

Issue 10

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The Fourth State

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

IPR Scientific Outreach Programme

Institute for Plasma Research and the Gujarat Council on Science & Technology (GUJCOST) jointly organized a training and scientific outreach programme on Plasma Science and Technology for the school and college students in Gujarat state from 11-13 September, 2015 at the Gujarat Science City. The workshop was inaugurated by Professor Dhiraj Bora, Director, IPR. In his inaugural address, Prof Dhiraj Bora told the participants that plasma science impacts daily life in many significant ways. He continued that it also plays major roles in areas like plasma processing, sterilization of medical products, lighting, and lasers. Plasma science is also important to the development of fusion as an energy source, high-power radiation sources, intense particle beams, as well as several aspects of space science.



Dr. Narottam Sahoo (GUJCOST), Prof. Dhiraj Bora, and Dr. V. B. Kamble inaugurating the event by lighting the lamp.



Dr. V. B. Kamble, Prof. Dhiraj Bora, and Dr. Narottam Sahoo releasing the book "Living with plasmas". Prof. Bora addressing the gathering.



The programme was attended by over 50 teachers and trainers from Community Science Centers, who were exposed to the field of Plasma Science & technology through a series of popular lectures, video shows, poster presentations and also hands-on experiments. Each of the participants would be provided a kit containing a DVD of all the lectures, videos on plasma, posters on Plasma, Fusion as well as societal benefits of plasma and a book entitled "Living with plasmas" which was generated by IPR.

This training programme will be organized at four different locations in Gujarat. Apart from Ahmedabad, workshops aimed at training more than 200 teachers / trainers will be held at Vadodara, Rajkot and (Lunawada) Mahisagar in association with the Community Science Centers at these locations. The trained teachers are then expected to disseminate information regarding plasma science & technology to students through the 2000 GUJCOST School Science Club Schools. A few lakh students across all 33 districts in the state are expected to be benefited by this training in the coming year.



The participants with the hands-on exhibit of a plasma discharge



View of the participants at the training programme.



The speakers from IPR (L-R) : Priyanka Patel, Tejas Parekh, Hiral Joshi, Swati Roy and Chhaya Chavda



The speakers from IPR (L-R) : K K Mohandas, N Ramasubramanian, Jyoti Agarwal, Dharmesh Purohit and V B Kamble

The concluding session of the programme was on 13th September 2015. Prof Abhijit Sen was the chief guest of the occasion. He addressed the gathering and participants as the brand ambassadors of plasma science & technology and urged them to spread the knowledge that they gained during the programme to other teachers and students all over the state. Prof Sen, Dr. Kamble and Dr. Ravi Kumar, (Coordinator, IPR outreach programme) gave away the certificates and the resource DVD to the participants.



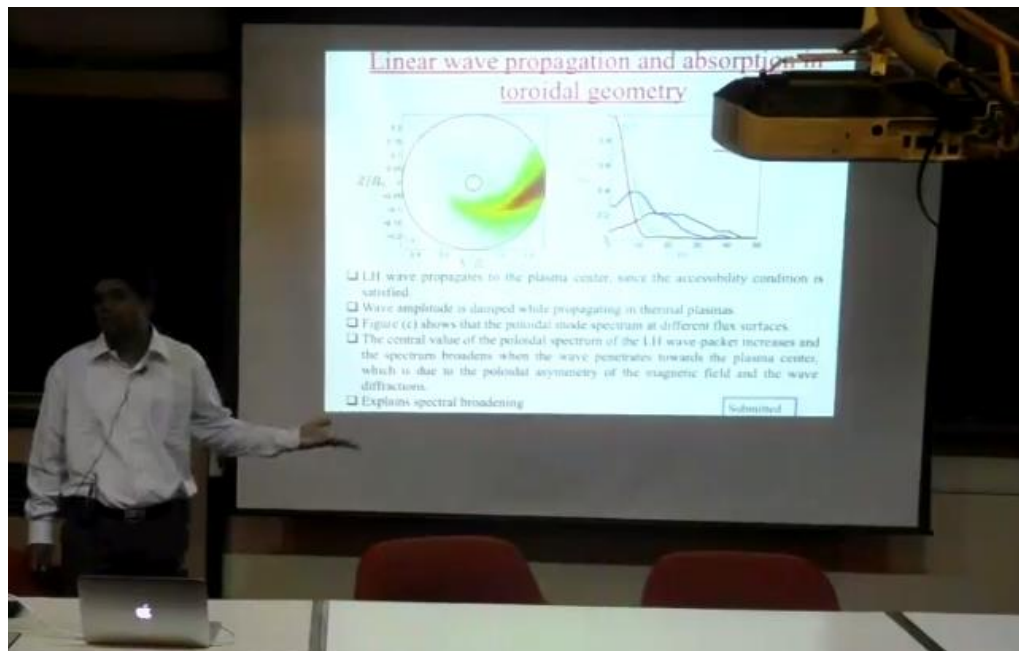
Dr. Kamble and Prof. Sen interacting with the participants. (R) Prof Sen giving away the certificates to the participants.



Prof. Sen addressing the gathering during the concluding session of the programme.



IPR staff explaining the exhibits and posters during the programme.



IPR has installed state-of-the-art audio/video system in the seminar hall which is capable of recording and webcasting events held in the seminar hall. This system was used for the first time to webcast the Talk by Dr. Animesh Kuley from UC Irving.

Using this system, IPR staff from any of the campuses can watch/listen to the lectures, seminars etc happening at IPR. More than 1000 viewers can simultaneously view the webcast.

This system also has the facility to archive the recorded talks which can then be viewed offline. Currently this facility is available only within the intranet and once the appropriate security protocols are in place, these will be viewable from outside IPR also.

Visit of Associate Director (R&D) VSSC to IPR



Shri.M.V.Dhekane
(Associate Director, VSSC)

Associate Director (R&D) of Vikram Sarabhai Space Centre -Shri.M.V.Dhekane visited IPR during 3rd & 4th September 2015 along with Dr. K. Jayakumar to introduce indigenously developed engineering analysis software at VSSC called FEAST (Finite Element Analysis of Structures). Shri. M. V.Dhekane gave an open talk on overview of various research programmes conducted by Department Of Space, specifically introducing R&D activities being conducted by VSSC. This is followed by an open talk by Dr. K. Jayakumar on introduction of the features and capabilities of FEAST software. A separate session was also arranged for the benefit of scientists & engineers at IPR to have detailed discussions about FEAST software and to explore the possibility of collaborative efforts between IPR and FEAST Team on developing modules of specific interest to IPR. This visit of scientists/

engineers from VSSC is found to be of immense interest to IPR, specifically in the area of development of finite element based engineering analysis software.



Dr. K. Jayakumar

IPR Visits by Colleges

In the month of September, students from two institutions, viz., Vidyavardhini College of Engineering and Technology, Vasai, Thane, Maharashtra (60 students from ECE Department), Sir PT Sarvajani College of Science, Surat (50 students from BSc Physics) visited IPR. Fifteen inter-disciplinary faculty from Shantilal Shah Engineering College, Bhavnagar also visited IPR during this period. This particular visit was as a part of the Technical Quality Improvement Program (TEQUIP) aimed at promoting research interests of faculties of various colleges .

The visitors were given introductory talks and visits to ADITYA, LVPD, SYMPLE, LHCD, ICRH and ECRH facilities.



The visitors at the LVPD and RF laboratories of IPR

The new Aditya vacuum vessel is currently undergoing vacuum tests. It has achieved vacuum better than 1×10^{-9} Torr. The system has been baked continuously at 150 degree C for approximately 60 hours. The pumping system for the vacuum testing consists of one turbo-molecular pump with pumping speed of ~ 2000 LPS along with appropriate backing and inter-space rotary vacuum pumps.



The new vacuum vessel of Aditya undergoing vacuum tests at IPR.

One-Day Workshop on “Applications of Cold Plasma for Surface Engineering” @ FCIPT

A one-day workshop on “Applications of cold plasma for surface engineering” was held in FCIPT on 11th September 2015. The workshop was initially inaugurated by Prof. Dhiraj Bora (Director, IPR) and Shri. R. N. Raval (Joint Commissioner of Industries, MSME) in the morning session followed by different talks delivered by the scientists on surface modification technologies based on cold plasmas. The seminar was attended by 36 participants from different industries mainly from polymer based, machinery manufacturing, Textile industries like MANTRA, WRA, ACTI, Dentists, Medical device dealers, Doctors from Medical organizations and research scholars from ICT, Mumbai. During the workshop, various topics on ranging from agriculture to machinery were discussed. After the first session, a visit to FCIPT was arranged for the delegates, where three technologies developed by FCIPT were demonstrated to them i.e., Plasma nitriding, Plasma jet and high density plasma for textile applications. After the workshop, Many industries expressed their interest in working with FCIPT on newer technologies like atmospheric plasma jet for medical application, enhancement of germination rate with plasma, textiles, etc.



Participants of the one-day workshop at FCIPT

हिंदी दिवस समारोह – 2015

प्रति वर्ष की तरह इस वर्ष भी 11 सितम्बर 2015 व 14 सितम्बर 2015 को दो दिवसीय हिंदी दिवस समारोह का आयोजन किया गया जिसमें कई तरह की प्रतियोगिताएँ रखी गईं। इनमें वैज्ञानिक एवं प्रशासनिक लेख, हिंदी पोस्टर, नारा लेखन, निबंध लेखन, समाचार वाचन, तात्कालिक भाषण, कविता-पाठ (स्वरचित) व वाद-विवाद प्रतियोगिताएँ शामिल हैं। दिनांक 10 सितम्बर 2015 तक कर्मचारियों द्वारा वैज्ञानिक व प्रशासनिक लेख एवं हिंदी पोस्टर हिंदी अनुभाग में जमा किए गए। हिंदी दिवस के उपलक्ष में पऊवि की सभी ईकाईयों में प्रदर्शन के लिए उन्हीं द्वारा निर्मित डॉ. बैनर्जी के संदेश की एक विडियो क्लिप को आईपीआर के सेमिनार हॉल में दिखाया गया व हिंदी के राजभाषा बनने की कहानी पर आधारित एक डॉक्यूमेंट्री भी दिखाई गई। 14 सितम्बर, 2015 को वाद-विवाद प्रतियोगिता रखी गई। डॉ. तेजेन कुमार बसु, डॉ. गौतम सेठिया, श्री सीवीएस राव, श्री प्रवीण कुमार आत्रेय, श्री राज सिंह, डॉ. कुमार अजय, श्रीमति रंजना मंचदा, श्री बी. के. शुक्ला एवं श्री आर. यु. पंड्या इन सभी प्रतियोगिताओं के निर्णायक रहे और श्री हरीश्वंद्र खण्डूरी ने इसका संचालन किया। इन प्रतियोगिताओं के अंत में पुरस्कार वितरण समारोह का आरंभ किया गया व विजेताओं को कार्यकारी मुख्य प्रशासनिक अधिकारी श्री पी. के. आत्रेय द्वारा पुरस्कार प्रदान किए गए।



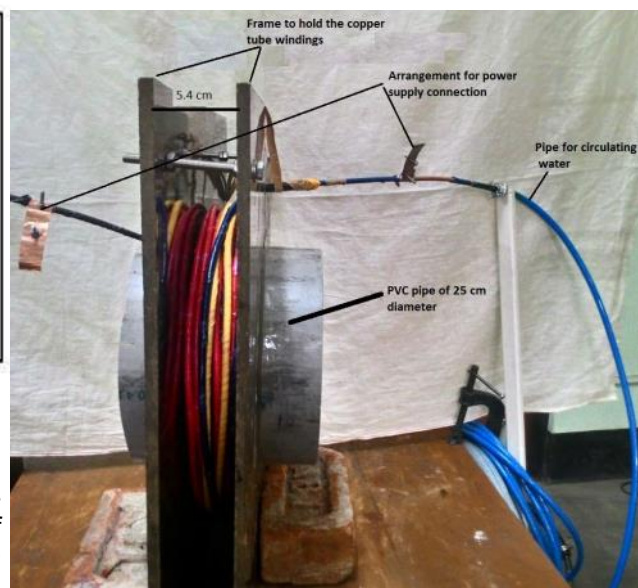
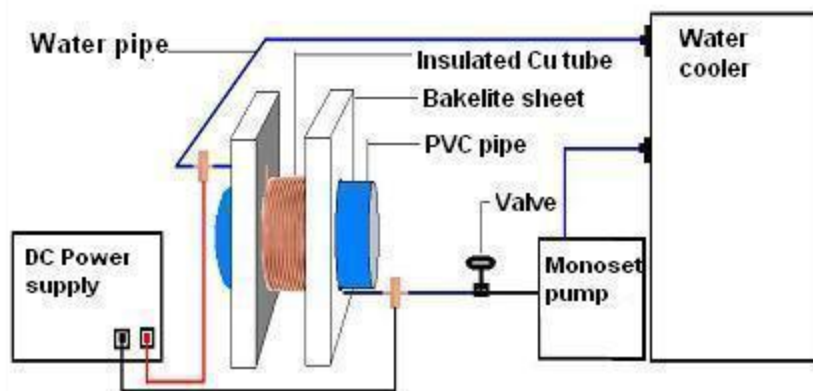
हिंदी दिवस समारोह – 2015 के कुछ दृश्य

India @ ITER

The Integrated Review on RLSB (Resource Loaded Schedule Baseline) was held from 31 Aug-11 Sept 2015, at IO, St Paul Lez Durance, France. The objective of this meeting was- review and update Resource-Loaded Schedule Baseline (RLSB) IN-DA Delegation consisting of Mr. Arun Chakraborty, Indranil Bandyopadhyay, Shambhu Nath and Malay Vora participated in the event.

Prof Y.C. Saxena participated in IAIPS (Independent Assessment of ITER Project Schedule) meeting during 23-24 Sep 2015. Experts group is doing independent assessment of ITER Project schedule. **Mr. Arun Chakraborty** participated in Conceptual Design Review of Neutral Beam Assembly on 23 Sep 2015.

The following staff from IPR recently joined IO viz., Mr. Laxmi Kant Bansal Joined in August 2015 as a Vacuum System Engineer, and Mr. Gaurav Bansal Joined in Sept 2015 as a Vacuum Line Engineer.



(L) The schematic of the solenoid system (R) The coil being tested.

A solenoid was fabricated, operated and tested in the Helicon Plasma Source (HeliPS) laboratory of CPP-IPR before the fabrication of the six solenoids that will be wrapped over the glass chamber in the helicon plasma source setup. The fabricated solenoid consists of a 25 cm diameter PVC pipe over which cylindrical hollow copper tubes of 5 mm inner and 6 mm outer diameter are wound. There are seven layers of copper tube wound over the PVC pipe of length 5.4 cm and each layer consists of seven turns. A 32 V, 60 A, DC regulated power supply is used as the source of power. The voltage is applied across the two ends of the copper tube and magnetic field produced is measured with a gauss meter. Cooling water is circulated from a chiller and monoset pump. Magnetic field is measured at the centre of the PVC pipe by changing the applied voltage. When the current is 60 amperes and voltage applied across is 7.3 volts, magnetic field of 100 gauss is obtained at the centre of the solenoid.

His Wards Now Stand Taller Than Him !



(Left) Shri. Raj Singh tending to the saplings last year. (Right) Today, the saplings have grown into tall and healthy plants !

It is not surprising that these plants are already taller than their mentor in a short span of one year, for the care and effort that he has put in to nurture them was not small by any measure. Sure, in a couple of years time, these trees would be providing the much needed shade to the pedestrians and of course, add a refreshing and vibrant green landscape to the busy 132 feet ring road. We could all be proud of him as our colleague for setting such a practical example on how one could, in one's own little ways help the environment.

Past Events @ IPR

- ◆ **Shri. M.V. Dhekane**, Associate Director, R&D, Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram, Kerala, gave a talk on "Introduction of FEAST (Finite Element Analysis of Structures)" on 4th September 2015
- ◆ **Dr. Jayakumar**, Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram, Kerala, gave a talk on "Overview of PreWin/FEAST Software" on 4th September 2015
- ◆ **Mr. Aashoo Sharma**, Institute for Plasma Research, Gandhinagar, gave a talk on "Studies on Quench Characteristics of Superconducting Magnets of SST-1" on 7th September 2015
- ◆ **Dr. Archana Lakhani**, Scientist, UGC-DAE Consortium for Scientific Research, Indore, gave a talk on "Temperature and Magnetic Field Induced Effects on Functional Magnetic Materials" on 7th September 2015
- ◆ **Dr Animesh Kuley**, University of California, California, USA, gave a talk on "Electromagnetic particle simulation of linear mode conversion of lower hybrid waves and parametric decay instability of ion cyclotron waves in tokamak" on 9th September 2015
- ◆ **Dr Surya K Pathak**, Institute for Plasma Research, Gandhinagar, gave a talk on "Millimeter Wave Fourier Transform Spectroscopy of Tokamak Plasma" on 10th September 2015

- ♦ **Mr. Abhishek Sinha**, Institute for Plasma Research, Gandhinagar, gave a talk on "Michelson Interferometer Diagnostics" on 10th September 2015
- ♦ **Prof. Kajari Mazumdar**, Department of High Energy Physics, Tata Institute of Fundamental Research, Mumbai, gave a talk on "The Unbelievable Pursuit of the Unimaginable" on 15th September 2015 (Colloquium # 253)
- ♦ **Mr. Firozkhan Pathan**, Institute for Plasma Research, Gandhinagar, gave a talk on "Hardware Upgrade of Fast Gas Injection System in DIII-D tokamak" on 21st September 2015

Upcoming Events

- ♦ Seminar on "Emerging Trends in Welding", Ahmedabad Management Association, Ahmedabad, on 10th October 2015 [http://iiwbaroda.com/17th Foundation Brochure_2015.pdf](http://iiwbaroda.com/17th%20Foundation%20Brochure_2015.pdf)
- ♦ Joint ICTP-IAEA Workshop on Radioactive Waste Management - Solutions for Countries without Nuclear Power Programme, ICTP Trieste, Italy, 2-6 November 2015 <http://indico.ictp.it/event/a14290/>
- ♦ 18th International Spherical Torus Workshop (ISTW 2015) and 2015 US-Japan Workshop on ST Plasmas, Princeton University, 3-6 November 2015 <http://istw-2015.pppl.gov/>
- ♦ 25th International Toki Conference (ITC-25), Creating the Future: Innovative Science of Plasma and Fusion, Ceratopia Toki, Toki-city, Gifu, Japan, 3-6 November 2015 <http://itc.nifs.ac.jp/>
- ♦ Magnetic Fields in Laboratory High Energy Density Plasmas (LaB), Institute for Advanced Study, Princeton, New Jersey, 11-13 November 2015 <http://pcts.princeton.edu/pcts/LaB2015/LaB2015.html>
- ♦ 57th Annual Meeting of the APS Division of Plasma Physics, Savannah, Georgia, 16-20 November 2015 <http://www.aps.org/units/dpp/meetings/annual/index.cfm>
- ♦ International Conference on Research Reactors: Safe Management and Effective Utilization, Vienna, Austria, 16-20 November 2015 <http://www-pub.iaea.org/MTCD/Meetings/PDFplus/2015/cn231/cn231Announcement.pdf>
- ♦ 9th NLTE Code Comparison Workshop, Paris, France, on 30 November - 4 December 2015 <http://nlte.nist.gov/NLTE9/>

Know Our Colleagues



Dr. Daniel Raju joined the Institute in 1990 as a Research Scholar and later, in 1995 as a Scientist. He has been involved in the development and installation of Magnetic Diagnostics system in tokamaks ADITYA and SST-1. He has been actively involved in tokamak plasma operation and control. He has also worked with the plasma control and operation experts of tokamaks TCV, DIII-D, ASDEX-U and Tore Supra (WEST).

He has keen interests in data analysis, image processing and computer modeling. For the last couple of years, he has also been looking after the International Collaborations in gap areas on fusion science and technology.



Mr. Sunil Belsare joined the Instrumentation Division of the Institute in 1993 and was involved in the design, development and maintenance of various experimental testing and measuring instruments and equipment's. He had set-up a state-of-art Calibration facility for the in-house calibration and testing of measuring of Instruments and was awarded the 1994 IPR OSMY award for the same. He was in the ECRH Division in the period 2009 -2010 with the responsibility of Data Acquisition and Control part of the acceptance tests of 82.6 GHz Gyrotron.

Since 2010 he is working with Diverter and First-wall Technology Development Division where he takes care of Instrumentation, Data Acquisition and the Control section. He has played major role in the establishment and successful commissioning of the High Heat Flux Test Facility where a 200 kW High Power Electron Beam System is used as the heat source. This system is used for the verification and testing of Plasma Facing Component and materials in Tokamaks.



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