

Issue 132
July 2024

The 4th State

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



As Ravi Retires...

Finally, the long-serving Chairperson of this newsletter team retired on 31 May 2024. In the middle of the year 2013, late Prof. Bora, former Director, IPR, suggested restarting the IPR Newsletter, *The Fourth State of Matter*. Dr. Ravi Kumar took the initiative and started working towards revamping the newsletter. In fact, he proposed getting the Newsletter unveiled on the 15th of August of that year, and it did happen! Since then there has been no turning back.

The newsletter has evolved as an integral part of the Institution, recording all the events and scientific achievements. The Newsletter Archives keep the memories alive and serve to recall the dates of memorable incidents/events. It is no exaggeration to say that Dr. Ravi Kumar pulled off this newsletter single-handedly on many issues.

We have a big job on our hands to carry forward the timely and exciting compilations of *"The 4th State"*. We thank Dr. Ravi Kumar heartily for his passion and perseverance in publishing [131 issues](#) of this newsletter and his other contributions to this Institution as well.

We wish him a very Healthy, Happy, and Exciting retired life.

-IPR Newsletter Team



Dr. Ravi Kumar Felicitated
by Dr. Shashank Chaturvedi



Dr. Ravi Kumar during the Sapling plantation in IPR campus on his Retirement Day



With colleagues during the plantation ceremony



With the Newsletter Team

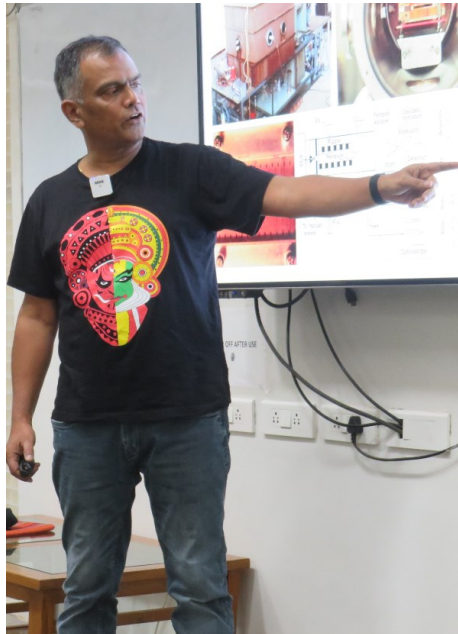
संस्थान के सेमिनार हॉल में दिनांक 24.05.2024 को डॉ. ए. रविकुमार, वैज्ञानिक अधिकारी-एच द्वारा 'संस्थान में मेरी प्लाज़्मा की रोचक यात्रा' विषय पर हिन्दी व्याख्यान दिया गया। इस कार्यशाला के आयोजन का उद्देश्य संस्थान के एक विख्यात एवं कर्मठ वैज्ञानिक द्वारा संस्थान को प्रदान की गई सेवा एवं उपलब्धियों को सरल हिन्दी भाषा में प्रस्तुत करना था। डॉ. ए. रविकुमार, वैज्ञानिक अधिकारी-एच प्लाज़्मा अनुसंधान संस्थान में अपनी 31 वर्षों की सेवा के पश्चात् 31 मई 2024 को सेवानिवृत्त हो रहे हैं। संस्थान में उनके कार्यकाल के 31 वर्ष के अनुभवों को साझा करने के उद्देश्य से यह व्याख्यान आयोजित किया गया, जिसका प्रसारण ऑनलाइन माध्यम से भी किया गया, ताकि अधीनस्थ कार्यालय एवं संस्थान के अधिकतम कार्मिक इसमें भाग ले सकें। श्री राज सिंह, वैज्ञानिक अधिकारी-एच ने डॉ. रवि कुमार का परिचय देते हुए हिंदी में व्याख्यान देने के अनुरोध को स्वीकारने के लिए आभार व्यक्त किया।

डॉ. रविकुमार ने शुरुआत में अपने हिन्दी ज्ञान तथा शिक्षा की चर्चा करते हुए हाईस्कूल के दिनों को याद किया तथा अपने उन शिक्षकों का आभार प्रकट किया जिनकी वजह से वे हिन्दी भाषा को सीख सकें। डॉ. रविकुमार ने संस्थान में विभिन्न प्रभागों में कार्य करते हुए सहयोगियों के साथ अपने अनुभवों के बारे में विस्तृत चर्चा की। उन्होंने उस समय संस्थान में उपलब्ध टेक्नोलॉजी, संरचना, तथा कार्य पद्धति के बारे में बताया तथा उपलब्ध सीमित संसाधनों एवं इन्टरनेट में अनुसंधान कार्यों को आगे बढ़ाने में आ रही कठिनाइयों का जिक्र किया। उन्होंने अपने कार्यकाल के दौरान उन्हें सौंपे गये अनुसंधान/परियोजनाओं के बारे में चर्चा की।

उन्होंने अपने कार्यकाल के दौरान PSSI, BRFSST, NFP, PFRC, NSD, IPR Newsletter, Outreach आदि गतिविधियों में पूरी तत्परता से अपनी भूमिका निभायी है। संस्थान में अद्यतन इन्टरनेट सेवा, उपकरणों से सुसज्जित प्रयोगशाला, सोलार टेलिस्कोप तथा जनजागरूकता प्रभाग में छात्रों एवं आम जनता को सरल रूप में समझाने हेतु प्लाज़्मा के मॉडलों का विकास, खासकर बच्चों को टोकामेक के बारे में समझाने के लिए टोकोटॉय, प्लाज़्मा विज्ञान के बारे में 26 भाषाओं में कॉमिक बुक का प्रकाशन आदि इनके विशिष्ट प्रयासों का फल है। अपने वक्तव्य में उन्होंने पूरे भारत में आयोजित जनजागरूकता कार्यक्रमों के अपने अनुभवों एवं चुनौतियों को साझा किया। इन कार्यक्रमों के दौरान छात्रों के साथ विज्ञान के बारे में परस्पर चर्चा करना उनके लिए विशेष सुखद अनुभव रहा है।

व्याख्यान के अंत में डॉ. रवि कुमार ने संस्थान में अपने 31 वर्ष की सेवा यात्रा के अनुभवों से प्राप्त सफलता के कुछ मंत्र श्रोताओं के साथ साझा किए और बताया कि अनुसंधान कार्य में अपने सहयोगी को प्रेरित करके, संतुलन स्थापित करके टीम वर्क से आसानी से सफलता हासिल की जा सकती है।

डॉ. सुब्रतो मुखर्जी, डीन प्रशासन ने हिंदीतर क्षेत्र से जुड़े डॉ. रवि कुमार को अपने सेवा काल के अनुभवों को सरल हिन्दी भाषा में व्यक्त करने एवं उपस्थित वैज्ञानिकों को अपने अनुभवों से प्रेरित करने के लिए धन्यवाद दिया एवं राजभाषा कार्यान्वयन समिति की ओर से उन्हें स्मृति चिन्ह प्रदान किया।



व्याख्यान देते हुए डॉ. ए.वी.रविकुमार

डॉ. रवि कुमार को स्मृति चिन्ह प्रदान करते हुए डॉ. सुब्रतो मुखर्जी



सेमिनार हॉल में उपस्थित श्रोतागण

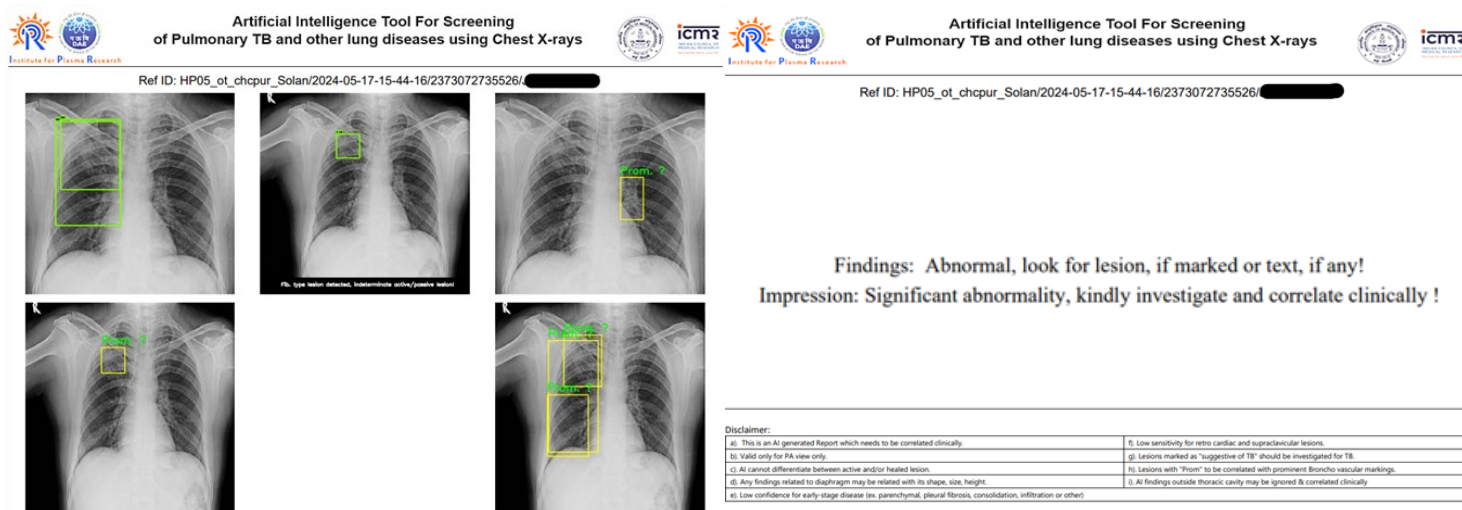
DeepCXR, an Artificial intelligence (AI) tool, is a patented (Indian Patent # 451958) technology developed in-house at IPR, in collaboration with Indian Council of Medical Research (ICMR), Delhi and 20 other medical colleges/institutions across 10 different states within the country. Data has been facilitated by ICMR while IPR has developed the software. The collaborative efforts are to develop an AI system that is robust and highly accurate CAD Tool using Chest X-Ray (CXR) imaging, across India.

DeepCXR has undergone rigorous training, testing and validation with over 300,000 data points from 18 different sites from 10 states across the country and spanning over more than 50 disease categories. Its performance has been evaluated on 60,000 X-rays. The sensitivity/specificity is > 97 % on the given test dataset.

Recently, the tool has been approved by Department of Health Research (DHR), ICMR, Ministry of Health & Family Welfare (MoHFW), India, endorsing it as a mature technology and suitable for wider adoption in India. It has been recommended by ICMR to Central TB Division (CTD) - MoHFW, to use this AI software as a Screening Tool for detection of TB and other abnormalities for larger population of India under National TB elimination program (NTEP).

Software as a Service (SaaS) i.e. a dedicated cloud server based solution for DeepCXR (<https://www.medcloud.ipr.res.in>) has been made operational in IPR since May 2024, for public through MoHFW. Currently, it is being used by multiple sites from Himachal Pradesh. Further requests from ~800 sites across 13 Indian states are in pipeline. The medCloud server and the associated computing resources are isolated from the present computing resources of IPR Computer Centre to cater the additional needs of MoHFW.

Additionally, IPR has also designed and developed a low cost, easy to use, portable chest X-Rays Digitizer Box for digitizing analog X-Rays. IPR has supplied these digitizer boxes to ICMR and 18 participating institutions to digitize old X-ray films to be used in training of AI model.



(L) X-Ray Report first page showing abnormal regions (R) Report second page with Findings and Impressions



(L) The Digitizer Box (R) IPR Team with the in-house developed Digitizer Boxes

Fusion Plasma in a Tokamak is heated by High Power Radio Frequency (RF) waves. A High-Power Amplifier (HPA) of 120 kW, operating over the 36 to 60 MHz range, has been successfully developed indigenously at IPR. This HPA is composed of indigenously fabricated High-Power RF Cavity and an imported Tetrode. All ancillaries such as 10 kW solid state power amplifier, high voltage power supply, auxiliary power supplies, and control systems are also fully indigenous. Characterization of the HPA has been completed up to the 40 MHz range and further tests are in progress.

On successful completion of full characterization, including reliability, repeatability, and compliance with electro-magnetic standards, this cavity will be delivered to ITER as an in-kind contribution.



120kW HPA integrated System

MoU between IPR and Nirma University

Memorandum of Understanding (MoU) has been signed between the IPR and Nirma University (NU) on 7 June 2024 to foster scientific research collaboration and academic partnership. This collaboration aims to address mutual interests and develop skilled human capital in plasma science, technology, and allied fields. IPR has a comprehensive R&D roadmap focused on development of indigenous expertise in fusion and plasma technologies to meet societal needs. IPR also has established a separate section-8 company (AIC-Plasmatech Innovation Foundation, AIC recognized by Atal Innovation Mission, NITI Aayog) for providing mentoring and infrastructure support for startups and innovators, promoting the rapid development of plasma technologies for fusion and broader applications. NU is renowned for its diverse academic programs in engineering, science, arts, and management, and its robust research and development infrastructure. NU has been actively engaged in research areas such as biotechnology, pharmaceuticals, life sciences, the space sector, engineering, technology, and design. Previously, NU has collaborated with IPR on various scientific projects funded by government agencies such as BRF-ST/BRNS and DST. The objective of this collaboration is to leverage the strengths of both organizations for the accelerated development of plasma technologies for societal applications and to cultivate a skilled workforce to achieve these goals. This partnership holds significant potential for transformative advancements in academic, technological, and societal spheres.



As part of **DAE Platinum Jubilee Celebrations** the following talks were organized at Institute for Plasma Research

Colloquium # 336

Title: *Non-equilibrium phases in active Brownian particles*

Speaker: Prof. Raghunath Chelakkot

Department of Physics, IIT Bombay, India

Date: 11th June 2024



Abstract: The system of Active Brownian particles has been used as a simplified theoretical model to study a large class of living and non-living active matter. The ability of Active Brownian particles to undergo a motility-induced phase separation (MIPS) even without any adhesive forces is well known. Detailed studies of such systems have concluded that their phase behaviour is relatively simple, with only homogeneous and MIPS states. However, we show that the phase behaviour of such systems is richer than what was previously conceived. More specifically, we observe another transition at high motility, where the particles form a percolated cluster. This transition follows all the characteristics of a standard percolation transition.

In the second part of the talk, we show that the aggregates of such particles on walls undergo a morphological transition with a change in wall interactions. This transition is strikingly similar to the wetting-dewetting transitions in equilibrium systems.

Prof. Raghunath Chelakkot

Colloquium # 337

Title: *All-optical control on acceleration length to optimize laser wakefield acceleration*

Speaker: Dr Vishwa Bandhu Pathak

School for Advanced Sciences, VIT, Vellore

Date: 25th June 2024

Abstract: One of the experimental configurations of interest, to verify the theories of strong-field quantum electrodynamics (SF-QED), is the collision of a multi-GeV electron beam with an ultra-intense laser pulse. Such sophisticated experiments also require strong theoretical support, more specifically simulation support, not only at the designing stage of the experiment but also after the experiment to understand the results. For such experiments, we are exploring various interesting concepts to produce a multi-GeV electron beam, such as all optical-dual-staged laser wakefield acceleration and transitional laser-plasma electron acceleration (Transition from laser to electron beam-driven wakefield acceleration). We here discuss some possible ways to extend the acceleration length of electron bunch beyond the single-stage LWFA, without compromising the beam quality. We extend the discussion on acceleration beyond the single-stage LWFA by proposing an all-optical dual-stage LWFA, staged with co-propagating two-colour laser pulses in a plasma medium. After the depletion of the leading fundamental laser pulse that initiates self-injection and sets up the first-stage particle acceleration, the subsequent second-harmonic laser pulse takes over the acceleration process and accelerates the electron bunch in the second stage over a significantly longer distance than in the first stage.



Dr Vishwa Bandhu Pathak

Conference Presentations

Ms. Tarundeep Kaur (IPR PhD Student) attended an **International School on Plasmonics and Nano-optics** at Institute of Advanced Studies in Como (Italy).

She presented her work titled **"Tuning LSPR anisotropy in metal nanoparticles arrays by sequential deposition"** in the form of a Poster Presentation



Orientation to Summer School Program (SSP-2024) Students

The summer school program for the year 2024 (IPR SSP - 2024) has started from 27th May, 2024 at the institute with the welcome and registration ceremony conducted at the seminar hall. The summer school students joined in the program have come from all across the country from various Universities, national institute etc. A total number of 25 students have joined in this program out of which 19 students are from Physics, 2 students are from electrical, 2 students from Electronics & Instrumentation and 1 student each from Mechanical and Computer disciplines. The students were given orientation about overall IPR activities, IPR Library and IPR Outreach programs. The program students were also addressed by the Director, IPR on overall activities and goals of the institute and followed by the talks from Dean Academic & Students Affairs, Dean Administration and Dean R & D. The students have attended popular lectures given by experts in the respective R & D fields in the institute along with lab visits including SST - 1, ADITYA-U, BETA, ITER India and FCIPT. The students also visited Vikram Sarabhai Space Exhibition (VSSE) Center in Ahmedabad to know more about the space research activities at ISRO. The students are currently engaged in various R&D labs and theory and simulation groups for project work on their respective fields.



(L) SSP-2024 Coordinator, Dr. Devendra Sharma giving introduction to the students (R) SSP-2024 Students



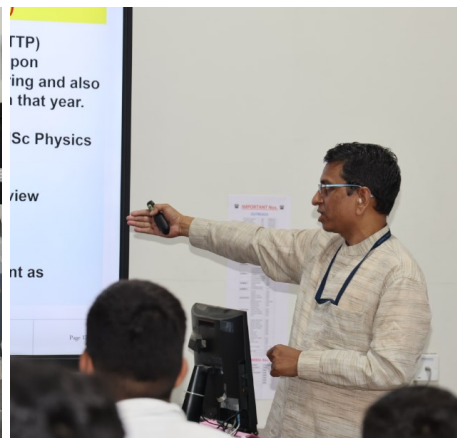
IPR Library Orientation to the SSP-2024 Students



SSP-2024 Students visiting the Vikram Sarabhai Space Exhibition (VSSE) Center, Ahmedabad

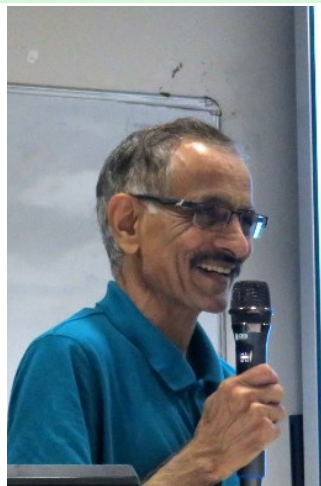


SSP-2024 Students visit to FC IPT, Gandhinagar



SSP-2024 Students visiting the IPR Exhibition Hall at IPR

World Environment Day (WED) 2024 was celebrated at IPR on 5th June 2024. Special invited guests, Shri R.D. Kamboj and Shri Indersinh K. Barad, both retired IFS attended the WED. A special talk on **"Biodiversity - Causes and Consequences of its Loss"** by **Shri R.D. Kamboj**, retired IFS, was organized at IPR. Distribution of Saplings and Plantation were also arranged by the IPR Staff Club.



(L) Mr. Raj Singh introducing the speaker (R) Audience attending the Talk



Dr. Paritosh Chaudhuri, Dean (R&D) felicitating Shri Barad



Dr. S. Mukherjee, Dean (Admin) felicitating Shri Kamboj



Plantation of Saplings at IPR Campus (L-R) Dr. S. Mukherjee, Mr. Raj Singh, Dr. P. Chaudhuri, Mr. N. Vaishnav



Sapling Distribution to the IPR employees

International Day of Yoga (IDY) - 2024

International Day of Yoga (IDY-2024) was celebrated at IPR on 21st June 2024. A large number of employees energetically participated by performing Yoga and pranayama. Mr. Amrutsinh Mali, Yoga trainer from Gujarat State Yog Board and his team conducted a guided session. The session included practicing of various types of Asanas by the participants.



Participants performing Yoga

The trainer and his team being felicitated by CAO, IPR

Date	Institution	Visitors
5-June-2024	St. Xavier's College, Ahmedabad (Summer School Program Students)	52 students of B.Sc. / M. Sc. Physics / Applied Physics
12-June-2024	L.D.R.P Institute of Technology and Research, Gandhinagar	57 students of B.E. Computer Engineering and 2 faculty
19-June-2024	University College of Engineering, Banswara, Rajasthan	56 students of B.E. /M.E. and 4 faculty
21-June-2024	Shivashish World School, Ahmedabad	65 student of 11th & 12th Standard and 3 faculty



Summer School Program Students of St. Xavier's College, Ahmedabad during their visit to IPR



Students and teachers of L.D.R.P Institute of Technology and Research, Gandhinagar during their visit to IPR



Students and teachers of University College of Engineering, Banswara, Rajasthan during their visit to IPR



Students and teachers of Shivashish World School, Ahmedabad during their visit to IPR

- ♦ **Mr. J. J. U. Buch**, gave a talk on "Density profile measurements from the developed FMCW Reflectometry system for Aditya-U tokamak" at 16th International Reflectometry Workshop (IRW16), Max Plank Institute for Plasma Physics, Greifswald, Germany, 13-16 May 2024
- ♦ **Prof. Sudip Sengupta**, gave an invited talk on "Breaking of Relativistically Intense Plasma Waves" at International Day of Light - 2024, Nuclear Photonics Symposium, Tata Institute of Fundamental Research (TIFR), Hyderabad, 16-17 May 2024
- ♦ **Mr. Suruj Jyoti Kalita**, gave a talk on "Molecular Dynamics Study of Subcritical Transition to Turbulence in a Yukawa Liquid" on 21st May 2024
- ♦ **Dr. Ruchi Mishra**, gave a talk on "Reactive Molecular Dynamics Simulation of the carbendazim degradation induced by reactive oxygen plasma species" on 21st May 2024
- ♦ **Mr. Sebin Augustine**, gave a talk on "Development of SERS substrates based on self-organized nanoparticles for the molecular sensing applications" on 31st May 2024
- ♦ **Mr. Vyom Desai**, gave a talk on "Synthesis and application studies of MAX phase Ti_3AlC_2 " on 06th June 2024
- ♦ **Dr. Debashrita Mahana**, Academy of Scientific and Innovative Research (AcSIR), CSIR-HRDC Campus, Ghaziabad, gave a talk on "Development and characterization of CuO thin films and ZnO/CuO heterostructure by PVD process for CO gas sensing application" on 07th June 2024
- ♦ **Ms. Swati**, gave a talk on "Studies on Magnetic Field Effects in a Capacitive Coupled Cylindrical Radio Frequency Plasma Device" on 07th June 2024
- ♦ **Ms. Anshika Chugh**, gave a talk on "Ratchet effects and collective dynamics in passive and active systems" on 10th June 2024
- ♦ **Prof. Raghunath Chelakkot**, Department of Physics, IIT Bombay, gave a talk on "Non-equilibrium phases in active Brownian particles" on 11th June 2024 (**Colloquium #336**)
- ♦ **Dr. D. K. Aswal**, Group Director of Health, Safety, and Environment at BARC, Mumbai, gave a talk on "Radiation, Nuclear Energy, and Environment" on 13th June 2024
- ♦ **Dr. Kamalakkannan**, University of Madras, Chennai, gave a talk on "Defects Studies in Low Energy Ion-Implanted Silicon Carbide" on 14th June 2024
- ♦ **Mrs. Dipalkumari Soni**, gave a talk on "Development Process of CE certified Signal Conditioning Modules" on 18th June 2024















Upcoming Events

- ♦ International Youth Conference on Energy (IYCE), Colmar, France, 2-6 July 2024; <https://www.iyce-conf.org/>
- ♦ 10th Plasma Science Society of India-Plasma Scholars' Colloquium (PSSI-PSC 2024), Indian Institute of Technology (IIT) Delhi, 4-6 July 2024; <https://sites.google.com/view/psc-2024/iitd>
- ♦ 50th EPS Conference on Plasma Physics (EPS 2024), Salamanca, Spain, 8-12 July 2024; <https://epsplasma2024.com/>
- ♦ Joint ICTP-IAEA INPRO School on Strategic Planning for Sustainable Nuclear Energy, Trieste, Italy, 8-19 July 2024; <https://indico.ictp.it/event/10495>
- ♦ Europhysics Conference on Atomic and Molecular Physics of Ionized Gases (ESCAMPIG), Brno, Czech Republic, 9-13 July 2024; <https://escampig2024.physics.muni.cz/>
- ♦ 14th Technical Meeting on Control Systems, Data Acquisition, Data Management and Remote Participation in Fusion Research, Sao Paulo, Brazil, 15-18 July 2024; <https://conferences.iaea.org/event/377/>
- ♦ Decennial IAEA Technical Meeting on Atomic, Molecular and Plasma-Material Interaction Data for Fusion Science and Technology (AMPMI 2024), University of Helsinki, Finland, 15-19 July 2024; <https://conferences.iaea.org/event/384/>
- ♦ Culham Plasma Physics Summer School, Culham, United Kingdom, 15-25 July 2024; <https://culhamsummerschool.org.uk/>
- ♦ 28th International Conference on Circuits, Systems, Communications and Computers (CSCC) Heraklion, Crete Island, Greece, 19-22 July 2024; <http://www.csccl.co/>
- ♦ 26th Technology of Fusion Energy (TOFE 2024), Madison, United States, 21-25 July 2024; <https://www.ans.org/meetings/tofe2024/>
- ♦ 29th International Cryogenic Engineering Conference / International Cryogenic Material Conference 2024, Geneva, Switzerland, 22-26 July 2024; <https://iccec29-icmc2024.web.cern.ch/>




Welcome to New Colleagues

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Best Wishes to the new staff members who joined IPR in various permanent positions during January - June 2024

				
Ms. Priyanka Kumari DOJ: 26-02-2024 Positive NBI Power Supply and Data Acquisition	Ms. Ragini Tripathi DOJ: 27-02-2024 Fusion Blanket Division (FBD)	Shri Ashutosh Pandey DOJ: 28-02-2024 Large Cryogenic Plant & Cryo Systems Division	Shri Mukul Rautela DOJ: 29-02-2024 Civil Infrastructure Project Section (CIPS)	Shri Mohd Umair DOJ: 29-02-2024 Magnet Systems Division (MSD)
				
Shri Ravikumar A Shishangiya DOJ: 01-03-2024 Admin-1	Shri Sunil Kumar Agrahari DOJ: 01-03-2024 High Temperature Technologies Division (HTTD)	Shri Sudhanshu Srivastava DOJ: 01-03-2024 Remote Handling & Robotics Tech. Dev. Division	Shri Satishbhai K. Patel DOJ: 01-03-2024 Multidisciplinary Research Section	Shri Ankit Kumar DOJ: 01-03-2024 High Power LHCD Systems Division
				
Shri Tushar Kumar Gupta DOJ: 04-03-2024 Mechanical Engineering Services Division	Shri Saurabh Verma DOJ: 04-03-2024 Spherical Tokamak Section (STS)	Shri Sunilkumar Gurjar DOJ: 04-03-2024 Purchase Sub-Section-2	Ms. Akanksha Devi DOJ: 06-03-2024 Microwave & ECE Diagnostic Section (MWS)	

Best Wishes to the new staff members who joined CPP-IPR in various permanent positions during January - June 2024

		
Shri Dipak P. Zope DOJ: 03-04-2024 Computer	Shri Gautam Shikdar DOJ: 18-03-2024 Electrical	Shri Sunny Kr Rai DOJ: 18-03-2024 Instrumentation

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In-house developed AI tool for automated detection of Lung Diseases	03	World Environment Day 2024	08
Successful development of 120 kW High Power Amplifier system	04	International Day of Yoga (IDY) - 2024	09
MoU between IPR and Nirma University	04	Academic Visits to IPR	10-12
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Know Your Colleague



Mr. Nayankumar D. Shukla

Mr. Nayankumar Dharmendrabhai Shukla completed his Diploma in Civil Engineering from Government Polytechnic, Junagadh in the year 2010. He joined IPR in year 2012 in the Campus Infrastructure Project Division (CIPD) as Technical Assistant-B. After Joining IPR, Nayankumar assisted Engineer-In-Charge in new project related activities of civil construction work of Additional offices building, New R & D building, Auxiliary building & New Pump House Building at IPR campus. Later on he went on to supervise construction works as an Engineer-In-Charge (EIC) of – 1) Recharge wells, 2) New Bore well Near IPR Guest House, 3) Additional Washroom Facilities at IPR Guest House, and 4) Concertina Coil work all over IPR boundary wall works. He did his graduation in Civil Engineering (AMIE) from Institution of Engineers, India in year 2017. He was awarded the Smt. Niranjana Madhusudan Amin Merit Medal by The Institute of Engineers India (Gujarat State), for Securing Highest Marks in AMIE Section - “B”, from Ahmedabad Exam Centre in Oct 2017. Presently Nayankumar is working as Scientific Assistant-D1. He likes to play cricket and participates in IPR cricket tournaments.

Homage to Prof P. K. Kaw on his 7th Death Anniversary

IPR Library arranged a Floral Tribute to Prof Kaw on his Seventh Death Anniversary on 18 June 2024.



Quote of the Month

"The strength of the team is each individual member. The strength of each member is the team."

--Phil Jackson

The IPR Newsletter Team

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