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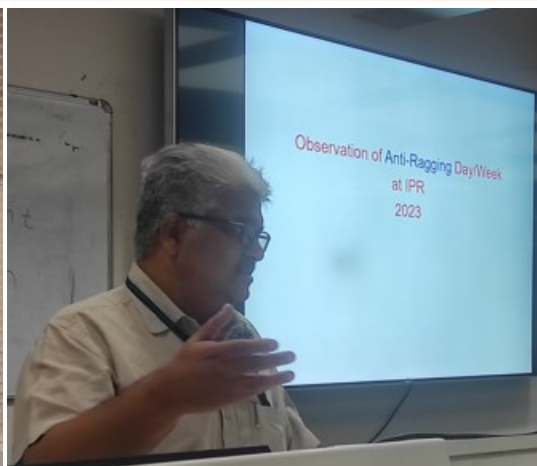
The Fourth State

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



Observation of Anti-Ragging Day/Week-2023 at IPR

To bring the awareness on prevention of ragging among the students and staff, IPR had observed Anti-Ragging Day on 12th August 2023 followed by Anti-Ragging Week during 12th August to 18th August 2023. The Dean Academics of Institute for Plasma Research had administered the oath against ragging practice on the Anti-ragging day. In the week that followed, competitions were conducted on slogan and essay writing, logo and poster making. The anti-ragging week was concluded with a brief speech by Dean, Administration of IPR followed by a special lecture by Dr. S. Shalini from Karnavati University on the *Psychology behind ragging and its prevention*. The winners and runners-up of various competitions were awarded prizes. Dean- R&D, IPR gave a short summary and presented the vote of thanks.



(L) Dr. S. Shalini (M) Dr. S Mukherjee (Dean Admin) and (R) Dr. Paritosh Chaudhuri (Dean R&D) addressing the gathering



(L) Dr. Mainak Bandyopadhyay Dean (Academics) administering the oath against ragging (R) Prize winning poster



View of the audience

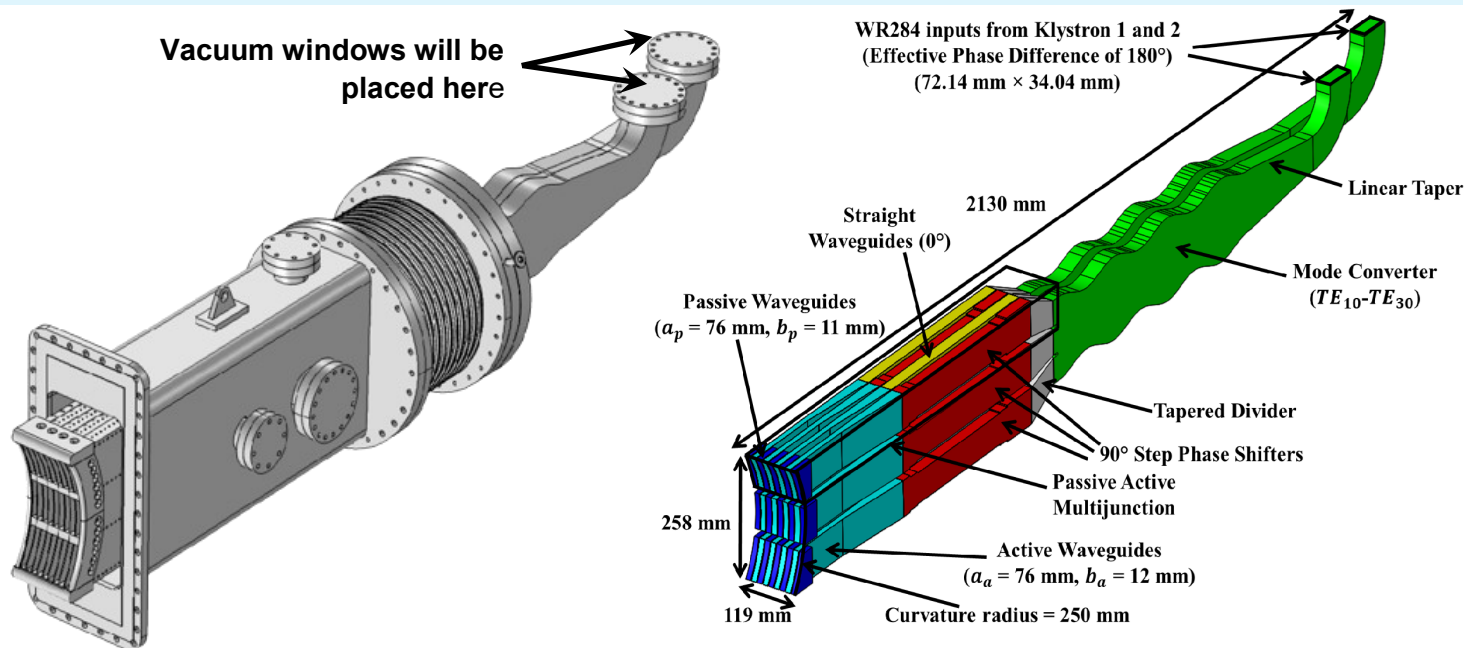


The organizing team and winners of the various competitions organized as part of the anti-ragging week at IPR

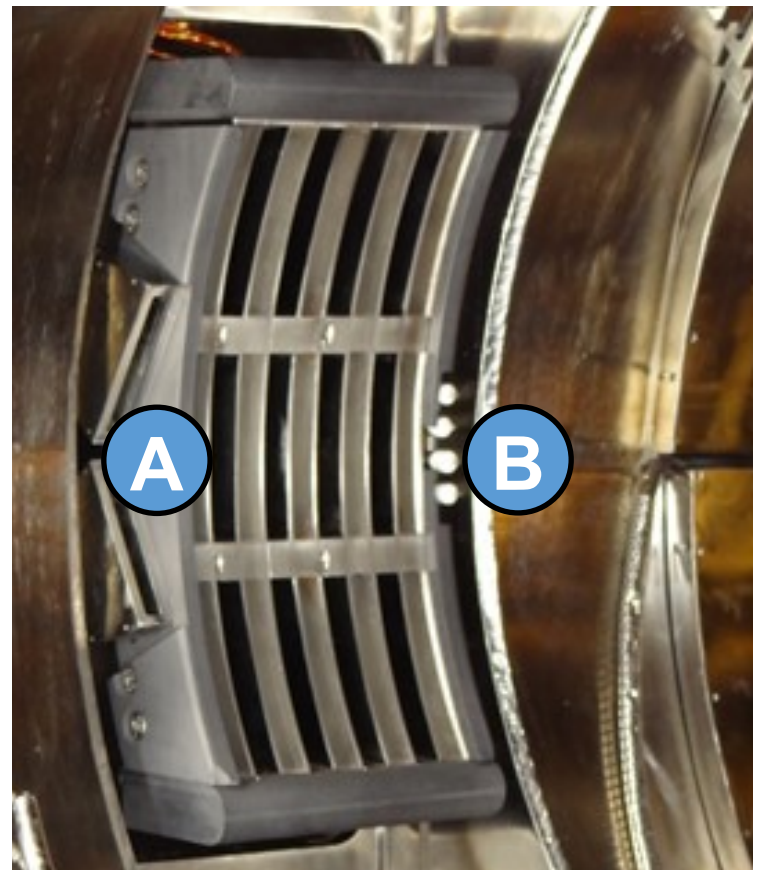
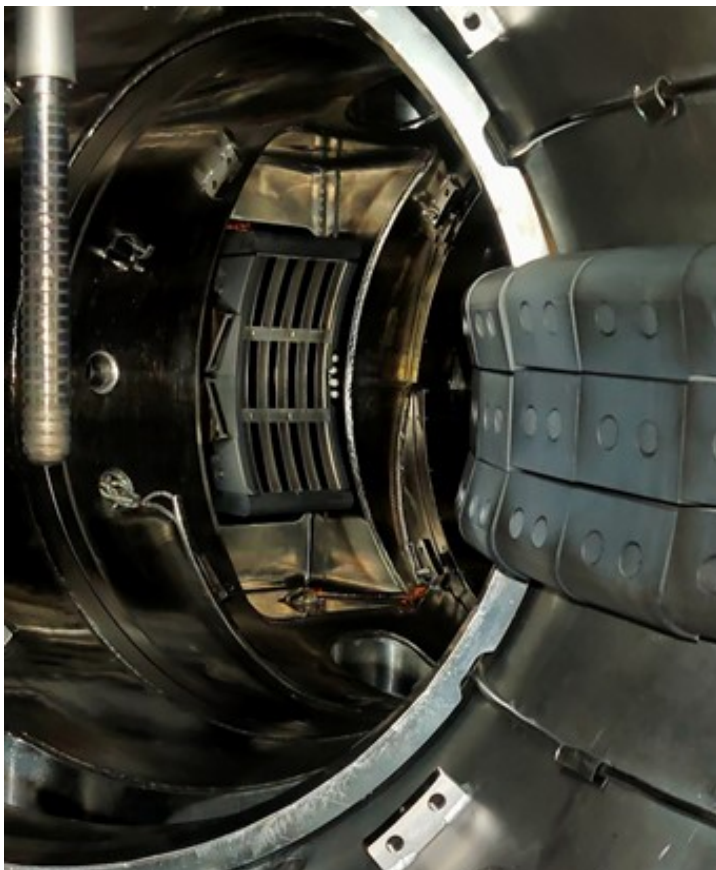


Some of the entries for the anti-ragging logo competition

A new Passive-Active-Multijunction (PAM) launcher has been designed, fabricated, tested and installed on ADITYA-U tokamak. The PAM launcher is designed to deliver about 250 kW of RF power at 3.7 GHz for about one second in to the plasma and launch lower hybrid waves (LHW's) in ADITYA-U machine in a preferred direction to drive plasma current non-inductively so that plasma duration may be extended beyond Ohmic phase. The advantage of using PAM launcher is the reduced reflection (<3 %) that too at very low edge densities, which allows to place the launcher far away from the last closed flux surfaces, a condition often desired for reactor grade plasmas. However this advantage comes at the cost of reduced directivity when compared with conventional grill or multijunction antenna. The PAM launcher has a matrix of three poloidal sections and two toroidal modules and consists of various RF sections . Each toroidal module consists of two active (76mm x 12mm) and two passive (76mm x 11mm x quarter wavelength depth) waveguide elements, separated by septum of thickness 2mm for mechanical stiffness and can be relatively phased with external phase-shifter. The PAM launches LHW's having asymmetric spectrum and its peak parallel refractive index ($N_{||}$) can be varied in the range of 2.25 ± 0.375 . After complete qualification tests (like RF, vacuum, baking, etc.), the PAM launcher was successfully installed on ADITYA-U machine and vacuum level of $\sim 10^{-8}$ mbar was successfully obtained. The PAM is ready for current drive experiments which will be initiated very soon.



CAD model of PAM launcher assembly and typical spectrum with different phasing of modules. Layout of PAM showing matrix arrangement of 3 poloidal & 2 toroidal module of PAM and various RF sections.



Views of the PAM installed inside Aditya-U (A) Ka band horn antenna for X-mode edge profile reflectometry (B) 4 Langmuir probes for measurement of edge density near launcher

Outreach Activities of CPP-IPR

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Date	Institution	Visitors
01-Sept-2023	Workshop on Basic Plasma Physics, organized by Assam Don Bosco University (ADBU), Sonapur, Assam	39 participants from 7 institutions and 6 faculty members



The 9th PSSI - Plasma Scholars Colloquium (PSC-2023) organized by IIT Kanpur and PSSI during 20-21 August, 2023. The colloquium had a total of 64 participants, including students and postdocs. Among them, 14 students delivered oral talks and 9 flash talks along with 50 poster presentations covering topics from space plasmas, fusion plasmas, basic laboratory plasma experiments and simulations, and plasma applications. The concept of flash talk was a new addition this year, where participants shared their research in a brief five-minute talk, followed by a detailed in the poster presentation. Additionally, seven experts in relevant fields delivered Invited Expert lectures. In addition to this, an invited General Physics Lecture titled "Patterns Arise from Conflicts" was delivered by Prof. Jayanta K. Bhattacharjee, and an Invited Public Lecture titled "Indian Knowledge System and Modern Science and Technology" by Prof. Manoj K. Harbola. At the conclusion of the second day, awards were given for exceptional presentations, which comprised of four best oral and three best poster prizes.

More detailed information about the Colloquium are available at (<https://sites.google.com/view/psc-2023/>).



Construction of the new Cooling Water System (CWS) at IPR is currently in progress and is expected to be ready for commissioning by mid-2024. Having completed the design successfully with optimized plant layout, the CWS has already entered the manufacturing and construction phases. Significant part of piping and piping supports erection work has already been completed at the site. With the arrival of equipment like cooling towers, storage tanks, water-cooled chillers, variable frequency drives, electrical panels, etc., the construction activities have picked up momentum at the site.

When it becomes fully operational, the CWS will remove 15 MW heat load. Supported by Water Polishing systems, this CWS will deliver ultra-pure water at the desired temperature & pressure with ionic conductivity as low as $\leq 0.1 \mu\text{S}/\text{cm}$ and critical dissolved oxygen limit of ≤ 0.01 ppm to the laboratories of ITER-India and IPR.



(L) Storage tank installed in the plant room (R) Concrete pedestals



Piping supports for the CWS for ITER-India & IPR Labs under construction at IPR main campus

IPR Staff Club, in the recent months, conducted sports events for IPR staff. Competitions in Carrom (single/doubles), Chess, Table Tennis, Badminton, volleyball etc. are being held or have been completed. Over 200 IPR staff participated in the various events organized by Staff Club. In the coming months, Cricket and football tournaments are planned to be held for IPR staff members. Staff club organized the Independence day function at IPR for staff members and their family on 15th August 2023. On 23rd August, IPR Staff Club organized screening of the Chandrayan-3 moon landing for the benefit of IPR staff. 31 July and 31 August respectively, farewell functions for Dr. Praveen Kumar Atrey and Mrs. Rakhi Singh respectively were organized, on their superannuation.



The superannuation farewell function of Dr. Praveen Kumar Atrey



Images from the various indoor game tournaments organized by IPR Staff Club

संस्थान में नये भर्ती होने वाले कर्मचारियों के लिए दिनांक 5 सितंबर 2023 को "केंद्रीय सिविल सेवा (आचरण) नियमों के अनुसार क्या करें और क्या नहीं करें" विषय पर एक व्याख्यान का आयोजन आईपीआर के सेमिनार हॉल में किया गया। साथ ही इस कार्यक्रम को ऑनलाइन भी प्रसारित किया गया। संस्थान के मुख्य प्रशासनिक अधिकारी श्री निरंजन वैष्णव द्वारा इस विषय पर व्यापक चर्चा की गई। उन्होंने केंद्रीय सिविल सेवा में सरकारी कर्मचारियों को अपने कर्तव्यों के निर्वहन में निष्पक्षता बनाए रखने पर जोर दिया। सरकारी कर्मचारी का दायित्व लोक हित में काम करना है और अनुचित व्यवहारों से बचना है। साथ ही अपने व्यक्तिगत लाभों से प्रेरित होकर अपने पद का दुरुपयोग नहीं करना है। सद्भावना, सत्यनिष्ठता से कार्य करते हुए विनम्रता से अपने कर्तव्य का पालन करना है। उन्होंने आचरण नियमों पर चर्चा करने के साथ उदाहरण देकर श्रोतागणों के संदेहों को दूर किया। व्याख्यान के अंत में श्री राज सिंह ने आचरण नियमों को स्पष्ट एवं सरल रूप में प्रस्तुत करने के लिए श्री निरंजन वैष्णव को धन्यवाद दिया। इस कार्यक्रम में लगभग 145 कर्मचारियों ने भाग लिया।



(L) व्याख्यान देते हुए श्री निरंजन वैष्णव (R) सेमिनार हॉल में उपस्थित श्रोतागण

Adieu



A farewell function was organized for Mrs. Rakhi Singh who superannuated on 31st August, 2023. IPR Newsletter wishes her a happy, healthy and fruitful retired life.

Date	Institution	Visitors
21-Aug-2023	Young Indians (YI), Ahmedabad	50 students from 8-11 std and teachers
22-Aug-2023	LDRP Institute of Technology and Research, Gandhinagar	80 students of B.Tech (IT) VI sem
23-Aug-2023	LDRP Institute of Technology and Research, Gandhinagar	85 students of B.Tech (IT) VI sem
24-Aug-2023	LDRP Institute of Technology and Research, Gandhinagar	82 students of B.Tech (IT) V sem
25-Aug-2023	Sardar Patel and Swami Vivekananda High School, Ahmedabad	56 students of class 8-11
18-Sept-2023	Nirma University, Ahmedabad	130 students of BTech (Electrical)



Batch 1 of students of B.Tech (IT) from LDRP Institute of Technology and Research, Gandhinagar during their visit to IPR



Batch 2 of students of B.Tech (IT) from LDRP Institute of Technology and Research, Gandhinagar during their visit to IPR



Batch 3 of students of B.Tech (IT) from LDRP Institute of Technology and Research, Gandhinagar during their visit to IPR

IPR Outreach conducted a week-long scientific outreach programme at the Department of Physics, Bharathiar University, Coimbatore during 10-14 July, 2023. This is IPR's second outreach activity in the state of Tamilnadu. The programme consisted of an exhibition on plasma, its applications as well as introductory talks on plasma for visiting students.

The event was inaugurated by Prof. V. Selvarajan, eminent plasma physicist and former HoD of Physics, Bharathiar University. The function was presided over by Dr. K Srinivasan (HoD Physics) and Prof. F. X. Lovelina Little Flower (Syndicate Member). The event was coordinated by Prof. G. Shanmugavelayutham of the Dept of Physics, Bharathiar University.

For this exhibition, 67 UG, PG and Research Scholars of the Department of Physics, Bharathiar University were trained by IPR team to explain the exhibits to visiting students in their local language. The concluding function was organized on 14th July, 2023 and was attended by Prof. K. Murugavel (Registrar, BU) and Prof. K Ramachandran (UGC Professor, Dept of Physics). Over 2300 students and general public visited the exhibition at Bharathiar University. For more details, click [HERE](#).



The plasma exhibition at the Department of Physics, Bharathiar University, Coimbatore



Inauguration of the Plasma Exhibition by Prof. V. Selvarajan



Prof. V. Selvarajan visiting the exhibition



Training the student volunteers



Introducing plasma to visiting students



Student volunteers explaining the exhibits to visitors

PhD scholars of IPR welcomed the new batch of PhD students on 16th September 2023. This year a total of fourteen students joined IPR to pursue their PhD on Plasma physics. Along with the senior students, faculty members also joined the welcoming event and shared their memorable experiences with the new students. After formal introduction of the new students, there was an informal cultural programme and games organized by the seniors along with the junior students.

The best performers were awarded with Mr. and Miss Fresher's award. The event ended with dinner. The IPR newsletter wishes the all the new PhD scholars all the very best in their career !



- ◆ **Ms. Yashshri Patil**, gave an invited talk on "*Hollow cathode DC discharge studies using the APPEL device*" at National Symposium on Gaseous Discharges (NSGD-2023), Pondicherry University, Puducherry, 09-11 August 2023
- ◆ **Mr. Ramesh Joshi**, gave a talk on "*Analysis of different inference implementations for deep learning model on ADITYA-U tokamak*" at 12th International Conference on Soft Computing for Problem Solving: Moving Towards Society 5.0 (SocProS-2023), Indian Institute of Technology, Roorkee, 11-13 August 2023
- ◆ **Dr. Sonu Kumar**, Indian Institute of Technology (IIT), Delhi, gave a talk on "*High Quality Electron Beam Generation through Laser Wakefield Acceleration in Bubble Regime with Its Application to Fusion*" on 25th August 2023
- ◆ **Mr. Urmil Thaker**, gave a talk on "*Design, Analysis, Fabrication & Testing of 100kV, 100mA full Wave Voltage Multiplier (FWVM) Modular Unit for Accelerator Power Supply*" on 29th August 2023
- ◆ **Dr. Mariammal Megalingam**, gave a talk on "*Observation of Sub-Sonic Plasma Flow in the Helicon Plasma Experimental Device*" on 31st August 2023
- ◆ **Dr. Varun**, gave a talk on "*Design and Development of Liquid Stub Tuner and Liquid Phase Shifter for Antenna-Plasma Coupling Impedance Matching for High Power RF Experiments*" on 04th September 2023
- ◆ **Dr. Abhinav B. Desai**, gave a talk on "*Development of Cryocooler for Application in Cryopump*" on 05th September 2023
- ◆ **Dr. Ajaz Ahmad Mir**, Indian Institute of Technology, Jammu, gave a talk on "*Nonlinear Mixing and Synchronization in Dusty Plasma*" on 06th September 2023
- ◆ **Mr. Dishang Upadhyay**, gave a talk on "*Optimization of the output filter for micro-second transients in PSM based Mega-watt HVPS*" on 11th September 2023
- ◆ **Ms. Dipal Soni**, gave an invited talk on "*Control and Protection Schema and Low power RF measurement schema used for Commissioning of ICRH RF Source*" at Workshop on Low-Level Radio Frequency (LLRF) for Particle Accelerators, Inter-University Accelerator Centre, New Delhi, 11-12th September 2023
- ◆ **Ms. Karishma Qureshi**, gave an invited talk on "*A Novel Technique for measurement of thermocouple signals within High Voltage transient's environment through a special circuit*" at Workshop on Low-Level Radio Frequency (LLRF) for Particle Accelerators, Inter-University Accelerator Centre, New Delhi, 11-12th September 2023
- ◆ **Dr. Miral Shah**, gave a talk on "*Investigation of EDF evolution and charged particle transport in E×B plasma based negative ion sources using kinetic simulations*" on 13th September 2023
- ◆ **Dr. Subhojit Bose**, National Institute of Technology, Agartala, gave a talk on "*Experimental Investigation of Self-Organized Criticality in Complex Space Charge Structure Formations in Glow Discharge Regime*" on 15th September 2023

Upcoming Events

- ◆ 12th International Conference on Nuclear Criticality Safety, Miyagi, Japan, 01-06 October 2023; https://oecd-neo.org/jcms/pl_75059/international-conference-on-nuclear-criticality-safety-icnc-2023
- ◆ 20th European Fusion Theory Conference, Padova, Italy, 02-05 October 2023; <https://indico.cern.ch/event/1239458/>
- ◆ International Conference on Environmental Remediation & Radioactive Waste Management, Stuttgart, Germany, 03-06 October 2023; <https://event.asme.org/ICEM>
- ◆ 76th Annual Gaseous Electronics Conference (GEC 2023), Ann Arbor, Michigan, USA, 09-13 October 2023; <https://www.aps.org/meetings/meeting.cfm?name=GEC23>
- ◆ Educational Workshop on Regulatory Challenges in Small Modular Reactors, Rabat, Morocco, 09-13 October 2023; <https://www.iaea.org/events/evt2101796>
- ◆ 29th IAEA Fusion Energy Conference (FEC 2023), Queen Elizabeth II Centre, United Kingdom, 16-21 October 2023; <https://www.iaea.org/events/fec2023>
- ◆ 21st International Workshop on Ceramic Breeder Blanket Interactions, Granada, Spain, 19-21 October 2023; <https://conference-service.com/conferences/plasma-and-gas-discharge-physics.html>
- ◆ 21st International Conference on Fusion Reactor Materials, Granada, Spain, 22-27 October 2023; <https://www.icfrm-21.com/>
- ◆ Technical Meeting on Fusion Design Safety and Regulation, IAEA Headquarters, Vienna, Austria, 23-25 October 2023; <https://www.iaea.org/events/evt2102804>
- ◆ 65th Annual Meeting of the APS Division of Plasma Physics, Denver, CO, USA, 30 October to 03 November 2023; <https://engage.aps.org/dpp/meetings/upcoming>
- ◆ Technical Meeting on Compatibility Between Coolants and Materials for Fusion Facilities and Advanced Fission Reactors, IAEA Headquarters, Vienna, Austria (Virtual participation via Cisco Webex), 30 October to 03 November 2023; <https://conferences.iaea.org/event/345/abstracts/>

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Know Your Colleague



Mr. Ravi Pandey joined IPR in 2010 (TTP-2010) after completing his B.Tech in Mechanical Engineering in 2009. He has been working with the Negative Neutral Beam System Division (Negative Ion Group) since 2011. His work areas include advance manufacturing, vacuum systems, piping engineering and thermo-mechanical analysis. He has worked towards indigenous manufacturing of two driver based negative ion source and its components including its extraction system (grids) for Twin source test facility as well as conceptualization of twin source high vacuum pumping system, cooling water distribution system and its successful realization. He has been responsible for successful integration and operation of mechanical systems of Twin source test facility. Currently, he is working on technology development for manufacturing of neutral beam components that involves precision machining, vacuum brazing, and explosion bonding and is further interested in extending it to additive manufacturing. He is also a member of LIGO-India working group that is responsible for quality assurance of certain ongoing procurements on vacuum vessel, related accessories and pumping systems. He completed his M.Sc (Engineering) from Homi Bhabha National Institute (HBNI) in the year 2019.

Plasma Exhibition @ Bharathiar University, Coimbatore



IPR team with the volunteers from Bharathiar University during the Plasma exhibition held at Coimbatore

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