

Issue 10

October 2014

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. Thank you..

Congratulations to ISRO !!
Success at the first attempt is always sweet !

25 SEPT 2014



MARS ORBITER MISSION
EVERY INDIAN'S PRIDE.....

On behalf of all the staff members of IPR, the IPR newsletter congratulates ISRO's scientific community for the successful insertion of the Mars Orbital Mission into the Mars orbit. This is the first time that any country has been able to do this successfully in the very first attempt. We wish them the best for all their future missions.

Wishing you all a very
Happy Dussehra !!



DAE Diamond Jubilee Activities @ IPR : Outreach Programme

The DAE Diamond Jubilee activities of IPR was inaugurated by Prof. Dhiraj Bora at a function in the Bhat village, adjacent to IPR campus on 8th October, 2014. The outreach programme, which is slated to have various programmes pertaining to empowering the people of Bhat village. The function was attended by Prof. R. Jha, Dr. Chenna Reddy, Shri P K Atrey and



Inauguration of IPR's outreach program at Bhat Village



Prof. Dhiraj Bora addressing the gathering at the inaugural function. L-R : Dr. Chenna Reddy, Shri P. K. Atrey, Prof. R. Jha, Shri Kanubhai (Sarpanch, Bhat Village) and members of the Bhat Village Panchayat.

the members of the jubilee celebrations committee. While Ms. Chhaya Chavda elaborated on the various programs that are to be held in the coming months, the Sarpanch of Bhat village, Shri Kanubhai thanked IPR for initiating this outreach programme. The first programme to be started is Data Entry training. More than 90 women and 60 men from the village have signed up for this basic course which will essentially teach the villagers how to use a PC, prepare documents in Gujarati language and also basic data entry on Excel. The first batch will begin on 13th October and will be of 10 days duration, after which certificates will be given to the participants who successfully pass the practical test at the end of the course.

Other programmes that are planned to be undertaken during the Jubilee year are ; (a) Science day for schools in Ahmedabad/Gandhinagar (b) Tech-Fest for engineering colleges in Ahmedabad/Gandhinagar (c) Popular lecture series by eminent scientists from various DAE institutions (d) Road-shows to various schools in Ahmedabad/Gandhinagar (e) Participation in Vibrant Gujarat 2015 (f) Hands-on training programme in Plasma Physics for post-graduate physics teachers in Ahmedabad/Gandhinagar. This programme will have refresher lectures in plasma physics followed by hands-on experiments in PG level plasma physics.

Professor Bora also visited the Government secondary school in the village and discussed various possibilities of IPR contributing to the development of the school infrastructure.



View of the gathering at the inauguration of the IPR outreach programme at Bhat Village.



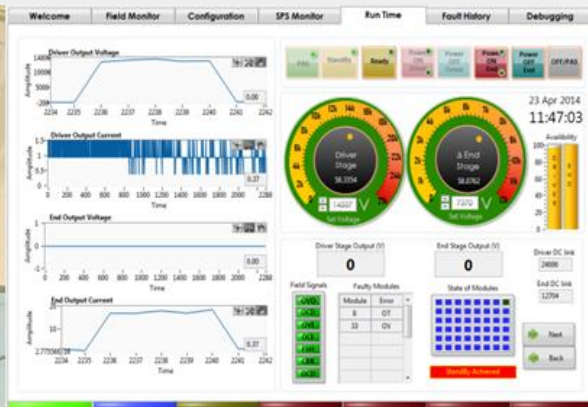
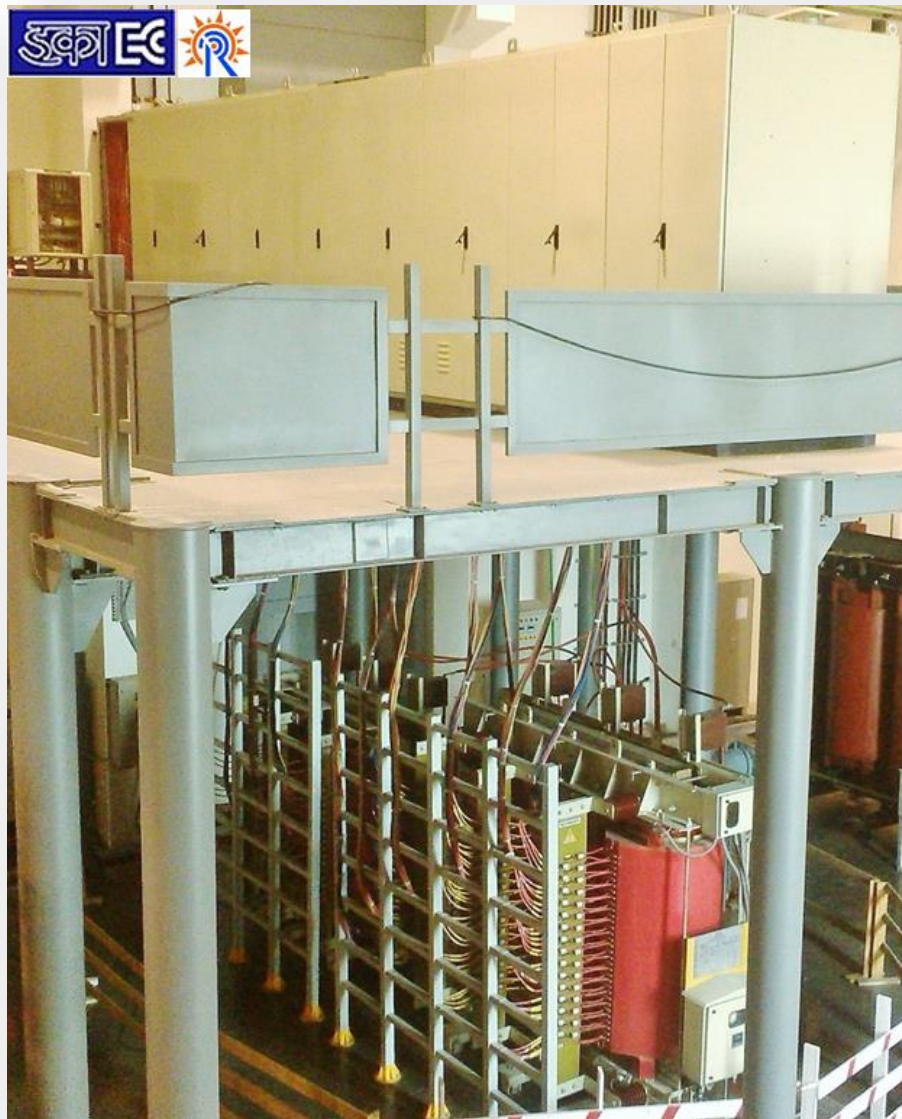
Prof. Dhiraj Bora discussing issues with the Panchayat members at the Government Secondary school at Bhat village

3MW, Dual output (27/18kV) HVPS at ITER-India lab

Under the MoU and Technology transfer agreement, M/s. ECIL has delivered 3MW High Voltage Power Supply (HVPS) with Dual output of 27/18kV. Layout for HVPS is performed to meet the building provisions at ITER site where multi-secondary CRTs are placed at ground level and SPS modules at mezzanine. Inter-connecting cables are routed through HV feed-through to maintain HV isolation.

HVPS is successfully commissioned at ITER-India lab and demonstrated for output of 27kV and dynamic requirements of programmable rise/fall time, low ripple ($\pm 1\%$), high accuracy ($\pm 1\%$), fast turn-off ($< 10\mu s$), in line with ITER specifications of IC HVPS. During the interface meeting with M/s. Thales Electron Devices at ITER-India lab, HVPS was demonstrated for performance requirement of IC RF sources R&D.

This milestone has established the participation of Indian Industry for ITER requirements of various HVPSs and domestic needs as well with BARC placing order on ECIL for 2 nos. of HVPSs.



Industrial Prototype HVPS developed by Electronics Corporation of India Ltd.

Symposium on Fusion Technology (SOFT)-2014

28th Symposium on Fusion Technology 2014 was organized this year by the Spanish Research Centre for Energy, Environment and Technology (CIEMAT) at San Sebastian, Spain during Sept 29 –Oct 3rd 2014. Over 1,000 engineers, scientists and industrial members participated in this most popular international event on Fusion Technology. IPR participation included invited talk by Prof. Dhiraj Bora, Director IPR, Oral presentation by Ashish Yadav and posters by Dinesh Sharma, Yuvakiran Parvastu, Swati Roy, Jignesh Soni and Aprajita Mukherji.



Prof. Dhiraj Bora delivering talk on Indian Fusion Technology Program



Dinesh Sharma, Yuvakiran, Prof. Bora, Swati Roy and Jignesh Soni during Poster sessions at the SOFT-2014



Ashish Yadav during oral presentation on Laser Beam Welding

प्लाज्मा अनुसंधान संस्थान में 8 सितम्बर, 2014 से 12 सितम्बर, 2014 तक हिन्दी सप्ताह समारोह का आयोजन किया गया। इस दौरान कर्मचारियों के बीच हिन्दी भाषा को बढ़ावा देने एवं जागरूकता लाने हेतु कुल 11 प्रतियोगिताओं का आयोजन किया गया - वैज्ञानिक एवं प्रशासनिक लेखन, कविता लेखन (कर्मचारियों के बच्चों के लिए), हिन्दी पोस्टर, समाचार पत्र वाचन, हिन्दी ज्ञान प्रश्नावली, नारा लेखन, निबंध लेखन, टिप्पण एवं आलेखन, तात्कालिक भाषण, वाद-विवाद और स्वरचित कविता-पाठ। संस्थान के कर्मचारियों ने बड़े ही उत्साहपूर्वक इन प्रतियोगिताओं में भाग लिया और हिन्दी सप्ताह समारोह के आयोजन को सफल बनाया। दिनांक 8 सितम्बर को कर्मचारियों द्वारा वैज्ञानिक एवं प्रशासनिक लेख हिन्दी अनुभाग में जमा किये गये एवं दिनांक 9 को हिन्दी पोस्टर और कर्मचारियों के बच्चों द्वारा लिखी कविताएं प्रस्तुत की गईं। हिन्दी पोस्टर प्रतियोगिता 'मानव जाति पर गहराया ऊर्जा संकट - समाधान के प्रयास' - इस विषय पर बहुत ही आकर्षक एवं विषय के उद्देश्य को सार्थक करने वाले पोस्टर प्राप्त हुए। समारोह के दौरान कर्मचारियों के



‘मानव जाति पर गहराया ऊर्जा संकट - समाधान के प्रयास’
विषय पर प्रस्तुत हिन्दी पोस्टर



कविता पाठ प्रतियोगिता का आनंद लेते हुए श्रोतागण

लोकोक्ति, हिन्दी साहित्यकारों से संबंधित प्रश्न पूछे गये। राजभाषा कार्यान्वयन समिति के सदस्य श्री हरीशचन्द्र खण्डूरी ने बड़े ही रोचक एवं उत्साहवर्धक शैली में इस प्रतियोगिता का संचालन किया। दोपहर में “भारत में वैज्ञानिक अनुसंधान” विषय पर नारा लेखन, तत्पश्चात् टिप्पण एवं आलेखन और हिन्दी निबंध प्रतियोगिता में कई प्रतिभागियों ने उत्साहपूर्वक भाग लिया।

दिनांक 11 सितम्बर, 2014 को तात्कालिक भाषण, वाद-विवाद एवं कविता-पाठ प्रतियोगिताओं में प्रतिभागियों का प्रदर्शन काफी सराहनीय रहा। ‘क्या भारत में सब्सिडी आवश्यक है’ - वाद-विवाद के इस विषय पर पक्ष-विपक्ष दोनों का पलड़ा भारी रहा। कविता-पाठ में प्रतिभागियों द्वारा उनकी मौलिक भावनाओं की प्रस्तुति से सभी श्रोतागण एवं निर्णायकगण आनंद विभोर हो उठे। डॉ.तेजेन कुमार बसु, डॉ.गौतम सेठिया, प्रो.रत्नेश्वर झा, श्री सीवीएस राव, श्री प्रवीण कुमार आत्रेय, श्री राज सिंह, डॉ.मनोज कुमार, डॉ.अजय कुमार, डॉ.राजु डेनियल, श्री हर्षद चामुण्डे, श्री हरीश चन्द खण्डूरी, श्री नरेशचन्द गुप्ता एवं श्रीमती संध्या पी.दवे इन सभी ने प्रतियोगिताओं के निर्णायक रहें।



हिन्दी सप्ताह समारोह में पुरस्कृत विजेता प्रफुल्लित मुद्रा में

दर्शन हेतु इन पोस्टरों का प्रदर्शन भी किया गया। 10 सितम्बर, 2014 को प्रातः समाचार वाचन के पश्चात् हिन्दी ज्ञान प्रश्नावली प्रतियोगिता का आयोजन किया गया। हिन्दी ज्ञान प्रश्नावली के अंतर्गत प्रतिभागियों को हिन्दी शब्द के पर्यायवाची शब्द, मुहावरें,



निदेशक प्रो.धीराज बोरा,
कर्मचारियों को संबोधित करते हुए

12 सितम्बर, 2014 को पुरस्कार वितरण समारोह में निदेशक डॉ.धीराज बोरा ने हिन्दी परीक्षा एवं हिन्दी टंकण परीक्षा के उत्तीर्ण कर्मचारियों को प्रमाण-पत्र प्रदान किये। उसके पश्चात् निदेशक महोदय ने हिन्दी सेमिनार और हिन्दी सप्ताह समारोह की प्रतियोगिता के विजेताओं एवं प्रतिभागियों को पुरस्कृत किया। इस अवसर पर सुश्री प्रतिभा गुप्ता ने संस्थान में हिन्दी की गतिविधियों पर विशेष प्रस्तुति दी।

Every year, Indians working at ITER organise several events to celebrate Indian festivals. It gives an opportunity for all the Indian's and their families to get together and celebrate the occasion. Navratri is one such event. This year, the Navratri celebrations were held on the 3rd day of Navratri, ie., on 27th September at *Manosque*, France, in a picturesque open area near the Vennade Lake. The function began with all the participants getting together to perform the "Mata-ni-Aarati", which was followed by "Garaba Dance" and then finally with delicious Indian meal and masala tea. Few other Indian families from Marseille and surrounding areas also participated in this event which now has become an annual event for the Indians here. Mr Sabri Derradji, Deputy Mayor, who is also in-charge of the Associations life in *Manosque*, from the Marie office of Manosque, also participated in this event along with ITER welcome office representatives. It is heartening to note that Marie Office representative join the event every year with great enthusiasm and share their views on the function and the Indian culture. Mr. Derradji was felicitated during the event by offering a floral bouquet by young children in appreciation of his participation in the event.



Mr. Sabri Derradji, Deputy Mayor, Manosque addressing the gathering as K.R. Sriram, Dr. Govindarajan, Vijay Bedakihale and Chabrand Magali look on.



The Garba dance in progress at Monosque, France.

Silver Stars Of IPR



Mr. Surendrasinh J Jadeja joined IPR Mechanical Workshop group in 1988 and was instrumental in accomplishing delicate welding process in SST-1 and other systems. An IPR OSMY award winner he is also credited with two PSSI awards for his poster presentations.



Mr. M.V. Gopala Krishna joined IPR in 1987 and has been associated with diagnostics for plasma current and position, loop voltage, poloidal magnetic field fluctuations and Impurity Radiated power loss in tokamak plasma. Currently he is associated with Aditya and SST-1 Tokamak.



Dr. D. Chenna Reddy joined the Institute in 1990. He is currently the Associate Dean (Infrastructure) and group leader to Infrastructure & Maintenance, Mechanical Engineering Services, and Chairman to the I & CDC. He also heads divisions on WC & A/C, Electrical Maintenance, Campus Maintenance, electrical Sub Station.

नगर राजभाषा कार्यन्वयन समिति द्वारा आयोजित प्रतियोगिता

गाँधीनगर की नगर राजभाषा कार्यन्वयन समिति द्वारा मुख्यालय तटरक्षक क्षेत्र (उत्तर-पश्चिम), गाँधीनगर में 19 अगस्त, 2014 को आयोजित आशुभाषण प्रतियोगिता में सुश्री प्रतिभा गुप्ता ने तृतीय पुरस्कार एवं उदयभाणसिंहजी क्षेत्रीय सहकारी प्रबंध संस्थान में 27 अगस्त, 2014 को आयोजित गीत गायन प्रतियोगिता में श्रीमती अनीता वी.पी. ने सांत्वना पुरस्कार प्राप्त किया है। हिन्दी गतिविधियों में हिस्सा लेने का उनका उत्साह सराहनीय है। इन उपलब्धियों के लिए उन्हें हार्दिक बधाई।



तटरक्षक क्षेत्र मुख्यालय (उत्तर-पश्चिम), गाँधीनगर में हिन्दी सप्ताह समारोह के उपलक्ष में 22 सितम्बर, 2014 को आयोजित स्वरचित कविता पाठ प्रतियोगिता में सुश्री प्रतिभा गुप्ता, इंजीनियर एसई को सांत्वना पुरस्कार प्राप्त हुआ।

Swachh Bharat Mission @ IPR

On October, 2nd, on the occasion of the birth anniversary of Mahatma Gandhi, IPR staff responded to the nation-wide call by our honorable Prime Minister Shri Narendra Modi for a "Swachh Bharath mission" (स्वच्छ भारत मिशन), by taking the Cleanliness Pledge (स्वच्छता शपथ). The pledge was read out by Shri. P. K. Atrey, ACAO, IPR. This was followed by a cleanliness drive by the staff members present at the occasion.



The oath taking ceremony at IPR Main Campus being led by Shri P K Atrey

The staff members at FCIPT after the cleanliness pledge. Two clean technology mission ideas mainly hybrid (solar assisted) plasma pyrolysis and industrial gaseous exhaust will be taken up on priority basis by FCIPT.



The experimental chamber of the Double Plasma Device (DPD) laboratory is the first experimental chamber bought by the institute in the early nineties. Initially it was used to produce plasma by the glow discharge process and basic studies were conducted. From 2003, using two magnetic cages filament discharge plasmas (in Argon and in Hydrogen gases) have been produced in two regions in this chamber.



Photograph of the DPD experimental setup at CPP

Full lined cusped magnetic cages confine these two regions in which plasmas are produced separately. These regions, usually separated by a grid, are called the source and target regions. As plasma can be produced, confined and studied in both the source and target regions therefore it is called a double plasma device.

The parameters of the DPD system

Length of the chamber	120 cm
Diameter of the chamber	30 cm
Length of the magnetic cage	32 cm
Diameter of the magnetic cage	25 cm
Working pressure	$\sim 10^{-4}$ mbar
Surface field strength	1.2 kG

Experiments have been conducted on plasma parameter variation in ion beam formation mode, on variations of plasma parameters and sheath thickness due to the extraction of ion and electron flux, on the role of high energetic electrons in controlling diffused plasma parameters, on the mechanical variation of diffused plasma parameters, on the growth of electron energies with ion beam injection, on influence of plasma loss area on transport of charged particles through a transverse magnetic field etc. Double plasma devices allow setting up of various experimental configurations with little effort and difficulty.

Such experimental systems are capable of allowing studies on diffused plasma characteristics, generation of electron and ion beams, launching of waves, sheath characteristics and a host of other plasma phenomena. With minor changes it can be used to conduct studies on negative ion production and its dynamics. Therefore DPDs are very versatile and attractive to conduct experiments for basic studies.

Past Events @ IPR

Dr. P. R. Vasudeva Rao, Distinguished Scientist & Director, Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, Tamil Nadu, India visited IPR on 19th September and spoke on '*R&D for Fast Reactor Programme*' in IPR colloquium series. Later in the day, he was also part of the meeting (along with Prof. D. Bora) that reviewed the work of the Test Blanket Module (TBM) group of IPR .



- ♦ **Mr. Arun Prakash**, IPR, gave a talk on "Design and Integration of ITER Diagnostics in Tokamak Complex" on 19th September 2014
- ♦ **Mr. Bharat Arambhadiya**, IPR, gave a talk on "Instrumentation and Control of ITER IC H & CD system" on 22nd September 2014
- ♦ **Dr. Gautam C Sethia**, Nonlinear Physics Division, Institute for Plasma Research, Gandhinagar, gave a talk on "Chimera freed from the constraints" (Colloquium #238) on 25th September 2014
- ♦ **Mr. Harshad Chamunde**, IPR, gave a talk on "Sensitizing Employees on Security Aspects" on 25th September 2014
- ♦ **Mr. BVVSNNP Sridhar**, IPR, gave a talk on "ITER Organization CAD DATA centralization, structure, procedures and methodologies" on 26th September 2014
- ♦ **Dr. Arun K. Bhattacharya**, IEEE APS Distinguished Lecturer, Northrop Grumman Corporation, USA, gave a talk on the topics "Efficient Shaped Beam Synthesis in Phased Arrays and Reflectors" and "Advanced Horn structures for Reflectors and Phased Arrays" on 8th October 2014

- ♦ **Mr. Rana Pratap Yadav**, DGFS Research Scholar, Institute for Plasma Research, gave a talk on "Design and developmental aspect of high power ultra-wideband 3dB hybrid coupler for the ICRF heating in tokamak" on 9th October 2014

Upcoming Events

- ♦ 67th Gaseous Electronics Conference, Raleigh, North Carolina USA, 3-7 November 2014 http://www.ne.ncsu.edu/gec2014/GEC_2014/Welcome.html
- ♦ Joint ICTP-IAEA Conference on Models and Data for Plasma-Material Interaction in Fusion Devices, Trieste, Italy, 3-7 November 2014 <https://www.amdis.iaea.org/Workshops/ICTP2014/>
- ♦ 24th International Toki Conference, Toki-city, Gifu, Japan, 4-7 November 2014 <http://itc.nifs.ac.jp/>
- ♦ US-CERN-Japan-Russia Joint International Accelerator School on "Beam Loss and Accelerator Protection", Newport Beach, California USA, 5-14 November 2014 <http://uspas.fnal.gov/programs/JAS/JAS14.shtml>
- ♦ 21st Topical Meeting on the Technology of Fusion Energy (TOFE 2014), Anaheim, California USA, 9-13 November 2014 http://www.ans.org/meetings/c_1
- ♦ Magnetic fields from the Sun to Blackholes In Memory of Jean Heyvaerts, Paris, France, 17-19 November 2014 <http://www.iap.fr/heyvaerts2014/index.html>
- ♦ The CERN Accelerator School - "Plasma Wake Acceleration", Geneva, Switzerland, 23-29 November 2014 <http://cas.web.cern.ch/cas/PlasmaWake2014/CERN-advert.html>



From The IPR Archives



The annual day of IPR is an event that most of IPR staff and their families look forward to. Usually held towards the end of the year, the fun & frolic usually begins early in the evening and extends late into the night with the customary "Garba" being the most popular item of the evening.

An image from the cultural programme of the IPR annual day function of 1997. Prathiba Gupta, Ranjana Manchanda and Chhaya Chavda (along with her daughter) sings a group song while Chandra-mouli Rotti (ITER-India), plays the harmonium.

The IPR Newsletter Team

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