

Issue 01  
January 2015

# The Fourth State

Newsletter of the Institute For Plasma Research, Gandhinagar, Gujarat (India)

*From the editorial desk*

*The editorial committee of the IPR newsletter wishes to thank all the IPR staff members for their encouragement and support that they have given to the revived newsletter. We hope that this will continue for all the forthcoming issues of "The Fourth State". Please feel free to send any comment / suggestion to the committee at <newsletter@ipr.res.in> for improvement of the look and contents of the newsletter. The newsletter team also extends their best wishes for the new year ! Thank you..*

*The Newsletter Team*

*Wishes You All*

*A Very Happy*

2015

## **Indo-Czech Cooperation Workshop on Monte Carlo Simulation and Applications for Plasma & Tokamak Physics @ IPR**

As part of the DAE Diamond Jubilee year programme, a one-day workshop on Monte Carlo Simulations and their applications for plasma physics was conducted in IPR in collaboration with the Department of Physics, Faculty of Science, MS University Baroda was organized by IPR on the 5<sup>th</sup> December 2014. The workshop was part of a three week Indo-Czech cooperation programme in applications of M-C techniques for nuclear research. The workshop at IPR started with the inaugural address by Mr. P.K. Atrey, the administration head of IPR, followed by talks by IPR scientists on application of M-C techniques for various aspects of plasma & tokamak physics. The speakers were Dr. R.Ganesh, Dr. Devendra Sharma, Dr. P.N. Maya and Dr. P.V. Subhash. An introductory lecture to nuclear fusion and ITER-India was given by Dr. Indranil Bandyopadhyay. The team visited both Aditya tokamak and basic physics labs at IPR. The soft copies of the lectures were also circulated among the participants.



The participants of the 1-day workshop on Monte Carlo Simulations and their applications for plasma physics

The 28th Annual day of IPR was celebrated on 29th October 2014. The Theme of this year was “UNISON– The essence of unity”. The event was inaugurated by Prof D Bora and Mes. Bora lighting the lamp, followed by a prayer a classical dance recital. The cultural programme that followed had dances, songs and instrumental performances by the members of IPR family, followed by a musical orchestra and DJ. The OSMI award for this year was awarded to Mr. Prakash Mokaria, Scientific Assistant-B of the Diverter and First-Wall Division. The wonderful evening ended with an extended *garba* dance. The prizes for various events organized by the staff club during the course of the year were also given away during the evening. More than 1200 people, including staff members and their family members attended the function.



A collage of the various events that took place during the annual day celebrations

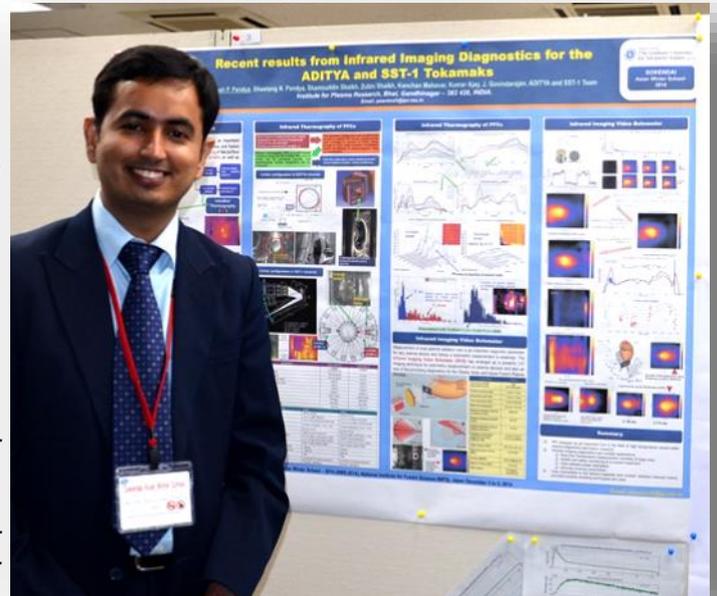
### IPR @ Conferences

Santosh P. Pandya of the Diagnostics Group attended the Sokendai Asian Winter School – 2014 (AWS-2014) held at the Graduate University for Advanced Studies (SOKENDAI), Department of Fusion Science, National Institute for Fusion Science (N.I.F.S.), Toki City, Gifu, Japan. The topic of the school was “Multiple Approaches in Plasma Physics and Fusion Science” along with “Toki Lectures on Simulation Science 2014”. Of the 30 students selected from 106 applicants, 12 students from Japan, 3 students from China, 2 students each from Indonesia, Taipei, Nepal, France and Russia, respectively, and one student each from Italy, India, Austria, Korea and Thailand, respectively.

Santosh Pandya also presented two posters at the school, viz.,

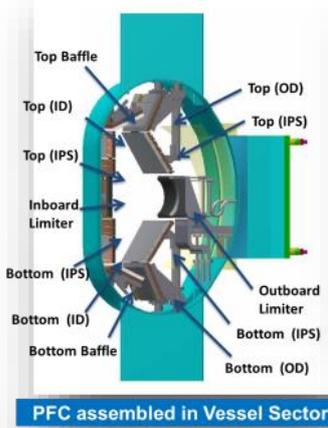
“Recent results from Infrared Imaging Diagnostics for the ADITYA and SST-1 Tokamaks” and

“Development of a 0-D code for the simulations of runaway electron production, energy dynamics in Tokamaks and benchmarking of the code”.

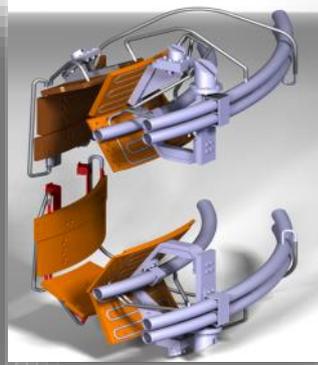


## SST-1 News

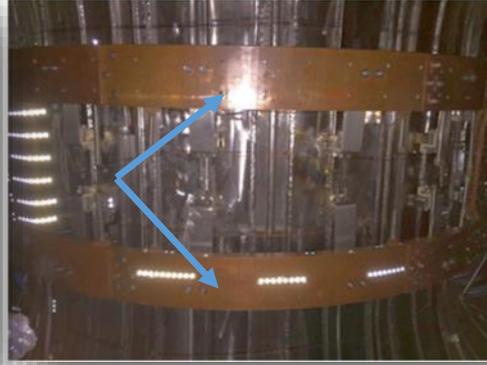
SST-1 machine is currently undergoing a major up gradation since Oct 01, 2014 after a total 11 successful experimental campaigns. Some of the sub systems of SST-1 are being upgraded and some new systems are being installed in the machine. Up gradation of SST-1 comprises installation of Plasma facing components with tubing connections in the vacuum vessel, modification of hydraulics for the super conducting Poloidal field coils, Fabrication and installation of new in-vessel controlling coil, Installation of additional diagnostics, Hydro test of high pressure and low pressure Helium gas tanks, up gradation of data acquisition system and installation of 80K Booster system. All the components are being rigorously tested before their integration on to SST-1 machine. For this, new test facilities have also been developed. These activities are planned to be completed by April, 2015 and experimental campaigns are planned to be initiated soon thereafter.



**PFC assembled in Vessel Sector**



**1/16th View of PFC assembly**



**Installation of Inner Passive stabilizer back plates in SST-1 Vacuum Vessel**



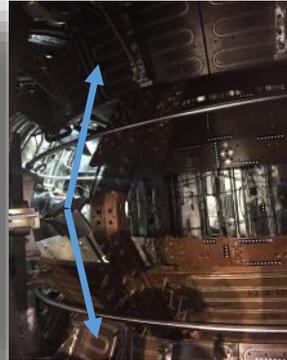
**Inner Passive stabilizer Lap joint location**



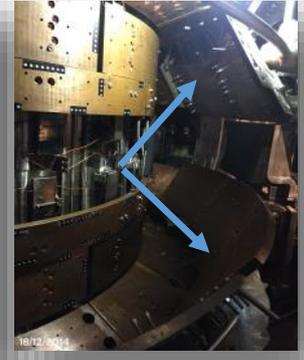
**Top & Bottom Inner divertor plate installed in SST-1 Vacuum Vessel**



**Top & Bottom Main baffle back plate installed in SST-1 Vacuum Vessel**



**Top & Bottom Outer divertor plate installed in SST-1 VV**



**Top & Bottom Outer passive stabilizer plate installed in SST-1 VV**

Plasma facing components of SST-1 are planned to be installed in the two phases. All the copper back plates are being installed without the graphite tiles for the marking and fixing of the Inconel supports on Vacuum vessel. There after, all the plates would be removed and baked graphite tiles will be mounted with back plates. These components then will be bolted with the end supports welded earlier. Installation of headers and tubing connection would be carried out after the final installation of back plates with graphite tiles.

With a very eventful and successful year 2014 in SST-1 coming to an end, a get together of SST-1 family was arranged on 24th December, 2014 in the SST-1 hall. Prof. Dhiraj Bora, Prof. Amita Das and colleagues from SST-1 sub systems, SST-1 diagnostics, administration, purchase, stores and account participated in this get together. Dr. Pradhan began the ceremony by giving a brief account of the progress of SST-1 till date and the progress of SST-1 up-gradation activities. This was followed by a brief address of Prof Bora and the gathering ended with a high tea.



**Prof. D Bora, Dr. S. Pradhan and Dr. Vipul Tanna interacting with the SST- 1 family and guests during the get together.**

The Plasma-2014 was organized by the Mahatma Gandhi University, Kottayam from 8-11 December 2014. More than 120 participants from IPR took part in this symposium and presented their work in the form of posters and oral talks. This symposium also had an international flavour and many experts in the area of plasma processing were present at the conference. The conference keynote address was delivered by Prof P I John. The conference was preceded by a workshop on plasma technologies for nano-technology applications. Dr. Mukherjee inaugurated this workshop. The Parvez Guzdar Young Scientist award was presented to Dr. Amit Lad, TIFR Mumbai for his outstanding work on laser-plasma interactions.

There were more than 35 invited talks and over 25 oral presentations and over 400 posters in the conference which saw a participation of more than 300 people from India & abroad. The main theme of the conference was "Plasma & Nanotechnology"

Over 21 awards were presented to both poster and oral presentations of contributed papers in the conference.



Dr. Mukherjee inaugurating the pre-conference workshop, Dr. Ramasubramanian and Dr. P N Maya giving their lectures at the workshop



IPR participants enjoying the boat ride in the backwaters of Kottayam organized as part of Plasma 2014



Dr. Mukherjee presenting the Parvez Guzdar Young Scientist award to Dr. Amit Lad of TIFR Mumbai and Prof P I John presenting the Buti Young Scientist award to Uday Chakravarty of RRCAT, Indore

More than 13 participants from IPR/FCIPT/ CPP/ITER-India won awards for their poster / oral presentations at the Plasmæ 2014. These awards were supported by PSSI and other sponsors. The newsletter team congratulates them on this achievement.

Development Of IECF Based Linear Neutron Source At CPP-IPR And Its Current Status	Neelanjan Buzarbaruah	CPP-IPR	Z H Sholapurwala award
A Tritium Transport Model For Lead Lithium Cooled Ceramic Breeder (LLCB) Test Blanket Module (TBM) System	Priyanka Bhrambhatt	IPR	Z H Sholapurwala award
Data Acquisition and Control System for the set-up of New High Heat Flux Test Facility at IPR	Sunil Balsare	IPR	Z H Sholapurwala award
Resistive wall destabilization of electron plasmas in SMARTEX-C	Lavkesh Lachwani	IPR	Poster award
Design of a Line Type Pulsed Modulator for S band Magnetron for SYMPLE.	Priyavandna Rathod	IPR	Poster award
Dust charging in the presence of magnetic field in low pressure hydrogen discharge	Deiji Kalita	CPP-IPR	Poster award
Development of Atmospheric Pressure Plasma Torch Array for Blood Coagulation	Akshay Vaid	IPR	Poster award
Effect on Electrostatic and Magnetic Fluctuations Due to Biased Electrode in ADITYA Tokamak	Parvesh Dhyani	IPR	Poster award
High-current, long-pulse plasma discharges in Aditya tokamak	Rakesh Tanna	IPR	Poster award
Relativistic electron beam driven wakefield excitation in a cold plasma	Ratan Kumar Bera	IPR	Poster award
The Usefulness of Oblique view Electron Cyclotron Emission (ECE) calculations for ITER	P V Subhash	ITER-India	Poster award
In-situ Plane Switching (IPS) heating mechanism for high density plasma source in LVPD	Pankaj Srivastava	IPR	Poster award
Fate of an electron plasma subjected to ion resonance instability: A numerical study at arbitrary aspect ratio	Meghraj Sengupta	IPR	Oral award



Lavkesh Lachwani (IPR)



Deiji Kalita (CPP)



R L Tanna (IPR)



Ratan Kumar Bera (IPR)



Meghraj Sengupta (IPR)



Neelanjan Buzarbaruah (CPP)

The new Executive Council of the Plasma Science Society Of India for the term 2015-17 was elected at the GBM meeting held during the Plasma 2014 at MG University, Kottayam. Prof Rabinranath Pal (retired from SINP Kolkata) was elected as the President and Dr. N S Saini of Gurunanak Dev University Amritsar was elected as the Vice-President. Dr. N. Ramasubramanian and Ms. Supriya Nair (both from IPR) were elected as the Secretary and Treasurer respectively.



The members of the outgoing and new Executive Committee of PSSI during the GBM held on 10th Dec 2014

### Safety Training @ IPR

First-Aid Training is being organised periodically by the Safety Section to ensure availability of sufficient number of trained manpower to respond in an eventuality needs medical attention. In continuation to this, first-aid training camp was organized at IPR by the Indian Red Cross Society (IRCS), Gujarat State Branch, Ahmedabad on 14<sup>th</sup> November 2014. A total of 30 participants attended the training. The training included practical demonstration for bandages and Cardio Pulmonary Resuscitation (CPR). As an encouragement to participants, M/s. IRCS will issue the certificates.



Training in CPR and bandaging were imparted to IPR employees

Fire Propagation is generally very fast and each minute is valuable for fighting the fire in its initial stage. Trained personnel would respond to the fire immediately and will be able to control the situation. It is also a requirement from DAE that fire fighting training should be imparted to the employees. In this context, Safety Section has organized practical demonstration of different types of firefighting equipment at IPR, FCIPT & IPR Extension Building on 27<sup>th</sup> and 28<sup>th</sup> November 2014. Very enthusiastic response has been received from the employees as well as security personnel.



IPR employees being trained in the operation of fire fighting equipment

Shri Rajubhai Parmar, Hon'ble Member of the National Commission for Scheduled Castes, Govt. Of India (A Constitutional Body under Article 338 of the Constitution of India) visited the Institute on December 24, 2014. He had a meeting with the Director and other members of the management. He expressed his satisfaction regarding the implementation of the policy by the Institute. He also appreciated the congenial working environment and the technologies developed by the Institute for green environment and advised to propagate it more especially to Municipal Bodies and Nagar Palikas such that the society gets the optimum benefit of the same.



Shri Rajubhai Parmar, Hon'ble Member of the National Commission for Scheduled Castes, during his visit to IPR

### Safety Induction Training & Safety Talk

Safety Induction Training is absolutely vital for newcomers, (direct recruitment on permanent as well as project basis, TTP students, PhD students, Post-Doctoral Fellows, Research Scholars, etc.) at our institute. Newcomers are prone to making mistakes and are at risk at workplace. Imparting of Safety Induction Training to newcomers will definitely help them to do their respective job in a safe manner. It is also our formal duty to provide relevant information towards safety. Considering the same, Safety Section has organized Safety Induction Training Program for newcomers on 1<sup>st</sup> & 2<sup>nd</sup> December 2014. A total nos. of 20 newcomers has attended the same.



Safety training for new employees at IPR



Safety Talk by Shri. S. G. Belokar

Safety Section has organised a Safety Talk on "Safety Management in Research & Development Organisation" at IPR on 21<sup>st</sup> November 2014. This talk was delivered by Shri S. G. Belokar, General Manager (SH&E), Heavy Water Board, Department of Atomic Energy, Mumbai. The talk covered various aspects like importance of safety in laboratories, safety system at R&D organization, safety culture, etc.

### Upcoming Events

- ◆ 17th Israeli Conference on Plasma Science and Applications (IPSTA 2017), Ariel, Israel, 16 February 2015  
<http://www.ariel.ac.il/projects/ipsta-2015>
- ◆ European Winter Conference on Plasma Spectrochemistry (EWPCS 2015), Munster, Germany, 22-26 February 2015  
<http://www.ewcps2015.org/>
- ◆ DAE Jubilee National Science Day Celebrations, IPR on 9-10 January 2015

- ◆ **Dr. Bert Ellingboe**, Dublin City University, gave a talk on “*A high efficiency, large area CCP plasma source: Scaling high-VHF rf power delivery to large areas*” on 15th December 2014
- ◆ **Mr. Vijay Bedakhale**, ITER Organization, France, gave a talk on “*ITER Assembly Approach, Planning and Current Status*” on 17th December 2014
- ◆ **Mr. Saroj Das**, IPR, gave a talk on “*ITER Library and Publication Services*” on 17th December 2014
- ◆ **Mr. Dharmesh Purohit**, IPR, gave a talk on “*ITER ECH & CD plant system and Instrumentation and Control system*” 22nd December 2014
- ◆ **Mr. Dharmendra Rathi**, IPR, gave a talk on “*ITER Ion Cyclotron Heating & Current Drive (IC H&CD) Antenna and Transmission line & Matching System*” on 23rd December 2014



*Adieu*

**Prof. Raghvendra Singh** joined IPR as Fellow on 12-May-1989. He will be retiring from IPR on 31-Jan-2015 after 26 years of service. Professor Singh was part of the theory group and was involved in research in tokamak physics. We wish him good health and a good life after his retirement from IPR.



From The IPR Archives



Construction of the IPR main building during 1985-86. (Left) The porch and library sections (Right) The electrical substation



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