

Sherwood 2014 Program

International Sherwood Fusion Theory Conference

March 21-26, Bahia Resort Hotel, San Diego, California

Monday, March 24

8:15am - 8:30am (*Room: Mission Bay Ballroom ABC*)

Welcome, Announcements—Sergei Krasheninnikov, UCSD

8:30am - 9:30am, Chair: Sergei Krasheninnikov, UCSD

Rob Goldston, PPPL, "Understanding and innovation in magnetic fusion"

9:30am - 10:00am

Jeff Freidberg, MIT, "Designing a tokamak fusion reactor no plasma physics required"

10:00am - 10:30am - Morning Break (*Room: Mission Bay Ballroom ABC*)

10:30am - 11:00am, Chair: Chris Hegna, University of Wisconsin

Wrick Sengupta, University of Maryland, "Trapped particle precession and effective mass in Rosenbluth-Hinton type zonal flows"

11:00am - 11:30am

John O'Bryan, University of Wisconsin, "Simulation flux rope evolution and relaxation during non-inductive startup in the Pegasus ST"

11:30am - 12:00 noon

Yi-Min Huang, PPPL, "Rapid change of field-line connectivity and reconnection in stochastic magnetic fields"

1:30pm - 3:30pm - Poster Session I (*Room: Bayside Pavilion*)

3:30pm - 4:00pm - Afternoon Break (*Room: Bayside Pavilion*)

4:00pm - 6:00pm - Poster Session II (*Room: Bayside Pavilion*)

Tuesday, March 25

8:20am - 8:30am (*Room: Mission Bay Ballroom ABC*)

Announcements - Sergei Krasheninnikov, UCSD

8:30am - 9:30am, Chair: Emily Belli, General Atomics

Russel Caflisch, UCLA, "Accelerated simulation of coulomb collisions in plasmas"

9:30am - 10:00am

Scott Parker, University of Colorado, "Nonlinear gyrokinetic simulations of the tokamak edge Pedestal"

10:00am - 10:30am - Morning Break (*Room: Mission Bay Ballroom ABC*)

10:30am - 11:00am, Chair: Joshua Breslau, PPPL

Michael Barnes, University of Texas, "On a local solution to a global problem: treating radial profile variation and intrinsic momentum transport in a flux tube gyrokinetic code"

11:00am - 11:30am

Matthew Lilley, Imperial College London, "On the formation of phase space holes and clumps"

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11:30am - 12:00noon

Samuel Lazerson, PPPL, "An enstrophy minimizing method for 3D MHD equilibrium with flow"

4:00pm - 6:00pm - Poster Session III (*Room: Bayside Pavilion*)

4:00pm - 4:30pm - Afternoon Break (*Room: Bayside Pavilion*)

6:00pm - 7:00pm - Reception (*William D. Evans Sternwheeler*)

7:00pm - 10:00pm - Banquet/Poster Awards (*William D. Evans Sternwheeler*)

Wednesday, March 26

8:20am - 8:30am (*Room: Mission Bay Ballroom ABC*)

Announcements - Sergei Krasheninnikov, UCSD

8:30am - 9:30am, Chair: John Finn, LANL

Dan Barnes, Tri Alpha, "Plasma theory as private enterprise"

9:30am - 10:00am

Hank Strauss, HRS Fusion, "Toroidal rotation produced by disruptions and ELMs"

10:00am - 10:30am - Morning Break (*Room: Mission Bay Ballroom ABC*)

10:30am - 11:00am, Chair: Andrew Cole, Columbia University

Denise Hinkel, LLNL, "Alpha heating in ICF implosions at the National Ignition Facility"

11:00am - 11:30am

Alexander Pigarov, UCSD, "Dynamic boundary plasma-wall modeling of ELMy H-mode"

11:30am - 12:00noon

Roman Smirnov, UCSD, "Modeling of tungsten and beryllium dust impact on ITER-like plasma edge"

Poster # **Monday March 24th, Poster Session I 1:30pm – 3:30pm (Room: Bayside Pavilion)**

- 1 Rob Goldston, *PPPL*, “Understanding and innovation in magnetic fusion”
- 2 Jeff Freidberg, *MIT*, “Designing a tokamak fusion reactor no plasma physics required”
- 3 Wrick Sengupta, *University of Maryland*, “Trapped particle precession and effective mass in Rosenbluth-Hinton type zonal flows”
- 4 John O’Bryan, *University of Wisconsin*, “Simulation flux rope evolution and relaxation during non-inductive startup in the Pegasus ST”
- 5 Yi-Min Huang, *PPPL*, “Rapid change of field-line connectivity and reconnection in stochastic magnetic fields”
- 6 A.Y. Pankin, *Tech-X Corporation*, “Can the anomalous effects improve the prediction of neoclassical poloidal rotation?”
- 7 O. Izacard, *UCSD*, “Self-Consistent Global Dynamics of Microturbulence in Presence of a Magnetic Island”
- 8 C. J. McDevitt, *LANL*, “Turbulence-driven bootstrap current in low-collisionality tokamaks”
- 9 J.J. Ramos, *MIT*, “Intrinsically Quasineutral Formalism for Electromagnetic Plasma Dynamics”
- 10 A.H. Kritz, *Lehigh University*, “Validation of MMM7.1 and TGLF Models for Anomalous Thermal Transport”
- 11 W. Lee, *UCSD*, “Electromagnetic effects on high-beta blob transport”
- 12 J.A. Breslau, *PPPL*, “Halo currents and the M3D boundary conditions”
- 13 E. Hameiri, *NYU*, “MHD plasma relaxation with mass flow and finite pressure”
- 14 I. Pusztai, *MIT*, “Local gyrokinetic simulation of high mode number kink instabilities”
- 15 J. Lee, *NYU*, “Progress on a high-order direct q-solver for static axisymmetric equilibria”
- 16 E. C. Howell, *University of Wisconsin-Madison*, “Nonlinear Simulations of Interchange Modes in Spheromaks”
- 17 J.W. Burby, *PPPL*, “Variational integrators for perturbed non-canonical Hamiltonian systems”
- 18 A.H. Boozer, *Columbia University*, “Non-axisymmetric magnetic fields and toroidal plasma confinement”
- 19 P. Montag, *MIT*, “New Features of the Quasi Coherent Mode and Novel Theoretical Model”
- 20 W.X. Wang, *UCSD*, “Non-neoclassical poloidal flow induced by micro-turbulence”
- 21 J.R. King, *Tech-X Corporation*, “Linear and nonlinear studies of edge harmonic oscillations with the NIMROD code”
- 22 L.E. Sugiyama, *MIT*, “Toroidal and nonlinear mode coupling effects on instabilities in fusion plasmas”

- 23 F.I. Parra, *University of Oxford*, "Non-local effects on neoclassical flows and fluxes in transport barriers"
- 24 C. L. Ellison, *PPPL*, "Evaluation of symplectic algorithms for the integration of guiding center trajectories"
- 25 G.M. Staebler, *General Atomics*, "Properties of the Gyro-kinetic Turbulence Electric Field Spectrum with Mean Field Parallel and ExB Velocity Shear"
- 26 C. Sung, *MIT*, "Studying changes in electron temperature fluctuations across the ohmic confinement transition using nonlinear gyrokinetic simulation"
- 27 J. D. Hanson, *Auburn University*, "Probability Distributions and 3D Equilibrium Reconstruction"
- 28 J.-Y. Ji, *Utah State University*, "A framework for moment equations for magnetized plasmas"
- 29 J. P. Sauppe, *University of Wisconsin-Madison*, "Helicity Conservation and Two-Fluid Relaxation Modeling for Reversed-Field Pinches"
- 30 D. N. Smithe, *Tech-X Corporation*, "RF Models for Plasma-Surface Interactions"
- 31 R.E. Waltz, *General Atomics*, "Prediction of fusion alpha loss in ITER from local marginal stability to Alfvén eigenmodes"
- 32 D.D. Ryutov, *LLNL*, "A churning mode and plasma convection in the vicinity of the poloidal field null"
- 33 N.M. Ferraro, *General Atomics*, "Resistive Wall Model in M3D-C1"
- 34 C. J. Hansen, *University of Washington*, "The PSI-TET framework for 3D MHD: application to injector coupling and current drive in HIT-SI"
- 35 Z. Wang, *UCI*, "Nonlinear Generation of Zonal Structures by Toroidal Alfvén Eigenmodes in Gyrokinetic Simulations"
- 36 E.A. Startsev, *PPPL*, "Gyrokinetic simulation of the tearing mode instability"
- 37 E. D. Held, *Utah State University*, "Neoclassical Transport Benchmark with NIMROD"
- 38 T. Zhou, *MIT*, "Magnetic Reconnection in Well Confined Plasmas: Paradox and Nature of Excited Modes"
- 39 C.R. Cook, *University of Wisconsin*, "BAE gap modification due to a magnetic island"
- 40 C.G. L. Martins, *University of Texas at Austin*, "A 4D map for escape from resonance: negative energy modes and nonlinear instability"
- 41 C. H. Ma, *Peking University*, "Global gyro-Landau-fluid simulations in BOUT++ framework"
- 42 B.C. Lyons, *Princeton University*, "Coupled neoclassical-magnetohydrodynamic simulations of axisymmetric plasmas"
- 43 S. Kobayashi, *LPP*, "Gyrokinetic simulations of collisionless reconnection in turbulent non-uniform plasmas"
- 44 Y. Wang, *LANL*, "The Effect of Magnetic Fields to the Divertor Sheath"
- 45 M.R. Halfmoon, *University of Tulsa*, "Energetic Particle Effects on Tearing Mode Stability with Varying "

- 1 M. Landreman, *University of Maryland*, δ 4D Fokker-Planck calculations of neoclassical effects in tokamak pedestals and stellarators
- 2 A.L. Becerra, *University of Wisconsin*, δ Generalized resistive wall boundary conditions for toroidal geometry in NIMROD and initial studies for NSTX equilibria
- 3 C. R. Sovinec, *University of Wisconsin-Madison*, δ Development and Verification Tests for Vertical Displacement Studies with NIMROD
- 4 C. Flint, *William & Mary*, δ Large Eddy Simulation Lattice Boltzmann Representation of 2D MHD Turbulence
- 5 L. E. Zakharov, *PPPL*, δ Continuously Flowing Liquid Lithium (${}_{24}^7\text{FLiLi}$) - the key to tokamak fusion
- 6 S.D. James, *University of Tulsa*, δ Self-consistent calculations of the interaction between drift wave turbulence and the tearing mode
- 7 R. Fitzpatrick, *U. Texas at Austin*, δ Determination of Non-Ideal Response of a High Temperature Plasma to a Static External Magnetic Perturbation via Asymptotic Matching
- 8 P.J. Morrison, *University of Texas at Austin*, Pot Pourri
- 9 D. Fulton, *UCI*, δ Gyrokinetic particle simulation of linear instabilities in edge plasmas
- 10 F. Zonca, *ENEA*, δ Spontaneous excitation of convective cells by kinetic Alfvén waves
- 11 A.D. Turnbull, *General Atomics*, δ Stabilization of the Vertical Instability by Non-axisymmetric Coils
- 12 M.V. Umansky, *LLNL*, δ Non-spectral Landau-fluid model for non-collisional and weakly collisional parallel electron transport
- 13 X. Tang, *LANL*, δ Recycling at tungsten surface and its impact on boundary plasmas
- 14 V.V. Mirnov, *University of Wisconsin-Madison*, δ Effect of parallel electron thermal conduction on resistive drift and tearing modes in non-uniform RFP plasmas
- 15 P. Zhu, *University of Science and Technology of China*, δ NIMROD Simulations of Plasma Response to Resonant Magnetic Perturbations in DIII-D Experiments
- 16 T. G. Jenkins, *Tech-X Corporation*, δ Active control of ECCD-induced tearing mode stabilization in coupled NIMROD/GENRAY HPC simulations
- 17 B. Sturdevant, *University of Colorado at Boulder*, δ Implicit f Lorentz Ion Orbit Averaging and Sub-Cycling
- 18 G.L. Delzanno, *LANL*, δ When the conventional model of dust transport in tokamaks begins to break
- 19 H. Weitzner, *NYU*, δ Representation of an Ideal Magnetohydrodynamic Equilibrium in a Toroidal Domain Near a Magnetic Axis
- 20 G. I. Hagstrom, *Courant Institute of Mathematical Sciences*, δ Stability of Inhomogeneous Equilibria of Hamiltonian Continuous Media Field Theories
- 21 A. Wurm, *University of Texas at Austin*, δ Action principles for reduced fluid models
- 22 W. W. Lee, *PPPL*, δ Effects of Background-Inhomogeneity-Generated Zonal Flows on Microinstabilities and Plasma Pressure Balance

- 23 M. Kotschenreuther, *Advanced divertor configurations (x-divertor and x-point divertor) on present tokamak experiments*
- 24 E.V. Belova, *PPPL*, *Coupling of Neutral-beam-driven Compressional Alfvén Eigenmodes to Kinetic Alfvén Waves in NSTX*
- 25 C. C. Hegna, *University of Wisconsin-Madison*, *The effects of weakly 3-D equilibria on the MHD stability of tokamak pedestals*
- 26 J. Chowdhury, *University of Colorado at Boulder*, *Study of microtearing mode in the core of NSTX with GEM*
- 27 Z. Guo, *LANL*, *Nonlinear evolution of transport induced anisotropic electron distribution*
- 28 B. Coppi, *MIT*, *High Energy Plasma Associates with Black Holes at Near and Far Distances*
- 29 W. Zhang, *Institute of Physics*, *Gyrokinetic Simulations of Energetic Particle Turbulence and Transport*
- 30 W. Zhang, *Institute of Physics*, *Gyrokinetic Simulations of Energetic Electron Driven Alfvén Instability*
- 31 A. Airoidi, *CREATE Consortium*, *Anomalous Transport Processes Including Self-organization for Fusion Burning Regimes in Ignitor*
- 32 J.F. Ma, *University of Texas*, *Global Two-Fluid and Gyro-Landau-Fluid simulations of the pedestal turbulence in DIII-D divertor geometry*
- 33 I. Krebs, *Max-Planck/PPPL*, *Progress on Nonlinear Sawtooth Simulations using M3D-C1*
- 34 R.H. Cohen, *LLNL*, *Simulation of neoclassical transport in a divertor geometry with COGENT*
- 35 H. Zhu, *Peking University*, *Global Geodesic Acoustic Eigenmode in Toroidal Plasmas*
- 36 F. Winterberg, *University of Nevada*, *Mutual Colliding Impact Fast Ignition*
- 37 A. K. Ram, *MIT*, *Scattering of radio frequency waves by edge density fluctuations and by blobs*
- 38 D. Zhao, *Peking University*, *Testing the high turbulence level breakdown of low-frequency gyrokinetics against high-frequency gyrokinetic simulations*
- 39 A. Oganessov, *William & Mary*, *Unitary Highly Parallelized Algorithms for Nonlinear Systems*
- 40 V.A. Izzo, *General Atomics*, *Simulation and validation of massive-gas-injection in the presence of 3D fields*
- 41 J. McClenaghan, *UCI*, *Gyrokinetic particle simulation of internal kink modes in tokamaks*
- 42 A.H. Glasser, *University of Washington*, *Computation of Outer Region Matching Data for Resistive Instabilities with DCON*
- 43 P.B. Snyder, *General Atomics*, *Super H-Mode: Pedestal Bifurcation to Enable High Performance*
- 44 C. S. Ng, *PPPL*, *Surface Currents during a Major Disruption*
- 45 F. Ebrahimi, *Princeton University*, *Physics of forced magnetic reconnection in coaxial helicity injection experiments in NSTX*

- 1 Dan Barnes, *Tri Alpha*, “Plasma theory as private enterprise”
- 2 Russel Caflisch, *UCLA*, “Accelerated simulation of coulomb collisions in plasmas”
- 3 Hank Strauss, *HRS Fusion*, “Toroidal rotation produced by disruptions and ELMs”
- 4 Denise Hinkel, *LLNL*, “Alpha heating in ICF implosions at the National Ignition Facility”
- 5 Alexander Pigarov, *UCSD*, “Dynamic boundary plasma-wall modeling of ELMy H-mode”
- 6 Roman Smirnov, *UCSD*, “Modeling of tungsten and beryllium dust impact on ITER-like plasma edge”
- 7 Scott Parker, *University of Colorado*, “Nonlinear gyrokinetic simulations of the tokamak edge Pedestal”
- 8 Michael Barnes, *University of Texas*, “On a local solution to a global problem: treating radial profile variation and intrinsic momentum transport in a flux tube gyrokinetic code”
- 9 Matthew Lilley, *Imperial College London*, “On the formation of phase space holes and clumps”
- 10 Samuel Lazerson, *PPPL*, “An enstrophy minimizing method for 3D MHD equilibrium with flow”
- 11 S.R. Hudson, *PPPL*, “A new class of magnetic confinement device in the shape of a knot”
- 12 V. A. Svidzinski, *FAR-TECH*, “Plasma dielectric response in inhomogeneous magnetic field near electron cyclotron resonance”
- 13 E.A. Belli, *General Atomics*, “Non-Axisymmetric and Poloidal Asymmetry Effects on the Neoclassical Transport in the Tokamak Plasmas”
- 14 J. Ball, *University of Oxford*, “Intrinsic momentum transport in up-down asymmetric tokamaks”
- 15 J.A. Spencer, “ECRH Models for Guiding-Center Orbits in Parabolic Magnetic Mirrors”
- 16 J. Bao, *Peking University*, “Particle simulation of lower hybrid wave propagation in fusion plasmas”
- 17 L. Guazzotto, *University of Rochester*, “MHD Pedestal Formation in Time-Dependent Simulations with Poloidal Viscosity”
- 18 N.T. Howard, *ORISE*, “Understanding the Role of Electron-Scale Turbulence in the Tokamak Core Using Multi-Scale, Gyrokinetic Simulation of Alcator C-Mod Discharges”
- 19 J. Guterl, *UCSD*, “Atomistic modeling of molecular hydrogen desorption from tungsten surface”
- 20 B. Covele, “Implementation of an advanced x-divertor on ITER without design changes”
- 21 S. I. Krasheninnikov, *UCSD*, “Model of ablation of large high-Z material dust grain in fusion plasma”
- 22 S.A. Galkin, *FAR-TECH*, “Role of plasma surface current in tokamak disruption events”
- 23 E.M. Bass, *Oak Ridge Institute for Science Education*, “Linear stability of edge turbulence using two-fluid models in BOUT++”
- 24 Y. Chen, *Univ. of Colorado at Boulder*, “On Gyrokinetic Simulations of Low-n MHD Modes”
- 25 G. Lu, *Southwestern Institute of Physics*, “A critical gradient analysis to better understand measured and predicted plasma responses in the DIII-D tokamak”

- 26 X. Wei, *Zhejiang University*, "Full particle orbit calculation in toroidal plasmas based on boris scheme"
- 27 Z. R. Wang, *PPPL*, "Drift Kinetic Effect on 3D Plasma Response in High-beta DIII-D Plasmas"
- 28 D.P. Brennan, *Princeton University*, "Control of resistive wall modes in a cylindrical tokamak with plasma rotation and complex gain"
- 29 W. Horton, *University of Texas at Austin*, "Penetration of Lower Hybrid Waves with Density Fluctuations for ITER-like Plasmas"
- 30 X.Q.Xu, *LLNL*, "Characteristics of Peeling-Ballooning modes and its energy loss scaling with increasing collisionality"
- 31 D. A. Spong, *ORNL*, "Models for energetic particle instability and transport in general toroidal configurations"
- 32 X. Li, *Institute of Computational Mathematics and Scientific/Engineering Computing*, "The Tokamak MHD (TMHD) plasma model"
- 33 L. Merriman, *MIT*, "Theory and Feasible Experiments on D-3He and D-D Burning Plasmas"
- 34 W. A. Farmer, *UCLA*, "Ballooning modes localized near the null point of a divertor"
- 35 B. Basu, *MIT*, "Spontaneous Rotation of Axisymmetric Plasmas and Its Connection to Collective Modes"
- 36 D. Liu, *UCI*, "GTC simulation of tearing modes in fusion plasmas"
- 37 L.-M. Imbert-Gerard, *NYU*, "Numerical approximation of resonant lower hybrid waves in the cold plasma model"
- 38 A. E. White, *MIT*, "Multi-channel transport studies in Alcator C-Mod Plasmas: probing the role of ITG/TEM stability crossing in rotation reversals"
- 39 D. Meyerson, *University of Texas at Austin*, "Simulation of Field Aligned Blobs in the Scrape off Layer"
- 40 E. G. Evstatiev, *FAR-TECH*, "Variational approach to kinetic, fluid, and hybrid plasma simulations"
- 41 J.E. Kinsey, *CompX*, "The Energy Transport Shortfall in the H-mode Deep Core and L-mode Near Edge Regions"
- 42 A. Cardinali, *ENEA*, "Study of Lower Hybrid Wave Propagation and Absorption in Tokamak Plasma by Hamiltonian Theory"
- 43 A. J. Cole, *Columbia University*, "Variational Principles with Padé Approximants for Tearing Mode Analysis"
- 44 P. Valanju, "Application of x-divertors with comprehensive design constraints in demo/reactors"
- 45 O. Meneghini, *Oak Ridge Associated Universities*, "Modeling of transport phenomena in tokamak plasmas with neural networks"