

# **International Conference on the Physics of Reactors 2022 (PHYSOR 2022)**

Pittsburgh, Pennsylvania, USA  
15 – 20 May 2022

Volume 1 of 5

ISBN: 978-1-7138-8634-1

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- 1095 Status of the WPEC Subgroup 46 Efficient and Effective Use of Integral Experiments for Nuclear Data Validation—*M. Hursin (Paul Scherrer Institute), O. Cabellos (Univ. Politècnica de Madrid), G. Palmiotti (INL)*



## 1105 High Enrichment / High Burnup Core Analysis

- 1106 Westinghouse Advanced Fuel Management Strategies Leveraging High Enrichment and High Burnup Fuel to Optimize PWR Economics—*Ho Lam (Westinghouse Electric Co.), Arielle Konig (Westinghouse Electric Co.), Chris Wagener (Westinghouse Electric Co.), Fausto Franceschini (Westinghouse Electric Co.)*
- 1130 Transition Core Modeling for Extended Enriched, Accident Tolerant Fuel Using PARCS/Polaris—*Muhammad Rizki Oktavian (Purdue), Ugur Mertuyrek (ORNL), Yunlin Xu (Purdue)*
- 1140 Reactor Physics Benchmark of Westinghouse PWR Core Design Suite for High Burnup/High Enrichment Fuel -- Part I: Pin and Lattice—*Fausto Franceschini (Westinghouse Electric Co.), Gary Mangham (Westinghouse Electric Co.), David Salazar (Westinghouse Electric Co.), Mykola Boychenko (Westinghouse Electric Co.)*
- 1152 Reactor Physics Benchmark of Westinghouse PWR Core Design Suite for High Burnup/High Enrichment Fuel -- Part II: 2D and 3D Core Simulations—*Gary Mangham (Westinghouse Electric Co.), Fausto Franceschini (Westinghouse Electric Co.), David A. Salazar (Westinghouse Electric Co.), Mykola Boychenko (Westinghouse Electric Co.)*

## 1165 Machine Learning and Artificial Intelligence for Reactor Physics: I

- 1166 PWR Loading Pattern Optimization with Reinforcement Learning—*Paul Seurin (MIT), Koroush Shirvan (MIT)*
- 1176 Parallel Simulated Annealing with Embedded Machine Learning and Multifidelity Models for Reactor Core Design—*William Gurecky (ORNL), Ben Collins (ORNL), Paul Laiu (ORNL), Tara Pandya (ORNL), Quincy Huhn (TAMU), Dave Kropaczek (ORNL)*
- 1186 Group Structure Selection with Random Forests—*Vishnu Nair (LANL), Thomas Saller (LANL), Andrew Till (LANL), Nathan Gibson (LANL)*
- 1196 Extension of the PINN Diffusion Model to k-eigenvalue Problems—*Mohamed H. Elhareef (Virginia Commonwealth Univ.), Zeyun Wu (Virginia Commonwealth Univ.)*

## 1206 Research Reactors for Reactor Physics Analysis and Simulation

### 1213 Deterministic Transport Methods: VI

- 1214 PN Source Expansion Nodal Method in MPACT for Boiling Water Reactors—*Sooyoung Choi (Univ. Michigan), Brendan Kochunas (Univ. Michigan)*

- 1224 Precise 3D Reactor Core Calculation Using Spherical Harmonics and Discontinuous Galerkin Finite Element Methods—*Kenneth Assogba (CEA), Lahbib Bourhrara (CEA), Igor Zmijarevic (CEA), Grégoire Allaire (Institut Polytechnique de Paris)*
- 1234 The MPN Method: A New Angular Discretization Method Based on Piecewise Polynomial Interface Fluxes—*Matteo Falabino (CEA), Daniele Sciannandrone (CEA), Emiliano Masiello (CEA), Jean-François Vidal (CEA)*
- 1244 Investigation of Methods for Targeted Search of Dominant Higher Modes in Subcritical Systems—*Ádám Aranyosy (Budapest Univ. Technology and Economics), Mate Szieberth (Budapest Univ. Technology and Economics)*

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- 1256 Analytic Error Analysis of Cross Section Interpolation Methods in Nodal Diffusion Codes-I: Theory—*Thomas Folk (Univ. Michigan), Siddhartha Srivastava (Univ. Michigan), Dean Price (Univ. Michigan), Brendan Kochunas (Univ. Michigan), Krishna Garikipati (Univ. Michigan)*
- 1266 Analytic Error Analysis of Cross Section Interpolation Methods in Nodal Diffusion Codes-II: Numerical Results—*Thomas Folk (Univ. Michigan), Siddhartha Srivastava (Univ. Michigan), Dean Price (Univ. Michigan), Brendan Kochunas (Univ. Michigan), Krishna Garikipati (Univ. Michigan)*
- 1276 POLCA8 -- Modelling of Cross Section Variations Inside Hexagonal Assemblies—*Sten-Orjan Lindahl (Westinghouse Electric Co.), Antonios Mylonakis (Westinghouse Electric Co.)*
- 1286 Sensitivity Analysis of Homogenized Cross Sections in AP1000 Lattices—*Dean Price (Univ. Michigan), Thomas Folk (Univ. Michigan), Siddhartha Srivastava (Univ. Michigan), Krishna Garikipati (Univ. Michigan), Brendan Kochunas (Univ. Michigan)*

### 1297 Advanced Reactors Design and Core Analysis: VI

- 1298 Rapid Depletion Analysis of Flowing-Pebble Reactor Systems at Equilibrium Using SCALE—*S. E. Skutnik (ORNL), F. Bostelmann (ORNL), W.A. Wieselquist (ORNL)*
- 1308 Hyper-Fidelity Depletion Coupled with Discrete Pebble Motion in Pebble Bed Reactors—*Yves Robert (Univ. California, Berkeley), Massimiliano Fratoni (Univ. California, Berkeley)*
- 1318 Verification of AGREE and Serpent for the Steady State HTR-10 Benchmark Problems—*Kaitlyn Barr (Univ. Michigan), Volkan Seker (Univ. Michigan), Jin Li (Univ. Michigan), Andrew Ward (Univ. Michigan), Thomas Downar (Univ. Michigan)*
- 1328 Transient Convective Delayed Neutron Precursors of <sup>235</sup>U for the Molten Salt Reactor Experiment—*Kyoung O. Lee (ORNL), Matthew A. Jessee (ORNL), Benjamin S. Collins (ORNL), Zack Taylor (ORNL), Aaron M. Graham (ORNL)*

### 1339 Data, Methods, Code Validation: VI

- 1340 Particle Swarm Optimization for Group Structure Optimization for Radiotherapy Shielding—*Oluwadamilola Fasina (LANL), Thomas Saller (LANL)*
- 1351 Calculation of Neutron Flux Spectra of the VVER-1000 Mock-up Shielding Benchmark with Monte Carlo Code MCS Utilizing Mesh-Based Weight Window—*Fathurrahman Setiawan (Ulsan Nat'l Institute of Science and Technology), Nhan Nguyen Trong Mai (Ulsan Nat'l Institute of Science and Technology), Yunki Jo (Ulsan Nat'l Institute of Science and Technology), Deokjung Lee (Ulsan Nat'l Institute of Science and Technology)*
- 1361 An Iron Evaluation Story: From TALYS Model Parameters to Validation on the ASPIS Benchmark with the Monte Carlo Code TRIPOLI-4®—*Valeria Raffuzzi (Univ. Cambridge), Jean-Christophe Sublet (IAEA), Cedric Jouanne (CEA), Arjan Koning (IAEA), Dimitri Rochman (PSI)*
- 1371 Benchmarking of ENDF/B-VIII.0 Cross Sections for LWR Ex-Core Transport Applications—*Greg A. Fischer (Westinghouse Electric Co.)*

### 1377 Machine Learning and Artificial Intelligence for Reactor Physics: II

- 1378 Optimization of the Deep Neural Network Parameters for Generating Homogenized Fuel Assembly Data for Nodal Codes—*Korawit Saeju (Ulsan Nat'l Institute of Science and Technology), Siarhei Dzianisau (Ulsan Nat'l Institute of Science and Technology), Muhammad Farid Khandaq (Ulsan Nat'l Institute of Science and Technology), Deokjung Lee (Ulsan Nat'l Institute of Science and Technology)*
- 1388 Genetic Algorithm-Based Optimisation of the Few-Group Structure for Lead Fast Reactors Analysis—*M. Massone (Karlsruher Institut für Technologie), N. Abrate (Politecnico di Torino), G.F. Nallo (Politecnico di Torino), S. Dulla (Politecnico di Torino), P. Ravetto (Politecnico di Torino), D. Valerio (Politecnico di Torino)*
- 1398 Quantification of Neural Networks Uncertainties with Applications to SAFARI-1 Axial Neutron Flux Profiles—*Lesego E. Moloko (South African Nuclear Energy Corp.), Pavel M. Bokov (South African Nuclear Energy Corp.), Xu Wu (NCSU), Kostadin N. Ivanov (NCSU)*

### 1409 MOOSE-Based Advanced Reactor Design and Technology: II

- 1410 The Virtual Test Bed (VTB) Repository: A Library of Multiphysics Reference Reactor Models Using NEAMS Tools—*G. Giudicelli (INL), C. Permann (INL), D. Gaston (INL), B. Feng (ANL), A. Abou-Jaoude (INL)*

- 1420 Coupling Coarse-Mesh CFD with Fine-Mesh CFD for Modeling for Molten-Salt Reactors in the Virtual Test Bed (VTB)—*M. Tano (INL), R. Freile (TAMU), J. Fang (ANL), A. Abou-Jaoude (INL), D. Shaver (ANL)*

- 1430 Coupled Monte Carlo and Thermal-Hydraulics Modeling of a Prismatic Gas Reactor Fuel Assembly Using Cardinal—*A.J. Novak (ANL), D. Andrs (INL), P. Shriwise (ANL), D. Shaver (ANL), P.K. Romano (ANL), E. Merzari (Penn State), P. Keutelian (Radiant Industries)*

- 1440 Initial Study on Cross-Section Generation Requirements for a PBR Equilibrium Core—*Javier Ortensi (INL), Paolo Balestra (INL)*

### 1454 High Enrichment/High Burnup Applications

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- 1456 Development and Verification of the pylsoDep Depletion Package for Nuclear Thermal Propulsion Reactors—*Matt Krecicki (Georgia Tech), Vigneshwar Manickam (Georgia Tech), Dan Kotlyar (Georgia Tech)*

- 1466 Development of Fast-Running Eighth Core Nodal Solution—*Akinori Giho (Westinghouse Electric Co.), Baocheng Zhang (Westinghouse Electric Co.), Byron R. Frank (Westinghouse Electric Co.)*

- 1474 Nuclide Inventory Characterization of EBR-II MOX Fuel Test Pins—*John D. Bess (JFoster & Assoc.), Chad L. Pope (Idaho State), Andrew S. Chipman (INL), Colby B. Jensen (INL)*

- 1484 Rossi- $\alpha$  Measurements on a System Consisting of Weapons Grade Plutonium Moderated by Polyethylene—*George McKenzie (LANL), Theresa Cutler (LANL), Travis Grove (LANL), Alex McSpaden (LANL), Rene Sanchez (LANL)*

- 1494 Demonstration of MOOSE-Based Griffin Reactor Physics Code for Heterogeneous Lead-Cooled Fast Reactor Analysis—*Colin Brennan (Univ. Texas, Austin), Hansol Park (ANL), Emily Shemon (ANL)*

- 1504 MCS Solutions for the TVA Watts Bar Unit 1 Multi-Physics Depletion Benchmark—*Muhammad Imron (Ulsan Nat'l Institute of Science and Technology), Tung Dong Cao Nguyen (Ulsan Nat'l Institute of Science and Technology), Deokjung Lee (Ulsan Nat'l Institute of Science and Technology)*

- 1514 An Influence of Manufacturing Tolerances on Pin-Cell k-infinity of MOX Fuel Using Data from the FUBILA Experiment Program—*Fujita Tatsuya (Nuclear Regulation Authority)*

- 1524 Inferring Small-Sample-Reactivity Worth from Oscillation Experiment with Auto-Corrected Local Flux—*Paul Ferney (CEA), Romain Boffy (CEA), Guillaume Truchet (CEA), Benoit Geslot (CEA), Jean-Marc Palau (CEA)*

- 1534 Multiphysics FISPACT-II and TENDL-2019 Simulation: Neutron-Induced Damage Metrics—*Jean-Christophe Sublet (IAEA), Mark Gilbert (United Kingdom Atomic Energy Authority)*
- 1544 Approach to Nuclear Criticality in IAN-R1 Research Reactor—*Jose A. Sarta Fuentes (Pontificia Univ. Javeriana), Luis A. Castiblanco B. (Technology and Nuclear Science)*
- 1550 Development of a High-Fidelity Multi-Cycle Model of the Nuscale Small Modular Reactor Using VERA—*Una Baker (Univ. Wisconsin, Madison), Marisol Garrouste (Univ. Michigan), Sooyoung Choi (Univ. Michigan), Gabriel J. Soto (Univ. Wisconsin, Madison), Ben Lindley (Univ. Wisconsin, Madison), Brendan Kochunas (Univ. Michigan)*
- 1560 Sensitivity Analysis of Small Modular Reactor mPower with ATHLET—*Heliang Wang (Harbin Engineering Univ.), Xiang Wang (Harbin Engineering Univ.)*
- 1570 Development of keff in the Unfolding Process of the LOTUS Reactor Design—*Yantao Luo (Harbin Engineering Univ.), Tian Zhang (Harbin Engineering Univ.), Xiang Wang (Harbin Engineering Univ.)*
- 1580 New Capabilities of the MORET 6 Monte Carlo Neutron Transport Code—*W. Monange (IRSN), A. Bardelay (IRSN)*
- 1591 Investigating the AGN-201M Research Reactor's Unique Dominance Ratio—*Mekiel Olguin (Univ. New Mexico), Christopher Perfetti (Univ. New Mexico), Forrest Brown (Univ. New Mexico)*
- 1601 Development of a Three-Dimensional APOLLO3® Neutrons Deterministic Scheme for the CABRI Reactor—*Tommy Coissieux (CEA), Julien Politello (CEA), Claire Vaglio-Gaudard (CEA), Timothée Kooyman (CEA), Karim Ammar (CEA)*
- 1611 Coupling TRACE with Nodal Neutronics Code Ants Using the Exterior Communications Interface and VTT's Multi-Physics Driver Cerberus—*R. Tuominen (VTT Technical Research Centre of Finland), R. Komu (VTT Technical Research Centre of Finland), V. Valtavirta (VTT Technical Research Centre of Finland)*
- 1620 Comparison and Investigation of Production of Specific Nuclides by Different Fission Yield Data—*Ryosuke Shibano (Osaka Univ.), Hirochika Tanaka (Osaka Univ.), Masato Ohara (Osaka Univ.), Satoshi Takeda (Osaka Univ.), Takanori Kitada (Osaka Univ.)*
- 1627 Error Analysis of a Hybrid Control Drum Worth Model—*Dean Price (Univ. Michigan), Shai Kinast (Nuclear Research Center Negev), Brendan Kochunas (Univ. Michigan)*
- 1637 Phase I Specifications and Preliminary Sensitivity Analyses of the OECD-NRC Liquid Metal Fast Reactor Core Thermal-Hydraulics Benchmark—*David Holler (NCSU), Maria Avramova (NCSU), Cole Takasugi (NCSU), Rodolfo Vaghetto (TAMU), Yassin Hassan (TAMU)*
- 1647 Thermal Performance Sensitivity to Radial Power Flattening Considerations in Nuclear Thermal Propulsion Reactors—*Matt Krecicki (Georgia Tech), Dan Kotlyar (Georgia Tech)*
- 1657 An Economics-By-Design Approach to a Radiant Integrated Thermophotovoltaic Microreactor System—*Naiki Kaffezi (Georgia Tech), Dan Kotlyar (Georgia Tech)*
- 1667 Reactivity Initiated Accident Uncertainty Quantification for Fuel Assembly with Subchannel Code—*Awais Zahur (Ulsan Nat'l Institute of Science and Technology), Jinsu Park (Ulsan Nat'l Institute of Science and Technology), Alexey Cherezov (Paul Scherrer Institute), Yunki Jo (Ulsan Nat'l Institute of Science and Technology), Deokjung Lee (Ulsan Nat'l Institute of Science and Technology)*
- 1677 Studsvik R2 Materials Test Reactor Ad Hoc Depletion Strategy for the Derivation of the Fuel Isotopic Composition of the MPCMIV Benchmark—*L. Giaccardi (NINE), S. Di Pasquale (NINE), S. Dulla (NINE), M. Cherubini (NINE), A. Petruzzi (NINE)*
- 1687 High-Burnup Isotopics Bias and Uncertainty Estimations for LANCRO2—*Joshua P. Finch (Global Nuclear Fuel), John Hannah (Global Nuclear Fuel)*
- 1697 Exponential Time Differencing Scheme for Mass Transport and Depletion in Molten Salt Reactors—*Zack Taylor (ORNL), Benjamin S. Collins (ORNL), G. Ivan Maldonado (Univ. Tennessee, Knoxville)*
- 1706 An IIPG-Based Finite Element Framework in MOOSE for Modeling Fiber Reinforced Composite Failure Governed by Extrinsic Cohesive Laws—*R. Liu (INL), W. Jin (INL), L. Harbour (INL), F. Kong (INL), C. Permann (INL), D. Gaston (INL), R. Podgorney (INL)*
- 1716 Study of Recirculating Liquid Fuel in a 1D Critical Stationary System—*Mathis Caprais (Univ. Paris-Saclay), Daniele Tomatis (CEA)*
- 1726 Putting Multipoint Kinetics to the Test: Preliminary Analysis of the MUSE-4 Experiment with APOLLO3—*Giorgio Valocchi (CEA), Jean Tommasi (CEA), Jean-François Lebrat (CEA), Frederic Mellier (CEA)*
- 1735 Deterministic Modelling of the SPERT IV Reactor Transients Using the Multi-Physics Capability of WIMS—*Thomas Postlethwaite (HMS Sultan), Brendan Tollit (Jacobs), Peter Smith (Jacobs), Alan Charles (Jacobs)*

- 1745 Recent Progress on the APOLL03® Calculation Scheme for the FLUOLE2 Experiment—*Romain Bertonazzi (CEA), Karim Ammar (CEA), Nicolas Gerard-Castaing (CEA), Stéphane Bourganel (CEA)*
- 1755 Historical Review and Proof-of-Concept Future Method Demonstration of Adaptive Mesh Refinement in Nuclear Engineering for Increased Fidelity and Computational Efficiency—*Kristin Stolte (TAMU), Pavel Tsvetkov (TAMU)*
- 1765 Analysis of Near-Field and Far-Field Aerosol Dispersion for Microreactors—*Rohan Biwalkar (Pittsburgh Technical), Adam Stein (Breakthrough Institute), Sola Talabi (Pittsburgh Technical)*
- 1774 Continuous Removal of Fission Products from Molten-Salt-Fueled Reactors—*Rolland Johnson (Muons), Bruce McNamara (PNNL), Thomas J. Roberts (Muons), R. Bruce Vogelaar (Virginia Tech)*
- 1784 Verification of the LOTUS Code with C5G7 Benchmark—*Dzianis Litskevich (Univ. Liverpool), Sebastian Davies (Univ. Liverpool), Anna Detkina (Univ. Liverpool), Bruno Merk (Univ. Liverpool)*
- 1792 Modeling of the TRIGA IPR-R1 Research Reactor with the Serpent2/RINNOVO Nodal Core Analysis Package—*Wilker Santos (CDTN / CNEN-MG), Petri Forslund Guimarães (GuimaSoft Computing), Daniel Campolina (CDTN / CNEN - MG), Erwin Müller (CompuSim), Graiciany de Paula Barros (CDTN / CNEN-MG), André Campagnole Santos (CDTN / CNEN-MG)*
- 1802 Development of a High-Fidelity Multi-Physics Coupling Between MCNP6.2 and CTF4.0 for VVER Applications—*Yesim Kutlu (NCSU), Pascal Rouxel (NCSU), Maria Avramova (NCSU), Kostadin Ivanov (NCSU)*
- 1812 Neutronics and Thermal-Hydraulics Simulation of Generic Pebble-Bed Fluoride-Salt-Cooled High-Temperature Reactor (gFHR)—*Jin Li (Univ. Michigan), Shai Kinast (Nuclear Research Center Negev), Volkan Seker (Univ. Michigan), Nader Satvat (Kairos Power), Dan O'Grady (ANL), Rui Hu (ANL), Thomas Downar (Univ. Michigan)*
- 1822 Benchmark Evaluation of One Dimensional Array of HEU Moderated and Reflected by Lucite—*Igor Lengar (Jožef Stefan Institute), Domen Kotnik (Jožef Stefan Institute), Luka Snoj (Jožef Stefan Institute), Jesson Hutchinson (LANL), Rene Sanchez (LANL), Travis Grove (LANL)*
- 1832 NucMesh: Nuclear Reactor Geometry Creation and Mesh Generation Module in NEMoSys—*Seth Pemberton (Illinois Rocstar), Alessandro Gondolo (Illinois Rocstar)*
- 1842 Alternative Analysis of the MINERVE ZPR Oscillation Experiments—*Guy Shtotland (Israel Atomic Energy Commission), Assaf Kolin (Nuclear Research Center Negev), Benoit Geslot (CEA), Patrick Blaise (CEA), Nir Kastin (Nuclear Research Center Negev)*
- 1854 Sensitivity and Uncertainty Analysis of PWR Spent Fuel Observables to Operational and Model Parameters—*P. Romojaró (SCK CEN), K. Ambrožič (Jožef Stefan Institute), D. Čalič (Jožef Stefan Institute), L. Fiorito (SCK CEN), K. Govers (Federaal Agentschap voor Nucleaire Controle), A. Hernandez-Solis (SCK CEN), B. Kos (Jožef Stefan Institute), P. Schillebeeckx (European Commission), A. Stankovskiy (SCK CEN), G. Žerovnik (Jožef Stefan Institute), M. Kromar (Jožef Stefan Institute)*
- 1864 Thermal Neutron Scattering Cross Sections for Amorphous Carbon—*T. Ahmed (NCSU), N.C. Fleming (NCSU), A.I. Hawari (NCSU)*
- 1874 Development of a Point Kinetics Subroutine for Molten Salt Reactors in RELAP5-3D—*John R. Ross (Univ. Texas, Austin), Kevin T. Clarno (Univ. Texas, Austin), Kyzer Gerez (Univ. Texas, Austin), Y.J. Choi (INL)*
- 1883 Power Distribution Estimation Method for SMR Using Ex-Core Detectors: Experimental Demonstration by Plural Control Rod Patterns at KUCA—*Rei Kimura (Toshiba Energy Systems and Solutions), Tadafumi Sano (Kindai Univ.), Yuki Nakai (Toshiba Energy Systems and Solutions), Atsushi Sakon (Kindai Univ.), Satoshi Wada (Toshiba Energy Systems and Solutions), Kunihiko Nakajima (Kindai Univ.), Takashi Kanda (Kindai Univ.), Masaki Goto (Kindai Univ.), Yoshiyuki Takahashi (Kyoto Univ.), Cheol Ho Pyeon (Kyoto Univ.)*
- 1893 Importance of 3-D SN Depletion in Non-Proliferation Using BSOLVE—*Meng-Jen Wang (Univ. Utah), Glenn E. Sjoden (Univ. Utah), Tanner W. Hall (Univ. Utah)*
- 1903 Space-Dependent Calculation of the Multiplicity Moments for Shells—*Imre Pázsit (Chalmers Univ. of Technology), Victor Dykin (Chalmers Univ. of Technology)*
- 1913 Deployment of the HFIRCON Transport and Depletion Tool for Plutonium-238 Production Studies—*D. Chandler (ORNL), C.R. Daily (ORNL)*
- 1923 Development of the MCNP-ORIGEN Activation Automation tool—*Roberto E. Fairhurst-Agosta (Univ. Illinois, Urbana-Champaign), Austin L. Carter (INL), Joshua L. Peterson-Droogh (INL)*
- 1933 Adjoint Sensitivity Analysis and Data Assimilation for Verification of Dry Storage Cask Contents—*Zi Liang Tan (Univ. Cambridge), Eugene Shwageraus (Univ. Cambridge)*
- 1943 Neutronics Modeling of the Pulsed Plasma Rocket Reactor Using Rattlesnake—*Jessica Williams (NCSU), Troy Howe (Howe Industries), Jason Hou (NCSU), Kan Ni (NCSU)*



- 1953 Stereolithographic Geometry Model of the IBR-2M Experimental Facility—*A. Talamo (ANL), Y. Gohar (ANL), Yu. N. Pepelyshev (Joint Institute for Nuclear Research), A. Vinogradov (Joint Institute for Nuclear Research), A. Bergeron (ANL)*
- 1963 Performance Improvements of the Windowed Multipole Formalism Using a Rational Fraction Approximation of the Faddeeva Function—*Benoit Forget (MIT), Jiankai Yu (MIT), Gavin Ridley (MIT)*
- 1973 Design of a Neural Thermal Scattering (NeTS) Module for Hydrogen in Light Water—*C.A. Manring (NCSU), A.I. Hawari (NCSU)*
- 1983 A Unified Framework of Stabilized Finite Element Method for Solving the Boltzmann Transport Equation—*Liangzhi Cao (Xi'an Jiaotong Univ.), Chao Fang (Xi'an Jiaotong Univ.), Yifei Li (Xi'an Jiaotong Univ.), Qingming He (Xi'an Jiaotong Univ.)*
- 1996 Stability Analysis of Monte Carlo Burnup Calculation Based on PWR Fuel Rods—*Ziliang Zeng (Sino-French Institute of Nuclear Engineering and Technology), Adrien Bidaud (CNRS), Davide Portinari (Institut Laue-Langevin)*
- 2006 Statistical Uncertainty of Fission Matrix Eigenvalues Using Perturbation Theory—*Constantin Bénilan (Univ. Grenoble Alpes), Adrien Bidaud (Univ. Grenoble Alpes), Thomas Croisette (Univ. Grenoble Alpes), Juliette Martin (Univ. Grenoble Alpes), Laurent Chabert (TechnicAtome), Davide Portinari (Institut Laue-Langevin)*
- 2016 Examination of AC-255 Production from Ra-226 Using Fast Reactor JOYO—*Daiki Iwahashi (Tokyo City University), Naoyuki Takaki (Tokyo City University)*
- 2027 Wednesday, May 18, 2022**
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- 2029 Plenary—Advanced Reactor Physics Developments at International Research Laboratories & Facilities**
- 2031 Core Analysis Methods: II**
- 2032 Proposal and Application of ROM-Lasso Method for Sensitivity Coefficient Evaluation—*Ryota Katano (Japan Atomic Energy Agency), Akio Yamamoto (Nagoya Univ.), Tomohiro Endo (Nagoya Univ.)*
- 2042 A New Approach for Resonance Treatment of Doubly Heterogeneous Fuel Using the RSE Method—*Akio Yamamoto (Nagoya Univ.), Tomohiro Endo (Nagoya Univ.), Satoshi Takeda (Osaka Univ.), Hiroki Koike (Mitsubishi Heavy Industries), Kazuya Yamaji (Mitsubishi Heavy Industries), Koichi Ieyama (Mitsubishi Heavy Industries), Koji Asano (Mitsubishi Heavy Industries)*
- 2052 Applicability Study of Bayesian Optimization in Core Neutronic Design Using a Toy Model—*Kazuki Kuwagaki (Japan Atomic Energy Agency), Kenji Yokoyama (Japan Atomic Energy Agency)*
- 2062 Data Assimilation for Burnup Distribution of PWR with Three-Dimensional Variational Algorithm and Artificial Neural Network—*Lin Guo (Xi'an Jiaotong Univ.), Chenghui Wan (Xi'an Jiaotong Univ.), Hongchun Wu (Xi'an Jiaotong Univ.), Wei Shen (Xi'an Jiaotong Univ.)*
- 2071 Advanced Reactors Design and Core Analysis: VII**
- 2072 Overview of Recent SCALE Activities for Non-LWR Inventory and Decay Heat Analysis—*William A. Wieselquist (ORNL), Friederike Bostelmann (ORNL), Robert Kile (ORNL), Austin Lo (ORNL), Ugur Mertuyrek (ORNL), Alex Shaw (ORNL), Steve Skutnik (ORNL), Erik Walker (ORNL)*
- 2082 Cell Dancoff-Based Embedded Self-Shielding Capability for Doubly Heterogeneous Particulate Fuels in SCALE/Polaris—*Byoung-kyu Jeon (Univ. Michigan), Won Sik Yang (Univ. Michigan), Hansol Park (Univ. Michigan), Kang Seog Kim (ORNL), Matthew A. Jessee (ORNL), William A. Wieselquist (ORNL)*
- 2092 Neutronic Analysis of a PWR-Type SMR Core Using Duplex ThO<sub>2</sub>-UO<sub>2</sub> in TRISO Fuel Particles—*Jesús Rosales (Univ. Nacional Autónoma de México), Juan-Luis François (Univ. Nacional Autónoma de México), Carlos García (INTEC)*
- 2102 Comparative Analysis of Energy Deposition Modes Available in Serpent 2 Within the Framework of the Supercritical Water Reactor -- Fuel Qualification Test Reactor Physics Benchmark—*B. Babcsányi (Budapest Univ. Technology and Economics), V. Giusti (Univ. Pisa), A. Moise (Institute for Nuclear Research), J. C. Chow (Canadian Nuclear Laboratories)*
- 2113 Data, Methods, Code Validation: VII**
- 2114 High-Performance and High-Fidelity Monte Carlo Solutions to the BEAVRS Benchmark—*Kyung Min Kim (Seoul Nat'l Univ.), Jaeuk Im (Seoul Nat'l Univ.), Namjae Choi (Seoul Nat'l Univ.), Han Gyu Joo (Seoul Nat'l Univ.)*
- 2124 Uncertainty Analysis for VERA Problem #2 Using the Cell-Code Condor v2.8.05—*Diego Ferraro (INVAP S.E.), Eduardo Villarino (INVAP S.E.)*
- 2134 Dancoff-Based Wigner-Seitz Approximation for the Subgroup Resonance Self-Shielding in the VERA Neutronics Simulator MPACT—*Kang Seog Kim (ORNL), Aaron M. Graham (ORNL), Matthew A. Jessee (ORNL)*

2144 Transformational Challenge Reactor Design Characteristics—*B.J. Ade (ORNL), B.R. Betzler (ORNL), A.J. Wysocki (ORNL), J.R. Weinmeister (ORNL), N.D. See (ORNL), P.K. Jain (ORNL), W.M. Kirkland (ORNL), J.R. Burns (ORNL), B.D. Hiscox (ORNL), D.P. Schappel (ORNL), A. Talamo (ANL), A. Bergeron (ANL), C.J. Jesse (INL)*

#### 2155 Neutronics Benchmark of CEFR Start-Up Tests: I

2156 Comprehensive Compilations of Computation Results and Validations for Neutronics Start-up Tests at China Experimental Fast Reactor—*Jiwon Choe (KAERI), Chirayu Batra (IAEA), Vladimir Kriventsev (IAEA), Armando Gomez-Torres (Instituto Nacional de Investigaciones Nucleares), Alexander Levchenko (Simulation Systems), Batki Balint (Centre for Energy Research), Una Davis (Univ. Cambridge), Jong Hyuck Won (KAERI), Min Jae Lee (KAERI), Pierre Sciora (CEA), Kunhiraman Devan (Indira Gandhi Centre for Atomic Research), Taek K. Kim (ANL), Huo Xingkai (China Institute of Atomic Energy)*

2166 Simulation of CEFR Neutronic Start-up Tests with FENNECS—*A. Seubert (GRS), Romain Henry (GRS)*

2176 TRIPOLI-4® Neutronics Calculations for IAEA-CRP Benchmark of CEFR Start-up Tests Using New Libraries JEFF-3.3 and ENDF/B-VIII—*Yi-Kang Lee (CEA)*

2186 CEFR Simulation Using Diffusion Code System RAST-F—*Tuan Quoc Tran (Ulsan Nat'l Institute of Science and Technology), Tung D.C. Nguyen (Ulsan Nat'l Institute of Science and Technology), Deokjung Lee (Ulsan Nat'l Institute of Science and Technology)*

#### 2195 Challenges and Improvements in Accident Dose Analysis: Regulatory and Industry Perspective

2196 Pellet Cladding Mechanical Interaction as a Potential Failure Mechanism During a Control Rod Drop Accident in a Boiling Water Reactor—*Kyle A. Gamble (INL), Aysenur Toptan (INL), Pierre-Clement A. Simon (INL), Aaron Graham (ORNL), Mehdi Asgari (ORNL), Baris Sarikaya (Constellation), James Tusar (Constellation), Moussa Mahgerefteh (Constellation)*

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