

**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 RMF<sub>0</sub>-Formed Collisionless High- $\beta$  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**

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

**Chair: Jan S. Brzosko**

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| 2:00-2:40 |  | <u>Panel Presentation</u> : Report from the Review Panel of Scientists and Engineers |
| 2:40-3:00 |  | Concluding Remarks<br><i>Roger Raman</i>   |