

**Program — Innovative Confinement Concepts Workshop 2004  
May 25-28, Madison, Wisconsin**

**Tuesday, May 25**

7:30 – 8:30 *Continental Breakfast, Monona Terrace Convention Center  
(special advanced registration required)*

8:30 Welcome and Announcements

*Magnetic Relaxation and Confinement*

*Chair: D. Craig*

9:00 Invited: Generalized Cowling Theorem

A. Boozer

9:30 Invited: Relaxation in MFE Experiments

T. Jarboe

10:00 *Break*

10:15 RFP Confinement with Varying Degrees of Relaxation

J.K. Anderson

10:35 The Role of Fluctuations on Energy Confinement in the SSPX Spheromak

H. McLean

10:55 Experimental Studies of the Detailed Dynamics Underlying Spheromak Formation

P. Bellan

11:15 First Clear Evidence for Magnetic Relaxation in Coaxial Helicity Injection Discharges  
in the HIT-II Spherical Torus

A. Redd

11:35 Panel Discussion

12:05 *Lunch*

1:30 Poster Session #1 (*Refreshments 2:30-3:00*)

*ICC Community Issues – Session 1*

3:00 FESAC Panel on Priorities (Overview)

M. Mauel

*Effects of Plasma Flow and Flow Shear*

*Chair: B. Nelson*

3:15 Invited: Effects of Flow and Flow Shear in NSTX

J. Menard

3:45 Invited: Perspectives on the Suppression of Turbulence by Sheared Flow

P. Terry

4:15 The Maryland Centrifugal Experiment and Velocity Shear Stabilization of Ideal MHD  
Interchanges

A. Hassam

4:35 Equilibrium and Stability of Rotating Plasmas in a Mirror Geometry

A. Aydemir

4:55 Formation and Sustainment of a Sheared Flow Z- Pinch

R. Golingo

5:15 Experiments with a Supported Dipole

M. Mauel

5:35 Panel Discussion

7:45 Tour of Local UW Experiments

**Wednesday, May 26**

7:30 – 8:30 *Continental Breakfast, Monona Terrace Convention Center  
(special advanced registration required)*

*FRC/MTF: Physics, History, and Status*

*Chair: R. Milroy*

8:30 Invited: FRC History, Physics and Recent Development

A. Hoffman

- 9:00 Invited: New Results in Plasma Implosion Techniques T. Intrator  
 9:30 Numerical Study of the Formation, Ion Spin-up and Nonlinear Stability Properties of FRCs E. Belova
- 9:50 *Break*
- 10:05 Merging Spheromaks to Access Large s FRC Dynamics C. Cothran  
 10:25 Formation of target Field-Reversed Configuration plasma for Magnetized Target Fusion in FRX-L S. Zhang  
 10:45 Stabilizing Effects of Rotating Magnetic Fields (RMF) on Field Reversed Configurations (FRC) H. Guo  
 11:05 Panel Discussion

### *Stellarators*

*Chair: S. Knowlton*

- 11:35 Invited: Stellarator Physics and the Status of the World Program M. Zarnstorff  
 12:05 Invited: Electric Fields in Stellarators T. Pedersen

12:35 *Lunch*

2:00 Poster Session #2 (*Refreshments 3:00-3:30*)

### *Inertial Fusion Energy*

*Chair: F. Thio*

- 3:30 Invited: Inertial Fusion Energy: Challenges and Opportunity M. Campbell  
 4:30 Invited: Innovations in Heavy Ion Fusion S. Yu  
 5:00 Invited: Innovations in Z-Pinch Fusion C. Olson

### *ICC Community Issues – Session 2*

- 8:00 Community Meeting with DOE F. Thio

## **Thursday, May 27**

7:30 – 8:30 *Continental Breakfast, Monona Terrace Convention Center (special advanced registration required)*

### *Networking, Diagnostics and Modeling*

*Chair: J. Gauvreau*

- 8:30 Invited: Grid Computing and Collaboration Technology in Support of ICC D. Schissel  
 9:00 Invited: Reconstruction of Spherical Torus Equilibria S. Sabbagh  
 9:30 Invited: MHD “Spectroscopy” D. Maurer

10:00 *Break*

- 10:15 Invited: Spheromak Transients and Energy Confinement C. Sovinec  
 10:45 Simulations of Sustained HIT-SI Operation in the Present Experimental Regime and Beyond V. Izzo

### *Mirror, Liquid Wall*

*Chair: G. Wurden*

- 11:05 Invited: Advances in GDT Physics A. Ivanov  
 11:35 Axisymmetric Tandem Mirrors: Kinetic-Stabilizer Studies R.F. Post  
 11:55 The Lithium Tokamak – Results from CDX-U and the Design of LTX R. Majeski

12:15 *Lunch*

1:30 Poster Session #3 (*Refreshments 2:30-3:00*)

*Reactors*

3:00 Invited: The Physics of Fusion Energy

3:30 Invited: Reconsidering Old Ideas

4:00 Discussion

4:15 Invited: D-3He Physics and Fusion Energy Prospects

*Chair: P. Politzer*

L. J. Perkins

S. Woodruff

J. Santarius

*Skunkworks*

4:45 Business Needs Regarding Fusion: Lessons Learned from Alternative Energy

5:05 Axisymmetric Mirror Stabilized by the Shaped End Wall

5:20 Fusion-Fission-Fusion Fast Ignition Plasma Focus

5:40 Helical Drive for RFPs and Stellarators

6:30 Workshop Banquet, Monona Terrace Convention Center  
(no-host bar begins at 6:00)

*Chair: P. Politzer*

J. Loman

D. Ryutov

F. Winterberg

R. Nebel

**Friday, May 28**

7:30 – 8:30 *Continental Breakfast, Monona Terrace Convention Center  
(special advanced registration required)*

*ICC Community Issues – Session 3*

8:30 Update on Priorities Panel Macroscopic Plasma Behavior Working Group

8:55 Update on Priorities Panel Multi-Scale Transport Behavior Working Group

9:20 *Break*

9:30 Two Parallel Discussion Sessions for the Above Working Groups

11:00 Summary of Discussion Sessions

11:30 End Workshop

*Chair: M. Mael*

G. Navratil

P. Terry

G. Navratil / P. Terry

## Poster Session #1

*Magnetic Relaxation and Confinement, RFP, Spheromak, Plasma Flow and Flow Shear*

001	Boozer, A.H.	Constraints on the Evolution of Plasma Currents and on Magnetic Reconnection
002	Jarboe, T. R.	Relaxation in MFE Experiments
003	Schaffer, M.J.	Physically Motivated and Mathematically Consistent Magnetic Helicity
004	Steinhauer, L.C.	Nonlinear plasma dynamics in compact toroids by Fourier-Beltrami methods
005	Shohet, J.L.	A Soliton Model for Slinky Modes in Reversed-Field Pinch Experiments
007	Anderson, J. K.	RFP Confinement with Varying Degrees of Relaxation
008	Goetz, J.A.	Heating and Current Drive Systems for the MST Reversed Field Pinch
009	McCollam, K.J.	Oscillating Field Current Drive Studies in MST
010	Mirnov, V.V.	Non - MHD Effects of Plasma Relaxation and Dynamo in the Reversed Field Pinch
011	Reynolds, J.M.	Computation Studies of Characteristic MHD Dynamo Suppression in the Reversed Field Pinch During PPCD
012	Finn, J. M.	Single Helicity and Quasi-Single Helicity States in RFPs
037	Nebel, R. A.	Helical Drive for RFPs and Stellarators
038	Cone, G.A.	Influence of Initial Magnetic Field Configuration on Spheromak Formation
039	Hill, D.N.	Plans for Increasing the Magnetic Field and Plasma Temperature in the SSPX Spheromak
040	Hooper, E. Bickford	Understanding spheromak formation and evolution by ideal and resistive MHD modeling
041	McLean, H.S.	The role of fluctuations on energy confinement in the SSPX spheromak
042	Romero-Talamas, C. A.	High-speed imaging of the SSPX plasma
043	Bellan, P. M.	Experimental studies of the detailed dynamics underlying spheromak formation
044	Micozzi, Paolo	The Multi-Pinch experiment
045	Nelson, B.A.	Injector Flux and Voltage Control of the Torus, HIT-SI
046	Sieck, P. E.	Recent Results from the HIT-SI Spheromak
047	Redd, A.J.	First Clear Evidence for Magnetic Relaxation in Coaxial Helicity Injection Discharges in the HIT-II Spherical Torus
048	Menard, J.E.	Effects of Flow and Flow Shear in NSTX
073	Terry, Paul	Suppression of Turbulence and Transport by Sheared Flow
074	Golingo, R.P.	Formation and Sustainment of a Sheared Flow Z- Pinch
075	Hsu, S. C.	Flowing Magnetized Plasma Experiment: Progress & Plans
076	Wang, Z.	Study of diamagnetism in the Los Alamos Flowing Magnetized Plasma Experiment
077	You, S.	Measurements of Plasma Flow in Current-Carrying Magnetic Flux Tubes
078	Furno, I.	Experimental investigation of the interaction of multiple magnetized current carrying plasma channels

## Poster Session #2

*Rotating Mirrors, FRC, MTF, Stellarator, IFE*

013	Aydemir, A. Y.	Equilibrium and stability of rotating plasmas in a mirror geometry
014	Ellis, R. F.	Status of the Maryland Centrifugal Experiment (MCX)
015	Hassam, A. B.	The Maryland Centrifugal Experiment and Velocity Shear Stabilization of Ideal MHD Interchanges
016	Huang, Y. M.	Resistive magnetohydrodynamic equilibrium and stability of a rotating plasma with particle sources
017	Teodorescu, C.	New High Rotation Mode in MCX

019	Hoffman, A.L.	FRC History, Physics, & Recent developments
020	Intrator, T.	Magnetized Target Fusion collaboration and recent progress
021	Belova, E.V.	Numerical Study of the Formation, Ion Spin-up and Nonlinear Stability Properties of FRCs
022	Cothran, C. D.	Merging spheromaks to access large s FRC dynamics
023	Guo, H.Y.	Stabilizing Effects of Rotating Magnetic Fields (RMF) on Field Reversed Configurations (FRC)
024	Yamada, M.	Sustainment of Stable FRC by NBI and Transformer
049	Miller, K.E.	TCS Upgrade
050	Milroy, R.D.	Observations of edge-driven RMF current drive in the TCS experiment
051	Slough, J.	Formation of high $\beta$ plasmas within a metal flux conserver by means of a rotating magnetic field
052	Qerushi, A.	Distribution of particle orbits in a Field Reversed Configuration with Rotation
053	Quevedo, H.	Asymmetry and Phase Transitions in Initial Data from MBX Experiment at Low Power
054	Wurden, G. A.	Progress and Plans for plasma studies on the FRX-L Field Reversed Configuration experiment
055	Zhang, S.Y.	Formation of target Field-Reversed Configuration plasma for Magnetized Target Fusion in FRX-L
056	Degnan, J. H.	Deformable contact liner implosion performed with large diameter electrode apertures
057	Goodrich, T.	Liner Dynamics During Flux Compression
058	Siemon, R.E.	Plans for an inverse z pinch experiment
059	Ryutov, D.D.	Variations on the theme of a plasma liner
060	Santarius, J.F.	Plasma-Jet Magnetized-Target Fusion
085	Zarnstorff, M.	Stellarator Physics and the Status of the World Program
086	Pedersen, T.S.	Effects of electric field in stellarators
087	Lyon, J.F.	Plasma Flow Characteristics and Enhanced Confinement Regimes in Stellarators
088	Anderson, D.T.	Overview of HSX Experimental Operations
089	Deng, C.	Evidence for Fast-Electron Driven GAE Modes in Quasi-Helically Symmetric HSX Plasmas
090	Gerhardt, S.	Measurements and Modeling of Plasma Flow Damping in the HSX Stellarator
091	Hegna, C. C.	Finite Larmor Radius Stabilization of Ideal Ballooning Modes in Three-Dimensional Geometry
092	Ng, S.W.	FLR-assisted Velocity Shear Stabilization of the Rayleigh-Taylor Instability
093	M. Campbell	Inertial Fusion Energy: Challenges and Opportunity
094	Olson, C. L.	Innovations in Z-Pinch Fusion
095	Yu, S.S.	Innovations in HIF

### Poster Session #3

*Networking, Diagnostics, Resistive MHD, Mirrors, Floating Dipole, ET, Electrostatic Confinement, Reactors, Misc.*

025	Sabbagh, S.	Reconstruction of Spherical Torus Equilibria
026	Maurer, D. A.	Active MHD Spectroscopy for Plasma Stability Studies
027	Barmish, B.R.	The Signature of a Signal: A New Approach to Model Validation for Toroidal Confinement Systems
028	Sovinec, C.R.	Spheromak transients and Energy Confinement
029	Izzo, V.A.	Simulations of sustained HIT-SI operation in the present experimental regime and beyond
031	Ivanov, A.A.	Recent results from gas dynamic trap experiment

032	Post, R.F.	Axisymmetric Tandem Mirrors: Kinetic-Stabilizer Studies
033	Ryutov, D.D.	Axisymmetric mirror stabilized by the shaped end wall
034	Ryutov, D.D.	Enhanced transport caused by magnetic field perturbations in the systems where only poloidal magnetic field is present
035	Sen, Amiya K.	A New Paradigm for the Isotope Scaling of Plasma Transport Paradox
036	Majeski, R.	The Lithium Tokamak – Results from CDX-U and the Design of LTX
061	Garnier, D.T.	Status of the Levitated Dipole Experiment
062	Hansen, A.K.	Employment of Multiple Frequencies of Electron Cyclotron Resonance Heating on the Levitated Dipole Experiment
063	Kesner, J.	NIMROD Simulations of the Levitated Dipole Experiment
064	Mauel, M.E.	Experiments with a Supported Dipole
065	Gauvreau, J.-L.	Diagnostics upgrade in ET for stability and equilibrium studies
066	Schmitz, L.W.	Neutral Beam and RF Momentum Drive and new Profile Diagnostics in the Electric Tokamak
067	Taylor, R.J.	Self Organized Bootstrap Current in ET at Zero Loop Voltage.
068	Lewicki, B.T.	A Flexible Multi-Coil Programmable Power Supply System for the Pegasus Toroidal Experiment
069	Reinke, M.L.	Diagnostic Suite for Plasma Pressure Profile Estimates in the Pegasus Experiment
070	Unterberg, E.A.	Physics Plan for Access to High Toroidal Beta and Normalized Current in the Pegasus Toroidal Experiment
071	Bergerson, W. F.	Experimental approach and diagnostics for the rotating wall machine
072	Hannum, D.A.	Current profile control via a plasma gun array in the rotating wall machine
079	Slough, J.	Small Scale Fusion: The Pulsed High Density FRC Experiment
080	Winterberg, F	Fusion-Fission-Fusion Fast Ignition Plasma Focus
081	Budaev, V.P.	Ion Trajectories and Focusing in Spherical Inertial Electromagnetic Confinement
082	Nebel, R. A.	Experimental and Theoretical Studies of Electrostatic Confinement on the INS-e Device
083	Piefer, G.R.	Helicon Ion Source and Core Physics Research for the UW IEC Device
084	Weber, J.	Confinement Scaling of the Decapede
097	Ashley, R.P.	Recent Progress and Applications in Steady State Fusion Using D-3He
098	Perkins, L.J	The Physics of Fusion Energy: Why we (Probably) Can't Build a Reactor on the Head of a Pin
099	Woodruff, S	An overview of conventional and non-conventional tokamak alternatives
100	Santarius, J.F.	D-3He Physics and Fusion Energy Prospects
101	Hassam, A. B.	Thermoelectric Rotating Torus for Fusion
102	Hicks, N.K.	Symmetric Neutralized Ion Beam Production
103	Wong, A.Y.	A New Approach to Heating, Fueling, and Control of Fusion Plasmas
104	Hwang, D.Q.	Formation Studies, Axial Target Field interaction, and new diagnostic development in the CTIX Injector Project
105	Kotschenreuther, M.	Innovative Divertor Solutions for High Confinement and Acceptable Heat Fluxes
106	Loman, J.M.	Business Needs Regarding Fusion: Lessons Learned From Alternative Energy
107	Pamfiloff, E.	Fragmentation of Protons is Efficient While Fusion of Protons is Not
108	Schissel, D.P.	Grid Computing and Collaboration Technology in Support of ICC