

**CURRENT TRENDS IN INTERNATIONAL FUSION RESEARCH:
A REVIEW**

Washington, D.C., U.S.A.
5 – 9 March 2007

PROGRAM

SUNDAY, 4 MARCH

6:00-9:00 p.m. Registration and no-host cocktail

MONDAY, 5 MARCH

Chair: Richard F. Post

- 8:00-8:15 a.m. Welcome Address
Emilio Panarella
- 8:15-8:30 . Opening Remarks
Roger Raman
- 8:30-9:30 Keynote Speech: Firm Points in the Physics of Fusion Burning Plasmas: Relevant and Irrelevant Experiments
Bruno Coppi

Magnetic Confinement

- 9:50-11:20 Status and Perspectives of the Fusion Research in ENEA
A. Renieri on behalf of the ENEA Fusion Research Group
- 11:20-11:50 Recent Advances in the SPIRIT (Self-Organized Plasma with Induction, Reconnection, and Injection Techniques) Concept
H. Ji, M. Yamada, S. P. Gerhardt, E. Belova
- 11:50-12:20 p.m. Review of the National Spherical Torus Experiment Research Results
D. Mueller for the NSTX Research Team
- 12:20-12:50 The Lithium Tokamak Experiment (LTX) and Low-Recycling Spherical Tokamak Reactors
R. Majeski, T. Gray, R. Kaita, H. Kugel, T. Kozub, D. Mansfield, J. Spaleta, J. Timberlake, L. Zakharov, V. Soukhanovskii, R. Maingi, R. Doerner
- 12:50-1:20 p.m. NIMROD Extended MHD Simulations for Disruption Mitigation Studies
V.A. Izzo, D.G. Whyte, R.S. Granetz, and the NIMROD Team

Chair: Edward Creutz

Magnetic Confinement and Other

- 2:30-3:30 p.m. Keynote Speech: Fusion Research in India: ITER and Beyond
Predhiman Kaw

- 3:50-4:30 The US Spallation Neutron Source
Robert F. Welton
- 4:30-5:30 Keynote Speech: The Wire-Array Z-Pinch: An Efficient X-Ray
Source for ICF and a New Ion Heating Mechanism
M.G. Haines
- 5:30-6:00 MST Reversed Field Pinch Development
*K. McCollam, J. Anderson, A. Blair, B. Chapman, D. Craig, D.
Den Hartog, F. Ebrahimi, G. Fiksel, S. Gangadhara, J. Goetz,
B. Hudson, R. O'Connell, S. Prager, J. Sarff, M. Wyman, and
the MST Team*
- 6:00-6:30 FRC Compression Heating Experiment (CHX) at AFRL
*C. Grabowski, J.H. Degnan, J.F. Camacho, S.K. Coffey, G.
Coulter, M. Domonkos, D. Gale, B. Martinez, J. Parker, D.
Ralph, E.L. Ruden, and W. Sommars, S.C. Hsu, T.P. Intrator,
R.M. Renneke, P. Sieck, W.J. Wagenaar, and G.A. Wurden,
and Y.C.F. Thio*
- 6:30-7:00 FRC History, Physics, & Recent Developments
A.L. Hoffman

TUESDAY, 6 MARCH

Chair: Roger Raman

8:00-9:10 a.m. Keynote Speech: Plans for Ignition Experiments on the National Ignition Facility
Edward I. Moses

Inertial Confinement and Other

9:30-10:00 a.m. A New Laser Driven Fast Igniter Scheme Using Plasma Blocks
Heinrich Hora and George H. Miley

10:00-10:50 The Institute for Fusion Studies in Southern Italy: Simulation Results of the Design Parameters of the First Prototype Fusion Reactor
Emilio Panarella

10:50-11:20 Design and Features of a Magnetized Target Fusion Experiment
T.P. Intrator, G.A. Wurden, W.J. Wagenaar, R. Renneke, M. Kostora, L. Dorf, S.C. Hsu, A. Lynn, M. Gilmore, R. Siemon, T. Awe, J. Degnan, C. Grabowski, E. Ruden

11:20-11:50 A Review of the Parameter Space for Controlled Thermonuclear Fusion
I.R. Lindemuth and R.E. Siemon

Chair: Hafiz Rahman

Magnetic Confinement and Other

1:00-2:00 p.m. Keynote Speech: Recent Progress in the GAMMA 10 Tandem Mirror
M. Hirata, T. Cho, J. Kohagura, T. Numakura, H. Hojo, M. Ichimura, A. Itakura, T. Kariya, I. Katanuma, R. Minami, Y. Nakashima, M. Yoshikawa, Y. Yamaguchi, Y. Higashizono, Y. Miyata, V. P. Pastukhov, W. Horton, T. Kondoh, K. Sakamoto, T. Imai, S. Miyoshi, and GAMMA 10 Group

The Keynote Speech will be given by *M. Hirata*

2:20-2:50 p.m. Kinetically Stabilized Axisymmetric Tandem Mirrors: A Faster route to Economic Fusion Power?
Richard F. Post

- 2:50-3:20 Spheromak Formation by Steady Inductive Helicity Injection
*A.J. Redd, T.R. Jarboe, C. Akcay, R.Z. AboulHosn, W.T. Hamp,
G.J. Marklin, B.A. Nelson, R.G. O'Neill, P.E. Sieck, R.J. Smith,
B.T. Stewart, and J.S. Wrobel*
- 3:20-3:50 Internal Measurements of the ZaP Flow Z-Pinch
R.P. Golingo, U. Shumlak, B.A. Nelson, and the ZaP team
- 3:50-4:20 Break-Even Fusion in a Staged Z-Pinch
H.U. Rahman, N. Rostoker, F.J. Wessel, and P. Ney
- 4:20-4:50 DPD Cluster Reactions in Low Energy Nuclear Reactions
(LENRS)
*George H. Miley, Andrei Lipson, Nie Luo, Heinz Hora, and
Prajakti Joshi Shrestha*
- 4:50-5:20 Evidences for and the Models of Fast Nonlocal Transport of
Heat in Magnetic Fusion Devices
Alexander B. Kukushkin, and Konstantin V. Cherepanov
- 8:00-9:030 Tutorial Talk: Analysis of Ignition and Gain for Small Fusion
Targets
Ronald C. Kirkpatrick

WEDNESDAY, 7 MARCH

Chair: Ronald Kirkpatrick

Inertial Confinement and Other

- 8:00-9:00 a.m. Keynote Speech: Inertial Confinement Fusion Research at the Laboratory of Laser Energetics
R.L. McCrory, D.D. Meyerhofer, S.J. Loucks, S. Skupsky, K.S. Anderson, R. Betti, T.R. Boehly, M.J. Bonino, R.S. Craxton, T.J.B. Collins, J.A. Delettrez, D.H. Edgell, R. Epstein, V.Yu. Glebov, V.N. Goncharov, D.R. Harding, R.L. Keck, J.H. Kelly, T.J. Kessler, J.P. Knauer, L.D. Lund, D. Jacobs-Perkins, J.R. Marciante, J.A. Marozas, F.J. Marshall, A.V. Maximov, D. Maywar, P.W. McKenty, S.F.B. Morse, J. Myatt, S.G. Noyes, P.B. Radha, T.C. Sangster, W. Seka, V.A. Smalyuk, J.M. Soures, C. Stoeckl, W. Theobald, K.A. Thorp, M.D. Wittman, B. Yaakobi, C.D. Zhou, and J.D. Zuegel
- The Keynote Speech will be given by *J.M. Soures*
- 9:20-10:20 a.m. Keynote Speech: Progress toward Development of a Laser Based Fusion Test Facility
Stephen P. Obenschain, John D. Sethian, Andrew Schmitt and Dennis Colombant
- The talk will be given by *Stephen P. Obenschain*
- 10:20-11:20 Keynote Speech: Inertial Confinement Fusion Research At Los Alamos National Laboratory
Steven H. Batha, Brian Albright, Paul A. Bradley, James A. Cobble, James Cooley, Robert D. Day, Kimberly DeFriend, Norman D. Delamater, Evan Dodd, S. Robert Goldman, Gary Grim, Hans W. Herrmann, Nelson Hoffman, Randall P. Johnson, Paul Keiter, John L. Kline, George A. Kyrala, Shengnian Luo, Joseph M. Mack, Glenn R. Magelssen, David S. Montgomery, John A. Oertel, Harvey A. Rose, Derek Schmidt, Mark J. Schmitt, Achim Seifter, Leslie Sherrill, Tsutomu Shimada, Damian C. Swift, Mark Wilke, Douglas C. Wilson, Lin Yin
- The Keynote Speech will be given by *Steven H. Batha*

- 11:20-11:50 Self-Similar Skeletal Structures in Fusion and Material Test Devices: Numerical Modeling and New Observational Data
Alexander B. Kukushkin, and Valentin A. Rantsev-Kartinov
- Chair: J. Reece Roth**
- 1:00-2:00 p.m. Keynote Speech: High Efficiency Plasma Focus: Fusion and Applications
Jan S. Brzosko
- Magnetic Confinement and Other
- 2:20-2:50 p.m. Experimental Profile Evolution of the FRX-L High Density Field Reversed Configuration Inferred from Multichord Interferometry
E.L. Ruden, Shouyin Zhang, T.P. Intrator, G.A. Wurden, R. Renneke, W.J. Wagenaar, F.T. Analla, and T.C. Grabowski
- 2:50-3:20 RMF₀-Formed Collisionless High- β Plasmas: Yesterday, Today & Tomorrow
S.A. Cohen, B. Berlinger, C. Brunkhorst, A. Brooks, N. Ferraro, D. Lundberg, A. Roach, A.H. Glasser
- 3:20-3:50 3D Reconnection and Flow Dynamics in the SSX Experiment
Michael R. Brown
- 3:50-4:20 Poloidal Magnetic Field Topology for Tokamaks with Current Holes
Julio Puerta, Pablo Martín and Enrique Castro
- 4:20-4:50 Simple Magnetized Torus as a Model System for Basic Investigation of Edge-Plasma Transport
M.E. Koepke
- 6:00-10:00 Banquet
Banquet Speaker: *Malcolm G. Haines*
“50 Years in Fusion”

THURSDAY, 8 MARCH

Chair: Erick Lindman

8:00-9:00 a.m. Keynote Speech: Operation of Fusion Reactors in One Atmosphere of Air Instead of Vacuum Systems
J. Reece Roth

Magnetic Confinement and Other

9:20-9:50 Transient Chi Start-Up in NSTX
Brian A. Nelson, Roger Raman, Thomas R. Jarboe, Dennis Mueller, Michael Bell, and Ricardo Maqueda

9:50-10:20 Issues of Particle Transport and Current Profile Control in Burning Tokamaks
R.J. Taylor and P.-A. Gourdain

10:20-10:50 Solenoid-Free Plasma Start-Up in HIT-II
R. Raman, T.R. Jarboe, B.A. Nelson, W.T. Hamp, R.G. O'Neill, A.J. Redd, R.J. Smith

10:50-11:20 Nonlinear Visco-Resistive Collisional Transport in Toroidal Elliptical Plasmas with Triangularity and Hole Currents
Pablo Martín and Enrique Castro, and Julio Puerta

11:20-11:50 Helicity Injection and the Relevant Self-Organizing Phenomena in Driven-Compact Spherical Torus Plasmas
M. Nagata, Y. Kikuchi, N. Fukumoto, Y. Kagei, T. Kanki

Chair: Pablo Martin

Inertial Confinement and Other

1:00-2:00 p.m. Keynote Speech: Applications to ICF of Fast Ions Generated by Focusing Short Laser Pulses on Ultra-Thin Causally Isolated Target
C. Strangio, and A. Caruso

2:20-3:20 Keynote Speech: Prospects for Demonstrating Double-Shell Ignition on the National Ignition Facility
Peter Amendt, Charlie Cerjan, Jose Milovich, and Harry Robey

The Keynote Speech will be given by *Peter Amendt*

- 3:20-3:50 ECOfusion: An Electron-Cooled, Cellular Approach to
 Harnessing Fusion Power
D.J. Larson
- 3:50-4:20 From Neutron Flux Fission Reactor to Deuteron Flux Reactor
 of Condensed Matter Nuclear Science
Xing Z. Li
- 4:20-4:50 Progress toward a Theory for Excess Heat in Metal Deuterides
P.L. Hagelstein and I.U. Chaudhary
- 4:50-5:20 Fusion State in Plasma as a Waveleton (Localized (Meta)-
 Stable Pattern)
Antonina N. Fedorova, Michael G. Zeitlin
- 5:20-5:50 Study of the Direct Energy Conversion Processes for Vista
 Laser Fusion Rocket in the Laser-Plasma Experiments with
 Dipole-Like Magnetic Field
*Yu.P. Zakharov, K.V. Vchivkov, A.V. Melekhov, V.G. Posukh,
E.L. Boyarintsev, I.F. Shaikhislamov, H. Nakashima*

FRIDAY, 9 MARCH

Chair: Julio Puerta

- 8:30-9:30 a.m. Keynote Speech: Role and Challenges of Superconducting Tokamak for Going to Fusion Reactor
Y.X. Wan
- Magnetic Confinement and Other
- 10:00-10:40 An Acoustically Driven MTF Reactor
Michel Laberge
- 10:40-11:20 Three Untried 'Optimal' Hot & Cold Fusion Reactors
Robert W. Bass
- 11:20-12:00 p.m. Research Activities on Inertial Fusion in the Institute of Nuclear Studies
Manuel Perlado
- 12:00-12:40 Exact Multiscale Representations for (Non)-Equilibrium Dynamics of Plasma
Antonina N. Fedorova and Michael G. Zeitlin

Chair: Jan S. Brzosko

- 2:00-2:40 Panel Presentation: Report from the Review Panel of Scientists and Engineers
- 2:40-3:00 Concluding Remarks
Roger Raman