**  
Jongrok Kim, Jong-kuk Park, Sang-Ki Moon(KAERI)
- 09:40 Major Results from 1-Train Passive Safety System Tests for the SMART Design with the SMART -ITL Facility**  
Hyun-Sik Park, Hwang Bae, Sung-Uk Ryu, Byong-Guk Jeon, Sung-Uk Ryu, Hyobong Ryu, Woo-Shik Kim, Sun-Joon Byun, Yong-Cheol Shin, Kyoung-Ho Min, and Sung-Jae Yi(KAERI)
- 10:00 Experimental Study and Validation of MARS Code for CCFL in Passive Emergency Core Cooling System (PECCS) of Public Acceptable Simple SMR (PASS) System**  
Ho Sik Kim, Mun Won Song, and Hee Cheon No(KAIST)
- 10:20 Performance Evaluation of a Printed Circuit Steam Generator for Integral Reactors: A Feasibility Test**  
Hun Sik Han, Han-Ok Kang, Juhyeon Yoon, Young In Kim, and Keung Koo Kim(KAERI)  
Jang-won Seo and Brain Choi(ALK)
- 10:40 Coffee Break**
- 11:00 Review of Mixed Convection Flow Regime Map of a Vertical Pipe**  
Myeong-Seon Chae and Bum-Jin Chung(KHU)  
Gyeong-Uk Kang(KORAD)
- 11:20 Similarity Analysis for Reactor Flow Distribution Test and Its Validation**  
Soon Joon HONG and Jung Hui HA(FNC Tech.)  
Taehoo LEE and Ji Woong HAN(KAERI)
- 11:40 Thermal Performance and Operation Limit of Heat Pipe Containing Neutron Absorber**  
Kyung Mo Kim, Yeong Shin Jeong, In Guk Kim, and In Cheol Bang(UNIST)
- 12:00 Isothermal Flow Measurement Using Planar PIV in the 1/4 Scaled Model of CANDU Reactor**  
Sunghyuk Im and Hyung Jin Sung(KAIST)  
Han Seo and In Cheol Bang(UNIST)  
Hyoung Tae Kim(KAERI)
- 12:20 CHF Enhancement by Surface Patterning Based on Hydrodynamic Instability Model**  
Han Seo and In Cheol Bang(UNIST)

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### 제5분과G

### 원자력열수력 및 안전(Thermal Hydraulics and Safety) -열수력해석-III (Thermal Hydraulic Analysis-III)

좌 장 윤한영(Hanyoung Yoon), 윤병조(Byong-Jo Yun)

발표장소 401A

#### 일 정 | 5. 8(금)

- 09:00 The Safety Assessment of OPR-1000 for Station Blackout Applying Combined Deterministic and Probabilistic Procedure**  
Dong Gu Kang, Seung-Hoon Ahn, and Dae-Hyung Cho(KINS)
- 09:20 Thermodynamic Optimization of Supercritical CO<sub>2</sub> Brayton Cycles**  
Dong-Ryul Rhim, Sung-Ho Park, Su-Hyun Kim, and Choong-Sub Yeom(IAE)
- 09:40 Performance Evaluation of the Concept of Hybrid Heat Pipe as Passive In-core Cooling Systems for Advanced Nuclear Power Plant**  
Yeong Shin Jeong, Kyung Mo Kim, In Guk Kim, and In Cheol Bang(UNIST)
- 10:00 An Overall Investigation of Cold Leg Pipe Break Accidents of the ATLAS Facility**  
Yeon-Sik Kim, Seok Cho, Ki-Yong Choi, and Bok-Deuk Kim(KAERI)
- 10:20 Development of TPNCIRC Code for Evaluation of Two-Phase Natural Circulation Flow Performance under External Reactor Vessel Cooling Conditions**  
A-Reum Choi, Hyuk-Jin Song, and Jong-Woon Park(DU)
- 10:40 Coffee Break**
- 11:00 Safety Injection System Filling Using Dynamic Venting**  
Wong Bae Kim, Jin Huh, Sung Je Hong, Joo Hee Lee, and In Young Im(KEPCO E&C)
- 11:20 Analysis on Roles for Components of Passive Emergency Core Cooling System**  
Soon Il Chung and Soon Joon Hong(FNC Tech.)  
Sang Hee Kang and Han Gon Kim(KHNP)
- 11:40 Preliminary Analysis of Supercritical CO<sub>2</sub> Loop Using MARS**  
Jai Oan Cho and Jeong Ik Lee(KAIST)
- 12:00 Thermohydraulic Design Analysis Modeling for Korea Advanced NUClear Thermal Engine Rocket for Space Application**  
Seung Hyun Nam, bo Young Choi, Paolo F. Venneri, Yong Hoon Jeong, and Soon Heung Chang(KAIST)

## 일 정 | 5. 8(금)

- 09:00 Statistical Uncertainty Quantification of Physical Models during Reflood of LBLOCA**  
Deog Yeon Oh, Kwang Won Seul, and Sweng Woong Woo(KINS)
- 09:20 A Study on the Uncertainty of Flow-Induced Vibration in a Cross Flow Over Staggered Tubes**  
Ji-Su Kim and Jong-Woon Park(DU)  
Hyeon-Kyeong Choi(Hannam Univ.)
- 09:40 Development of RETRAN-3D Model to Analyze the Water Discharge through Pressurizer Purge Drain Pipe**  
Y.S.KWON, C.S.Jang, J.D.Choi, G.S.Lee, and J.W.SUN(KEPCO NF)  
H.Y.YOON(KAERI)
- 10:00 Analysis of MSLB for APR1400 Using SPACE Mass and Energy Release Methodology**  
Seong Min Hong, Hyoung Kyoung Ahn, Seok Jeong Park, and Chan Eok Park(KEPCO E&C)
- 10:20 Development of Methodology for Spent Fuel Pool Severe Accident Analysis Using MELCOR Program**  
Won-Tae Kim and Jae-Uk Shin(RETech.Co., Ltd.)  
Kwang-Il Ahn(KAERI)
- 10:40 Coffee Break**
- 11:00 Hydrogen Risk in the Containment Filtered Venting System**  
Young Su Na and Kwang Soon Ha(KAERI)  
Song-Won Cho(NSE)
- 11:20 Current State of the Construction of an Integrated Test Facility for Hydrogen Risk**  
Young Su Na, Seong-Ho Hong, and Seong-Wan Hong(KAERI)



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### 제5분과

### 원자력열수력 및 안전(Thermal Hydraulics and Safety) -중대사고-II (Severe Accident-II)

좌 장 박래준(Rae-Joon Park), 방인철(In Cheol Bang)

발표장소 402A

일 정 | 5. 8(금)

- 09:00 Investigation of Focusing Effect According to the Cooling Condition and Height of the Metallic Layer in a Severe Accident**  
Je-Young Moon and Bum-Jin Chung(KHU)
- 09:20 Conjugate Heat Transfer Analysis Model for Best Estimation of In-Vessel Retention of Multiple Layered Corium**  
Jae-ho Bae and Jong-Woon Park(DU)
- 09:40 Experimental Study for Effects of the Stud Shape of the Core Catcher System**  
Kysang Song, Hong Hyun Son, Uiju Jeong, Gwang Hyeok Seo, Doyoung Shin, Gyoodong Jeun, and Sung Joong Kim(HYU)
- 10:00 Evaluation of Ablation Rate by the Change of Sacrificial Material for PECS in EU-APR**  
Do Hyun Hwang, Yong Soo Kim, and Keun Sung Lee(KHNP CRI)
- 10:20 Measurement of Pool Boiling CHF for SUS 304&SA 508 Flat Plate under Downward-facing and Atmospheric Conditions**  
Dong Hoon Kam, Hae Min Park, Young Jae Choi, and Yong Hoon Jeong(KAIST)
- 10:40 Coffee Break**
- 11:00 Development and Verification of MAAP5.0.3 Parameter File for APR1400**  
Mi Ro Seo and Hyeong Taek Kim(KHNP CRI)
- 11:20 CFD Analysis for H<sub>2</sub> Flame Propagation during Spray Operation in the THAI Facility**  
Hyung Seok Kang and Seong-Wan Hong(KAERI)  
Sanjeev Gupta(Becker Technologies GmbH)
- 11:40 The Analysis of Surrounding Structure Effect on the Core Degradation Progress with COMPASS Code**  
Jun Ho Bae, Dong Gun Son, Jong Tae Kim, Rae Jun Park, and Dong Ha Kim(KAERI)
- 12:00 A Study of Invasive RCS Depressurization under SBO/SBLOCA in OPR1000-IPSS**  
Jihee Kim and Hyun Gook Kang(KAIST)  
Soon Heung Chang(HGU)

## 일 정 | 5. 8(금)

**09:00 Design of Qualitative HRA Database Structure**

Seunghwan Kim, Yochan Kim, Sun Yeong Choi, Jinkyun Park, and Wondea Jung(KAERI)

**09:20 SCHEME (Soft Control Human Error Evaluation MEthod) for Advanced MCR HRA**

Inseok Jang and Wondea Jung(KAERI)

Poong Hyun Seong(KAIST)

**09:40 Measuring Risk Aversion for Nuclear Power Plant Accident : Results of Contingent Valuation Survey in Korea**

Sang Hun Lee and Hyun Gook Kang(KAIST)

**10:00 A Framework to Estimate the Coverage of AOPs in Nuclear Power Plants**

Jinkyun Park and Wondea Jung(KAERI)

**10:20 Restructuring of an Event Tree for a Loss of Coolant Accident in a PSA Model**

Ho-Gon Lim, Sang-Hoon Han, Jin-Hee Park, and Seong-Chul Jang(KAERI)

**10:40 Coffee Break****11:00 Classification of Cold Leg LOCA by Thermal Hydraulic Analysis**

Jaehyun Cho, Ho-Gon Lim, and Jin-Hee Park(KAERI)

**11:20 A Quantitative Index to Support Recurrence Prevention Plans of Human-Related Events**

Yochan Kim, Jinkyun Park, and Wondea Jung(KAERI)

Do Sam Kim and Durk Hun Lee(KINS)

**11:40 Development of Collision Accident Scenario during Nuclear Spent Fuel Maritime Transportation**

Min Yoo and Hyun Gook Kang(KAIST)

**12:00 Comparison of Various Methods to Quantify a Fault Tree for Seismic PSA**

Sang Hoon HAN, Jin Hee PARK, Dong San KIM, Ho-Gon LIM, and Seung Cheol JANG(KAERI)

## IV. 분과별 논제 및 발표자

### 제5분과K

### 원자력열수력 및 안전(Thermal Hydraulics and Safety)-Poster -열수력실험

좌 장 어동진(Dong Jin Euh), 김성중(Sung Joong Kim)

발표장소 3층 로비

일 정 | 5. 7(목) 13:00-15:00

- P05K01 Subcooled Pool Boiling from Two Tubes of 6 Degree Included Angle in Vertical Alignment**  
Myeong-Gie Kang(ANU)
- P05K02 Effects of Inclination Angle on Pool Boiling Heat Transfer from Tandem Tubes**  
Myeong-Gie Kang(ANU)
- P05K03 Hydrodynamic Experiments for a Flow Distribution of a 61-Pin Wire-wrapped Rod Bundle**  
S.K. Chang, D.J. Euh, H.S. Choi, H.M. Kim, Y.J. Ko, D.W. Lee, H.Y. Lee, and S.R. Choi(KAERI)
- P05K04 Experimental Study on the Thermal Stratification in a Pool Boiling with a Horizontal Heat Source**  
Seok Kim, Sung Uk Ryu, Dong-Jin Euh, and Chul-Hwa Song(KAERI)
- P05K05 Evaluation for the Impact of Debris Settling on the In-Vessel Downstream Effect Tests of the APR1400 Design**  
Jeong-kwan Suh and Jae-yong Lee(KHNP CRI)
- P05K06 Scaling Analysis of the Single-Phase Natural Circulation : the Hydraulic Similarity**  
Xin-Guo Yu(UST)  
Ki-Yong Choi(KAERI)
- P05K07 Thermal-hydraulic Experiments for the PCHE Type Steam Generator**  
C. W.Shin and H.C.NO(KAIST)
- P05K08 Pool Boiling Heat Transfer Characteristics of Chromium Coatings Deposited by RF Magnetron Sputtering**  
Gwang Hyeok Seo, Hong Hyun Son, Uiju Jeong, Gyoodong Jeun, and Sung Joong Kim(HYU)
- P05K09 Improvement of Interfacial Friction Factor for the Prediction of Void Fraction in the Nearly Horizontal Flow**  
Tae-Hwan Ahn, Jae-Jun Jeong, and Byong-Jo Yun(PNU)
- P05K10 A Comparative Study on the Critical Heat Flux Characteristics of Oxidized Multi-Walled Carbon Nanotube and Graphene Nanofluids**  
Young Hun Kim, Sung Seek Park, Woo Joong Kim, and Nam Jin Kim(JNU)
- P05K11 Understanding of CHF Enhancement Mechanisms with Millimeter-scale Fin Structures**  
Jin Young Choi, Hee Cheon NO, and Dong Yeol Yeo(KAIST)
- P05K12 Propagation of Local Bubble Parameters of Subcooled Boiling Flow in a Pressurized Vertical Annulus Channel**  
In-Cheol Chu, Seung Jun Lee, Young Jung Youn, Jong Kuk Park, Hae Seob Choi, and Dong Jin Euh(KAERI)

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**P05K13 Inspection of Pool Boiling with Superhydrophilic and Superhydrophobic Coating**

Gyumin Son, Sung Bo Moon, and In Cheol Bang(UNIST)

**P05K14 Experimental Investigation on Thermal-Hydraulic Interaction between CMT and SIT of a Single-Train Passive Safety System during an SBLOCA Test**

Hwang Bae, Sung Uk Ryu, Yong-Cheol Shin, Kyoung-Ho Min, Hyo Bong Ryu, Jong-Kuk Park, Yun-Gon Bang, Young-Jong Chae, Sung-Jae Yi, Hyun-Sik Park(KAERI)

**P05K15 Development of Three-Ring Conductance Meter on Flexible Printed Circuit Board for Liquid Film Thickness Measurement**

Kyu-Byoung Lee, Goon-Cherl Park, and Hyoung Kyu Cho(SNU)  
Jong-Rok Kim and Dong-Jin Euh(KAERI)

## IV. 분과별 논제 및 발표자

### 제5분과L

### 원자력열수력 및 안전(Thermal Hydraulics and Safety)-Poster -열수력해석

좌 장 정법동(Bub Dong Chung), 김경두(Kyung Doo Kim)

발표장소 3층 로비

일 정 | 5. 7(목) 13:00-15:00

**P05L01 Reflood Phenomena in a 5x5 Ballooned Rod Bundle**

Byoung Jae Kim, Jong Rok Kim, Kihwan Kim, and S. K. Moon(KAERI)

**P05L02 Numerical Simulation of Fluid Mixing In Upper Annular Space of SMART during Early Stage of Non-LOCA**

Youngmin Bae, Young-In Kim, and Keung Koo Kim(KAERI)

**P05L03 Implementation of a Model of Turbulence into a System Code, GAMMA+**

Hyeonil Kim and Hong-Sik Lim(KAERI)

Hee-Cheon No(KAIST)

**P05L04 Assessment Using ANL Experiments on Void Fraction in a Vertical Tube**

KyuHyun Han and YoungSeok Bang(KINS)

**P05L05 The Effect of the Holes Size Change of Lower-Support-Structure-Bottom Plate on the Reactor Core-Inlet Flow-Distribution**

Gong Hee Lee, Young Seok Bang, and Ae Ju Cheong(KINS)

**P05L06 Thermal-hydraulic Analysis and Code Assessment for Reactor Vessel Upper-head Small Break LOCA Using SPACE Code**

Minhee Kim and Seyun Kim(KHNP CRI)

**P05L07 Lunar Nuclear Power Plant Design for Thermal-Hydraulic Cooling in Nano-Scale Environment: Nuclear Engineering-based Interdisciplinary Nanotechnology**

Tae Ho Woo(Systemix Global Co., Ltd.)

**P05L08 Assessments of UCB-Kuhn Condensation Tests by Various Thermal-Hydraulic Codes**

Ju Yeop Park(KINS)

**P05L09 A Preliminary Study on the Reconstruction Algorithm of the Bubble Size to Inspect Twophase Flows Using Single Cone-beam X-ray**

Che Wook YIM, Song Hyun KIM, and Chang Ho SHIN(HYU)

**P05L10 Determination of Initial Conditions for the Safety Analysis by Random Sampling of Operating Parameters**

Hae-Yong Jeong and Moon-Ghu Park(Sejong Univ.)

**P05L11 k-ε Turbulence Modeling in the CUPID Code for Natural Convection**

Seung-Jun Lee, Ik Kyu Park, and Han Young Yoon(KAERI)

Jungwoo Kim(Seoultech)

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- P05L12 Numerical Analysis of APR1400 Steam Generator by CUPID/MARS Heat Structure Coupling**  
Jae Ryong Lee, Seung Jun Lee, Ik Kyu Park, and Han Young Yoon(KAERI)  
Hyoung Kyu Cho(SNU)
- P05L13 A Study on the Optimization Method of the Main Steam Safety Valve Characteristics for Overpressure Protection**  
Kyoung Ryun Kim, Ung Soo Kim, Min Soo Park, Gyu Cheon Lee, and Shin Whan Kim(KEPCO E&C)
- P05L14 Integrity Analysis of Turbine Building for the MSLB Using GOTHIC Code for Wolsong NPP Unit 2**  
Bong-Jin Ko, Dong-Sik Jin, Jong-Hyun Kim, and Sang-Koo Han(ACT Co., Ltd.)  
Choi Hoon, Dong-Wook Kho(KHNP CRI)
- P05L15 Comparative Study of Thermal Hydraulic Analysis Codes for Pressurized Water Reactors**  
Yang Hoon Kim, Mi Suk Jang, and Kee Soo Han(NESS)
- P05L16 Assessment of TRACE Condensation Model Against Reflux Condensation Tests with Noncondensable Gases**  
Kyung Won LEE, Ae Ju CHEONG, Andong SHIN, and Nam Duk SUH(KINS)
- P05L17 Assessment of Wall Condensation Model in the Presence of Noncondensable Gas for the SPACE Code**  
Jong Hyuk Lee, Byong Jae Kim, Seung Wook Lee, and Kyung Doo Kim(KAERI)  
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- P05L18 CUPID Code Simulation of Two-Dimensional Film Flow Test**  
Y. J. Cho and H. Y. Yoon(KAERI)  
J. H. Yang and H. K. Cho(SNU)
- P05L19 CFD Investigation the Thermal-hydraulic Behavior behind the Flow Blockage in SFR**  
Jin Yoo, J. H. Jeong, W. P Chang, and K. S Ha(KAERI)
- P05L20 A Comparative Study of MATRA-LMR/FB with CFD on a Fuel Assembly in PGSFR**  
Jin Yoo, Won-Pyo Chang, Jae-Ho Jeong, Kwi-Seok Ha, Kwi-Lim Lee, Seung Won Lee, Chiwoong Choi, Sang-Jun Ahn(KAERI)
- P05L21 CATHENA Code Assessment for Pressure Tube and Calandria Tube Contact Phenomena**  
Hyoung Kyoun Ahn, Chul Jin Choi, and Jong Ho Choi(KEPCO E&C)
- P05L22 Preliminary Analysis of a Loss of Condenser Vacuum Accident Using the MARS-KS Code**  
Jieun Kim, Young Seok Bang, Deog Yeon Oh, Kap Kim, and Sweng-Wong Woo(KINS)
- P05L23 Code Coupling for Multi-Dimensional Core Transient Analysis**  
Jin-Woo Park, Guen-Tae Park, Min-Ho Park, Seok-Hee Ryu, Kil-Sup Um, Jae-II Lee(KEPCO NF)
- P05L24 Validation of Friction Models in MARS-MultiD Module with Two-Phase Cross Flow Experiment**  
Chi-Jin Choi, Jin-Hwa Yang, Hyoung-Kyu Cho, and Goon-Cherl Park(SNU)  
Dong-Jin Euh(KAERI)
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- P05L25 Bubble Size Models for the Prediction of Bubbly Flow with CMFD Code**  
Jin-yeong Bak, Byong-jo Yun, and Jae-jun Jeong(PNU)
- P05L26 Preliminary Evaluation of the Diverse Protection System in PGSFR**  
Taekyeong Jeong, Won-Pyo Chang, Seung Hwan Seong, Sang June Ahn, Seok Hun Kang, Chi-Woong Choi, Jin Yoo, Kwi Lim Lee, Seung Won Lee, Jae-Ho Jeong, and Kwi-Seok Ha(KAERI)
- P05L27 MARS-KS Code Analysis for SBLOCA Counterpart Test in ATLAS Facility**  
B. U. Bae, Y. S. Park, K. Y. Choi, K. H. Kang, J. R. Kim, and N.H. Choi(KAERI)
- P05L28 Numerical Analysis on Temperature Variation of Coolant in Pressurizer Spray Nozzle Considering Vapor Condensation**  
Se-Hong Oh, Choengryul Choi, and Sung-Man Son(ELSOLTEC Inc.,)  
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- P05L29 Assessment of Nucleation Site Density Models for CFD Simulations of Subcooled Flow Boiling**  
N.H. Hoang(UST)  
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- P05L30 Sensitivity Analysis to Improve the Gap Conductance Uncertainty for KINS-REM**  
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- P05L31 Preliminary Analysis on Reactivity Insertion Transient of Natural Circulation Reactor**  
Hyung Min Son(KAERI)  
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**P05M01 Key Characteristics of Combined Accident Including TLOFW Accident for PSA Modeling**Bo Gyung Kim and Hyun Gook Kang(KAIST)  
Ho Joon Yoon(KUSTAR)**P05M02 Development of Web-Based Common Cause Failure (CCF) Database Module for Nuclear Power Plants**

Hyun-Gyo Lee, Seok-Won Hwang, and Tae-young Shin(KHNP CRI)

**P05M03 Piping Failure Probability Assessments on Material Types, Temperatures and Leak Rates for a RI-ISI Program**

Yoonho Bae and Dongwook Kim(KEPCO E&amp;C)

**P05M04 A Methodology for Evaluating Quantitative Nuclear Safety Culture Impact**

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**P05M05 Survey of Dynamic PSA Methodologies**Hansul Lee, Hyeonmin Kim, and Gyunyoung Heo(KHU)  
Taewan Kim(KINGS)**P05M06 Outline of the Desktop Severe Accident Graphic Simulator Module for OPR-1000**

S. Y. Park and K.I. Ahn(KAERI)

**P05M07 New Algorithm to Detect Modules in a Fault Tree for a PSA**

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**P05M08 Hybrid Method to Detect Modules in a Fault Tree for a PSA**

Woo Sik Jung(Sejong Univ.)

**P05M09 Analysis of Primary External Cooling Water Injection Mass during Extended SBO in Wolsong #1**

Lee Youngseung and Shin Jungmin(KHNP CRI)

**P05M10 Studies of Behavior Melting Temperature Characteristics for Multi Thermocouple In-Core Instrument Assembly**Donghyup Shin, Myoungseun Chae, Sungjin Kim, and Kyulim Lee(Woojin inc.)  
Song Hae Ye(KHNP CRI)**P05M11 Evaluation of the Natural Circulation Flow Loop with Inclined Downward Heating Channel**Kyung Jin Wi, Kwang Soon Ha, and Rae Joon Park(KAERI)  
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**P05M12 Study of Containment Vent Strategies during Severe Accident Progression for the CANDU6 Plant**  
Youngho Jin and K.I. Ahn(KAERI)

**P05M13 Effectiveness of Modified Jakob Number as a SAMG Entry Condition of OPR1000**  
Wonjun Choi, Youngjae Lee, and Sung Joong Kim(HYU)  
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**P05M14 A Study on Scenario Selection for Evaluation of Fission Product Behavior during a Severe Accident at APR 1400 Nuclear Power Plants**  
E. S. Yoon and Han-Chul Kim(KINS)  
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**P05M15 A Study on DB Schema of the Electronic SAMG**  
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**P05M16 Consideration of Task Performance for Robots Engaged in Extremely Dangerous Environment in Nuclear Power Plants**  
Seung Mo Hong, Kee Soo Han, Sung Deok Yi, and Seoung Rae Kim(NESS)  
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**P05M17 Evaluation of Non-Condensable Gas Effect during LBLOCA in an OPR1000 Plant**  
Seung Hun Yoo, Kwang-Won Seul, Young-Seok Bang, and Jun Soo Lee(KINS)

**P05M18 The Development of Evaluation Model for Component Aging in CANDU-6 Reactor**  
Jun Ho Bae, Jong Yeob Jung, and Yong Man Song(KAERI)

**P05M19 Transient Performance of Air-cooled Condensing Heat Exchanger in Long-term Passive Cooling System during Decay Heat Load**  
Myoung Jun Kim and Hee Joon Lee(KMU)  
Joo Hyung Moon, Youngmin Bae, and Young-In Kim(KAERI)

**P05M20 Application of Full Equation in Kinematic Shock on Emergency Core Cooling System**  
Seung-Chan Lee, Duk-Ju Yun, and Sang-Jun Ha(KHNP CRI)

**P05M21 Technical Issues and Proposes on the Legislation of Probabilistic Safety Assessment in Periodic Safety Review**  
Seok-Won Hwang, Ho-Jun Jeon, Jang-Hwan Na(KHNP CRI)