Nuclear Science User Facilities (NSUF) Annual Program Review

Monday April 15 to Thursday April 18, 2024

Objective: Review Progress and provide feedback on the NSUF

Hybrid Meeting

Meeting Links:

Monday, April 15: https://events.gcc.teams.microsoft.com/event/6ab7734c-dc72-4400-bcb9-51193207a02d@4cf464b7-869a-4236-8da2-a98566485554
Tuesday, April 16: https://events.gcc.teams.microsoft.com/event/3ff94070-b807-4616-b3a7-b9e346ec9bc8@4cf464b7-869a-4236-8da2-a98566485554
Wednesday, April 17: https://events.gcc.teams.microsoft.com/event/45211c96-9de5-4add-b830-b7ed25d229d9@4cf464b7-869a-4236-8da2-a98566485554
Thursday, April 18: https://events.gcc.teams.microsoft.com/event/4f93e9ff-5f1b-4c4e-90cd-c0245d509fe5@4cf464b7-869a-4236-8da2-a98566485554

Monday April 15 Morning Session - Program Review

Center for Advanced Energy Studies (CAES) Auditorium & Hybrid

MDT

9:00 Welcome and Introductions ..... Brenden Heidrich
NSUF Director

9:15 DOE-NE Perspective and FY 2024 Outlook ..... Christopher Barr
DOE-NE NSUF Program Manager

9:45 NSUF Overview ..... Brenden Heidrich
NSUF Director

10:45 Break

11:00 CINR Experiment Awards and Status ..... Lindy Bean
NSUF Program Administrator

11:30 RTE Experiment Awards and Status ..... Anna Podgorney
NSUF Program Administrator

12:00 Lunch

Monday, April 15 Afternoon Panel Session - NSUF User Access Awards: Structural Materials

Panel Chair – Rongjie Song, NSUF Chief Scientist

1:00 Session Introduction – Structural Materials Related R&D under NSUF

1:10 Irradiation Influence on Alloys Fabricated by Powder Metallurgy and Hot Isostatic Pressing for Nuclear Applications ..... Janelle Wharry
Purdue University

1:30 NuScale SMR Materials Irradiation and Testing..... Carlen Donahue
NuScale Power, LLC

1:50 Irradiation Testing of LWR Additively Manufactured Materials..... Drew Johnson
Idaho National Laboratory

2:10 Synergy of Radiation Damage with Corrosion Processes through a Separate Effect Investigation Approach..... Djamel Kaoumi
North Carolina State University

2:30 Examining Microstructures and Mechanical Properties of Neutron and Ion Irradiated T91, HT9 and 800H Alloys ..... Pengcheng Zhu
University of Tennessee, Knoxville

2:50 Wrap-up and Discussion

3:30 Adjourn

Tuesday, April 16 NSUF Program Update

Center for Advanced Energy Studies (CAES) Auditorium & Hybrid

MDT

9:00 Neutron Irradiation as a Function of Temperature - Experiment ..... Simon Pimblott
Idaho National Laboratory

9:20 Nuclear Fuels and Materials Library..... Rongjie Song
NSUF Chief Scientist

9:40 INL Irradiation Capacities..... Nicolas Woolstenhulme
Idaho National Laboratory

10:00 NSUF User Organization Overview..... Maria Okuniewski
NSUF Organization Chair

10:30 Break

Tuesday, *April 16 NSUF Program Update*

10:45 Nanodispersion Strengthened Metallic Composites with Enhanced Neutron Irradiation Tolerance ..... Ju Li
Massachusetts Institute of Technology

11:15 New NSUF Supported Capability Development - Hodoscope ..... Luis Ocampo Giraldo
Idaho National Laboratory

11:30 Advanced Photon Source and AML ..... Xuan Zhang
Argonne National Laboratory

11:45 Silicon Carbide (SiC) Temperature Measurements in NSUF Experiments ..... Troy Unruh
Idaho National Laboratory

12:00 Lunch

Tuesday, *April 16 Panel Session – NSUF User Access Awards: Fuel and Cladding Materials*

Panel Chair – Jeffrey Giglio, NSUF Chief Scientist

1:00 Session Introduction – Fuel Related R&D under NSUF

1:10 High Power Irradiation Testing of TRISO Fuel Particles with UCO and UO2 Kernels in Miniature Fuel Specimen Capsules in HFIR..... Ryan Latta
Kairos Power

1:30 UN Multi-design Irradiation Campaign: A Critical Assessment of Accelerated Burnup and Main Correlations for Mechanistic Fuel Performance Modeling ..... Elizabeth Sooby
University of Texas at San Antonio

1:50 Investigation of Degradation Mechanisms of Cr-coated Zirconium Alloy Cladding in Reactivity Initiated Accidents (RIA) ..... WooHyun Jung
University of Wisconsin

2:10 Assessment of Irradiated Microstructure and Mechanical Properties of FeCrAl Alloy Fabrication Routes ..... Haozheng Qu
GE Research

2:30 Thermal Conductivity Measurement of Irradiated Metallic Fuel Using TREAT ..... Heng Ban
University of Pittsburgh

2:50 Wrap-Up and Discussion

3:30 Adjourn

Wednesday, April 17 NSUF Program Updated – High Performance Computing

Center for Advanced Energy Studies (CAES), Auditorium & Hybrid

MDT

9:00 High Performance Computing Accomplishments ..... Matthew Anderson
Idaho National Laboratory

9:45 HPC User Experience – Updates and Opportunities ..... Matthew Anderson
Idaho National Laboratory

10:45 Break

11:00 Nuclear Research Data System (NRDS) ..... Bradlee Rothwell
Idaho National Laboratory

11:30 Outlook on the Future of Computing Resources for Nuclear Energy Studies - NEAMS ..... Cody Permann
Idaho National Laboratory

12:00 Lunch

Wednesday, *April 17 Panel Session – NSUF User Access Awards, Sensor Materials*

Panel Chair – Jeffrey Giglio, NSUF Chief Scientist

1:00 Session Introduction – Sensor Related R&D under NSUF

1:10 Integral Fuel Rod Real-Time Wireless Sensor & Transmitter Irradiation Test and Post Irradiation Examination (WIRE 21 Experiment) ..... Chris Petrie
Oak Ridge National Laboratory

1:30 Demonstration of Self Powered Neutron Detectors Performance and Reliability ..... Kevin Tsai
Idaho National Laboratory

1:50 Understanding Irradiation Behaviors of Ultrawide Bandgap Ga203 High Temperature Sensor Materials for Advanced Nuclear Reactor Systems .... Ge Yang
North Carolina State University

2:10 Radiation-induced Attenuation and Nonlinear Optical Properties of Fused Silica and Single-crystal Sapphire ..... Chris Petrie
Oak Ridge National Laboratory

2:30 Wrap-Up and Discussion

3:00 Adjourn

Thursday, April 18 NSUF Program – PIE Capabilities and Instrument Scientists

Center for Advanced Energy Studies (CAES), Auditorium & Hybrid

MDT

9:00 NSUF Post-Irradiation Capabilities Overview..... Rongjie Song
NSUF Chief Scientist

9:20 NSUF Instrument Scientist Program. .....Jeffrey Giglio
NSUF Chief Scientist

9:30 Instrument Creating a Data Collection and Processing Workflow for Three-Dimensional Slice-by-Slice Reconstruction of Nuclear Structural Materials Using Focused Ion-Beam Microscopy..... Trishelle Copeland-Johnson
Idaho National Laboratory

9:45 High Temperature Portable Positron Annihilation Spectroscopy Operation (HiPPO) Sample Chamber .....Chuting Tsai
Idaho National Laboratory

10:00 Electron Energy Loss Spectroscopy at High Energy Losses to Study Chemical Interactions in Nuclear Materials. .....Kaustubh Bawane
Idaho National Laboratory

10:15 Data Acquisition and Analysis Techniques for X-ray Computer Tomography ..... William Chuirazzi
Idaho National Laboratory

10:30 Development of FIB-TOF-SIMS Methods for Irradiated Fuels and Materials ..... Daniel Murray
Idaho National Laboratory

10:45 Break

Thursday, April 18 Panel Session – NSUF *In Situ* Irradiation Capabilities

Panel Chair – Rongjie Song, NSUF Chief Scientist

11:00 **Session 1: NSUF *In Situ* Irradiation Corrosion Testing**

11:00 *In Situ* Irradiation and Molten Salt Corrosion ..... Cole Evered
University of Wisconsin

11:15 *In Situ* Irradiation and Molten Salt Corrosion ..... Lin Shao
Texas A&M University

11:30 *In Situ* Proton Irradiation in High Temperature Water ..... Peng Wang
University of Michigan

11:45 *Session 1 Discussion*

12:00 Lunch

1:00 **Session 2: NSUF *In Situ/Post-* Irradiation Mechanical Testing/Corrosion Capabilities**

1:00 *In Situ* Ion Irradiated Creep and Mechanical Testing ..... Charlie Hirst
University of Michigan

1:15 IASCC Testing ..... Peng Wang
University of Michigan

1:30 *Session 2 Discussion*

1:45 **Session 3: NSUF *In Situ* Irradiation Characterization Capabilities**

1:45 Modern *In Situ* TEM Ion Irradiation with Real-Time AI-Powered Data Analysis ..... Kevin Field
University of Michigan

2:00 *In Situ* TEM Ion Irradiation ..... Wei-Ying Chen
Argonne National Laboratory

2:15 *In Situ* TEM Ion Irradiation ..... Christopher Smyth
Sandia National Laboratory

2:30 *In Situ* Helium Ion Irradiation ..... Peter Hosemann
University of California, Berkeley

2:45 *Session 3 Discussion*

3:00 Adjourn