The Abdus Salam International Centre for Theoretical Physics

International Workshop on Frontiers of Plasma Science

Organizer(s): Directors: S.M. Mahajan, P.K. Shukla,R. Bingham, L. Stenflo and Z. Yoshida. Local organizer: C. Tuniz
Local Organizer(s): C. Tuniz
Trieste - Italy, 21 August 2006 - 1 September 2006

Venue: Adriatico Guest House Kastler Lecture Hall

Final programme

Monday, 21 August 2006 (Room:Adriatico Guest House (Lower Level 1))

08:30 - 10:00 **Registration and Administrative Formalities**

Monday, 21 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

10:20 - 10:30 **Workshop Directors and Organizers**
Opening

10:30 - 11:30 **S.M. Mahajan** / *University of Texas at Austin, Institute for Fusion Studies, USA*
Two Fusion Reactors- The Gravitational and the Magnetic

11:30 - 12:30 **F. Pegoraro** / *Universita' di Pisa, Dept. of Physics, Italy*
Nonlinear wake waves in a plasma and single cycle pulse generation/1

12:30 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

14:00 - 17:00 **Working Groups**

18:00 - 20:00 (Room: Adriatico Guest House Cafeteria)
--- Reception ---

Tuesday, 22 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

09:00 - 10:00	**V. Krishan** / *Indian Institute of Astrophysics, Bangalore, India* **Partially Ionized Astrophysical Plasmas**
10:00 - 10:30	(Room: Adriatico Guest House Cafeteria) --- Coffee Break ---
10:30 - 11:30	**M. Yamada** / *Princeton University, Plasma Physics Lab., USA* **Magnetic Reconnection and Self-organization of Laboratory and Space Astrophysical Plasmas**
11:30 - 12:30	**S.M. Mahajan** / *University of Texas at Austin, Institute for Fusion Studies, USA* **Linear-Nonlinear Waves/2**
12:30 - 14:30	(Room: Adriatico Guest House Cafeteria) --- Lunch Break ---
14:30 - 15:30	**J. Dorning** / *University of Virginia, Charlottsville, USA*
15:30 - 16:30	**N. Shatasvili** / *Tbilisi State University, Georgia* **Dynamo and Reverse Dynamo-Acceleration/Generation of Flows**

Wednesday, 23 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

09:00 - 10:00	**F. Pegoraro** / *Universita' di Pisa, Dept. of Physics, Italy* **Nonlinear wake waves in a plasma and single cycle pulse generation/2**
10:00 - 10:30	(Room: Adriatico Guest House Cafeteria) --- Coffee Break ---
10:30 - 11:30	**M. Yamada** / *Princeton University, Plasma Physics Lab., USA* **Recent Development of Magnetic Reconnection Research for Laboratory and Space Astrophysical Plasmas**
11:30 - 12:30	**V. Krishan** / *Indian Institute of Astrophysics, Bangalore, India* **Partially Ionized Astrophysical Plasmas**
12:30 - 14:00	(Room: Adriatico Guest House Cafeteria) --- Lunch Break ---
14:00 - 17:00	**Working Groups**

Thursday, 24 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

09:00 - 10:00	**W. Dorland** / *University of Maryland, College Park, USA* **Landau Damping and Irreversibility in Numerical Simulations**
10:00 - 10:30	(Room: Adriatico Guest House Cafeteria) --- Coffee Break ---

10:30 - 11:30 **D. Gomez** / *University of Buenos Aires, Argentina*
Magnetic Fields in Astrophysics

11:30 - 12:30 **Z. Yoshida** / *University of Tokyo, Graduate School of Frontier Science, Chiba, JAPAN*
Variational Principle and Topology of Plasma Structures

12:30 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

14:00 - 17:00 **Working Groups**

Friday, 25 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

09:00 - 10:00 **W. Dorland** / *University of Maryland, College Park, USA*
Laboratory Studies of Turbulence Induced by the Magnetorotational Instability

10:00 - 10:30 (Room: Adriatico Guest House Cafeteria)
--- Coffee Break ---

10:30 - 11:30 **D. Gomez** / *University of Buenos Aires, Argentina*
Reduced MHD Turbulence and Coronal Heating

11:30 - 12:30 **Z. Yoshida** / *University of Tokyo, Graduate School of Frontier Science, Chiba, JAPAN*
Magnetosphere-like Plasma Experiment

12:30 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

14:00 - 17:00 **Working Groups**

Symposium on Fascinating Nonlinear Physics (Room:Adriatico Guest House Kastler Lecture Hall) (**Sunday**)

27 August 2006

08:45 - 09:00 **R. Bingham, M. Marklund & P.K. Shukla**
Opening

Symposium on Fascinating Nonlinear Physics (Room:Adriatico Guest House Kastler Lecture Hall) (**Sunday**)
Chairperson: L. Stenflo

27 August 2006

09:00 - 09:30 **Chuan Sheng Liu** / *University of Maryland, College Park, USA*
Laser Plasma Acceleration of Charged Particles

09:30 - 10:00 **G. Brodin** / *University of Umea, Sweden*
Unruh Radiation - and how to (not) Detect it

10:00 - 10:30 **L.O. Silva** / *Instituto Superior Tecnico, Lisbon, Portugal*
Challenges for Relativistic Plasma Astrophysics

10:30 - 11:00 (Room: Adriatico Guest House (Lower Level 1))
--- Coffee Break ---

Symposium on Fascinating Nonlinear Physics (Room:Adriatico Guest House Kastler Lecture Hall) (**Sunday**)
Chairperson: Chuan Sheng Liu

27 August 2006

11:00 - 11:30 **L. Stenflo** / *University of Umea, Sweden*
Stimulated Scattering of Electromagnetic Waves in Various Plasmas, e.g. Quantum Plasmas

11:30 - 12:00 **M. Marklund** / *University of Umea, Sweden*
New Understanding of the Monsters of the Oceans

12:00 - 12:30 **R. Bingham** / *Rutherford Appleton Lab., U.K.*
Collective Neutrino Plasma Interactions

12:30 - 13:00 **J.J. Rasmussen** / *Risoe National Lab., Roskilde, Denmark*
Collapse Dynamics, Singularity Formation and Regularization

Monday, 28 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)

08:45 - 09:00 **R. Bingham, P.K. Shukla & L. Stenflo**
Opening

Monday, 28 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: P.K. Shukla

09:00 - 10:30 **R.Z. Sagdeev** / *University of Maryland, College Park, USA*
Unsolved Misteries of Nonlinear Plasma Behavior

10:30 - 11:00 **H. Schamel** / *Universitaet Bayreuth, Germany*
Plasma Processes Ruled by Phase Space Vortices

11:00 - 11:30 (Room: Adriatico Guest House Cafeteria)
--- Coffee Break ---

11:30 - 12:00 **J.T. Mendonca** / *Instituto Superior Tecnico, Lisbon, Portugal*
Time Refraction and the Quantum Vacuum

Monday, 28 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: R. Bingham

12:00 - 12:30 **I. Kourakis** / *State University of Ghent, Belgium*
Oblique Electromagnetic Modulated Envelope Structures in e-p-i and Pair Ion Plasmas

12:30 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

Monday, 28 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: N. Gulley

14:00 - 14:30 **J. Dorning** / *University of Virginia, Charlottesville, USA*
Multiple Undamped Collective Waves and Final States in Nonlinear Landau Damping

14:30 - 15:00 **B. Eliasson** / *Ruhr-Universitaet Bochum, Germany*
Relativistic Bernstein-Greene-Kruskal Modes in Plasmas - Theory and Simulations

15:00 - 15:30 **O. Ishihara** / *Yokohama National University, Japan*
Quantum Mechanical Approach to Complex Plasmas

15:30 - 16:00 (Room: Adriatico Guest House Cafeteria)
--- Coffee Break ---

16:00 - 17:30 **Discussion**

Tuesday, 29 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: R.Z. Sagdeev

09:00 - 09:45 **G. Morfill** / *Max-Planck Institute for Extraterrestrial Physics, Garching bei Munchen, Germany*
Collective Phenomena in Complex Plasma

09:45 - 10:15 **E. Stoffels-Adamowicz**
Cold plasma - Bactericidal and Bacteriostatic Functions

10:15 - 10:45 **G. Sorasio** / *Universidade Tecnica, Lisbon, Portugal*
Laser Plasma Interaction with Multi Layer Targets: Ion Acceleration and Ion Heating

10:45 - 11:15 (Room: Adriatico Guest House Cafeteria)
--- Coffee Break ---

Tuesday, 29 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: O.A. Pokhotelov

11:15 - 12:00 **P.K. Shukla** / *Ruhr-Universitaet Bochum, Germany*
Collective Interactions in Quantum Plasmas

12:00 - 12:30 **L.O. Silva** / *Instituto Superior Tecnico, Lisbon, Portugal*
Ultra Strong Collisionless Shocks Driven by Laser Pulses

12:30 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

Tuesday, 29 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: G. Murtaza

14:00 - 14:30 **F.G. Verheest** / *State University of Ghent, Belgium*
Acoustic Modes in Pair Plasmas

14:30 - 15:00 **M.E. Dieckmann** / *Ruhr-Universitaet Bochum, Germany*
Microphysics of Collision-less Shocks and Fore Shock: Observations Versus Simulation

15:00 - 15:30 **G.H. Brodin** / *University of Umea, Sweden*
Alfvén waves, nonlinear wave couplings and inertial MHD.

15:30 - 16:00 (Room: Adriatico Guest House Cafeteria)
--- Coffee Break ---

16:00 - 18:00 (Room: Adriatico Guest House (Lower Level 1))
POSTER SESSION

18:30 - 20:30 (Room: Adriatico Guest House Cafeteria)
--- Reception ---

Wednesday, 30 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: F. Verheest

09:00 - 09:30 **O.A. Pokhotelov** / *Institute of Physics of the Earth, Moscow, Russian Federation*
Non-Maxwellian Effects in Magnetosonic Solitons

09:30 - 10:00 **P.L. Sulem** / *Observatoire de la Cote d'Azur, Nice, France*
A FLR-Landau Fluid Model for the Simulation of Alfven Wave Cascade and Mirror Structures in a Collisionless Plasma

10:00 - 10:30 **G. Murtaza** / *Government College University, Lahore, Pakistan*
Color Collective Modes of QGP and Modes of Ultra-relativistic Electron Plasma

10:30 - 11:00 (Room: Adriatico Guest House Cafeteria)
--- Coffee Break ---

Wednesday, 30 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: J.T. Mendonca

11:00 - 11:30 **F. Peano** / *Politecnico di Torino, Italy*
Kinetic Effects in the Collisionless Expansion of Spherical Nanoplasmas

11:30 - 12:00 **R.A. Cairns** / *University of St. Andrews, UK*
Cyclotron Maser Instabilities

12:00 - 12:30 **M. Marklund** / *University of Umea, Sweden*
Nonlinear QED in Magnetized Plasmas

12:30 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

Thursday, 31 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: R.A. Cairns

09:00 - 09:45 **B. Lembege** / *Centre de Recherches en Physique des Environnements Terrestres et Planetaires, Velizy, France*
Dynamics of Electrons Reflected at Collisionless Shock Front

09:45 - 10:15 **V. Krasnosselskikh** / *C.N.R.S., Orleans, France*
Beam-plasma Interaction in Inhomogeneous Plasmas, Theory and Simulation versus Observations

10:15 - 10:45 **H. Saleem** / *PINSTECH, Islamabad, Pakistan*
Theoretical Analysis of Pair-Ion Plasmas in the Light of Recent Experiments

10:45 - 11:15 (Room: Adriatico Guest House Cafeteria)
--- Coffee Break ---

Thursday, 31 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: L. Stenflo

11:15 - 11:45 **J.J. Rasmussen** / *Risoe National Lab., Roskilde, Denmark*
Turbulence and Intermittent Transport in Magnetized Plasmas

11:45 - 12:15 **F. Haas** / *UNISINOS, Sao Leopoldo, Brazil*
Exact Harris Sheet Solutions for Magnetized Quantum Plasmas

12:15 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

Thursday, 31 August 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: J.J. Rasmussen

14:00 - 14:30 **C. Mazelle** / *C.N.R.S., Toulouse, France*
Production and Transport of Energetic Particles Upstream from a Collision-less Planetary Bow Shock

14:30 - 15:00 **A. Fruchtman** / *Holon Institute of Technology, Israel*
Pressure Balance of Neutrals, Plasma and Fields in Space and Laboratory

15:00 - 15:30 **D. Jovanovic** / *Institute of Physics, Belgrade, Serbia*
Kinetic Phase Space Structures in Magnetized Space Plasmas

15:30 - 16:00 (Room: Adriatico Guest House Cafeteria)
--- Coffee Break ---

16:00 - 17:30 **Discussion**

20:00 - 22:00 (Room: Adriatico Guest House Cafeteria)
--- Dinner ---

Friday, 1 September 2006 (Room:Adriatico Guest House Kastler Lecture Hall)
Chairperson: B. Lembege

09:00 - 09:45 **R. Bingham** / *Rutherford Appleton Lab., Didcot, UK*
Physics of Coupled Drift Wave-Zonal Flow Systems

09:45 - 10:15 **I. Potapenko** / *Keldysh Institute of Applied Mathematics, Moscow, Russian Federation*
Computing Methods for the Nonlinear Landau-Fokker-Planck Equation and Applications for Collisional Plasma Problems

10:15 - 11:00 **P.K. Shukla** / *Ruhr-Universitaet Bochum, Germany*
Nonlinear Aspects of the Solar Coronal Heating

11:00 - 11:15 **S.M. Mahajan, P.K. Shukla, R. Bingham, L. Stenflo, Z. Yoshida**
Closing Session