

PREFACE

SIXTH ITER INTERNATIONAL SCHOOL (2012)

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The sixth in the series of ITER International Summer Schools (renamed this time as ITER International School—IIS2012) was held December 2–6, 2012, at Ahmedabad, India. IIS2012 was jointly organized by the Institute for Plasma Research (IPR) and ITER-India (the Indian domestic agency for ITER). The five previous ITER International Schools had been held in Aix-en-Provence, France (2007, 2009, and 2011); Fukuoka, Japan (2008); and Austin, Texas, United States (2010). The purpose of the ITER International Schools is to prepare young researchers for mastering the current and anticipated challenges of magnetic fusion devices and to spread the global knowledge required for a timely and competent exploitation of the ITER physics potential.

ITER (www.iter.org) is one of the largest and most ambitious international science projects ever undertaken in the world. Countries from seven ITER members (China, the European Union, India, Japan, Republic of Korea, Russian Federation, and the United States), representing over half of the world's population, have joined in the mission to construct and operate the large-scale ITER experimental facility at Cadarache, in southern France. The objective of ITER is to demonstrate the feasibility of producing net energy from thermonuclear fusion reactions. ITER will nominally operate at a net fusion power gain $Q = 10$ by producing 500 MW of fusion power against an input power of 50 MW. It will also try to push fusion physics and engineering into the regime of “burning plasmas,” in which the nuclear reactions continue to fuel themselves with little or no externally supplied heating. Achieving this regime will cross a new scientific frontier.

“Radio-Frequency Heating and Current Drive in Plasmas” was the theme for IIS2012. The program of lectures covered the following range of topics:

- fundamentals of current drive and efficiency of ion cyclotron (IC) heating and current drive (H&CD), lower hybrid current drive (LHCD), and electron cyclotron (EC) H&CD
- experimental results on application of radio-frequency (rf) H&CD systems to fusion plasmas
- simulation capability for rf H&CD systems in fusion plasmas
- aspects of noninductive scenarios with rf H&CD systems
- challenges and status of physics and technology of research and development for IC H&CD, LHCD, and EC H&CD.

IIS2012 had a large attendance consisting of graduate students, postdoctoral researchers, and young scientists. The 20 lecturers came from 8 different countries (France, India, Italy, Japan, Republic of Korea, Switzerland, the United Kingdom, and the United States) and from the ITER Organization. The 75 participants were from 36 institutions in 12 countries (Brazil, China, France, India, Japan, Nepal, Republic of Korea, Russian Federation, Sweden, Switzerland, Ukraine, and the United States). At the closing ceremony on the last day, all the participants received a Certificate of Participation.

IIS2012 was held at the Gateway Hotel Ummed, which is located close to the campus of IPR. The participants and lecturers were mostly accommodated at this hotel and at the neighboring Hotel Pristine Residency. A few participants stayed at the IPR Guest House. The IIS2012 banquet was hosted by the

director of IPR on the IPR premises. On that occasion the participants also had an opportunity to visit the various laboratories of IPR.

Our sincere thanks to the eminent lecturers who gave very well prepared and highly informative presentations and also spent time interacting with the participants. We greatly appreciate their contribution toward the success of IIS2012. We are also grateful to Dr. David Campbell for inaugurating IIS2012 and for delivering the opening overview talk. We are very pleased that *Fusion Science and Technology (FS&T)* has agreed to publish the IIS2012 refereed lectures, and we would like to express our appreciation to Dr. Nermin Uckan, the editor, for her significant help and support in this matter. Of the 20 lectures, 12 are published in this issue of *FS&T*. Most of the other lectures are included as extended abstracts with references in Appendix A of this issue. The actual lecture presentations, along with many photographs, are posted on IIS2012's Web site: <http://www.iter-india.org/iis2012>.

We are grateful to IPR and ITER-India for their sponsorship and financial support to IIS2012. We would also like to acknowledge the significant contributions of the two scientific secretaries of IIS2012, Dr. R. Ganesh and Dr. I. Bandyopadhyay, who between them shared all the responsibility related to organization of the program, soliciting the lecturers, and coordinating the local arrangements. Special thanks are due our group of student volunteers: Aditya K. S., Harish Charan, T. Shekar Goud, Sushil K. Singh, and Akanksha Gupta—and the team from the computer centre: Govind Lokhande, Hemant Joshi, Arvind Kumar, and Avadhesh Maurya, for their invaluable help in the various activities of IIS2012. We also wish to thank P. K. Atrey, Harshad Chamunde, Hitesh Mehta, Nilay Adhvaryu, and M. Sourabhan for providing excellent administrative support.

This was the first time that the ITER International School was held in India, and it was an enriching experience for all of us who attended it. This special issue of *FS&T* provides a record of the rich academic content of IIS2012 that, I hope, will serve as a valuable addition to the global knowledge pool in support of the ITER project.



Participants at the Sixth ITER International School (2012)