Program ~ Sherwood 2022 Conference
Location: **Hyatt Regency Sonoma Wine Country Hotel** in Santa Rosa, California

The program consists of one Invited Plenary presentation, 13 Invited Speaker presentations selected out of 42 submissions. The total number of abstract submissions is 109.

All group meetings and technical sessions will be held in the **Hyatt Regency Sonoma Wine Country Hotel**. The Plenary and Invited presentations will be held in the **Dry Creek Valley Ballroom except on Tuesday, April 5 the combined Sherwood-TTF session will be in the Alexander Valley Ballroom I & II**. The Poster Sessions will be held in **Alexander Valley Ballroom III & IV**.

Sunday, 3 April 2022

8:30AM - 5:00PM CTTS Group Meeting Location: Sonoma Mountain
1:00PM - 8:00PM On-Site Registration (Location: Dry Creek Valley Foyer)
5:30PM - 8:30PM Sherwood Reception (Location: Dry Creek Valley Foyer)

Monday, 4 April 2022 (Location:Dry Creek Valley Ballroom)

8:15AM - 8:30AM Welcome and Announcements

Invited Session 1 - Chair: Elizabeth Paul

8:30AM - 9:00AM Matt Landreman (U. of Maryland) - Achieving energetic particle confinement in stellarators with precise quasisymmetry

9:00AM - 9:30AM Adelle Wright (PPPL) - Exploring stellarator beta-limits with nonlinear MHD modelling

9:30AM - 10:00AM Ilon Joseph (LLNL) - Exploration of Quantum Computing for Fusion Energy Science Applications

10:00AM - 10:30AM Coffee Break

Invited Session 2 - Chair: Ben Zhu

10:30AM - 11:00AM Adam Stanier (LANL) - A conservative multi-scale hybrid scheme with full-orbit ions and fluid-electrons

11:00AM - 11:30AM Jacob King (Tech-X Corp) - A time-split approach to atomic and multiple species physics within the semi-implicit leapfrog method and development for next-generation hardware

11:30AM - 12:00AM Yuzhi Li (Virginia Tech) - Bohm criterion of plasma sheaths away from asymptotic limits

12:00PM - 1:30PM Lunch Break

Poster Session 1 (1:30PM - 3:30PM) (Location Alexander Valley Ballroom III & IV)

3:30PM - 4:00PM Beer Break

Poster Session 2 (4:00PM - 6:00PM) (Location: Alexander Valley Ballroom III & IV)

Tuesday, 5 April 2022 (Location: Alexander Valley Ballroom I & II)

Combined Plenary Session 1 with US-EU Joint TTF Workshop - Chair: Valerie Izzo

8:30AM - 9:00AM Jeronimo Garcia (CEA) - Deuterium-tritium experiments in JET with the ITER-like wall

9:00AM - 9:30AM Steven Sabbagh (Columbia University / PPPL) - Tokamak Disruption Event Characterization and Forecasting Research and Expansion to Real-Time Application

9:30AM - 10:00AM Yanzeng Zhang (LANL) - Cooling flow regime of a plasma thermal quench

10:00AM - 10:30AM Coffee Break

Combined Plenary Session 2 with US-EU Joint TTF Workshop - Chair: Chris Holland

10:30AM - 11:00AM Robert Hager (PPPL) - Electromagnetic total-f simulation of diverted edge plasma in the gyrokinetic particle-in-cell code XGC

11:00AM - 11:30AM A.V. Dudkovskaia (U. of York) - Extended global non-linear electromagnetic gyrokinetic theory for the tokamak H-mode pedestal

11:30AM - 12:00PM M. Kotschenreuther (U. of Texas, Austin) - Fundamental Physics Basis for Transport Barriers without Velocity Shear

12:00PM - 12:30PM Discussion

12:30PM - 4:00PM: Afternoon Break

Poster Session 3 (4:00PM - 6:00PM) (Location: Alexander Valley Ballroom III & IV)

7:00 PM - 10:00PM Banquet and Student Awards (Location: Dry Creek Valley Ballroom)

<u>Wednesday, 6 April 2022</u> (Location: Dry Creek Valley Ballroom)

Invited/Plenary Session 3 - Chair: Linda Sugiyama

8:30AM - 9:30 AMPhil Snyder (ORNL) - Physics of the Tokamak Pedestal, and Implications for a Fusion Pilot Plant

9:30AM - 10:00AM Michael Halfmoon (U. of Texas, Austin) - Analysis of gyrokinetic microinstabilities driving anomalous losses in DIII-D pedestal region

10:00AM - 10:30AM Coffee Break

Invited Session 4 - Chair: Yashika Ghai

10:30AM - 11:00AM Plamen Ivanov (U. of Oxford) - Dimits transition in three-dimensional ion-temperature-gradient turbulence

11:00AM - 11:30AM Sebastian De Pascuale (ORNL) - Acceleration of SOLPS-ITER Simulations with Data-Driven Projective Integration

11:30AM - 12:00PM Thomas Jenkins (Tech-X Corporation) - Coupled UEDGE/Vorpal modeling of RF-induced ponderomotive effects on edge and SOL transport

Poster Session 1 (Monday, 4 April 2022, 1:30PM-3:30PM)

1. Matt Landreman (U. of Maryland) - Achieving energetic particle confinement in stellarators with precise quasisymmetry
2. Adelle Wright (PPPL) - Exploring stellarator beta-limits with nonlinear MHD modelling
3. Ilon Joseph (LLNL) - Exploration of Quantum Computing for Fusion Energy Science Applications
4. Adam Stanier (LANL) - A conservative multi-scale hybrid scheme with full-orbit ions and fluid-electrons
5. Jacob King (Tech-X Corp) - A time-split approach to atomic and multiple species physics within the semi-implicit leapfrog method and development for next-generation hardware
6. Yuzhi Li (Virginia Tech) - Bohm criterion of plasma sheaths away from asymptotic limits

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7. Alistair Arnold - Max Planck Institute for Plasma Physics - Parallel expansion of a pellet plasmoid
8. William Barham - University of Texas at Austin - Structure preserving discretization of Maxwell's equations with a staggered-grid mimetic spectral element method
9. Braden Buck - Purdue University - Comparison of numerical and analytic ITG turbulence models in stellarators
10. Joey Duff - UW-Madison - Stellarator Turbulence Optimization Based on Flux-Surface Triangularity
11. Kaixuan Fan - Peking University - Kinetic Landau-Fluid closures of non-Maxwellian distributions
12. Samuel Frank - Massachusetts Institute of Technology - Simulations of Lower Hybrid Current Drive Spectral Gap Closure by Full Wave Effects
13. Urvashi Gupta - University of Wisconsin-Madison - Pressure driven dynamics and global energy transport in finite-beta RFP computations
14. Joseph Jepson - University of Wisconsin - Madison - Simulations of plasma flow evolution of an axisymmetric tokamak using a Chapman-Enskog-like (CEL) kinetic closure approach in NIMROD
15. Ian Abel - IREAP, University of Maryland - Modelling of Equilibria and Confinement for Centrifugal Mirror Machines

16. Cihan Akcay - General Atomics - Locked mode predictor in the presence of a resistive wall, error field and finite island saturation

17. Bamandas Basu - MIT - “Alternator” Involving Reconnected Magnetic Field Structures in the Presence of Electron Temperature and Density Gradients

18. Joshua Burby - Los Alamos National Laboratory - Geometric integration of Hamiltonian systems on exact symplectic manifolds

19. Alejandro Campos - Lawrence Livermore National Laboratory - Finite-element exterior-calculus simulations of extended Hasegawa-Wakatani drift-wave turbulence

20. Robert Dewar - The Australian National University - Quasi-Relaxed Magnetohydrodynamics (QRxMHD) incorporating Ideal Ohm's Law Constraint (IOL)

21. Julien Dominski - PPPL - Core-Edge Coupled Gyrokinetic Simulations of Whole Device Plasma

22. Darin Ernst - Massachusetts Institute of Technology - Reduced Model and Algorithmic Test-bed for Cross-Scale Interactions in Multi-Scale ITG/ETG Turbulence

23. Benjamin Faber - University of Wisconsin-Madison - StellaratorOptimization.jl: optimizing stellarator confinement with Julia

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

25. Pier Ferraris - Consorzio Ignitor - Non-Thermal "Cool" Fusion Considered for the Ignitor Program

26. John Finn - Tibbar Plasma Technologies, LLC - Meshfree analysis of numerical stability and noise properties in particle methods for plasma kinetic theory

27. Yashika Ghai - Oak Ridge National laboratory - Modelling energetic particle instabilities using FAR3D for ITER simulations

28. Chris Hansen - University of Washington - Development and validation of tools for magnetized plasmas in fusion devices with 3D structural features

29. Eric Held - Utah State University - Continuum drift kinetic electron closures in NIMROD

30. Eric Howell - Tech-X Corporation - Benchmarking RMP Response Models in KSTAR Plasma

31. Valerie Izzo - Fiat Lux - Simulations to investigate the thermal-quench-onset phase of DIII-D natural disruptions*

32. Dmitrii Kiramov - Institute for Fusion Studies, UT Austin - Bifurcation-driven vertical plasma displacement

33. Atul Kumar - Oak Ridge National Laboratory - Modeling of plasma parallel transport in the Material Plasma Exposure eXperiment (MPEX) during ion cyclotron heating

34. Giovanni Lapenta - KU Leuven - ECsim implicit PIC for 6D fusion modelling

35. Brendan Lyons - General Atomics - Nonlinear, Extended-Magnetohydrodynamic Modeling of Disruption Mitigation

36. Noah Mandell - MIT - GX: a GPU-based pseudo-spectral gyrokinetic code

37. Patrick Kim - IREAP - Stellarator Nonlinear Gyrokinetic Simulations Using Near-Axis Magnetic Fields

38. Patrick Kim - IREAP - Prospects for Efficient Calculation of 3D Plasma Response to RMPs Using Equilibrium Principles

39. Tony Qian - Princeton University - Fast profile predictions using dynamic non-linear flux tubes in Trinity-GX

Poster Session 2 (Monday, 4 April 2022, 4:00PM - 6:00PM)

1. Steven Sabbagh (Columbia University / PPPL) - Tokamak Disruption Event Characterization and Forecasting Research and Expansion to Real-Time Application
2. Yanzeng Zhang (LANL) - Cooling flow regime of a plasma thermal quench
3. Robert Hager (PPPL) - Electromagnetic total-f simulation of diverted edge plasma in the gyrokinetic particle-in-cell code XGC

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4. Taweesak Jitsuk - University of Wisconsin-Madison - Saturation-Channel Selection Rules for Toroidal and Slab ITG Turbulence
5. Tyler Markham - Utah State University - Relativistic, Continuum Drift-Kinetic Capability in the NIMROD Plasma Fluid Code
6. Alexandre Sainterme - University of Wisconsin-Madison - Nonlinear MHD Simulations of a Tokamak Current Quench using the Fluid Runaway Electron Model in NIMROD
7. Sage Stanish - College of William and Mary - Topological Data Analysis and its Application to Drift Wave Turbulence
8. Trevor Taylor - Utah State University - Serendipity shape functions in NIMROD's delta-f PIC approach to energetic particle physics
9. Stefan Tirkas - University of Colorado, Boulder - Gyrokinetic Simulations of Zonal Flow Generation by Intermediate-Scale Electron Temperature Gradient Turbulence in Tokamak Plasmas
10. Silvia Trinczek - Rudolf Peierls Centre for Theoretical Physics, Uni - Finite orbit width effects on neoclassical transport in large aspect ratio tokamaks
11. Wenhao Wang - University of California, Irvine - Simulation of 2D electrostatic presheath potential in the SOL of FRC
12. Rahul Gaur - University of Maryland, College Park - Linear stability of ultra high-beta equilibria
13. Carl Sovinec - University of Wisconsin-Madison - Verification and Pre-Processing Development for NIMSTELL
14. Andrew Spencer - Utah State University - Time advance schemes for continuum drift kinetics and extended MHD
15. Denis St-Onge - University of Oxford - Intrinsic rotation driven by the radial variation of turbulence intensity

16. Linda Sugiyama - MIT - Current ramp and startup of high field DT fusion burning
17. Xianzhu Tang - Los Alamos National Laboratory - Progress by the Tokamak Disruption Simulation (TDS) SciDAC Project on Disruption Mitigation
18. Pallavi Trivedi - Princeton Plasma Physics Laboratory - Modelling of core-edge coupling between delta-f and total-f gyrokinetic model in the XGC code
19. Andrew Ware - University of Montana - Three-Dimensional, Finite-Beta, MHD Equilibria
20. Xishuo Wei - University of California, Irvine - Verification of a fully-kinetic ion simulation model for high-frequency electromagnetic waves in toroidal geometry
21. Linjin Zheng - The University of Texas at Austin - Plasma rotation effects on the resistive wall modes in the negative triangularity tokamaks
22. Matthew Beidler - Oak Ridge National Laboratory - Role of the avalanche source in wall heating during an unmitigated runaway electron final loss event in DIII-D
23. Alessandro Cardinali - ENEA - Non-thermal (“Cool”) Fusion Burning Plasma Regimes
24. CHIPING CHEN - Beyond Carbon Energy, LLC - Energy confinement time in a magnetically confined thermonuclear fusion device
25. Junyi Cheng - University of Colorado at Boulder - Transport barrier for spinning blobs in magnetically confined plasmas
26. Bruno Coppi - MIT - New Mesoscopic Modes Associated with Impurity Populations
27. Bruno Coppi - MIT - Theoretical Formation and Ejection of Double Helix Plasma Structures and Recent Observations on Astrophysical Jets
28. Milan Holec - Lawrence Livermore National Lab - Energy and Enstrophy Conserving High-Order Temporal-Spatial Method for Drift -Reduced MHD
29. Yi-Min Huang - Princeton University - Numerical study of delta-function current sheets arising from resonant magnetic perturbations
30. Salomon Janhunen - Tokamak Energy Ltd - Gyrokinetic analysis of plasmas in the ST40 spherical tokamak
31. Nami Li - LLNL - Characteristics of grassy ELMs and its impact on the divertor heat flux width
32. Chris McDevitt - University of Florida - Phase Space Evolution of a Runaway Electron Population during Rapid Termination Schemes
33. Jason Parisi - Princeton Plasma Physics Laboratory - Three-Dimensional Inhomogeneity of Electron-Temperature-Gradient Turbulence in the Pedestal

34. Lee Ricketson - Lawrence Livermore National Laboratory - Implicit, asymptotic-preserving and energy-conserving time integration for charged particle motion in arbitrary electromagnetic fields

35. Bhimsen Shivamoggi - University of Central Florida, - Stellar Rotation and Polytropic Gas Effects on the Stellar Wind

Poster Session 3 (Tuesday, 5 April 2022, 4:00PM - 6:00PM)

1. Phil Snyder (ORNL) - Physics of the Tokamak Pedestal, and Implications for a Fusion Pilot Plant
2. Michael Halfmoon (U. of Texas, Austin) - Analysis of gyrokinetic microinstabilities driving anomalous losses in DIII-D pedestal region
3. Plamen Ivanov (U. of Oxford) - Dimits transition in three-dimensional ion-temperature-gradient turbulence
4. Sebastian De Pascuale (ORNL) - Acceleration of SOLPS-ITER Simulations with Data-Driven Projective Integration
5. Thomas Jenkins (Tech-X Corporation) - Coupled UEDGE/Vorpal modeling of RF-induced ponderomotive effects on edge and SOL transport

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6. Jessica Li - Princeton Plasma Physics Lab - Suppression of Microinstability-Driven Turbulence in Negative Triangularity Toroids
7. Juan Losada - UiT The Arctic University of Norway - Stochastic modelling of filament structures, intermittent fluctuations and broad average profiles at the boundary of magnetically confined plasma
8. Bindesh Tripathi - University of Wisconsin-Madison - Transport reduction in forced shear layers due to stable modes
9. Sorah Fischer - CUNY City College - A multi-species plasma transport simulation for stellarators
10. Djin Patch - PPPL - MUSE: an optimized quasi-symmetric stellarator with simple coils
11. Chen Zhao - PPPL - Disruption simulation with pellet injection and runaway electrons
12. Fatima Ebrahimi - Princeton Plasma Physics Laboratory/Princeton Univ - Theory of nonlinear ELMs as reconnection bursts
13. Philip Morrison - University of Texas at Austin - On a computable model for testing assumptions of plasma kinetic theory
14. Stuart Hudson - PPPL - Connecting the plasma to the world
15. Paul Tranquilli - Lawrence Livermore National Laboratory - Deterministic verification for particle-in-cell algorithms using the method of manufactured solutions

16. Roman Samulyak - Stony Brook University - Lagrangian Particle Simulations of Pellets and SPI into Runaway Electron Beam in ITER
17. Ben Zhu - Lawrence Livermore National Laboratory - Development of Model-based Divertor Detachment Prediction
18. Menglong Zhao - Lawrence Livermore National Lab - Bifurcation solutions in the tokamak scrape-off layer w/o the presence of supersonic transition
19. Tyler Cote - Oak Ridge Associated Universities - Comparison of DIII-D and AUG pedestal ballooning stability during 3D magnetic perturbations
20. Cole Stephens - Institute of Fusion Studies, University of Texas a - Energetic particle destabilization of toroidal Alfvén eigenmodes with steep pedestal gradients
21. Chris Hansen - University of Washington - Development and validation of tools for magnetized plasmas in fusion devices with 3D structural features
22. Javier Maurino - Univ. of Oxford - Effect of turbulence on the neoclassical momentum fluxes and current drive
23. Hongxuan Zhu - PPPL - Quantitative measurements of ion orbit loss from gyrokinetic simulations
24. Elizabeth Paul - Princeton University - Department of Astrophysical - Energetic particle transport in 3D magnetic fields: Loss mechanisms and optimization strategies
25. Matthew Poulos - Princeton Plasma Physics Laboratory - Nonlinear features arising from radio-frequency sheath boundaries in magnetized plasmas
26. Valeria Ricci - CNR - Magnetic Reconnection Driven by Thermal and Non-thermal Particle Energy Densities
27. Wrick Sengupta - Princeton University - On-axis magnetic shear
28. David Smithe - Tech-X Corporation - Benchmarking of the Time-Domain RF Sheath Algorithm in the VSim software
29. Henry Strauss - HRS Fusion - Thermal quench in JET and DIII-D disruptions
30. Benjamin Sturdevant - Princeton Plasma Physics Laboratory - Eliminating finite-grid instabilities in gyrokinetic particle-in-cell simulations
31. George Vahala - William & Mary - Qubit Lattice Algorithms for Electromagnetic Wave Scattering from Two Dimensional Scalar Dielectric Objects
32. George Wilkie - Princeton Plasma Physics Laboratory - Nonlinear collision processes with neutrals in kinetic simulations of edge plasma

33. Jong-Kyu Park - Princeton Plasma Physics Laboratory - Parametric dependencies of resonant field penetration across linear two-fluid drift MHD regimes

34. Felix Parra - Princeton Plasma Physics Laboratory - Finite orbit width effects in large aspect ratio stellarators

35. Priyanjana Sinha - Princeton Plasma Physics Laboratory - Neoclassical transport due to resonant magnetic perturbations in DIII-D