2013 IEEE 25th Symposium on Fusion Engineering

(SOFE 2013)

San Francisco, California, USA 10-14 June 2013

Pages 1-698



IEEE Catalog Number: ISBN:

CFP13SOF-POD 978-1-4799-0170-8

Technical Program

Experimental Devices

FPL-3: JT-60SA Construction and Research Directions "% William Spears, Fusion for Energy

ThPO-1: NSTX-U Vacuum Vessel Design Modification ... Neway Atnafu, PPPL

ThPO-2: THE INVESTIGATION PROGRAMME OF PLASMA DISCHARGE ON HL-2A TOKAMAK '% Xiao SONG, Southwestern Institute of Physics(SWIP)

ThPO-3: Physics of Cfetr '%+ Baonian Wan, Institute of Plasma Physics, Chinese Academy of Sciences

ThPO-4: Investigation of Field Null for HL-2M Tokamak Start Up "&' Jian Liu, Southwestern Institute of Physics

ThPO-5: The ST25 Tokamak for Rapid Technological Development^{••}&+ Alan Sykes, Tokamak Solutions UK

FO1-3: Real Time Control of Plasma Performance on ASDEX Upgrade and Its Implications for ITER $^{\prime\prime}$ %

Wolfgang Treutterer, Max-Planck Institute for Plasma Physics, Garching, Germany

TO1-4: East Accomplishments/Plans in Support of Fusion Next-Steps[…],

yuntao song, institute of plasma phycics, Chinese academy of sciences

TO1-2: MAST Accomplishments/Plans in Support of Fusion Next-Steps"((William Morris, EURATOM/CCFE Fusion Association

FO1-1: LHD Accomplishments/plans in Support of Fusion Next-Steps⁽¹⁾) &

Shinsaku Imagawa, National Institute for Fusion Science

ThPO-8: Equilibrium Features of Bean-Shaped Spherical Tokamak Plasmas with an Ergodic Limiter[…]* \$

Celso Ribeiro, Instituto Tecnológico de Costa Rica

TO1-3: MAST UPGRADE - PROGRESS AND ENGINEERING CHALLENGES ** *

Joseph Milnes, CCFE

ThPO-9: Engineering Issues to the Stellarator of Costa Rica 1 (SCR-1) ^{··*} -

Ivan Vargas, Costa Rica Institute of Technology

TO1-5: Preparation of the Wendelstein 7-X Commissioning ``+)

Hans-Stephan Bosch, Max-Planck-Institut für Plasmaphysik, Greifswald, Germany

ThPO-11: FLUCTUATION MITIGATION AND AZIMUTHAL VELOCITY PROFILE REGULATION BY EXTREMUM SEEKING IN HELCAT"+-

Zeki Ilhan, Lehigh University

WO1-5: DIII-D Accomplishments and Plans in Support of Fusion Next-Steps",)

Richard Buttery, GA

ThO1-3: Acousticaly Driven Magnetized Target Fusion"- '

Michel Laberge, General Fusion

ThPO-12: Plasma Centre-Post for Spherical Tokamaks ** \$\$ Celso Ribeiro, Instituto Tecnológico de Costa Rica

ThPO-13: A Method of Increasing the Rate of Nuclear Fusion Inside an Iec Device "%" Jose Lopez, FusorTek, Sunnyvale, CA

ThPO-14: Proto-CIRCUS Tilted-Coil Tokamak-Stellarator Hybrid: Construction and Field Line Mapping "%\$,

Francesco Volpe, Columbia University in the City of New York

Fusion Development: R&D facilities, Next Steps and Power Plants

WO1-1: EU DEMO Design and R&D Studies "%%(Gianfranco Federici, F4E, Barcelona

TPO-8: Progress in Developing the K-Demo Device Configuration **%, Keeman Kim, National Fusion Research Center

TPO-1: TBR and Shielding Analyses in Support of ST-FNSF Study ''% ' Laila El-Guebaly, University of Wisconsin

ThO1-1: IFMIF: Steps Toward Realization "% - Juan Knaster, IFMIF

TPO-9: Balance of Plant Challenges for a Near-Term EU Demonstration Power Plant '% + Michael Porton, Culham Centre for Fusion Energy

TPO-2: Progress in Developing the St-FNSF Configuration "%) ' Thomas Brown, PPPL

TPO-10: Facilities for Quasi-Axisymmetric Stellarator Research ''%) - Hutch Neilson, PPPL

ThO1-4: The Spherical Tokamak Path to Fusion Power, Revisited "%") Alan Sykes, Tokamak Solutions UK

TPO-11: Concept Design of CFETR Tokamak Machine %+% yuntao song, institute of plasma phycics, Chinese academy of sciences

TPO-4: Design Description of the Coaxial Helicity Injection System on NSTX-U ***

Roger Raman, University of Washington

TPO-13: Engineering Design and Steady State Thermomechanical Analysis of the Ifmif European Lithium Target System ``%~%

Davide Bernardi, ENEA C.R. Brasimone, 40032 Camugnano (BO), Italy

TPO-14: Application of Accelerator Based Neutron Sources in Materials Research * Elizabeth Surrey, Culham Centre for Fusion Energy

FO1-4: Systems Analysis Exploration of Operating Points for the Korean Demo Program "% &

Keeman Kim, National Fusion Research Center

WO1-4: Opportunities for Fusion Materials Science and Technology Research Now and During the Iter Era ``% +

Brian Wirth, University of Tennessee

TPO-15: Optimizaton of the Snowflake Diverted Equilibria in Cfetr "&\$)

Zhengping Luo, Institute of Plasma Physics, Chinese Academy of Sciences

TPO-16: Scoping Studies for NBI Launch Geometry on DEMO^{...}&\$, Ian Jenkins, CCFE

TPO-17: Design Integrated System for Power Plant Development **&%(Heiko Neuberger, Karlsruher Institut für Technologie (KIT)

TPO-5: Power and Particle Exhaust in an ST-FNSF ... &&\$ John Canik, ORNL

TPO-18: Plasma Performance Required for Fusion Power Control Considering Grid Operation in Demo-CREST^{**}&&*

Ryoji Hiwatari, Central Research Institute of Electric Power Industry

TPO-19: Optimization of Fusion-Fission Hybrid Reactor Fuel Composition "&" % Martin Nieto-Perez, CICATA-IPN Unidad Queretaro

Plasma-Material Interactions, First Wall, and Divertors

ThPO-15: Assessment of Copper Based Materials for the Water-Cooled Divertor Concept of the Demo European Fusion Reactor"&' *

Lorelei Commin, KIT

ThPO-16: Energy and Particle Inpact on W Surface for the Case of Repetitive Elms and Re Electrons in Demo Plasmas^{**}&(\$

Yuri Igitkhanov, Karlsruhe Institute of Technology

ThPL-1: Lesson Learned from the Design of ITER Internal Components "&(*

Michael Ulrickson, SNL

ThO2-3: Tungsten Experiences in ASDEX Upgrade and JET &) (Rudolf Neu, European Fusion Development Agreement, Central Support Unit, Garching

ThPO-17: Development Activities for the Target Elements of the Wendelstein 7-X Divertor * & Jean Boscary, Max Planck Institute for Plasmaphysics

ThPO-18: Themal Management Using a Hypervapotron; Part III: Summary of Controlling Parameters "&* ,

Ronald Boyd, Prairie View A&M University

ThPO-20: Investigation into Irradiation Effects in ODS-Alloys Using Ion Implantation and Micromechanical Testing "&+'

Eleanor Grieveson, Department of Materials, University of Oxford

ThPO-22: PSI Studies at DIII-D^{..}&++ Clement Wong, GA

ThPO-23: Thermo-Mechanical Investigation of the New Solid Tungsten Divertor Tile for Special-Purposes at ASDEX Upgrade "&, '

Nikola Jaksic, Max-Planck-Institute for Plasma Physics

ThO2-2: Wendelstein 7-X High Heat-Flux Divertor Scraper Element^{..}&, - Arnold Lumsdaine, ORNL

ThO2-1: Wendelstein 7-X High Heat Flux Components * Alan Peacock, IPP Garching Germany

ThPO-32: Impact of High Transient Plasma Loads on Beryllium Damage" \$(

Igor Kupriyanov, A.A. Bochvar Research Institute of Inorganic Materials

ThPO-33: Fault Analysis of Plasma Facing Component Mounts Using Multiphysics Simulation^{••} **\$**-Dennis Youchison, SNL

ThPO-34: Upward Facing Lithium Flash Evaporator for NSTX_U¹¹ %

Lane Roquemore, PPPL

ThPO-35: Results of the Qualification Test for ITER Blanket First Wall Small-Scale Mockups in Korea^{•••} &\$

Suk-Kwon Kim, Korea Atomic Energy Research Institute

ThPO-36: Evaluation of Thermal Conductivity of Unidirectional SiC Composite Enhanced with Carbon Fibers $^{\prime\prime}$ &(

SungHun KIM, Institute of Advanced Energy, Kyoto University

TO4-5: Assessment of an ITER-like Water-Cooled Divertor for DEMO¹¹ &-

Eliseo Visca, ENEA

ThPO-37: Optimization of Functionally Graded Materials for Plasma Facing Components by Finite Element Methods '' ')

Deepu Krishnan, IPR

ThPO-38: Anisotropic Heat Transfer Characteristics of Composite Material Enhanced with High Thermal Conductivity Fiber^{•••} (\$

Hyoseong Gwon, Institute of Advanced Energy, Kyoto University, Kyoto, Japan

ThPO-39: He-Cooled Divertor: Study on Low-Temperature Design Using Ta Alloy as Thimble Material ... ((

Prachai Norajitra, Karlsruhe Institute of Technology (KIT)

ThPO-44: Physics and Engineering Design of the Divertor Scraper Element for the W7-X Stellarator $\ddot{}\,\ddot{}\,$ (-

Jeremy Lore, ORNL

ThPO-45: Numerical Analysis and Optimization of Divertor Cooling System^{•••}) (Andrei Khodak, PPPL

ThO2-4: Design of the C-Mod Advanced Outer Divertor * ***** Rui Vieira, MIT

ThPO-46: Modeling Technique to Predict Fields, Currents and Loads for C-Mod's Advanced **Outer Divertor During a Disruption with a 2ma Plasma Current and 9t Toroidal Field**^{...} ** Jeffrey Doody, PSFC-MIT

ThO4-3: Heat Transfer Simulation of C-Mod Advanced Outer Divertor +& Lihua Zhou, MIT

ThPO-47: Modification of NSTX-U Row 1 Outboard and Inboard Divertor Tiles for the **Protection of the PF-1C Coils**^{...} +, Kelsey Tresemer, PPPL

ThPO-49: Evaluation of Material Erosion from Plasma-Facing Surfaces in Hard Disruptions via Simluated Ablation Due to Heat Flux in Electrothermal Discharges..., % Leigh Winfrey, Virginia Polytechnic Institute and State University

ThPO-51: First Results from the Liquid Lithium Film Experiment (LiLiFEx)...., * Martin Nieto-Perez, CICATA-IPN Unidad Queretaro

ThO4-4: Deuterium Retention in Tungsten at Fuego Nuevo II - % Gonzalo Ramos, Insituto Politecnico Nacional

ThPO-55: Hardening Parameters for Modelling CuCrZr and OFHC Copper under Cyclic Loadings... -) Mauro Dalla Palma, Consorzio RFX

Chambers, Blankets, and Shields

TPO-21: A Global Mechanical Analysis and Optimization of Vacuum Vessel and Attached Structure of KTX Device (\$\$

Shanshuang Shi, Institute of Plasma Physics, Chinese Academy of Sciences

TPO-22: A Preliminary Concept Design Study of Blanket for Korean Demo Reactor (K-DEMO) (\$) Young-Seok LEE, National Fusion Research Institute

TPO-23: Design and Manufacture of the ITER Cryostat"(\$-Bharatkumar Doshi, ITER Organization

TPO-24: Benchmark Calculations for the Starter Fendl-3.0 General Purpose Neutron Library with Impact on Iter Analysis" (%)

Mohamed Sawan, University of Wisconsin-Madison

TPO-25: Numerical Analysis Two-Phase Flow and Heat Transfer of Fuel Particles and Liquid Metal for Waste Transmutation Blanket" (&\$

Weihua Wang, New Star Institute of Applied Technology

TPO-27: Numerical Analysis of Coupling MHD Rectangular Duct Flows (**&**) Xiujie Zhang, SWIP **TPO-28: A Multi-Layer Breeding Blanket Concept for CFETR Based on PWR Water Condition** (' \$ changle liu, Institute for Plasma Physics, Chinese Academy of Sciences

FO2-4: Transient Electromagnetic Analysis of Selected Blanket Modules of the Iter Blanket System Due to Plasma Disruption "(' '

Joseph Kotulski, SNL

TPO-31: Flow Distribution Systems for Liquid Metal Cooled Blankets ``(' -

Christina Koehly, Karlsruhe Institute of Technology (KIT)

FO2-1: ITER Blanket Engineering Challenges and Solutions (() Rene Raffray, ITER Organization

TPO-32: Structural Analysis of the Iter Thermal Shield () Chang Hyun Noh, National Fusion Research Institute

TPO-33: Functional Components Design and Analysis of a Korean HCCR TBM in ITER $^{\cdot \cdot}$ (),

Dong Won LEE, Korea Atomic Energy Research Institute

TPO-36: Structural Analysis Work on ITER Vacuum Vessel (* & Chang Jun, ITER International Organization

TPO-37: APPLICATIONS OF MCCAD FOR THE AUTOMATIC GENERATION OF MCNP 3D MODELS IN FUSION NEUTRONICS (**

Fabio Moro, 1Association EURATOM-ENEA

TPO-38: THE ITER EC-H&CD Upper Launcher: FEM Analyses of the Blanket Shield Module with Respect to Surface and Nuclear Heat Loads (+%)

Alessandro Vaccaro, Karlsruhe Institute of Technology

FO2-3: In-Service Inspection and Instrumentation for ITER Vacuum Vessel (+* Kimihiro IOKI, ITER Organization

TPO-39: Considerations of Transient Electromagnetic Forces in Structural Behaviors for Iter Shield Blanket Components" (, &

Alice Ying, UCLA

TPO-40: Structural Design Analysis Considering Contact Stress between KO HCCR TBM Sub-Modules for ITER $\ddot{}$ (, ,

Kyu In Shin, Korea Atomic Energy Research Institute, Daejeon, Republic of Korea

TPO-43: Further Experimental Validation of Continuum FEM Simulation for Ceramic Breeder Pebble Bed Units (- &

Justin Tucker, UCLA

TPO-46: Error Evaluation in Hydrogen Isotope Permeability Measurement of Silicon-Carbide and the Required Degree of Vacuum⁽⁾(-,

Yasushi Yamamoto, Kansai University, Faculty of Engineering Science

TPO-47: Final Design and Start of Manufacture of the ITER Vacuum Vessel Ports) \$'

Yury Utin, ITER Organization

TPO-48: Impact of Pulsed Operation on Lifetime of Demo Blanket^{••}) \$-

Jarir Aktaa, Karlsruhe Institute of Technology

TPO-49: Parametric Analysis of EM Loads Acting on Demo Vertical Segments with Respect to Module's Dimension⁽¹⁾) %

Ivan Maione, Karlsruhe Institute of Technology

TPO-50: Resonance of the Iter Diagnotic Upper Port Plug with Em Loads During a Plasma Disruption () %

Sunil PAK, National Fusion Research Institute

TPO-51: Influence of Uninsulated Gaps Between Flow Channel Inserts in Ducts of DCLL Blankets⁽¹⁾) &)

Leo Bühler, Karlsruhe Institute of Technology

TPO-52: Influence of Variable Heat Source on Magneto Convective Flows in HCLL Blankets ') ' % Chiara Mistrangelo, Karlsruhe Institute of Technology

Magnets

TPO-53: Novel Use of Water Soluble Aquapour as Temporary Spacer During Coil Winding for the NSTX-U Centerstack `)' +

Michael Mardenfeld, PPPL

TPO-54: Mechanical Analysis for ITER Upper ELM Coil) (% Shanwen Zhang, Institute of Plasma Physics Chinese Academy of Sciences

TPO-56: Conceptual Design and Analysis of CFETR Magnets) (*

Xufeng Liu, Institute of Plasma Physics, Chinese Academy of Sciences

TPO-58: SOLDER DEVELOPMENT AND FABRICATION TECHNIQUES FOR COOLANT TUBE BONDING IN TOROIDAL FIELD CONDUCTORS FOR THE NATIONAL SPHERICAL TOURUS EXPERIMENT CENTER STACK UPGRADE ()) \$

Stephan Jurczynski, PPPL

TPO-59: Electromagnetic Loads Prediction and Structural Analysis of HL-2M Toroidal Field Coils ()) *

Lijun Cai, Southwestern Institute of Physics

TO2-4: The Current Leads of the Wendelstein 7-X Superconducting Magnet System ") * % Thomas Rummel, Max-Planck-Institut für Plasmaphysik

TPO-60: Mechanical Design of the Central Solenoid Assembly for the JT-60SA Tokamak^{••}) * + Katsuhiko Tsuchiya, Japan Atomic Energy Agency

TPO-61: The Tolerance Analysis for Iter Feeder Ctb&sbb Components) +& Sumei LIU, Institute of Plasma Physics , Chinese Academy of Sciences

TPO-62: Concept Design of Hybrid Superconducting Magnet for CFETR Tokamak Reactor.) +* Jinxing Zheng, Institute of Plasma Physics, Chinese Academy of Sciences

TPO-63: Development of a Process to Build Polyimide Insulated Magnets for Operation at 350 C[•]), &

Irving Zatz, PPPL

TPO-64: Experiences from the Installation of the Superconducting Bus Bar System of Wendelstein 7-X^{••}) , +

Kerstin Rummel, Max Planck Institute for Plasma Physics, EURATOM Association, Wendelsteinstr. 1, 17491 Greifswald

TPO-65: Electromagnetic and Structural Analyses of the Iter Central Solenoid Feeder Structures ...) - &

Ali Zolfaghari, PPPL

TPO-66: Thermal Analysis of the Iter Tf Feeder Cryogenic Components⁽¹⁾) - +

Zhong Wang, Institute of Plasma Physics, Chinese Academy of Science

TO2-1: Design and Manufacturing Studies for Iter in-Vessel Coils^{**} **\$&** Michael Kalish, PPPL

TPO-67: Design and Analysis of the Iter Tf Feeder Dry Box ** **\$**, Guang Shen, Institure of Plasma Physics, Chinese Academy of Sciences

ThO3-2: Radial Cooling of a Spherical Torus (st) Tf Centerpost ** % Robert Woolley, PPPL

TPO-68: Axisymmetric Simulations of the Iter Vertical Stability Coil ** % Peter Titus, PPPL

TPO-69: A Preliminary Conceptual Design Study for Korean Fusion Demo Reactor Magnets^{··*} &(Sangjun Oh, National Fusion Research Institute

TPO-71: Reduction of Eddy Currents Induced by Resonant Magnetic Perturbation Coils by Inserting High Permeability Materials ** * \$

Yonghua Ding, State Key Laboratory of Advanced Electromagnetic Engineering and Technology, Wuhan, 430074, China

TPO-72: W7-X Trim Coils - Component Safety Aspects and Commissioning Strategy "*' (Konrad Risse, Max-Planck-Institut für Plasmaphysik

TPO-73: Manufacturing of the First Toroidal Field Coil for the Jt-60sa Magnet System^{••}, Antonio Cucchiaro, ENEA

TPO-74: Identifying the Cause of the NSTX TF Coil Bundle Failure ** ((Lawrence Dudek, PPPL

TO2-3: ITER Central Solenoid Module Fabrication ** (, John Smith, GA

TPO-76: THERMAL AND STRUCTURAL ANALYSIS OF THE ITER ELM COILS^{...}*) & Arthur Brooks, PPPL

TO2-2: ITER Central Solenoid Design *** **)**, David Everitt, ORNL

MFE Plasma Heating and Current Drive

ThPO-56: Filament Power Supplies (Ac-Ac Converters) and Their Design for Long Pulse

Neutral Beam Injector of SST-1^{****} Dipalkumar Thakkar, IPR

ThPO-57: The ITER ECH&CD Upper Launcher: Steps Towards Final Structural Design of the First Confinement System ** +\$ Peter Spaeh, KIT

ThPO-58: Effect of Magnetic Field on Voltage Holding in the Mitica Electrostatic Accelerator^{**} +* Nicola Pilan, Consorzio RFX

ThPO-59: Simulational Studies of the Wire-Array Z-Pinch Implosions...*, & Ning Ding, Institute of Applied Physics and Computational Mathematics (IAPCM)

ThPO-60: Theorectical and Experimental Investigations on the Interaction of Wire-Array Z-Pinch with Low Density Foam ``* , ,

Delong Xiao, Institute of Applied Physics and Computational Mathematics

ThPO-61: Study of Protection Strategies Against Breakdown Effects in the SPIDER Experiment * - * Alberto Pesce, Consorzio RFX, Associazione Euratom-ENEA sulla Fusione

ThPO-62: An Alternative Design Concept for the DNB Calorimeter Motion Mechanism ** - -Irfan Ahmed, IPR-ITER-India

TO5-5: Realization and Testing of Grid Prototypes for the Iter Neutral Beam Injectors"+**\$)** Piero Agostinetti, Consorzio RFX

ThPO-63: Attachment of Ferrite Material Used in an Active Matching Network for LHCD on Alcator C-Mod⁺+%%

Richard Murray, MIT Plasma Science and Fusion Center Alcator CMOD

ThPO-64: Optimization of Beam Optics and Strategies for Focusing the Multi-Beamlet Accelerator of the MITICA Injector"+%

Pierluigi Veltri, Consorzio RFX

ThPO-65: Operation of a Double Stub Tuner for Alcator C-Mod Lower Hybrid Current Drive System "+&%

Peter Koert, Plasma Science and Fusion Center - M.I.T.

ThPO-66: Radio Frequency Additional Heating Systems Issues for the Tore-Supra West Project"+&(Dominique GUILHEM, CEA cadarache / IRFM

ThPO-67: The ITER Neutral Beam Vacuum Vessel Design"+&-Etienne Delmas, ITER Organization

ThPO-68: Upgrades and Performance of the Electron Cyclotron Heating System on DIII-D"+') Mirela Cengher, GA

ThPO-69: Molybdenum Armour Layer on Copper Plates: Manufacturing Technologies and Tests of Prototypes^{**}+(%

Mauro Pavei, Consorzio RFX, EURATOM-ENEA Association, Corso Stati Uniti 4, I-35127 Padova, Italy

ThPO-70: A New High-Efficiency Stepper Motor Driver for Old Technology Stepper Motors"+(+ Nevell Greenough, PPPL

ThPO-71: Beam Transport and Interactions with Beam-Line Components in MITICA Injector"+) % Emanuele Sartori, Consorzio RFX - Padova

ThPO-72: Two-Stage Heating Mechanism for Plasma Fusion at 10 MK"+) + Tianxi Zhang, Alabama A & M University

ThPO-74: Electrical Fault Protection System for Fusion Devices"+*" GE LI, Institute of Plasma physics, Chinese Academy of Sciences

ThPO-75: A Study of Mode Conversion and Output Beam Profile in Long Distance Corrugated Waveguide Transmission Line⁺⁺ +

Yasuhisa Oda, Japan Atomic Energy Agency

ThPO-77: Design Status of ITER IC H&CD Plant System Control"++% Bharatkumar Arambhadiya, ITER Organization

ThPO-78: 3.7 GHz 500kW CW Klystron Operation at Full Power for SST1 LHCD System"+++ Promod Sharma, Institute for Plasma Research

ThPO-79: Control of the Magnetic Field Configuration in the MITICA Neutral Beam Injector"+, ' Giuseppe Chitarin, University of Padova - Consorzio RFX

ThPO-80: Design of Beam Dump for Spider Facility"+, - Chandramouli Rotti, IPR-ITER

ThPO-81: Development of Steady-State Mirrors for the KSTAR ECH Launchers "+-) Robert Ellis, PPPL

TO5-3: Development of a Large RF Ion Source for the ITER Neutral Beam Injector: Project Overview and First Results of Elise^{••}, \$\$

Riccardo Nocentini, Max-Planck-Institut für Plasmaphysik Garching

ThPO-82: Dynamic Rf Power Control for Diii-D Ich/fast Wave Operation ", \$*

Chun Kung, PPPL

TO5-4: Progress of Two Rf Driver Based Negative Ion Source Experiment^{••}, % Mainak Bandyopadhyay, IPR-ITER

ThPO-85: Commissioning of 42GHz/500kW ECRH System on Tokamak SST-1^{..}, **%** Braj Shukla, Institute for Plasma Research

IFE Drivers

TPO-77: EFFICIENT IGNITION of FUSION USING PW-ps LASER PULSES for ULTRAHIGH ACCELERATION of PLASMA BLOCKS^{**}, %

Henrich Hora, University of New South Wales, Sydney

TPO-79: Petawatt Laser Driven Cluster Foils for an Intense Pulsed Neutron Source^{..}, **&)** George Miley, University of Illinois, UC

MFE Plasma Fueling

ThPO-86: A Method to Produce Lithium Pellets for Fueling and ELM Pacing in NSTX-U", &-

Daniel Andruczyk, University of Illinois

ThPO-88: Optimization of Capillary Source Geometry for Maximum Pellet Exit Velocity in Electrothermal Plasma Launchers^{··}, ' (Micah Esmond, Virginia Polytechnic Institute and State University

TO3-6: H\Y'9ZZYVMg`cZ'DY``Yh'J c`i a Y'UbX'5gdYVMFUh]c`cb`: i Y``DY``Yh'9I]h'J Y`cVMh]Yg`]b`U'7Ud]``Ufm 8]gVVUf[Y`AUgg`5VWY`YfUhcf``, ' - ` Leigh Winfrey, Virginia Polytechnic Institute and State University

IFE Target Fabrication and Injection

WO2-6: Bulk Modulus for Solid Molecular Tritium: Ab Inito Aproximation , () Carlo Guerrero Contreras, Instituto de Fusión Nuclear, Universidad Politécnica de Madrid

WO2-7: Accelerated Evaporative Drying of RF Foam for Target Fabrication^{••}, (- Sarah-Jane Scott, Laboratory for Laser Energetics, University of Rochester

Exhaust and Vacuum Systems

TPO-80: Design Progress of Plasma and Outer Vessel Exhaust Gas System Based on LOCA Safety Analysis of W7-X Stellarator^{...},) (Didier Chauvin, CEA, DSM/IRFM, F-13108 Saint-Paul-lez-Durance, France

TO3-4: The THESEUS Facility - A Test Environment for the Torus Exhaust Vacuum Pumping System of a Fusion Power Plant[•],) -

Thomas Giegerich, Institute for Technical Physics, Karlsruhe Institute for Technology (KIT), Karlsruhe, GERMANY

TO3-2: Exhaust Pumping of DT Fusion Devices: Current state-of-the-art and a potential roadmap to a power plant^{(''}, *)

Christian Day, Karlsruhe Institute of Technology (KIT)

TPO-81: Preleminary Results of Glow Discharge Cleaning Test on SWIP Test Bench^{··}, +' Yingqiao Wang, Southwestern Institute of Physics

TPO-86: Upgrades to the Alcator C-Mod Gas System^{••}, +, Roza Tesfaye, MIT PSFC

TPO-87: Experimental Validation of a Molecular Flow Code with the ARIANNA Setup^{••}, , & Emanuele Sartori, Consorzio RFX - Padova

Tritium Processing, Breeding and Containment

FO3-4: Tritium Permeation Issues for Helium-Cooled Breeding Blankets^{••}, , , Fabrizio Franza, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, D-76344

TPO-89: Development of a Flange Type Hydrogen Permeation Sensor for Liquid Breeders^{..}, - (Eo Hwak Lee, Korea Atomic Energy Research Institute

TPO-91: Liquid Lithium for the Purpose of Attenuating Tritium Inventory Levels in Fusion Energy Reactors^{••}, - +

Charles Gentile, PPPL

TPO-93: Impact of Tritium Solubility in Liquid Pb-Li on Tritium Migration in Hcll and Wcll Blankets^{**}, - -

Alessia Santucci, Associazione ENEA-Euratom sulla Fusione, C.R. ENEA Frascati, Via E. Fermi 45, 00044 Frascati (RM), I

TPO-94: Operation Scenario of Dt Fusion Plant Without External Initial Tritium - \$'

Saerom Kwon, Kyoto University

TPO-95: Hydrogen Solubility and Electrical Resistivity Measurements of Hydrogenated Pb-Li^{...}- \$, Silvano Tosti, ENEA

TPO-90: Hydrogen Isotopes and Helium Diffusion Challenges on Future Nuclear Fusion Reactors $\ddot{}$ - $\%\!\!\%$

Moral, Nuria

Power Supply Systems

TPO-97: Research of the Soft Start Circuit for the High Voltage Power Supply Based on Psm Technology - %+

Linglong Xia, Huazhong University of Science and Technology

TPO-98: HARDWIRED CONTROL SYSTEM CHANGES FOR NSTX DC POWER FEEDS^{..}- &% Subrahmanya Ramakrishnan, PPPL

TPO-99: Power Supply Changes for NSTX Resistive Wall Mode Coils ... **&)** Subrahmanya Ramakrishnan, PPPL

ThO3-1: ITER Power Supply Innovations and Advancements ``- ' \$

Charles Neumeyer, PPPL

TPO-100: Initial Integration of "Regulated High Voltage Power Supply" (RHVPS) with LHCD System of SST-1"- ',

Pareshkumar Patel, IPR

TPO-101: Development and Aging Tests of High Current Busbar Contacts for the ITER Coil Power Supply System^{••}- (&

Elena Koktsinskaya, D.V. Efremov Scientific Research Institute of Electrophysical Apparatus, St. Petersburg

TPO-102: ITER Electrical Distribution System $^{\cdots}$ - (,

Joel Hourtoule, Iter Organization

TPO-103: A Pulse Step Modulator Cathode Power Supply for Ecrh System on HI-2a Tokamak...) ' Xiaohui Mao, Southwestern Institute of Physics, Chengdu, China

TPO-104: High-Voltage Power Supply for ECRH System on J-TEXT Tokamak -),

ShaoXiang Ma, Huazhong University of Science and Technology

TPO-107: Generation of High Power Pulse Series Based on Resistive Loads - * '

Oleg Egorov, TRINITI

ThO3-3: Critical Revision of the RFX-mod ac/dc Conversion System Design and Possible Improvements $\ddot{}$ - * +

Alberto Ferro, Consorzio RFX-EURATOM-ENEA Association

TPO-108: Pulsed-Inductive-Plasma Thruster -+&

Frank Wessel, Tri Alpha Energy, Inc.

Diagnostics, Data Acquisition, Control and Protection

ThPO-90: The Application of Mid-Range Control to Improve Thermal Disturbance Rejection for Cryogenic Thd/dt Layering at the National Ignition Facility -+,

Matthew Dayton, Control Systems Engineering, National Ignition Facility, Laser Science Engineering and Operations, Law

ThPO-91: VME BASED DATA ACQUISITION AND CONTROL SYSTEM FOR GYROTRON BASED ECRH SYSTEM ON SST-1 ..., '

Jatinkumar Patel, IPR

ThPO-93: The Preliminary Design of Global Interlock System in J-Text"-, +

Guozhen Zheng, J-TEXT Lab, Huazhong University of Science & Technology

ThPO-94: Eddy Current and Potential Gap Voltage at Electrical Contacts of ITER Diagnostic First Walls and Shield Modules During Plasma Disruption - - % Yuhu Zhai, PPPL

ThPO-95: Design and R&D for MITICA Thermal Sensors - - +

Mauro Dalla Palma, Consorzio RFX

ThPO-96: Signal Conditioning & Data Acquisition System for Neutral Beam Calorimeter for NBI SST-1 "%\$\$'

Laxmi Kant Bansal, IPR

ThPO-97: Assembly and Installation of ITER in-Vessel Electrical Looms "%\$+

Anna Encheva, ITER IO

ThPO-98: A Remote Control System for Tokamak Based on Web Service "%\$%

Wei Zheng, State Key Laboratory of Advanced Electromagnetic Engineering and Technology, HUST

ThPO-100: The Charge Exchange Recombination Spectroscopy Diagnostic on HI-2a Tokamak 3%+ Lieming Yao, University of Electronic Science and Technology of China

ThPO-101: Design and Test of a Thermal Measurement System Prototype for Spider Experiment ** \$\$ & &

Mauro Dalla Palma, Consorzio RFX

ThPO-102: THE DIGITAL CONTROL SYSTEM FOR THE TCV TOKAMAK "%\$&,

Hoang Bao Le, Ecole Polytechnique Fédérale de Lausanne, Center for Research in Plasma Physics (CRPP-EPFL)

ThPO-104: Iter Disruption Mitigation System Development and Port Plug Integration "%" &

Gabor Kiss, ITER Organization, Route de Vinon sur Verdon 13115 St Paul Lez Durance - France

ThPO-108: Optical Layout and Alignment Methods for Visible Tomography and Emission Spectroscopy Diagnostics in Spider "%\$' +

Rita Delogu, Consorzio RFX, Euratom-ENEA association

ThPO-110: A Magnet Current Monitor for Gyrotron Magnet Power Supplies : % (&

Nevell Greenough, PPPL

WO3-4: Diagnostic Integration Issues in the Tore Supra Upgrade Project WEST * Sophie SALASCA, CEA Cadarache (Association Euratom-CEA)

ThPO-113: Digital Coil Protection System I/O and Data Subsystem for NSTX-U^{...}%), Gregory Tchilinguirian, PPPL

ThPO-114: Reconfigurable Timing Unit for NSTX-U ** (Gregory Tchilinguirian, PPPL

TO4-1: Cutting Edge Concepts for Control and Data Acquisition for Wendelstein 7-X^{...}%*, Andreas Werner, Max-Planck Institute for Plasma Physics

ThPO-116: Electromagnetic Behavior on ITER Radial Soft X-Ray Camera "%+" Songke Wang, Institute Of Plasma Physics, Chinese Academy Of Sciences

ThPO-119: Hardware Requirements for Digital Nuclear Radiation Spectroscopy *** **%**, **&** Marco Riva, ENEA FRASCATI

ThPO-120: Status of the Design Refinement and the Characterisation of the in Vessel Viewing System for Iter "%, *

Carlo Neri, Associazione EURATOM ENEA frascati

ThPO-122: Design and Preliminary Measurements of a Diagnostic Calorimeter for BATMAN ** **%** - **\$** Gianluigi Serianni, Consorzio RFX, Euratom-ENEA association, Corso Stati Uniti 4, 35127 Padova

ThPO-124: Development of Talbot-Lau Phase-Contrast Method for High Energy Density Diagnostics "%- *

Maria Pia Valdivia, Johns Hopkins University

ThPO-125: OPTIMAL CLOSED-LOOP CONTROL OF THE AZIMUTHAL VELOCITY PROFILE BY ExB ACTUATION IN HELCAT %%%% Zeki Ilhan, Lehigh University

ThPO-126: Digital Coil Protection System for the National Spherical Torus Experiment Upgrade ''8%\$+

Ronald Hatcher, PPPL

ThPO-127: A Fast RF Power Diagnostics for the DIII-D Fast Wave Current Drive System Using Commercial FPGA-Based Systems '%%& Ravi Marawar, National Instruments

ThPO-128: Neutronics Instrumentation for the European Iter Tbm %%+ Axel Klix, Karlsruhe Institute of Technology

ThPO-129: Latest Advancements in the DIII-D Plasma Control System '%&%

Benjamin Penaflor, GA

ThPO-130: Designing, Constructing and Using Plasma Control System Algorithms on DIII-D % (***) Tucker, GA

ThO3-4: Nstx-U Digital Coil Protection System Software Design "%% % Keith Erickson, PPPL

ThPO-132: Shape Reconstruction of RF-Driven Divertor Plasma on QUEST **** +

Kazuo Nakamura, Research Institute for Applied Mechanics, Kyushu University

ThPO-134: ASSESSMENT AND OPTIMIZATION OF THE INTERSPACE DOSE RATE OF THE DIAGNOSTICS EQUATORIAL PORT PLUG #3 IN ITER WITH ATTILA "%%('

Mahmoud Youssef, UCLA

Fabrication, Assembly, Maintenance, and Availability

TPO-109: EBW technology applied on the ICRF Antenna Component '%%(- Qingxi Yang, Institute of Plasma Physics, Chinese Academy of Science

TPO-110: THE DESIGN AND R&D WORK OF EAST TUNGSTEN DIVERTOR ''**%**) ' Zibo Zhou, Institute of Plasma Physics, CAS

TPO-114: DEMO: Heating and Current Drive System Integration with Blanket System ''**%**) + Giovanni Grossetti, Karlsruher Institut für Technologie

TO6-4: Manufacturing of ITER Vacuum Vessel In-Wall Shielding "%%" Hareshbhai Pathak, IPR-ITER-India

WO3-6: The Development of a Methodology to Allocate Reliability, Availability, Maintainability and Inspectability Requirements to DEMO^{**} -Pichard Brown, The Culbarn Contro for Fusion Energy

Richard Brown, The Culham Centre for Fusion Energy

TPO-115: New Design of the Support Leg for the ITER Transfer Cask System "%%+) Shaoqing LI, Anhui University of Architecture, Hefei China, 230022

TPO-118: Early Design Verification of Iter Remote Handling Systems Using Digital Mock-Ups ''%+-Romain Sibois, VTT Technical Research Centre of Finland

TO6-5: Preliminary Design of Iter Component Cooling Water System and Heat Rejection System %) Ajith AG, ITER India

ThO6-1: W7-X Precision Metrology %% \$ Torsten Braeuer, Max-Planck-Institut fuer Plasmaphysik Greifswald

TPO-119: Design, Manufacturing and Testing of a Fast Disconnecting System for the European Target Assembly Concept of Ifmif %, Gioacchino Miccichè, ENEA

TPO-120: Qualification Process and Quality Control Planning for Jt-60-Sa Toroidal Field Coils Construction "%%\$'

Valter Cocilovo, ENEA FNP FUSTEC

TO6-1: Design and Manufacture of the ITER Vacuum Vessel 38%

Carlo Sborchia, ITER

TPO-121: DEMO - Initiation of Remote Maintenance Requirements ... %%%

Martin Mittwollen, Karlsruhe Institute of Technology; Institute for Materials Handling and Logistics

Safety & Environmental Engineering

ThO5-2: Korean Activities on Fusion Safety ... &&&(

Gyunyoung Heo, Kyung Hee University

TPO-123: Comparison with Simulations Using the PHITS code and Activated Materials Analysis toward JT-60SA Radiation Safety Assessment "%" %

Atsuhiko Sukegawa, Japan Atomic Energy Agency

ThO5-5: Failure Rate Adjustment Factors for High Technology Components "%" *

Lee Cadwallader, Idaho National Laboratory

TPO-124: Sensitivity Study on in-Vessel Loca of a Korean Tbs in Iter "%" -

Hyung Gon Jin, KAERI

ThO5-4: Feasibility Study of Validating Activation Corrosion Products Calculations in Cooling Water Loops at Jet^{...}%(' Luigi Di Pace, EURATOM/ENEA Fusion Association

TPO-126: Tritium Extraction System Pipe Break Environmental Impact by Atmospheric Modelling of Tritium Forms Transport^{**}% (-CASTRO PALOMA, CEMAT

Systems Engineering & Project Management

WO3-1: Numerical Modeling in the Construction of Wendelstein 7-X^{..}**%)** * Victor Bykov, Max-Planck-Institut für Plasmaphysik

WO3-2: Approaches to Numerical Modeling in the Development Process of Complex Structures for Fusion Devices "%* (

Olaf Neubauer, Forschungszentrum Jülich GmbH

TPO-127: A Dynamic Simulation on the Demand of Human Resource for Construction of Korean Fusion Demo^{··}‰+&

Hansoo CHANG, National Fusion Research Institute

TPO-128: Configuration Space Control of In-Vessel Components for Wendelstein 7-X^{··}**%**+(Jörg Tretter, Max-Planck-Institute for Plasmaphysics, 85748 Garching, Germany

TPO-129: Do we need a quality management system in fusion research? - Experience from W7-X⁻⁻‰, \$

Reinhard Vilbrandt, Max Planck Institute for Plasma Physics, Greifswald, Germany

TPO-130: Design and Integration of the Ground Level Platform for W7-X ... **%**, **)** Sébastien Renard, CEA, IRFM, F-13108 Saint-Paul-lez-Durance, France

WO3-3: The Application of Systems Engineering Principles to the EU Demo Design and R&D

Studies^{...}‰, -Jonathan Harman, EFDA

WO3-5: Management of the ITER Configuration Towards Construction Phase $\ddot{}$ %-)

Ingo Kuehn, ITER