
Guest Editor's Preface: Second International Conference on the Frontiers of Plasma Physics and Technology

The Second International Conference on the Frontiers of Plasma Physics and Technology was held in Goa, India, from February 21–25, 2005. This conference explored a number of fundamental and applied plasma physics topics. Special attention was focused on the exploration of frontiers in physics and technology of high energy density plasmas—a topic growing at a very fast pace due to the emergence of extremely powerful laser sources. Reviews on activities and new opportunities for large laser facilities in prominent laboratories of Asia, Europe, and Canada were presented. Talks on recent advances on laser driven Wakefield particle acceleration scheme were very exciting. This technology has a strong potential of revolutionizing the existing accelerator physics, technology, and radiation sources such as synchrotrons and X-ray free-electron lasers. Discussions were also given on the generation of extreme physical conditions similar to those existing in astrophysical objects, under laboratory conditions using intense lasers. This technique may lead to an easy and inexpensive way to simulate and understand a variety of astrophysical phenomena. This aspect of realization of astrophysical conditions in a laboratory has now become reality, and soon may lead to routine experiments. New applications of laser in the designs of light-crafts may soon become reliable.

A number of long existing but still growing and promising plasma technologies and their recent advances were vigorously discussed. These technologies have made valuable contributions to the economy all around the world. Such applications include plasma-assisted coating of fabrics, mine detection, laser micro-ablation, creation of nano materials of different structures, preparation of thin films of required hardness, optical quality, and meteorological studies. These are expected to be booming cross-disciplinary plasma technology of the future. There were several presentations on the development of new super-radiant, coherent, and incoherent radiation sources. Applications and progress of high harmonic emission and X-ray emission from solids and clusters were discussed.

Another important topic covered in the conference includes the study of blast waves in warm dense matter and more generally the interaction of intense electromagnetic fields

with plasma. To explore EOS of matter at high pressures, a long-thought question, how can we reach states outside the Hugoniot, was posed? Several suggestions like using porous target material, pre-compression, a double shock technique, and the use of release states along with relevant theoretical aspects were vigorously discussed. The exciting application of plasma physics theory contributing to our understanding of fundamental particle such as quark-gluon plasma and spatial photon localization etc. . . were also presented.

Prospects of future fusion energy technologies like controlled fusion (laser driven inertial confinement, fast ignition, heavy ion beam fusion, magnetic confinement schemes like tokamak, stellarators, other hybrid schemes etc. . .) were comprehensively discussed and debated. Very high current charged particle beam propagation in solids, relevant to high-intensity laser-solid interactions and fast ignition, were explored by revisiting the Alfvén limit. Various important contributions to the health sciences like painless dentistry, XUV radiation damage threshold, both single strand and double strand breaking of DNA structure were also discussed. D. Jaroszynski (UK) and A. Sen (India) reviewed the scientific activity of the conference.

International advisory committee consisted of D. Batani (Italy), G. Furlan (Italy), J. Grun (USA), M. H. A. Hassan (Italy), J. Honrubia (Spain), H. Hora (Australia), P. K. Kaw (India), T. Kawabe (Japan), O. Khrokin (Russia), A. J. Louzeiro-Malaquias (IAEA), J. T. Mendonca (Portugal), P. Mulser (Germany), S. Nakai (Japan), N. Rudraiah (India), P. Sakanaka (Brazil), B. Sinha (India), F. Verheest (Belgium), and J. Zhang (P.R. China).

Conference was sponsored by Devi Ahilya Vishwa Vidhyalaya (Indore, India), Institute for Plasma Research (Gandhinagar, India), IUPAP (USA), IAEA, Laser Technologies Ltd. (St. Petersburg, Russia), National Research Institute for Applied Mathematics (Bangalore, India), and Universit di Milano-Bicocca (Milano, Italy). T. Desai, H. C. Pant, A. Sen, and K. P. Maheshwari directed the conference.

More than 130 delegates from all the continents actively participated in the conference and about 70 delegates were from overseas. We take this opportunity to extend our special thanks to all the delegates and authors for their valuable

contribution to the success of the conference. Thirty papers from this conference will appear in forthcoming issues of *Laser and Particle Beams*. Our special thanks are due to referees for their critical referring of the manuscripts and valuable suggestion. We earnestly thank Prof. Hoffmann, Editor in chief, *Laser and Particle Beams* for careful scrutinizing of the papers of interest to *Laser and Particle Beams* readers.

Tara Desai
Dipartimento di Fisica "G.Occhialini"
Universita degli Studi di Milano-Bicocca Milano, Italy
and
H.C. Pant
Bhabha Atomic Research Centre, Mumbai, India