

69th Independence Day Celebrations

The 69th Independence Day was celebrated with a lot of enthusiasm at IPR. The day's events began with the flag hoisting ceremony. Prof Bora hoisted the national flag which was followed by rendering of the National Anthem, after which, Prof Bora addressed the gathering. He highlighted the achievements of various departments of IPR, and stressed on the importance of working together for the progress of the Institute. Dr. Anitha and Mr. Thankey sang patriotic songs during the event. This was followed by snacks and various other programmes for children of IPR staff.



(L-R) Prof Dhiraj Bora unfurling the national flag and then addressing the gathering.



Prof Dhiraj Bora addressing the gathering after the flag hoisting ceremony



Prof Dhiraj Bora addressing the gathering after the flag hoisting ceremony



(L) Rendering of the National Anthem (R) The audience in attention during the national anthem.





(L-R) Dr. V.P. Anitha and Mr. Prashant Thankey rendering patriotic songs. Prof Dhiraj Bora addressing the gathering.

Independence Day Celebrations

After the tasty snacks that followed the flag hoisting ceremony, children of IPR staff actively participated in the drawing, quiz and fancy-dress competitions organized by the IPR Staff Club. Prizes were also distributed to the winners by both Prof. Bora and Mrs. Bora at the end of the program, which was followed by lunch.



(L) High tea after the flag hoisting ceremony (R) Gattu Ramesh conducting the quiz programme for kids.



(L) Drawing competition in progress (R) Fancy-dress competition for kids.

IPR Workshop

IPR workshop provides the basic mechanical manufacturing and fabrication services as per the requirements given by the users. The workshop has facilities for cutting, welding, milling, turning, etc. This workshop has carried out more than 1200 jobs (small and big) for various groups of the Institute. Apart from this, the IPR workshop also stocks materials required for the user's jobs. Some of the works being done at the workshop involves materials such as SS, brass, graphite, ceramic, lead and fiber-glass. The workshop has various machines required for the jobs such as lathe, milling, rolling machines. Some of the recent major systems fabricated by the workshop are the Negative Ion Extraction Chamber and the Helicon Source Plasma Chamber for CPP-IPR.



(L) View of the IPR workshop (R) The workshop staff.

Activities of Plasma Torch Laboratory @ FCIPT

Thermal plasmas are of great technological interest and industrial thermal plasma systems are in use in variety of applications ranging from plasma spraying & waste treatment, to metal melting, smelting, & spacecraft re-entry simulation. FCIPT division of IPR has been involved in developing many thermal plasma technologies for over a decade. Graphite electrode based torches have been used successfully for pyrolysis of medical and plastic waste, involving thermal disintegration of carbonaceous material in the absence of oxygen. Non-expendable electrode based torches have also been developed and used in variety of applications such as spherodization of irregular alumina, dissociation of Zircon sand etc. A new program for development of high power (100 - several 100's of kW) non-transferred plasma torches for use as high heat flux sources has been initiated, keeping in mind several high-end applications such as fusion, metallurgical, space and defense. The program comprises of two main activities: (i) Development of higher power torches (ii) Fundamental studies on the thermal plasma inside the torch.

The new plasma torch laboratory set up at FCIPT premises presently consists of two major plasma torch systems. Each system is complete with plasma torch, dc power supplies, heat exchangers, gas manifolds, computer controlled digital mass flow controllers, electric and calorimetric diagnostics and PC based controls for data acquisition and control. The 25 kW system is used to study fundamental dynamics of the plasma arc root and column fluctuations and instabilities. It has magnetic diagnostics incorporated into it and uses a sophisticated data acquisition system. Studies have revealed many interesting results, especially of the effect of the interplay between magnetic field and flow dynamics on the fluctuations.

The other system consists of a 100 kW plasma torch, 150 kW supply, enthalpy probe system and PC based interface for controls and visualization of real-time temperature data. This system is used to carry out studies at high powers, test systems for industrial adaptability and characterize the plasma plume using enthalpy probe. High power experiments and tests are presently underway for demonstrating steady-state operation. Three dimensional parametric computer models using finite-volume techniques have also been developed for designing the plasma torches, to better understand the plasma dynamics and help reduce the design cycle times.



(L) The DC, non-transferred plasma torch experimental setup. (R) Prof. D Bora visiting the plasma torch laboratory.

Cyclone Charity: Messengers on Cycles

"Sense International India" has organized the cycling event (Cyclone Charity: Messengers on Cycles) for awareness about a rare disability DEAFBLINDNESS on June 28, 2015 Sunday. The starting and finishing point for the ride was Gujarat University Convention and Exhibition Center. The 16 km cycling route was in Ahmedabad city.





The participants from IPR : Shiju Sam, Aroh Shrivastava, Ankit Gandhi, Vrushank Mehta and Narender Singh

Pressures of Modern Life !

Having a home of one's choice is a very difficult thing for most of us. While financial constraints reduce the options for human beings, it is mostly their unwarranted interference that cuts short not only the natural habitats but also puts a big question mark on the very existence and survival of lesser creatures. The reduced foliage in the campus has forced a peahen to choose a concrete home to lay



her eggs ! She would have been under tremendous pressure to find a place to nest and over and above that, protect the eggs from potential threats. This is what probably made her choose this location. The big question now is whether her fledglings would ever manage to come out of their shell and see the light of the day !



Aditya Upgrade - Update

The new vacuum vessel of Aditya was received at IPR from the fabricator M/s Godrej & Boyce Mfg. Co. Ltd., Mumbai, on 10th August 2015. The torus vessel was assembled and tested and it has passed all the acceptance tests. The ultimate vacuum with one turbomolecular pumping system was achieved up to 1.5×10^{-8} mbar. The ultimate vacuum may be improved further by more pumping and baking. All the joints were tested for leak rate better than 1×10^{-9} mbar-liter/second. This vessel can be baked up to ~ 150° C temperature.



Some of the members of Aditya group with the new vacuum vessel.





हिन्दी स्वरचित हास्य-व्यंग्य कविता-पाठ प्रतियोगिता

नगर राजभाषा कार्यान्वयन समिति, गांधीनगर के तत्वावधान में दिनांक 27 जुलाई, 2015 को आईपीआर में स्वरचित हास्य-व्यंग्य कविता-पाठ का आयोजन किया गया जिसमें गांधीनगर में स्थित केन्द्रीय सरकारी कार्यालय/संस्थान/उपक्रम/बैंक जैसे वाप्कोस लिमिटेड (भारत सरकार का उपक्रम – जल संसाधन, नदी विकास व गंगा संरक्षण मंत्रालय), राष्ट्रीय सहकारी विकास निगम, जनगणना कार्य निदेशालय, कार्यालय पुलिस उप महानिरीक्षक- मुख्यालय तटरक्षक क्षेत्र, भारतीय भू वैज्ञानिक सर्वेक्षण, राष्ट्रीय फैशन टेक्नोलोजी संस्थान (NIFT) एवं प्लाज़्मा अनुसंधान संस्थान के कर्मचारियों ने बढ़-चढ़ कर हिस्सा लिया । श्रीमती रेनू चतुर्वेदी, आकाशवाणी अहमदाबाद एवं श्री एस. के. पाठक, वैज्ञानिक-SG, प्लाज़्मा अनुसंधान संस्थान ने निर्णायक के रूप में इस प्रतियोगिता का मूल्यांकन किया। इस प्रतियोगिता में श्री जयकुमार जोशी, आईपीआर को प्रथम, श्री दीपक गुप्ता, प्रोग्राम अधिकारी, राष्ट्रीय सहकारी विकास निगम को द्वितीय व श्री श्यामकुमार बी. सोनार, भारतीय भू वैज्ञानिक सर्वेक्षण को तृतीय विजेता घोषित किया गया। इस प्रतियोगिता के अंत में श्रीमती रेनू चतुर्वेदी जी ने कार्यालय के कुछ अनुभवों को श्रोताओं के सामने प्रकट किया जिसे सुनकर सभी श्रोतागण काफी प्रसन्नचित हुए।



IPR @ PSSI Plasma Scholars' Colloquium

The 4th Plasma Scholars' Colloquium organized by PSSI was held at Jadavpur University, Kolkata during 6-7 August, 2015. More than 10 research scholars from IPR attended this annual meeting meant exclusively for scholars working in the area of plasma physics. Invited speakers from IPR were ; S. Deshpande, S. Pradhan, S. Mukherjee, N. Ramasubramanian. IPR research scholars Neeraj Chaube and Meenakshi Sharma were among the winners of the oral and poster presentations respectively.



The participants of the 4th PSSI Plasma Scholars' Colloquium

IPR Scientific Outreach Programme

Scientific Outreach activities at 5 cities in Gujarat is planned to be held in collaboration with the Gujarat Council for Science & Technology (GUJCOST), Government of Gujarat. The first of such programmes for school teachers and students is planned to be held at the Science City, Ahmedabad in the first week of September 2015. Other cities where the programme will be held are ; Baroda, Rajkot, Dahod and Surat.

The one and a half day meeting will have around 6 popular talks on plasma, fusion and societal applications of plasma, live demonstration of plasma and its basic properties, static exhibit of tokamak device and interactive sessions with the participants. A book entitled "Living with Plasmas" (both in English & Gujarati) is also being published in collaboration with GUJCOST. The lectures would be given by volunteers from IPR.

Each participating school will be given a kit of (1) Book on Living with plasmas (2) CD containing the popular lectures in both Gujarati and English (3) Videos related to plasma, tokamak and applications of plasma (4), Brochure on IPR in English/Hindi/Gujarati languages (5) Posters on basics of plasma, plasma applications and fusion. This kit will help the teachers propagate the concept of plasma to high school and college levels.

Women Education Day Program @IPR

In connection with the Women Empowerment fortnight celebration from 1st August to 14th August, organized by the Gujarat State Government under the leadership of the Gujarat Chief Minister, 7th August 2015 was declared as Women Education Day. Students from various colleges were chosen to visit renowned Academic Institutes. IPR was chosen as one among them and 80 girl students from three Government Engineering Colleges (Chandkheda, Gandhinagar and Modasa) visited IPR the said day. The Academic Visits Committee of IPR took care of the entire event with a welcome speech by the chairman (Dr. Anitha V P), followed by a detailed presentation on IPR activities organized by the committee members Mr. Naveen Rastogi, Mr. Pramit Dutta and Ms. Jyoti Agarwal and Mr. Harshad Chamunde. The students were taken to Aditya lab and were given an account of Plasma formation in a basic plasma system by Dr. Pintu Bandyopadhyay. The nodal officer acknowledged our efforts and expressed that it was a very informative visit for the students.



(L) View of the visiting girl students (R) Naveen Rastogi delivering a talk on activities of IPR

From the IPR Archives



Images from the National Science Day, 1995. (L) The organizing committee members Raju Daniel, Sanjeev Varshney, Parag Pathak, P. K. Atrey, Arun Chakraborty, Arundathy Das, Vinay Kumar and J. Govindarajan. (R) Subrata Pradhan entertaining the students with science anecdotes.





Past Events @ IPR

- **Dr. Rohit Kumar,** University of Allahabad, Uttar Pradesh, gave a talk on "Study of Toxic Elements in Environmental Samples Collected from Industrial Area using Spectroscopic Techniques" on 27th July 2015
- **Mr. Soumen Ghosh,** Institute for Plasma Research, Gandhinagar, gave a talk on "Localized Heating and Non-Uniform Potentials in Expanding Helicon Plasma" on 3rd August 2015
- Dr. A. Sivathanu Pillai, ex CMD BrahMos, gave a talk on "Technology Leadership" on 10th August 2015
- Dr. Lalit M. Awasthi, Institute for Plasma Research, Gandhinagar, gave a talk on "Briefing of 42nd European Physical Society Conference on Plasma Physics 2015 and LVPD contribution" on 11th August 2015
- Mrs. Ranjana Gangradey, Institute for Plasma Research, Gandhinagar, gave a talk on "Briefing of Highlights of visit to DIIID and CEC-ICMC Conference" on 11th August 2015
- Prof. R.B. Sharma, Scientist, DRDO, Delhi & Adjunct Faculty, DIAT, Pune, gave a talk on "Field emission/ ion microscopy: Principle and applications" on 20th August 2015 (Colloquium # 252)
- **Dr. Dattatray Shinde,** S. N. Bose National Centre for Basic Sciences, Kolkata, gave a talk on "Investigation of Granular and Cognitive Complex Systems" on 21st August 2015

Upcoming Events

- International School on Ultra-Intense Lasers (ICUIL), Moscow, Russia, 4-9 October 2015 http://www.isuil.iapras.ru/
- 16th European Fusion Theory Conference (EFTC 2015), Lisbon, Portugal, 5-8 October 2015 http://www.ipfn.ist.utl.pt/ eftc2015/EFTC2015_webpage/Welcome.html
- 20th International Stellarator/Heliotron Workshop (ISHW), Greifswald, Germany, 5-9 October 2015 http:// www.ipp.mpg.de/3523924/ishw_2015
- 13th International Conference on Plasma-Based Ion Implantation & Deposition (PBII&D2015), Buenos Aires, Argentina, 5-9 October 2015 http://www.lfp.uba.ar/pbiid2015/
- 17th International Conference on Fusion Reactor Materials (ICFRM-17), Aachen, Germany, 11-16 October 2015 http:// www.fz-juelich.de/conferences/ICFRM2015/EN/Home/home_node.html
- 9th International Conference on Reactive Plasmas and 68th Gaseous Electronics Conference and 33rd Symposium on Plasma Processing, Honolulu, Hawai, 12-16 October 2015 http://www.plasma.engg.nagoya-u.ac.jp/icrp-9/
- 12th International Computational Accelerator Physics Conference (ICAP'15), Shanghai, China, 12-16 October 2015 http://icap2015.csp.escience.cn
- 15th International Workshop on H-Mode and Transport Barrier Physics, Garching, Germany, 19-21 October 2015 http:// www.ipp.mpg.de/h-mode2015

Know Our Colleagues



Dr. B. Ganguli completed his Ph.D. at the University of Pittsburgh under the supervision of internationally renowned physicist and Davisson-Germer award winner Manfred A. Biondi in the area of atomic/molecular/plasma physics. After two post-doctoral stints at University of Texas and National Institute of Standards and Technology, Maryland he joined IPR as a faculty member in 1994 and has been involved in basic and applied research in plasma processing. He was one of the early members of the newly formed plasma processing group. He is best known for his contribution in developing and commercialising the technology of plasma nitriding in the country. Among his other achievements are development of plasma sources and related technologies such as microwave plasma, ECR plasma, high density plasma beam, DC magnetron plasma, microwave technologies, energy-efficient electro-magnets, continuous high voltage pulsed power supply. He is currently the head of the plasma nitriding group.

Dr. Nirmal Kumar Bisai joined IPR in 1991 as a research scholar and became permanent staff from 1995. Initially, he worked on Free Electron Laser and neutral beam injector system and later nominated to work on the Integrated Tokamak Modeling Expert Group in ITER. Presently he is a member of the Fusion Theory and simulation group and is working on tokamak plasma turbulence in the edge and scrape-off layer (SOL). He developed numerical simulation code for investigating plasma transport in the boundary region of tokamak plasma. His work on plasma blob formation and transport in the edge and SOL region is well appreciated. He received PhD degree in this field from the Institute.



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