

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

Washington, D.C., U.S.A.
7 – 11 March 2005

PROGRAM

SUNDAY, 6 MARCH

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

MONDAY, 7 MARCH

Chair: Richard F. Post

8:00-8:20 a.m. Opening Remarks and Welcome Address
E. Panarella

8:20-9:20 . Memorial Lecture: Edward Teller's Scientific Legacy
Stephen B. Libby

9:20-9:50 IAEA Support for Fusion Energy Research
R.E.H. Clark, G. Mank, A.L. Nichols, and A. Malaquias

10:20-11:20 Keynote Speech: Fusion Research as a Scientific Undertaking:
Relationship to Other Fields of Science and Technology
Bruno Coppi

Magnetic Confinement

11:20-11:50 Enhancement of the Thermonuclear Component of the Neutron
Yield in Pinch Plasma Focus. Experiments in Devices with
Energy from 100 kJ to Less Than 1 J
*Leopoldo Soto, Patricio Silva, José Moreno, Marcelo Zambra,
Gustavo Sylvester, and Cristian Pavez*

11:50-12:20 Advances Towards pB11 Fusion with the Dense Plasma Focus
Eric J. Lerner, and Robert E. Terry

12:20-12:50 p.m. Plasma Formation in Spherical Tokamaks without a Central
Transformer Solenoid
*F. Alladio, P. Costa, A. Mancuso, P. Micozzi, A. Sykes, G.
Cunningham, M. Gryaznevich, J. Hicks, M. Hood, G. McArdle,
and Y. Dnestrovskij*

12:50-1:20 p.m. About the Next Step in the Development of a Tokamak Fusion Reactor
E. Mazzucato

Chair: R.E.H. Clark

Magnetic Confinement and Other

2:30-3:30 p.m. Keynote Speech: Future Issues in the RFP Research
Piero Martin

4:00-4:30 Small Scale Fusion: The Pulsed High Density FRC Experiment
John Slough

4:30-5:00 Plasma and Ion Beam Injection into an FRC
M. Anderson, M. Binderbauer, V. Bystritskii, E. Garate, N. Rostoker, Y. Song, A. Van Drie, and I. Isakov

5:00-5:30 Progress on the PEG Program
M. Binderbauer, N. Rostoker, H. Monkhorst, V. Bystritskii, E. Garate, O. Gornostaeva, W. Heidbrink, Y. Song, A. Van Drie, F. Wessel, S. Dettrick, D. Hendrix, Y. Mok, A. Qerushi, M. Anderson, S. Armstrong, M. Morehouse, G. Strashnoy. K. Walters

5:30-6:00 Plasma Electric Generator Space Propulsion System
A Cheung, F. Liu, A. Qerushi, N. Rostoker, F.J. Wessel, and M.W. Binderbauer

6:00-6:30 Supersonically Rotating Plasmas for Magnetic Fusion: The Maryland Centrifugal Experiment
R. Ellis, A. Hassam, S. Messer, A. Case, A. DeSilva, R. Elton, J. Ghosh, H. Griem, R. Lunsford, and C. Teodorescu

TUESDAY, 8 MARCH

Chair: Norman Rostoker

8:30-9:30 a.m. Keynote Speech: The National Ignition Facility: Exploring ICF Burning Plasmas in the Laboratory
Edward I. Moses

Inertial Confinement and Other

- 9:30-10:15 a.m. Commissioning Status of the Mercury Laser, a Scalable Option for Inertial Fusion Energy
C. Bibeau, A.J. Bayramian, J.P. Armstrong, R.J. Beach, R.W. Campbell, C.A. Ebberts, B.L. Freitas, A.S. Ladran, J. A. Menapace, E.I. Moses, S.A. Payne, N.L. Peterson, K.I. Schaffers, C. J. Stolz, S. Telford, J.B. Tassano, and E.J. Utterback
- 10:45-11:35 The Institute for Fusion Studies in Southern Italy: Progress Report on the Design and Construction of the First Fusion Prototype Reactor
Emilio Panarella
- 11:35-12:15 Taming of Electromagnetic Instabilities in Fast Ignition Scenarios For ICF and REB Stopping
Claude Deutsch, Antoine Bret, Marie-Christine Firpo, and Konstantin Starikov
- 12:15-12:45 p.m. Localization and Pattern Formation in Models of Fusion/Energy Confinement in Plasma Physics. I. Math Framework for Non-Equilibrium Hierarchies
Antonina N. Fedorova and Michael G. Zeitlin
- 12:45-1:15 Localization and Pattern Formation In Models of Fusion/Energy Confinement in Plasma Physics. II. BBGKY Hierarchy and Reductions
Antonina N. Fedorova and Michael G. Zeitlin

Chair: Frank Wessel

Magnetic Confinement and Other

- 2:30-3:30 p.m. Keynote Speech: Progress In Mirror Plasma Activities
T. Cho, J. Kohagura, M. Hirata, T. Numakura, H. Higaki, H. Hojo, M. Ichimura, K. Ishii, K. Md. Islam, A. Itakura, I. Katanuma, Y. Nakashima, T. Saito, Y. Tatematsu, M. Yoshikawa, T. Imai, V. P. Pastukhov, S. Miyoshi, and GAMMA 10 Group

The Keynote Speech will be given by *T. Cho*

- 4:00-4:40 p.m. Axisymmetric Tandem Mirrors: Status of Kinetic-Stabilizer Studies
R.F. Post
- 4:40-5:20 Demonstration of Steady Inductive Helicity Injection
T.R. Jarboe, P.E. Sieck, W.T. Hamp, B.A. Nelson, R.G. O'Neill, A.J. Redd, and R.J. Smith
- 5:20-5:50 Stopping Power for Arbitrary Angle Between Test Particle Velocity and Magnetic Field
C. Cereceda, M. de Peretti, and C. Deutsch
- 5:50-6:30 Staged Z-Pinch for Fusion
H.U. Rahman, P. Ney, F.J. Wessel, and N. Rostoker
- 6:30-7:00 Nonlocal Transport of Heat by Electromagnetic Waves in Magnetically Confined Plasmas
Alexander B. Kukushkin, and Konstantin V. Cherepanov
- 8:00-9:00 Tutorial Talk: Desirable Fusion Reactor Qualities For Commercial Electrical Generation Applications
Vincent Page

WEDNESDAY, 9 MARCH

Chair: Ronald Kirkpatrick

- 8:30-9:30 a.m. Keynote Speech: Direct-Drive Inertial Confinement Fusion Research at the Laboratory of Laser Energetics
R.L. McCrory, D.D. Meyerhofer, S.J. Loucks, S. Skupsky, J.M. Soures, 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, J.P. Knauer, L.D. Lund, D. Jacobs-Perkins, J.R. Marciante, J.A. Marozas, F.J. Marshall, A.V. Maximov, P.W. McKenty, S.F.B. Morse, J. Myatt, S.G. Noyes, P.B. Radha, T.C. Sangster, W. Seka, V.A. Smalyuk, C. Stoeckl, K.A. Thorp, M.D. Wittman, B.Yaakobi, and J.D. Zuegel, K.A. Fletcher, C. Freeman, and S. Padalino, J.A. Frenje, C.K. Li, R.D. Petrasso, and F.H. Séguin

The Keynote Speech will be given by *J.M. Soures*

Inertial Confinement and Other

10:00-10:45 a.m. Inertial-Confinement Fusion At Los Alamos
Erick Lindman, M.M. Balkey, D.C. Barnes, C.W. Barnes, J. Bartos, S.H. Batha, R.R. Berggren, B. Bezzerides, K. Bowers, P.A. Bradley, P. Brooks, B. Cameron, J.A. Cobble, R.F. Coker, J. Cooley, R. E. Chrien, C.R. Christensen, R. Day, N.D. Delamater, E.S. Dodd, M.R. Douglas, D.F. DuBois, J. Edwards, J. Elliott, N. Elliott, J.C. Fernandez, J.R. Fincke, S.R. Goldman, V. Gomez, M.A. Gunderson, D. Hatch, A. Hauer, D.A. Haynes, B.M. Hegelich, N.M. Hoffman, R.L. Holmes, G.C. Idzorek, R.P. Johnson, P.A. Keiter, J.M. Kindel, K.A. Klare, D.P. Kilcrease, J.L. Kline, G.A. Kyrala, N.E. Lanier, S.N. Luo, P. Lushnikov, R. Morse, G.R. Magelssen, R. Manzanares, R.J. Mason, D.S. Montgomery, M.S. Murillo, A. Nobile, D.L. Paisley, P. Papin, A.L. Peratt, R. Perea, D.L. Peterson, R.R. Peterson, T. Pierce, G.D. Pollak, P. Ramaprabhu, B. Randolph, G. Rivera, H.A. Rose, D. Sandoval, D. Schmidt, M. Schmitt, J.M. Scott, R. Sebring, R. Snow, M.S. Sorem, W. Steckle, D.C. Swift, T.E. Tierney, D.L. Tubbs, A. Valdez, W.S. Varnum, E. Vold, R.G. Watt, B.H. Wilde, D.C. Wilson, B.P. Wood, J.B. Workman, L. Yin

The talk will be given by *Erick Lindman*

10:45-11:30 Evidences for and the Models of Self-Similar Skeletal Structures in Fusion Devices, Severe Weather Phenomena and Space
Alexander B. Kukushkin, and Valentin A. Rantsev-Kartinov

Chair: Edward Creutz

1:00-2:00 p.m. Keynote Speech: Compression of Field Reversed Configurations for Magnetized Target Fusion
J.H. Degnan, A. Brown, T. Cavazos, S.K. Coffey, M. Frese, S. Frese, D. Gale, C. Gilman, C. Grabowski, B. Guffey, T.P. Intrator, R. Kirkpatrick, G.F. Kiuttu, F.M. Lehr, R.E. Peterkin, Jr., N.F. Roderick, E.L. Ruden, R.E. Siemon, W. Sommars, Y.F. Thio, P.J. Turchi, G.A. Wurden, S. Zhang

The Keynote Speech will be given by *J.H. Degnan*

Magnetic Confinement and Other

- 2:30-3:10 p.m. Field-Reversed Configuration Plasma for Magnetized Target Fusion at Los Alamos National Laboratory
S.Y. Zhang, T.P. Intrator, G.A. Wurden, W.J. Waganaar, R. Renneke, J.M. Taccetti, C. Grabowski, E.L. Ruden, J.H. Degnan
- 3:10-3:40 The MAGO System: Current Status
S.F. Garanin, V.I. Mamyshev, V.B. Yakubov
- 3:40-4:10 Physical Schemes of Experimental Devices with Disk EMG for Feasibility Study of Thermonuclear Ignition in MAGO System
A.M. Buyko, S.F. Garanin, G.G. Ivanova, V.M. Kalashnikov, V.I. Mamyshev, V.B. Yakubov
- 4:10-5:00 New Conserved Quantities Around a Magnetic Surfaces for Plasma Equilibria with Non-Linear Convective Terms and Low Vorticity: A Review
Julio Puerta, Enrique Castro, and Pablo Martín
- 6:00-10:00 Banquet
Banquet Speaker: *Norman Rostoker*
“Adventures with Privately Supported Fusion Research and Development”

THURSDAY, 10 MARCH

Chair: Irvin R. Lindemuth

- 8:30-9:30 a.m. Keynote Speech: Prospects For Magneto-Inertial Fusion Using The Atlas Facility at the Nevada Test Site
Richard E. Siemon

Magnetic Confinement and Other

- 9:30-10:00 Laser - Magnetized Plasma Interaction - Toward a Few Hundreds eV Solid Density Plasma in the Laboratory
Y. Sentoku, A.J. Kemp, M. Bakeman, R. Presura, and T.E. Cowan
- 10:30-11:00 Recent Compact Torus Injection Experiments on the STOR-M Tokamak
D. Liu, C. Xiao, A. Singh, S. Livingstone, and A. Hirose

- 11:00-11:30 a.m. Fueling Requirements for Advanced Tokamak Operation
Roger Raman
- 11:30-12:00 Neoclassical Collision Transport in Tokamaks for Elliptic Plasmas with Triangularity: A Review
Pablo Martín and Enrique Castro
- 12:00-12:30 p.m. New Regime in TCABR Tokamak: Runaway Electron Avalanche in Cold Recombinative Plasma
Yu.K. Kuznetsov, R.M.O. Galvão, and I.C. Nascimento

Chair: Erick Lindman

Inertial Confinement and Other

- 1:30-2:30 p.m. Keynote Speech: Current Status of Fast Ignition Research Using a Long Pulse Laser for Implosion and a PW Laser For Heating
Kazuo A. Tanaka, R. Kodama, Yoneyoshi Kitagawa, Kiminori Kondo, Kunioki Mima, Hiroshi Azechi, Zenling Chen, Shinsuke Fujioka, Tomoyuki Johzaki, An le Lei, Takeshi Matsuoka, Noriaki Miyanaga, Keiji Nagai, Hideo Nagatomo, Hiroyuki Nishimura, Takayoshi Norimatsu, Keisuke Shigemori, Hiroyuki Shiraga, Motonobu Tanpo, Yusuke Tohyama, Toshinori Yabuuchi, and Jian Zheng, Richard Stephens, Christian Stoeckl, David D. Meyerhofer, Mike Key, Stephen P. Hatchett, and Richard Freeman

The Keynote Speech will be given by *Kazuo A. Tanaka*

- 2:30-3:00 Single Event Laser Fusion Schemes Using ns-MJ or PW-ps Laser Pulses
George H. Miley, H. Hora, F. Osman, X.Z. Li

- 3:30-4:30 Keynote Speech: Progress in US Fast Ignition Research
M.H. Key, F. Amiranoff, D. Batani, S.D. Baton, T. Cowan, N. Fisch, R.R. Freeman, L.Gremillet, T. Hall, S.P. Hatchett, J.M. Hill, J.A. King, R Kodama, J.A. Koch, M. Koenig, B.F. Lasinski, B. Langdon, A.J. MacKinnon, E. Martinolli, P.A. Norreys, P. Parks, E. Perelli-Cippo, M. Rosenbluth, C. Rousseaux, J.J. Santon, R.A. Snavely, R. Stephens, M Tabak, K Tanaka, and R Town

The Keynote Speech will be given by *M.H. Key*

- 4:30-5:00 p.m. Study of Dipole-Assisted Inertial Electrostatic Confinement
George H. Miley, Hiromu Momota, Rob Thomas, and Yoshi Takeyama
- 5:00-5:30 Rational Paradigm of Plasma Physics
V.I. Erofeev
- 5:30-6:00 Low Energy Nuclear Reactions In Reproduced Experiments
And Explained As Picometer-Megasecond Reactions
H. Hora, G.H. Miley, X.Z. Li, J.C. Kelly and F. Osman
- 6:00-6:30 From Cold Fusion to Condensed Matter Nuclear Science - A
Chinese View on the Summary of CMNS
Xing Zhong Li

FRIDAY, 11 MARCH

Chair: Julio Puerta

- 8:30-9:30 a.m. Keynote Speech: Inertial Fusion Energy Research Progress in
China
X.T. He, W.Y. Zhang, and Chun-Fu Ye

The Keynote Speech will be given by *X.T. He*

Inertial Confinement and Other

- 10:00-10:40 D-D Fusion Neutrons from a Strong Spherical Shock Wave
Focused on a Deuterium Bubble in Water
Michel Laberge
- 10:40-11:20 Laser-Plasma Experiment and PIC-Simulation To Study
Dynamics and Energetics of ICF-Plasma in a VISTA-Type
Rocket with Dipole Magnetic Field
Yu.P. Zakharov, H. Nakashima, A.V. Melekhov, K.V. Vchivkov
- 11:20-12:00 Thermonuclear Fusion, NPT, and CTBT
V.N. Mokhov

Chair: Richard E. Siemon

Inertial Confinement and Other

- 1:30-2:30 p.m. Keynote Speech: Progress Toward Fusion Energy with Direct-Drive Krypton Fluoride Laser Drivers
Andrew N. Mostovych, Stephen P. Obenschain, and John D. Sethian
- The Keynote Speech will be given by *Andrew N. Mostovych*
- 3:00-3:40 Panel Presentation: Report from the Review Panel of Scientists and Engineers
- 3:40-4:00 Concluding Remarks
E. Panarella