## Proceedings of 2021 28th International Conference on Nuclear Engineering

(ICONE28)

Volume 1

August 4-6, 2021 Virtual, Online

Conference Sponsor Nuclear Engineering Division

Two Park Avenue \* New York, N.Y. 10016

© 2021, The American Society of Mechanical Engineers, 2 Park Avenue, New York, NY 10016, USA (www.asme.org)

All rights reserved. Printed in the United States of America. Except as permitted under the United States Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher.

INFORMATION CONTAINED IN THIS WORK HAS BEEN OBTAINED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS FROM SOURCES BELIEVED TO BE RELIABLE. HOWEVER, NEITHER ASME NOR ITS AUTHORS OR EDITORS GUARANTEE THE ACCURACY OR COMPLETENESS OF ANY INFORMATION PUBLISHED IN THIS WORK. NEITHER ASME NOR ITS AUTHORS AND EDITORS SHALL BE RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR DAMAGES ARISING OUT OF THE USE OF THIS INFORMATION. THE WORK IS PUBLISHED WITH THE UNDERSTANDING THAT ASME AND ITS AUTHORS AND EDITORS ARE SUPPLYING INFORMATION BUT ARE NOT ATTEMPTING TO RENDER ENGINEERING OR OTHER PROFESSIONAL SERVICES. IF SUCH ENGINEERING OR PROFESSIONAL SERVICES ARE REQUIRED, THE ASSISTANCE OF AN APPROPRIATE PROFESSIONAL SHOULD BE SOUGHT.

ASME shall not be responsible for statements or opinions advanced in papers or . . . printed in its publications (B7.1.3). Statement from the Bylaws.

For authorization to photocopy material for internal or personal use under those circumstances not falling within the fair use provisions of the Copyright Act, contact the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, tel: 978-750-8400, www.copyright.com.

Requests for special permission or bulk reproduction should be addressed to the ASME Publishing Department, or submitted online at: https://www.asme.org/publications-submissions/journals/information-for-authors/journalguidelines/rights-and-permissions

ISBN: 978-0-7918-8524-6

## **CONTENTS**

## Proceedings of the 2021 28th International Conference on Nuclear Engineering Volume 1

Operating Plant Challenges, Successes, and Lessons Learned
ICONE28-62558
ICONE28-63246
ICONE28-64142
ICONE28-64294
ICONE28-64364
ICONE28-64681
ICONE28-65628
Nuclear Plant Engineering
ICONE28-61786
ICONE28-63134
ICONE28-63294

ICONE28-63633
ICONE28-63659
ICONE28-64191
ICONE28-64227
ICONE28-64278
ICONE28-64300
ICONE28-64337
ICONE28-64351
ICONE28-64397
ICONE28-64398
ICONE28-64427
ICONE28-64446
ICONE28-64460
ICONE28-64473

ICONE28-64521	
ICONE28-64527	
ICONE28-64532	
ICONE28-64548	
ICONE28-64554	
ICONE28-64586	
ICONE28-64605	
ICONE28-64612	
Kaijie Zhu, Boran Kong, Jie Hou, Han Zhang, Jiong Guo, and Fu Li  ICONE28-64617	
Recent Activities and New Challenges for the EUR Organization  Vincent Sorel	
ICONE28-64632	
ICONE28-64638	
ICONE28-64714	
ICONE28-64716	
ICONE28-64784	

ICONE28-64931	
ICONE28-65502	
ICONE28-66338	
Hanying Chen, Linzhong Xia, Puzhen Gao, Sichao Tan, and Hongsheng Yuan  ICONE28-66619	
Advanced Reactors and Fusion	
ICONE28-61123	
ICONE28-63277	
ICONE28-64134	
ICONE28-64388	
ICONE28-64416	
ICONE28-64430	
Chaoqun Wang, Qun Yang, Kai Wang, Xiaowei Jiao, Yanhua Wu, and Zhaozhong He  ICONE28-64525	
ICONE28-65406	
ICONE28-66385	

Small Modular and Micro-Reactors Technologies and Applications
ICONE28-62494
ICONE28-63220
Mian Xing, Linsen Li, Gang Zheng, Junlang Wen, Chunyuan Liu, Yeoh Eing Yee, Zhen Luo, Peidong Sun, and Jinjun Feng
ICONE28-63314
ICONE28-63357
ICONE28-64162
ICONE28-64163
ICONE28-64168
ICONE28-64261
Shuta Fukizaki, Akifumi Yamaji, and Takanari Fukuda  ICONE28-64346
A Finnish District Heating Reactor: Background and General Overview  Jaakko Leppänen, Seppo Hillberg, Ville Hovi, Rebekka Komu, Joona Kurki, Unna Lauranto, Ahti  Oinonen, Jussi Peltonen, Antti Rintala, Ville Tulkki, Riku Tuominen, and Ville Valtavirta
ICONE28-64347
ICONE28-64448
Wen Yang, Fei Chao, Yun Tai, and Longze Li
ICONE28-64466
Shijia Xu, Qinglong Wen, Shenhui Ruan, Ningning Zhao, and Yukang Liu
ICONE28-64572
ICONE28-65689

ICONE28-65765	V001T04A015
A Sodium-Cooled Thermal-Spectrum Fission Battery Patrick J. McDaniel and Charles Forsberg	
ICONE28-65810	V001T04A016
Evaluation of Serpent Capabilities for Hyperfidelity Depletion of Pebble Bed Cores  Yves Robert and Massimiliano Fratoni	
ICONE28-65828	V001T04A017
Heat Transfer Analysis of a Conceptual Horizontally-Oriented High Temperature Gas-Cooled	
Reactor	
Jinyong Feng, Enrique Velez Lopez, William Robb Stewart, Ralph Wiser, Emilio Baglietto, and Koroush Shirvan	
ICONE28-67519	V001T04A018
Westinghouse eVinci™ Heat Pipe Micro Reactor Technology Development <i>Matt M. Swartz, William A. Byers, John Lojek, and Rory Blunt</i>	