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The 4th State

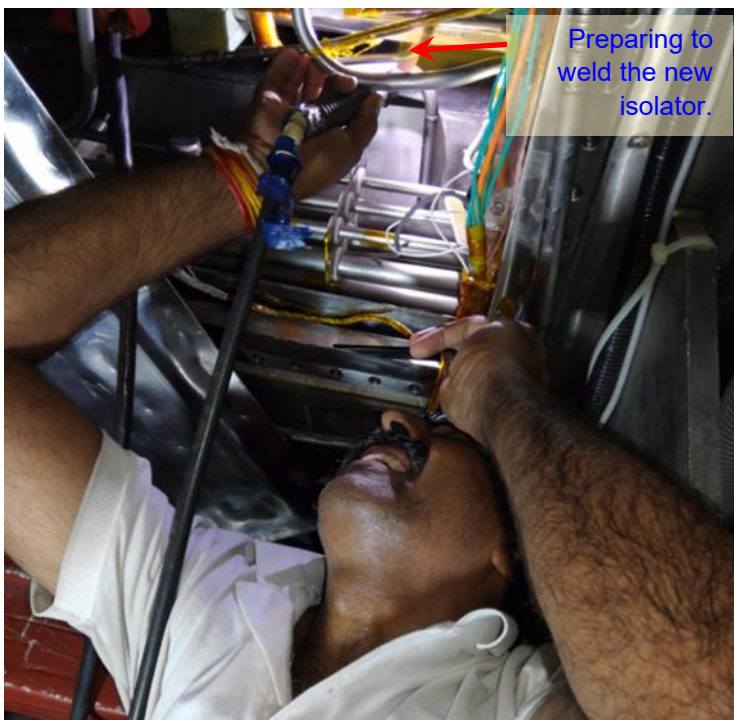
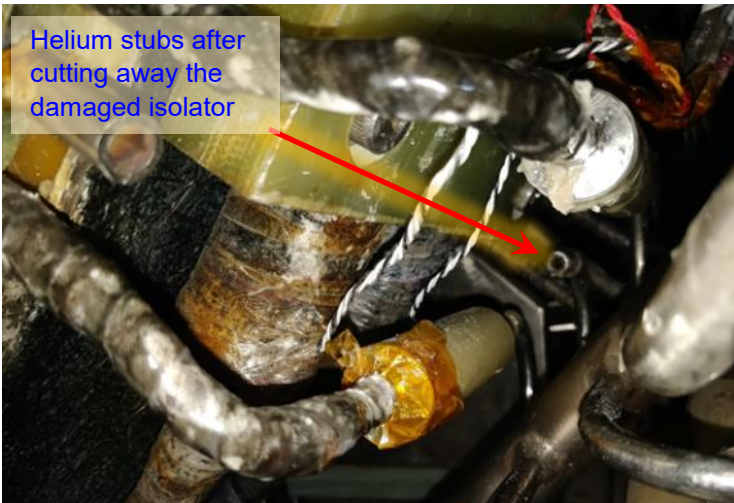
Newsletter of the Institute For Plasma Research, Gandhinagar, Gujarat (India)

“E-House” of Cooling Water System delivered at ITER site

The control unit (Variable Frequency Drives, Electrical Panels etc.) for the ITER Cooling Water System (CWS) equipment like pumps, valves etc. will be housed in a large "E-House". This E-house consists of 37 pieces, of which 4 are main modules and 6 HVAC units. The whole E-house will be 23.2 m long, 10.5 m wide, 5.8 m high and weighing nearly 100 tons when assembled at ITER site. The shipment of CWS E-House left India in June 2019 from Hazira Port and has now been delivered at ITER Site. The design of the E-House was jointly done by ITER-India and L&T, while the manufacturing was carried out at L&T Hydrocarbon Engineering, Hazira, Gujarat.



The repair of leaky cryogenic electrical isolator of TF#16 coil of the supercritical helium manifolds circuit was carried out using the in-house resin/glass-cloth but it did not perform well at the low temperatures of $\sim 200\text{K}$. It was therefore required to remove this isolator by cutting it out from the (as built) complex supercritical helium circuit. The location of this isolator was not quite accessible, and therefore it was difficult to remove and replace with a new isolator. The very challenging job of welding the new isolator in place was assigned to Mr. S. J. Jadeja (Sr. Technician, IPR Workshop). He had already performed many such critical welding on the SST-1 superconducting magnets in the past. With the help of a hired, experienced fitter to help cutting this isolator, in 5-6 days, Mr. Jadeja was able to complete the new isolator loop welding job successfully on Sunday (20/07/19). This welding has also successfully been leak tested up to 9 bar (absolute) inlet helium pressure. We are proud to have Mr. Jadeja whose dedication and experience paid off in completing this crucial and difficult helium leak tight isolator loop welding with TF#16 coil of SST-1. The SST-1 team are thankful to him for his diligent efforts.



India's first mega science exhibition, "Vigyan Samagam" concluded its first leg at the Nehru Science Center, Mumbai on 7th July 2019. This 2-month exhibition was visited by over 1.5 lakh visitors during the two months. This exhibition will now move to the second leg at Visvesvaraya Industrial and Technological Museum, Bangalore (VITM) from 29th July to 29th September, 2019. During the 2 month programme at Mumbai, 35 scientists/engineers from ITER-India and IPR participated in this event for manning the ITER stall, delivering popular and technical talks at various programmes of the exhibition as well conducting the hands-on experiments and demonstrations during the ITER week held during 20-26 May, 2019.



Images from the concluding week of the Vigyan Samagam at Mumbai

Upcoming Events

- ◆ 12th International Conference on Plasma Assisted Technologies (ICPAT-12), Yalta, Crimea, Russian Federation, 2-5 September 2019 <http://www.plasmacombustion.com/iwepac.html>
- ◆ 2019 International Conference on Numerical Simulation of Plasmas, Santa Fe, New Mexico, 3-5 September 2019 <http://cnls.lanl.gov/icnsp>
- ◆ iPlasmaNano-IX 2019, Croatia, 15-20 September 2019 <http://iplasmanano.org/index.php?Mid=7>
- ◆ 14th International Conference "Gas Discharge Plasmas and Their Applications" (GDP 2019), Russia, 15-21 September 2019 <http://gdp2019.hcei.tsc.ru/>
- ◆ Nature conference series — Advances and Applications in Plasma Physics, Saint Petersburg, Russia, 18-20 September 2019 <https://www.nature.com/natureconferences/AP19/index.html>
- ◆ LAPD19 Symposium — Laser Aided Plasma Diagnostics 2019, Montana, United States, 22-26 September 2019 <https://lapd2019.centerforconferences.uiowa.edu/>
- ◆ 14th International Symposium on Fusion Nuclear Technology (ISFNT 2019), Budapest, Hungary, 22-27 September 2019 <http://isfnt-14.org/>
- ◆ 11th International Conference on Inertial Fusion Sciences and Applications (IFSA), Osaka, Japan, 22-27 September 2019 <https://confit.atlas.jp/guide/event/ifsa19/top?lang=en>

Cryostat Handing Over Ceremony at ITER

ITER Director-General Bernard Bigot, India's Ambassador to France Shri. Vinay Mohan Kwatra, and the former chairman of the Atomic Energy Commission of India, Dr. Anil Kakodkar, symbolically smashed a bottle of French champagne on a large chunk of steel representing the ITER cryostat. Shri Ujjwal Baruah, Project Director, ITER-India was also present during the ceremony. The ceremony marked an important milestone in the fabrication of this strategic component: two sections—the base and lower cylinder—are now completed and fully accepted by the ITER Organization, the upper cylinder is being assembled and aligned prior to welding, and half a world away, in the manufacturer's facility, the last segment of the "top lid" is being finalized. Essentially, construction of 60% of the cryostat has been completed. This world's largest vacuum vessel (30m high and 30 m diameter) is being built by L&T, Hazira as part of India's deliverables to the ITER project. *Text and images courtesy www.iter.org*



ITER Cryostat Group Leader Anil Bhardwaj giving a tour of the recently finalized base section at ITER



ITER Director-General Bernard Bigo smashing a bottle of champagne on a section of the cryostat to mark the handing over of the base of the cryostat by India to ITER.

Cryostat Handing Over Ceremony at ITER... Continued

Staff of both IPR and ITER-India staff participated in the ceremony *via* video conferencing at both IPR and ITER-India offices. Dr. Shashank Chaturvedi (Director, IPR) and Dr. Shishir Deshpande (Dean-Admin, and former ITER-India Project Director) conveyed congratulatory messages to everyone involved in the achievement of this important milestone.

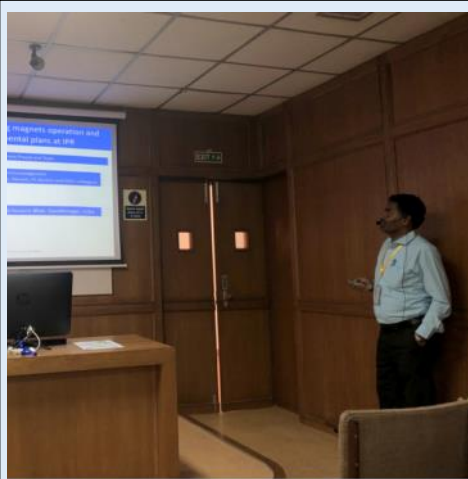


Images from IPR and ITER-India offices where the staff participated in the ceremony *via* video conferencing.

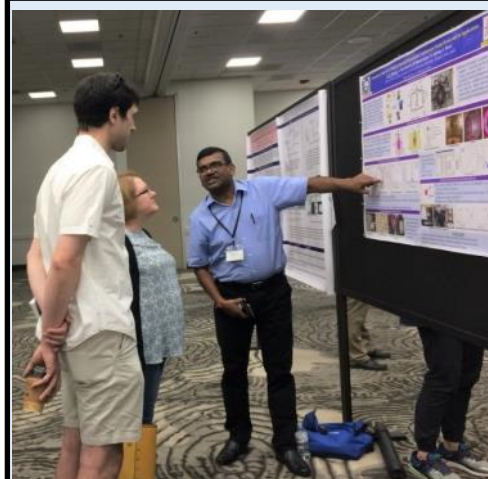
IPR @ Conferences



Mr. Rajiv Sharma delivered a talk entitled *"In-house Development of Composite Materials for Superconducting Fusion Reactor and Cryogenic Applications"* at the "Composite Materials Technology and Applications" organized by ATI-RA (Ahmedabad Textiles Industries Research Association), Vastrapur, Ahmedabad on 15 June, 2019.



Mr. Upendra Prasad delivered a talk entitled *"Superconducting magnets operation and developmental plans at IPR"* at the Workshop on Future Trends of cryogenic engineering and applied Superconductivity held at the Inter-University Accelerator Center, New Delhi on 21 June, 2019



Dr. S. R. Mohanty, Associate Professor – F, CPP-IPR, attended IEEE Pulsed Power and Plasma Science Conference (PPPS 2019) at Orlando, US, held during 23 - 28 Jun, 2019. He presented a poster entitled *"Parametric Study of a Cylindrical Inertial Electrostatic Confinement Fusion Device and its Applications."*

IPR participated in the IEEE Pulsed Power and Plasma Science Conference (PPPS 2019) from 23-28 June, 2019 at Orlando, Florida. **Dr. Anitha V.P.** presented a poster entitled *"Implementation of line type high voltage nanosecond rectangular pulse generator with adjustable pulse widths for liquid discharge applications"* **Dr. Suryakant Gupta** presented a talk entitled *"Optical and electrical diagnostic of surface arcs"* and a poster on *"Indigenously developed pulsed power sources for non-equilibrium plasma applications"*. **Dr Vishal Jain** presented a poster talk entitled *"Novel high voltage pulsing to generate uniform glow discharge air plasma for environment friendly inline treatment of textile"*



IPR has recently setup a 1 PetaFlop High Performance Computing System having 236 Compute Nodes, 22 Compute Nodes with GPU, 2 High Memory node and 1 Visualization Node. A training session was organized for this HPC system for the benefit of users from various groups of IPR who are involved in computation and simulation studies. The training was carried out by experts of the industry. Dr. R. Ganesh, Head, Computer Division, gave an overview of the new system. Over 50 staff members and PhD scholars of IPR attended this training programme.



The training programme for the 1 PetaFlop HPC machine underway at IPR

Seminar on HFSS

A one-day seminar on electromagnetic solvers was organized at IPR on 19 July, 2019. The three talks related to the topic were delivered by Dr. S. B. Sharma, retired scientist of Space Application Center, Ahmedabad. He has 34 years of academic and diversified research and development experience in the field of electromagnetic modeling and microwave engineering in general and antenna engineering. His major contributions to space research were ground based, airborne and space borne antenna systems for satellite communication and remote sensing programs of ISRO.



A delegation of senior officers of Ministry of Micro, Small & Medium Enterprises (MSME) visited institute on 19th July, 2019. The delegation comprising 35 officers from various offices in all over India interacted with Chairman, Senior Purchase Committee, Chairman Stores Committee, Chairman Minor Works Contract Award Committee, CAO and the Purchase Officer on various aspects of the Public Procurement Policy and also on how the share of MSME's can be increased in the procurement of our institute.



The delegation of senior officers of Ministry of Micro, Small & Medium Enterprises (MSME) during their visit to IPR

Demonstration / Training of Library Based Software @ IPR

IPR Library organized demonstration of Grammarly, a better English writing tool on **05 July 2019** at IPR Seminar Hall. The demonstration was arranged in addition to the institution-wide trial access to the tool. The demonstration was aimed towards introducing and effectively using the tool during the trial period to understand the features and its usefulness in the professional activities. The interactive demonstration session was attended by a large group of staff members and research scholars. IPR Library also organized a refresher training session on Scopus and Mendeley on 10 July 2019 at IPR Seminar Hall. Library has a subscription to Scopus: an abstracting and citation database of peer reviewed literature, and the library also has access to Mendeley Institutional Edition (MIE), a Reference Manager tool. The refresher training was aimed to provide updated features of the Scopus database and for better understanding, and maximizing the usage of these online tool to help the researchers and the scientific community to carry out and collaborate their research work. A good number of researchers and scientific staff attended the interactive training.



The Grammarly software training in progress at IPR. (Inset) : The trainer conducting the training.

The Summer School programme of (SSP) 2019 which began on 27th May, was successfully completed on 5th July 2019. The group of 32 science and engineering students had a good exposure to the activities of IPR and apart from a week long course work, the students also undertook project works in various labs of IPR. A poster session was held based on the work carried out by the students and Ms. Anam Saifi and Mr. Nikhil Sharma received prizes for their project work in physics and engineering categories respectively.



Students of the summer school with the Director, IPR and School Chairman

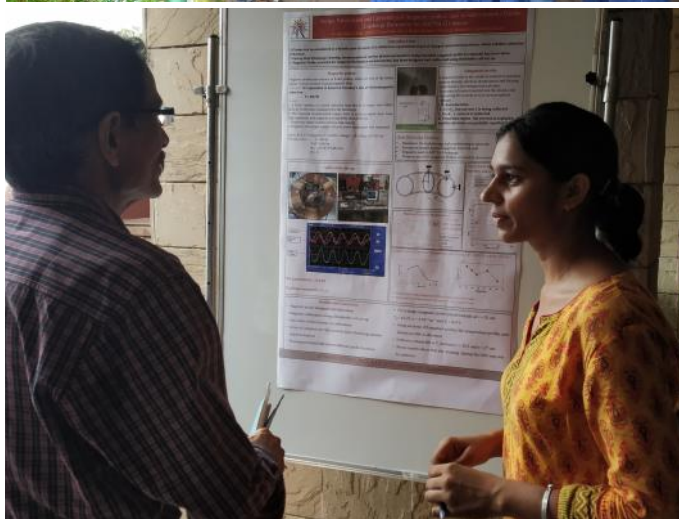


The first prize winners in physics and engineering categories (L) Ms. Anam Saifi and (R) Mr. Nikhil Sharma receiving their prizes from ITER-India Director Mr Ujjwal Baruah.



Group photo of the SSP-2019 with the organizing team.

The poster session based on the projects carried out by the participants of the SSP-2019 was conducted on 4th July, 2019 at IPR. The posters were reviewed by a committee comprising of IPR faculty and prizes were awarded to the best posters in both physics as well as engineering categories.



Images from the poster session of the SSP-2019

Name	Title of award winning PHYSICS projects
Ms. Anam Saifi	Detection of Faulty Location as well as Measurement of Degree of Fault.
Mr. Samadhan D. Kamble	Study of laser Induced Shockwave Using Time Resolved Shadowgraphy
Ms. Amala Augusthy	Characterization of Electron Temperature gradient Dominated Plasma.
Ms. Nickita Acharya	Study of Surface Wettability by Varying Plasma Parameters of Anode Glow Discharge
Ms. Athira S Kumar	Spatial Profile of Impurity Ion Temperature of Aditya-U Tokamak Plasma

Name	Title of award winning ENGINEERING projects
Mr. Nikhil Sharma	Plasma Nitriding and Plasma Carburizing of Tungsten and its Alloy
Mr. Hamedawan Sten	Design of Refrigerated Air Drier for Reliable Pneumatic Services
Mr. Darsh Parag Modi	Thermal Design of Shell & Tube Heat Exchanger for EHCL

The SSP-2019 was organized by a core team comprising of Dr .L. M. Awasthi, Mr. Raj Singh, Mr. N. Vaishnav, Ms. F. A. Shah, Mr. H. Chamunde, Mr. A. E. Harvey, Mr. H. C. Khanduri, Mr. M. H. Vartak, Mr. Saroj Das, Mr. Prashant Kumar, Dr. Santosh Pandya, Mr. H. Nimawat, Mr. P. K. Srivastava, Ms. Unnati Patel, Mr. Ashish Ranjan and Ms. A. Bano.

As a part of Indoor Games Tournament - 2019, Chess and Carrom (Singles and Doubles) tournaments were organized by IPR Staff Club in the months of June and July. A total of 135 staff members participated in these tournaments. The final matches were held on 12th July 2019. The results are given in the table below.

Game	Winner	Runner up
Chess	Rohit Kumar	Bharat Rawat
Carrom (Singles)	P. Ajesh	Alpesh Patel
Carrom (Doubles)	Vikas Gaur & Madeena Valli	P. Ajesh & Ronak Shah



- ♦ **Mr. Amitkumar Patel**, Institute for Plasma Research, Gandhinagar, gave a talk on "Study of plasma in a versatile multi-pole cusp magnetic field" on 21st June 2019
- ♦ **Dr. Lalita**, Department of Physics, IIT Delhi, gave a talk on "Self Focusing and Frequency Shift of Super-Gaussian Laser Beam in a Plasma" on 28th June 2019
- ♦ **Dr. P J Bhuyan**, CPP-IPR, Assam, gave a talk on "NDOT-1D: A MATLAB code for preparation & execution of Monte Carlo transport code input files for 1-D radial model of fusion reactors" on 3rd July 2019
- ♦ **Dr. Sunil Rawat**, Institute for Plasma Research, Gandhinagar, gave a talk on "Computer simulations for the design and optimization of the electromagnetic coilgun" on 8th July 2019
- ♦ **Dr. Bobby Joseph**, Elettra Synchrotron Radiation Facility, Italy, gave a talk on "Pressure tuning of material properties: selected examples from the high pressure powder diffraction beamline "Xpress" at Elettra synchrotron radiation facility, Trieste" on 9th July 2019
- ♦ **Prof. Avinash Khare**, Central University of Sikkim, gave a talk on "Thermodynamics and simulations of gravitating systems" on 10th July 2019
- ♦ **Ms Pallavi Trivedi**, Institute for Plasma Research, Gandhinagar, gave a talk on "Driven Phase Space Structures in a 1D Vlasov-Poisson Plasma" on 11th July 2019
- ♦ **Mr. Devilal Kumawat**, Institute for Plasma Research, Gandhinagar, gave a talk on "Tokamak as a Transformer" on 11th July 2019
- ♦ **Mr. R. Jehadeesan**, IGCAR, Kalpakkam, gave a talk on "Scientific Computing Infrastructure and related R&D activities at IGCAR" on 11th July 2019 (Colloquium #295)
- ♦ **Dr. Surojit Gupta**, University of North Dakota, Netherland, gave a talk on "High Performance Nanolaminates based Functional Materials for High Temperature and Multifunctional Applications" on 12th July 2019 (Colloquium #296)
- ♦ **Dr. Umesh Kumar**, Institute for Plasma Research, Gandhinagar, gave a talk on "Effect of controlling density gradient on equilibrium and confinement in a current-less magnetized toroidal plasma using two plasma sources simultaneously" on 16th July 2019

Know Our Colleagues



Mr. Manoj Singh Parihar (SO-F) joined IPR through the Technical Training Program batch of 2001 and was subsequently appointed as Engineer-SC (Electronics & Communication) in RF-ICRH (Radio Frequency) division. As control engineer, he developed and integrated feedback looped matching networks, fast (1 ms) hardwired interlock protection system, commissioned in-house signal processing cards for around 600 field and diagnostic signals, interfacing and integration of VME & PXI based real-time data acquisition system for system operation on Aditya and SST-1 Tokamak Machine. He also has developed PLC based systems for power supplies and RF generators. He was also involved in the design and integration of fibre-optic based control signals for remote operation of 30KV-130Amp RHVPS (Regulated High Voltage Power Supply) from ICRH Lab. He completed his M.Tech (Integrated Electronics Circuit) from IIT Delhi in 2010. He has also successfully executed the ITER- assignment task (Engineering support in IC H&CD system on development of IC-PSC prototype and fast controller phase) while he was on a 2-year deputation to ITER IO, Caderache, France during 2015-17. He is also the General Secretary of the IPR-Staff club for the period 2019-20.

Ms. Shirin Sam Behsania (Office Assistant C) joined IPR as Office Clerk-A in 1997 and since then she has been working with IPR Account section. In the accounts section, she looks after Accounting of CHSS, Utility Services, Accounting for Conference / Symposium participants, Visiting Scientist expenditure etc. Under CHSS (Contributory Health Service Scheme), she takes care of billing for Authorized Medical Officers, Panel of Specialist doctors, Pathologist (Pathology Laboratory), registration of beneficiary for making payment, making payment to doctors, hospital, chemists, laboratories, Reimbursement of staff medical claims etc. Under Utility service bills, she takes care of Payment of utility bills like telephone, electricity, water, reimbursement of telephone expenses to approved employees etc. While under other payment management, she takes care of Issuance of demand draft, etc. for symposium, conference fees etc., Payment of courier bills, Issuance of cafeteria coupons, Payments for library journals, books etc. She also actively participate voluntarily in event management like National Science Day, IPR Summer School program, Conference organized / sponsored by IPR and IPR Staff Club Activities.



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