Program :: Sherwood 2023 Conference

The program consists of one Invited Plenary presentation, 14 Invited Speaker presentations selected out of 34 submissions. The total number of abstract submissions is 117.

All technical sessions will be held in the **University of Tennessee Conference Center**. The Plenary and Invited presentations will be held in the **Ballroom**. The Poster Sessions will be held in the **Atrium**.

Sunday, 7 May 2023

1:00PM - 8:00PM On-Site Registration (Location: Atrium)
5:30PM - 8:30PM Sherwood Reception (Location: Atrium)

Monday, 8 May 2023

8:15AM - 8:30AM Welcome and Announcements (Location: Ballroom)

Invited Session 1 Chair: TBA (Location: Ballroom)

8:30AM - 9:00AM Jason Parisi (PPPL) - Multi-Device Study of Pedestal Width Scaling Using a Gyrokinetics-Based Model

9:00AM - 9:30AM Vinicius Duarte (PPPL) - Shifting and Splitting of Resonance Lines due to Dynamical Friction in Plasmas

9:30AM - 10:00AM Priyanjana Sinha (PPPL) - Neoclassical transport due to resonant magnetic perturbations in DIII-D and NSTX

10:00AM - 10:30AM Coffee Break (Location: Atrium)

Invited Session 2 Chair: TBA (Location: Ballroom)

10:30AM - 11:00AM Livia Casali (U. of Tennessee) - SOL impurity transport and effects on H-mode pedestal in closed divertors

11:00AM - 11:30AM Nami Li (LLNL) - BOUT++ Simulations on Turbulence Spreading in Small ELM Regimes for Divertor Heat Load Control

11:30AM - 12:00AM Atul Kumar (ORNL) - Modeling of plasma parallel transport in the Material Plasma Exposure eXperiment during radio-frequency heated discharges

12:00pm - 1:30pm Lunch Break

Poster Session 1 1:30pm - 3:30pm (Location: Atrium)

3:30pm - 4:00pm Beer Break (Location: Atrium)

Poster Session 2 4:00pm - 6:00pm (Location: Atrium)

Tuesday, 9 May 2023

Plenary Session 1/Invited Session 3 Chair: TBA (Location: Ballroom)

8:30AM - 9:30AM Vittorio Badalassi (ORNL) - Challenges in blanket design - examples and solutions using modelling and simulation

9:30AM - 10:00AM Dario Panici (Princeton University) - Novel Stellarator Phase Space Exploration with DESC

10:00AM - 10:30AM Coffee Break (Location: Atrium)

Invited Session 4 Chair: TBA (Location: Ballroom)

10:30AM - 11:00AM Silvia Trinczek (PPPL) - Neoclassical transport in strong gradient regions

11:00AM - 11:30AM Gary Staebler (ORNL) - A new flexible gyro-fluid linear eigensolver

11:30PM - 4:00PM Afternoon Break

Poster Session 3 4:00pm - 6:00pm (Location: Atrium)

Banquet and Student Awards 7:00 PM - 10:00PM (Location: Dining Room)

Wednesday, 10 May 2023

Invited Session 5 Chair: TBA (Location: Ballroom)

8:30AM - 9:00AM Chen Zhao (GA) - Disruption simulation with pellet injection and runaway electrons

9:00AM - 9:30AM Haotian Mao (LANL) - Rapid assimilation of high-Z impurities along the magnetic field line from an ablated pellet

9:30AM - 10:00AM Minglei Yang (ORNL) - A machine learning normalizing flow surrogate model for plasma kinetic computations

10:00AM - 10:30AM Coffee Break (Location: Atrium)

Invited Session 6 Chair: TBA (Location: Ballroom)

10:30AM - 11:00AM Jacobo Varela (U. Carlos III of Madrid) - Effect of the NBI operational regime on the AE saturation phase in DIII-D plasma

11:00AM - 11:30AM Koki Imada (U. of York) - Drift-Kinetic Modelling of Neoclassical Tearing Modes (NTMs) at Threshold Scale

11:30AM - 12:00PM Discussion/Conclusions (Location: Ballroom)

Poster Session 1 :: Monday, 8 May 2023 :: 1:30pm - 3:30pm (Location: Atrium)

1. Jason Parisi – PPPL - Multi-Device Study of Pedestal Width Scaling Using a Gyrokinetics-Based Model

2. Vinicius Duarte – PPPL - Shifting and Splitting of Resonance Lines due to Dynamical Friction in Plasmas

3. Priyanjana Sinha – PPPL - Neoclassical transport due to resonant magnetic perturbations in DIII-D and NSTX

4. Livia Casali – U. of Tennessee - SOL impurity transport and effects on H-mode pedestal in closed divertors

5. Nami Li – LLNL - BOUT++ Simulations on Turbulence Spreading in Small ELM Regimes for Divertor Heat Load Control

6. Atul Kumar – ORNL - Modeling of plasma parallel transport in the Material Plasma Exposure eXperiment during radio-frequency heated discharges

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7. Jack Gabriel - William & Mary - Numerical investigation into the effect of temperature gradients on drift wave turbulence

8. Scott Parker – U. of Colorado - CUGK - A lightweight gyrokinetic modeling workflow for improving our understanding of transport

9. Kaixuan Fan - Peking U. - Theory of micro-tearing mode and drift Alfven wave instability

10. Jacob King - Tech-X Corp - Refactoring the NIMROD code to incorporate accelerated computing, modern Fortran and multicomponent MHD

11. Jessica Li - PPPL - Stabilizing effect of negative triangularity on turbulence-driving microinstabilities

12. Matthew Beidler - ORNL - KORC Modeling of Runaway Electron Beam Impact on DIII-D DiMES

13. Allen Boozer - Columbia U. - Chaos and Magnetic Reconnection in Low Resistivity Plasmas

14. M. Cianciosa - ORNL - A domain-specific compiler to generate optimized GPU kernels for RF Ray Tracing

15. Pier Ferraris - Consorzio Ignitor - Non-Thermal Fusion Processes and Innovations Considered for the Ignitor Program

16. Omar Lopez – ORNL - Development of a hybrid kinetic-MHD equilibrium solver for runaway electron plateau modeling

17. Patrick Kim – U. of Maryland - Optimization of Nonlinear Turbulence in Stellarators

18. Adelle Wright - PPPL - Innovations in high-fidelity magnetohydrodynamic modelling for advanced stellarators

19. Francesco Ceccherini - TAE Technologies Inc. - RF dispersion relations in FRC geometries and HHFW regime

20. Augustus Azelis – U. of Wisconsin - Madison - Intermittency in the Dimits Regime of Toroidal Ion Temperature Gradient Driven Turbulence

21. Philip Morrison – U. of Texas at Austin - On metriplectic dynamics and geometry: joining Hamiltonian and dissipative dynamics

22. Howard Wilson – U. of York - Stability of the Tokamak Pedestal with Applied 3D Magnetic Perturbations

23. Guangye Chen - LANL - A multidimensional implicit, conservative and asymptotic-preserving electrostatic particle-in-cell algorithm for strongly magnetized plasmas

24. Ivan Novikau - PPPL - Quantum computing for modeling linear waves in plasmas

25. Shu-Wei Tsao – U. of Texas at Austin - Analysis of 3D reconnection heating in the solar corona via gyrokinetic simulations

26. Felix Parra - PPPL - Linear equations for stellarator local MHD equilibria around irrational and rational flux surfaces

27. Joey Duff – U. of Wisconsin-Madison - Stellarator Turbulence Optimization Based on Flux Surface Triangularity

28. Bradley Andrew - Auburn U. - Possible Reduced Non-Equilibrium Plasma Model by Using Scaling Relations of Fractional Laplacian

29. Raul Sanchez - Universidad Carlos III de Madrid - Application to ITER and W7-X of a novel free-plasma-boundary scheme for the SIESTA and FLIPEC MHD equilibrium codes

30. Xishuo Wei - UC Irvine - Reconstruction of tokamak plasma safety factor profile using deep learning

31. Koki Imada - York Plasma Institute, U. of York - Pedestal stability analysis of MAST-U H-mode plasmas

32. Valerie Izzo - Fiat Lux - Thermal quench and resistive wall effects on operation of the DIII-D runaway electron mitigation coil

33. Lanke Fu - PPPL - Numerical near-axis expansion of weakly quasisymmetric equilibria to all orders

34. Wrick Sengupta - Princeton U. - Periodic Korteweg-de Vries soliton potentials generate magnetic field strength with exact quasisymmetry

35. Kaixuan Fan - Peking U. - Theory of micro-tearing mode and drift Alfven wave instability

36. Stefan Buller – U. of Maryland - Turbulence optimization of stellarator using linear + nonlinear gyrokinetic simulations for multi-fidelity optimization

37. Ian Gustafson - Auburn U. - Minimization of Poloidal Viscosity in Tokamaks Using the FLOW Code

38. Yi-Cheng Chuang - College of William and Mary - SOLPS-ITER simulation of MAST neutral penetration versus aspect ratio

39. Francois Waelbroeck – U. Texas at Austin - Compressible theory of unmagnetized islands in inhomogeneous plasma

Poster Session 2 :: Monday, 8 May 2023 :: 4:00pm - 6:00pm (Location: Atrium)

1. Vittorio Badalassi – ORNL – Challenges in blanket design - examples and solutions using modelling and simulation

2. Dario Panici – Princeton U. - Novel Stellarator Phase Space Exploration with DESC

3. Silvia Trinczek – PPPL - Neoclassical transport in strong gradient regions

4. Gary Staebler – ORNL - A new flexible gyro-fluid linear eigensolver

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5. Alexandre Sainterme – U. of Wisconsin - Madison - Resistive Instability of a Fluid Runaway Electron Beam

6. Eric Howell - Tech-X Corporation - Benchmarking Linear and Nonlinear RMP Response Models using KSTAR Plasma

7. Ivan Paradela Perez - ORNL - Analysis of power and momentum transport and removal in spherical tokamaks using SOLPS-ITER

8. Matthew Poulos - PPPL - An overview of recent progress in radio-frequency sheath theory, modeling, and experiment

9. Bamandas Basu - MIT - Collective Modes Associated with Rarefied Populations of Heavy Nuclei

10. Xueqiao Xu - LLNL - BOUT++ Simulation Code: Advancing our Understanding of Turbulence and Transport in Boundary Plasmas

11. Bruno Coppi - MIT - Non-thermal Fusion Burning Processes, Relevant Collective Modes and Gained Perspectives

12. Chris Hansen - Columbia U. - Development and validation of tools for magnetized plasmas in fusion devices with 3D structural features

13. Andrew Spencer - Utah State U. - A Newton-Krylov Method for Simultaneous Semi-Implicit Time-advance of Extended MHD with Kinetic Closures

14. George Vahala - William & Mary - Quantum Algorithms for Electromagnetic Scattering from Anisotropic Dielectric Objects

15. Xin Zhi Tan – U. of Illinois at Urbana Champaign - Elliptical corrections to the gyroaveraging operation in gyrokinetic Particle-in-Cells in high E-field-gradients regions

16. William Barham – U. of Texas at Austin - A self-consistent Hamiltonian model of the ponderomotive force and its structure preserving discretization

17. Evdokiya Kostadinova - Auburn U. - Sub-regimes in the subdiffusive and superdiffusive transport and their implications to energetic particles in magnetized plasma

18. Henry Strauss - HRS Fusion - Resistive Wall Tearing Modes In ITER Disruptions

19. Elizabeth Paul - Columbia U. - Energetic Particle Transport in Configurations Close to Quasisymmetry with Alfvénic Perturbations

20. Roelof Groenewald - TAE Technologies - A hybrid-PIC implementation in WarpX

21. Byoungchan Jang – U. of Maryland - Device-Agnostic Grad-Shafranov Solver using Parametric Physics-Informed Neural Networks

22. Samuel Frank - MIT - The impact of full-wave effects on the lower-hybrid current drive spectral gap

23. Richard Nies - Princeton U. - Perpendicular anisotropy and critical balance in electrostatic ITG turbulence

24. Gilberto Faelli - CNR - Novel Hybrid Reactor Concepts Based on Ignitor Technology and Physics

25. Philip Snyder - ORNL - Developing a New Self-Consistent Model of Coupled Pedestal, Scrape-Off-Layer, and Divertor Physics

26. Ehab Hassan - ORNL - Estimating the Heat and Particle Fluxes from the Electron-Temperature Gradient Unstable Modes at the H-mode Pedestal of Fusion National Science Facility (FNSF)

27. Linjin Zheng - Institute for Fusion Studies, U. of Te - The negative triangularity effects on the safety factor profile for tokamak steady state confinement

28. David Zarzoso - CNRS - Limitations of the gyro-kinetic description of energetic particle transport in the presence of turbulence

29. Nikita Nikulsin - Princeton U./PPPL - Approximate analytical stellarator equilibria

30. Diego del-Castillo-Negrete - ORNL - A Feynman-Kac based method for the computation of local and nonlocal anisotropic transport in magnetized plasmas.

31. Paolo Coppi - Yale U. - Plasma Structures of Astrophysical Jets Unraveled

32. Ben Dudson - LLNL - Multi-component transport and turbulence simulations with Hermes-3

33. Benjamin Sturdevant - PPPL - A finite-grid stable implicit gyrokinetic electromagnetic particle-in-cell algorithm

34. Matthew Pharr - Columbia U. - A non-local magneto-curvature instability in differentially rotating plasmas

35. Stefan Schnake - ORNL - An Adaptive Sparse Grid Discretization (ASGarD) for High-dimensional Kinetic Problems

36. Andreas Kleiner - PPPL - Extended-MHD modeling of transients in spherical tokamaks and SPARC

37. Bindesh Tripathi – U. of Wisconsin - Madison - Transport and Saturation in Two- and Three-Dimensional Shear-Flow Turbulence

38. Seung-Hoe Ku - PPPL - Electromagnetic effect on divertor heat-load width: A gyrokinetic simulation study using total-f particle-in-cell code XGC

39. Joe Abbate – Princeton U. - Combining data and simulations for plasma dynamics prediction

Poster Session 3 :: Tuesday, 9 May 2023 :: 4:00pm - 6:00pm (Location: Atrium)

1. Chen Zhao – General Atomics - Disruption simulation with pellet injection and runaway electrons

2. Haotian Mao – LANL - Rapid assimilation of high-Z impurities along the magnetic field line from an ablated pellet

3. Minglei Yang – ORNL - A machine learning normalizing flow surrogate model for plasma kinetic computations

4. Jacobo Varela – U. Carlos III of Madrid - Effect of the NBI operational regime on the AE saturation phase in DIII-D plasma

5. Koki Imada – U. of York - Drift-Kinetic Modelling of Neoclassical Tearing Modes (NTMs) at Threshold Scale

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6. Yanzeng Zhang - LANL - Collisionless cooling of perpendicular electron temperature in the thermal quench of a magnetized plasma

7. Hongxuan Zhu - PPPL- Intrinsic toroidal rotation in tokamaks from global total-f gyrokinetic simulations

8. Valeria Ricci - CNR - Formation of Magnetic Fields on Grand Scale Distances

9. Taweesak Jitsuk – U. of Wisconsin - Madison - Analysis of Nonlinear Selection Rules for Saturation Channels in Toroidal and Slab ITG Turbulence

10. Rahul Gaur – U. of Maryland, College Park - Optimizing high-beta fusion devices against linear instabilities

11. Robert Hager - PPPL - Hybrid-spectral field solver in total-f gyrokinetic particle-in-cell simulations with XGC

12. Joseph Jepson – U. of Wisconsin - Madison - Simulations of the plasma flow evolution of an axisymmetric tokamak using a Chapman-Enskog-like (CEL) kinetic closure approach in NIMROD

13. Evan Toler - New York U. - An Integral Equation Approach to Free Boundary Equilibrium Calculations in Tokamaks

14. Caira Anderson - PPPL - Progress on a fast and robust solver for ideal MHD stability in stellarator geometry

15. Nathaniel Ferraro - PPPL - Toward Whole-Facility Tokamak Disruption Modeling with M3D-C1

16. Pallavi Trivedi - PPPL - Core-Edge Coupling: Modelling of fixed gradient driven core delta-f and flux driven edge total-f mode

17. Renato Spigler - CNR-ISC, Italy - Magnetic Reconnection Driven by Thermal and Non-thermal Energy Densities

18. Timothy Stoltzfus-Dueck - PPPL - Transport-Oriented Calculation of Orbit Loss in L- and H-mode

19. Fatima Ebrahimi - PPPL/Princeton U. - Theory of nonlinear ELMs as reconnection bursts

20. Frank Lee – U. of Nebraska-Lincoln - A Novel Method for Solving the Linearized 1D Vlasov--Poisson Equation

21. Bradley Shadwick – U. of Nebraska - Lincoln - Eulerian Finite-Difference Vlasov Solver with a Non-Uniform Momentum Grid

22. Ben Zhu - LLNL - Conducting Hasegawa-Wakatani model

23. Chang Liu - PPPL - Self-consistent simulation of compressional Alfvén eigenmodes excited by runaway electrons

24. Yashika Ghai - ORNL - Modelling interactions between runaway electrons and whistler waves

25. Benjamin Faber – U. of Wisconsin - Madison - Modeling nonlinear turbulence saturation dynamics in stellarators and its application to optimization

26. Sanket Patil – U. of Wisconsin - Madison - Updates on numerical implementation and testing of NIMSTELL

27. Jonathan Arnaud – U. of Florida - The impact of tokamak geometry on runaway electron formation in a disrupting plasma.

28. David Pugmire - ORNL - Visualization Services for Poincare Analysis

29. Stephanie Diem – U. of Wisconsin-Madison - The New Pegasus-III Experiment

30. Todd Elder - Columbia U. - Sparse optimization and topological considerations of current potentials for coil simplification

31. Rhea Barnett - ORNL - Updates to the far-SOL MFEM Anisotropic Plasma Solver (MAPS) code

32. Ilon Joseph - LLNL - Diamagnetic Polarization: Another Manifestation of the Spitzer Paradox

33. Greg Riggs - West Virginia U. - Time-resolved biphase signatures of quadratic nonlinearity observed in coupled eigenmodes on the DIII-D tokamak

34. Richard Fitzpatrick - Institute for Fusion Studies, UT Austin - Theoretical Investigation of Braking of Tearing Mode Rotation by Resistive Walls in ITER

35. Bradley Andrew - Auburn U. - Possible Reduced Non-Equilibrium Plasma Model by Using Scaling Relations of Fractional Laplacian

36. Wenhao Wang – U. of California, Irvine - A 2D simulation model for electrostatic presheath potential in FRC SOL

37. Donald Spong - ORNL - Stabilization of energetic particle driven Alfvén instabilities in stellarators through high density operation

38. Federico Halpern - General Atomics - Drift-fluid simulations of blobby transport using a consistent vorticity equation

39. Gabriel Woodbury Saudeau - Auburn U. - Compressible Analysis of Combined Kelvin-Helmholtz and Rayleigh-Taylor Instabilities In the Supersonic Regime