

# वार्षिक प्रतिवेदन ANNUAL REPORT

*Annual Report*

2023-24

वार्षिक प्रतिवेदन



हरीश-चन्द्र अनुसंधान संस्थान  
**Harish-Chandra Research Institute**

छतनाग मार्ग, झूँसी, प्रयागराज (इलाहाबाद) – 211 019  
Chhatnag Road, Jhunsi, Prayagraj (Allahabad) – 211019

## LIBRARY

In an academic or research institute, a library plays an important role in the dissemination of knowledge. In fact, the **ambience of the library** reflects the quality of the education and research imparted by the institute. The Central Library plays a **vital role** in furthering the academic and research missions of HRI and facilitates the creation and dissemination of knowledge. The range of services offered by the library is comparable to the best libraries in the country. HRI Library has recognised the importance of the **academic vibrations** required in the library and has been growing in this direction right from its very inception. HRI's library serves as a **knowledge hub**, containing resources in print and electronic form.

### A Glimpse of the Library:

16      17

#### Collection Development and Management:

Building a collection of reading materials is one of the important functions of the library, which supports the academic and research work of students, faculty, staff, and other users. Our library collection comprises all types of materials related to **mathematics** and **physics** and is considered one of the best in the country, which is its greatest asset. The total collection of the library as of 31<sup>st</sup> March 2024 stands as follows:

Resources	details	Subscribed E-resources/ Databases	Other resources and facilities:	
<b>Total Collections:</b>		<b>Total Collections:</b>	Theses	144
<b>Books (Print)</b>	<b>63203</b>	<b>Journals: 152</b>	CD's/DVD's	102
No. of Books – Print	22919	Subscribed: 98	General Magazines	21
No. of Bound Volumes	38292	DAE's ODOS Consortium:42	Newspapers	07
– Print	1992	National Jls: 12	Seating Capacity	53
Gratis – Print			Carpet Area	550 Sq. Mts
		<b>Databases/Archives:</b>	Computers for Users/ OPAC	04
<b>Newly added materials:</b>	<b>613</b>	1] MathSciNet	Kiosk for self issue-return	01
Books	<b>49</b>	2] Project Euclid Journals	Photocopy machine	01
Gratis-books		3] JSTOR	Lamination machine	01
		<b>Life-time archives</b>	Spiral machine	01
		1] DMJ 100 archive	Library Management Software: with RFID Technology	Koha 22.05 version
		2] AIP archive		
		3] IoP archive		

#### Library Working Hours:

The institute's library is one of the best equipped libraries in India, and it aims to put the motto "**Books are for use**" into practice.

The library works on all days of the year except holidays of national and social importance.

<b>Monday to Saturday</b>	8.00 am to 2.00 am (midnight)
<b>Sundays &amp; Gazetted holidays</b>	8.00 am to 8.00 pm

### Library Team:

The day-to-day functions of the library at HRI are efficiently managed by a team headed by a qualified librarian with 25+ years of professional experience. He is supported by a SO "C" along with a team of well-trained library staff. The library staff performs their duties exceptionally well and is always appreciated by library users for the service mindedness, intelligence, enthusiasm, and sincerity with which they serve them. In addition to their regular jobs, officers and staff members are involved in various committees and the institute's other work.

Team members:	
Dr. K.K. Suresh Kumar	Librarian
Mrs. Anju Verma	SO "C"
Shri. Vivek Kumar	Junior Library Assistant
Shri. Deepak Yadav	Junior Library Assistant
Shri. Kamta Prasad	Peon
Other contractual staff members	05

### Library Advisory Committee:

The Library Advisory Committee works towards continual improvement of the library's activities so that the library and its facilities achieve a fair degree of acceptability and appreciation amongst the users.

#### Members: 18

Prof. Anirban Basu	Convenor	18
Dr. Gyan Prakash	Member	19
Dr. B.S.S. Sreedhar	Member	
Dr. K.K. Suresh Kumar	Member & Librarian	20

21

### Highlights:

Services:	
1] Reader's assistance	10] Theses consultation
2] Reference & Referral services	11] Remote Access (VPN- Virtual Private Network)
3] Circulation Services	12] Faculty publications/ Institute Publication's corner.
4] OPAC/ Library Website	13] Online access of E-resources
5] Reprographic, Spiral binding and Lamination	14] Open Educational Resources: NDL, NPTEL, MIT's resources, free search engines
6] Institute ID Card generation	15] Awareness on copyrights and self-archiving policies.
7] Book Reservation service	16] Self-Issue/Return System (RFID enabled security gate system)
8] Orientation for newly joined library users & individual mails.	17] Collection development/ Book Exhibition
9] SDI (Selective Dissemination of Information) and CAS (Current Awareness Services) (New Arrivals Services & Information on Indented books)	18] Library Website/OPAC

<b>Services/ Best Practices:</b>	
A “Best Practice” in simple terms, is known as the practice, that paves the way for enhancing the existing functions and helps in the effective implementation or use of the process.	
19] Off-Campus Services through E-mail: [Scientific Information]	23] Inter Library Loan service
20] Research support services (Through mail) a] Awareness on “Research and Publication Ethics”. b] Reference Management tools & Similarity Check support: Shodchakra, SheRNI, IRINS, Vidwan, INFED, Turnitin; c] DST projects, Awareness on Predatory Journals d] Awareness on copyrights and self-archiving policies.	24] Personal and issued books are permitted inside the library
21] Misplaced books tracing service	25] Translation service
22] Newspaper clippings	26] 18 hours of uninterrupted services

### **Library Management Software/RFID Technology:**

The library is automated and enabled with RFID technology by using KOHA open source library management software (22.05 version). All in-house activities in the library, including Acquisition, Cataloguing, Circulation and Serials Control etc., are fully computerised. The Online Public Access Catalogue (OPAC) of the library is operational on the Intranet. It can be accessed online to search more than 63203+ bibliographic records available in the library database.

### **RFID Technology:**

The library has implemented the **Radio Frequency Identification (RFID)** system. It is the best automated library automation system used worldwide and is an effective way of managing the collections of the library and providing enhanced services to the users, with benefits like self check-out of books, self-check-in, finding misplaced reading materials, inventory accuracy, stock verification procedures, security control, smart card issuance, etc.

### **Inter Library Loan Services/Sharing of Resources:**

The library is a part of DAE family/libraries so the HRI library can help in obtaining articles and other materials that HRI library does not subscribe to and get it from other libraries all over the India. Also, the library maintains excellent relations with a number of major institutions and libraries in India for exchange of journal articles etc., for the mutual benefit of the users.

### **Major Initiatives:**

The library has taken various initiatives to improve the existing services, infrastructure, facilities, and procurement of bookshelves and reading chairs to increase the collections and user strength to provide strong and dynamic support to the academic, research programmes and policies of the institute. Some of these initiatives are described in the following sections.

- **Active participation:** conducted library committee meetings, implemented policies and programs of the library as adopted by the library committee, and authorities.



- **Legal Agreement Procedure:** Introduced the legal agreements (stamp paper) process for the subscription of online and print journals, databases, and e-book packages. Thereby cautioning vendors and publishers about the consequences of misuse of the huge subscription amount.
- **Safe environment:** Regularly conducting discussions with publishers and vendors regarding invoices, currency conversion rates, price proof, discounts, the institute's subscription tier level, regularly checking access to online journals, and keeping a safe environment for the library's spending budget.
- **Value-added Services:** Every year, a marked budget of Rs. 2–3 crore is spent on the library. Therefore, to value the spend, we made a continuous effort to facilitate the user community with value-added services with the help of the library team.
- **Best Practices:** In consultation with the Library Committee, the Registrar and Director implemented best practices in the library, strived to make HRI-Library one of the best research libraries in the DAE community, and tried to bring library standards to the national/IIT/IISER library level.
- **Infrastructure APEX Project (Library Component):** Presently, the library team is working on the project and, from time to time making progress as per the DPR for the period of 2021–2024.
- **DAE-Elsevier Consortium 2024 & One DAE One Subscription (ONOS):** Handled DAE-Elsevier Consortium-2024 & ODOS-2024 for the institute and attended several online meetings.
- **Systematic re-shelving of books:** Experienced library staff members have been assigned to devote one to two hours daily in the morning in the stack areas to facilitate easy retrieval of books. This process is continuous process throughout the year, and it will give easy access to the books and other materials without any hurdles. This initiative has produced considerable satisfaction among users.
- **Library Lounge/Collaboration Learning Space:** The library has created the library lounge/collaborative learning space at the entrance of the library, near the security checkpoint. This space has been created to facilitate space for users who want to learn, have one-on-one discussions, discuss together or in a group to solve problems, work on a project, or have a meaningful discussion in a limited amount of time. Also, newspapers and general

magazines are kept for the users benefit. We provided comfortable furniture for the users. This area is quite popular with library users.

- **Hindi Book Collection:** HRI Library has built up a good collection of books in Hindi language and made different sections like Language, Literature, Biography, Poem, Fiction, Novels, Religion, Science Literature, Children's Literature, and General Reading. These books are prominently kept near the stack area in the library to promote their usage. To increase the use of **Rajbhasha Hindi**, the HRI library regularly sends a **NEW ARRIVALS LIST** to the HRI library user community.

---\*---

## COMPUTER CENTRE

The Computer Centre provides the support to a very large community which includes academic and research faculty, administrative staff, Post Doctoral Fellows, Ph.D. students, M.Sc. students, visiting students and long term and short term visiting scientists. The computing facilities are available to users round the clock i.e. 24x7x365 all over the residential campus. The entire HRI campus-wide-network is connected with Optical Fibre Cable (OFC) based Gigabit backbone providing the network and Internet connectivity to each and every office, the Institute building, Engineering building, Library building, all the Hostels, Guest House, Pantry, Health Centre and all residential apartments and bungalow. The campus-wide-network is connected to the Internet through two Internet Service Providers. The primary Internet connectivity is through 1 Gbps dedicated National Knowledge Network (NKN) Internet leased link.

The Computer Centre runs in-house developed open source based Mail server, Web server, LDAP server, firewall servers and other important servers running on most secured OpenBSD and Linux Operating Systems with hand written firewall rules/packet filter rules and all the servers are placed inside the DMZ. All the servers are well configured and well secured and protected from the external world.

The core of the network is the Computer Centre, which houses various servers, and several desktop computers for general use. File and authentication services are exported from the Computer Centre to a large chunk of the network through NFS and LDAP. Apart from the NFS and LDAP clients, users have independent machines running different flavours of Linux operating System, Apple Macintosh and MS Windows that are not clients of the central servers.

The common operating systems used at computer centre are Unix clones like GNU/Linux, and Unix-like operating systems such as OpenBSD and FreeBSD. Most software packages, proprietary and open source, that are necessary for research in mathematics and physics, are available to users. The computer centre, time-to-time, upgrades the operating systems and its associated software packages to meet out the requirements and to enhance the security of the servers.

The computer centre maintains high end centralised online UPS systems for the servers, network of the institute and for the independent machines used by

academic and administrative members of the institute to avoid any breakdowns in the computer systems due to the power supply problem.

The computer centre provides high-end Wi-Fi6 routers for the student's hostels and very high-end Wi-Fi6 routers for the hostels, institute buildings and guest house.

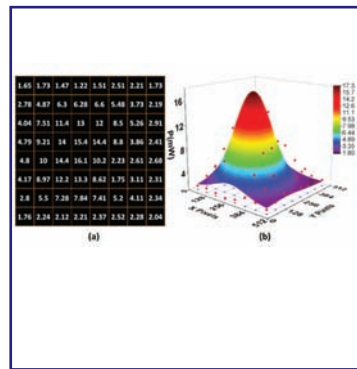
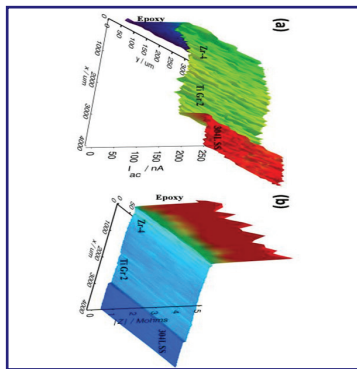
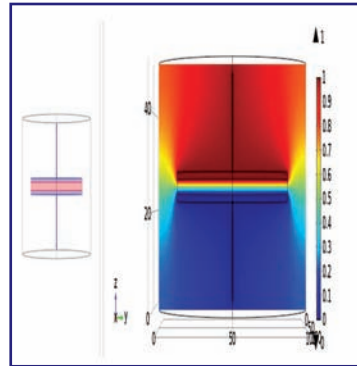
The computer centre provides centralised printing facility to all the academic and administrative members of the institute.

The Computer Centre continues to grow and is trying to keep updated with latest technological support by the Computer Centre Project staff under the leadership of Dr. Sudip Chakraborty, Faculty-In-charge, Computer Systems.

All this has become possible by the great support from the Director, Registrar and our dedicated team of computer committee, Computer Centre project staff and very cooperative non-teaching staff and also well disciplined students.

We are proud of our achievements and excited by new opportunities as we aspire to be among the top computer centre. The computer centre endeavour to provide the right environment for students, staff and faculty to flourish.

---\*---



# CHAPTER V

# Basic Research

## VI.10 Digital Asset Enhancement & Value Added Services

Scientific Information Resource Division (SIRD) is an advanced research library caters to the needs of more than 5000 Scientists, Engineers, Research Scholars, and students of various DAE Units at Kalpakkam by providing access to relevant information at their desktops. The collection includes 62,000 books, 48,000 back volumes, 600 journals, 15,000 standards, two lakh technical reports, e-books, scientific/technical databases and research assistant tools. SIRD has constantly been endeavouring to modernize and keep itself abreast with the latest in the field of Library through the implementation of digital library infrastructure and services. SIRD is rendering various services to the Centre like interlibrary loans, photography, videography, reprography, desktop design, in-house printing publications, auditorium, and video streaming.

### Centralized Video Repository for IGCAR

SIRD has taken initiative to build repository of videos of IGCAR for the last 2 decades. Videos on the cassette form were digitized and rendered for necessary post production. Video streaming facility, which was installed in 2011 at Sarabhai auditorium also had the archival of recorded videos of the events. These videos were taken and after post production works like sound mixing, title addition and other effects, were uploaded into a server system. For this purpose, a centralized video library solution was implemented in SIRD during the last year. More than 200 videos with necessary meta data were uploaded into the repository (Fig. 1).

### RFID based Book Drop System

RFID-based Integrated Library Management System with the latest gadgets are used for library management activities. During this period, SIRD has enhanced the circulation system by providing RFID based book drop machine (Fig. 2). This system can be operated from the entrance of SIRD premises (Library) on 24 x 7 basis. This system allows the patron to 'Check in' (return) books even during non-office hours, thereby avoiding fines when returned after due date.

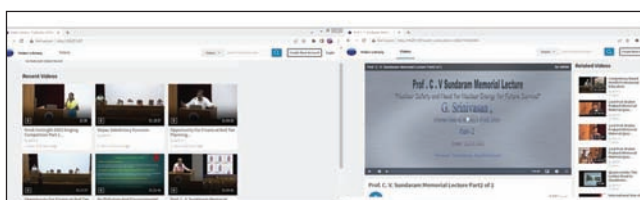


Fig. 1. Video Repository of IGCAR



Fig. 2. RFID based book drop system.

### Digital Display Signage

Three numbers of 75-inch digital display signage with KIOSK structure are procured and commissioned. They are being used to display the achievements of the centre, various developmental activities, SIRD book collection, new arrivals and announcements to the visitors (Fig. 3). Similarly, Convention Centre projection system is enhanced with 12000 lumens based laser projector with HDMI Display systems.

Digital contents are uploaded into high performance digital library infrastructure comprising of server, storage and networking. Institutional repositories are developed through open source solutions such as DSpace, Linux, Apache & Mysq. Servers are maintained on IT cooling racks with UPS power backup. Fire alarm systems, CCTV surveillance, Zero client user access stations, Information access KIOKS are some of the technologies implemented in SIRD. Servers run on 24/7 basis to provide uninterrupted smooth information access to patrons across the IGCAR campus

SIRD brings out the ISSN-based in-house publication of IGCAR viz IGC Newsletter every quarter. SIRD efficiently executes the responsibility to bring out IGC annual report, desktop calendars, pocket diaries, planners, and bulk printing of confidential documents,

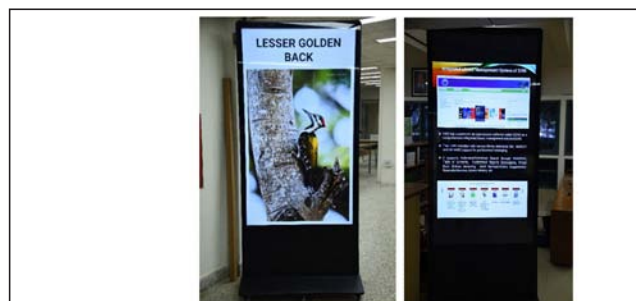


Fig. 3. Digital display signage



designing the templates for brochures, souvenirs, etc. Research data output of the institute like the theses, IGC technical reports, in-house publications like IGC Newsletter, Annual reports, pre-prints, journal and conference publications are archived in a centralized Institutional Repository (IR). The metadata of the knowledge assets are stored in Standard Dublin Core format and supports open archives initiative

for metadata harvesting. Springer & IOP eBooks on Physics, Chemistry and Astronomy, Research assistant tools like grammarly ,ithenticate, flipping book, E-journals, databases and standards are being subscribed by the SIRD. Digital resources are accessible 24/7 at desktops (within and outside the campus) of the patrons and user alerts are provided through email.

## VI.11 Deployment of Open-Source Security Information and Event Management System and its Integration with Proxy Servers

A Security Information and Event Management (SIEM) system continuously collects security-related data from various sources across the network, including firewalls, servers, applications, and user devices. This data includes security events, log entries, and user activity.

### A SIEM system performs three key functions:

- Security Information Management (SIM):** Analyzes and stores historical security data for compliance reporting, security audits, and forensic investigations.
- Security Event Management (SEM):** Monitors security events in real-time, identifies suspicious activity, and generates alerts for potential threats.
- Log Management:** Aggregates and normalizes event logs from diverse sources, making them easier to search and analyze.

### Deployment of SIEM system at IGCAR

In order to enhance threat detection and improve incident response, an open-source SIEM system has been implemented and deployed at IGCAR. It consists of 3 servers each with two Intel Xeon 16-core processors, 32 GB memory and a 3.3 TB SAS Hard Disk with Raid protection. These servers are designated the following roles – Manager, Sensor and Search.

The Manager node provides a web interface to configure the SIEM system, see the alerts and statistical reports, and perform log analysis and detailed forensic investigation. It works in co-ordination with the Search Node and the Sensor Node.

The Sensor node, which acts as a Network Intrusion Detection System (NIDS), consists of two interfaces --- an interface on which it talks to the Manager Node and the Search Node, and another monitoring interface which listens in promiscuous mode. The port of the network switch where the monitoring interface is connected is configured to receive a copy of all the network packets flowing between the Internet and the Intranet. The Sensor Node captures and stores the entire traffic seen on the monitoring interface for 2 days to facilitate in-depth forensic analysis. It retrieves the network metadata and

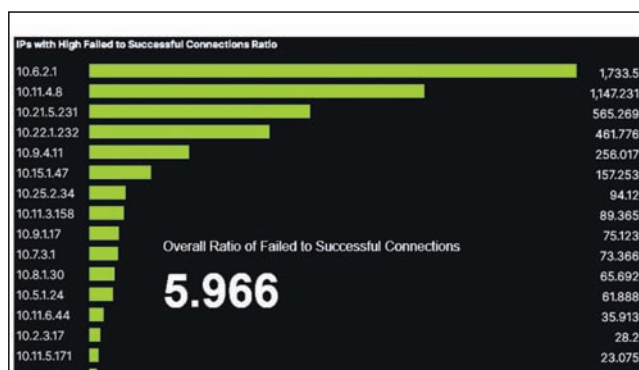


Fig. 1: A dashboard listing the internet IPs with unusually high internet access failure to success ratio

relevant security information from the captured traffic and checks for the presence of threat signatures using the threat signature database periodically fetched from various national / international sources. The network metadata, and threat alerts, if any, are handed over to the Search Node for further processing and storage.

The Search node acts as the back-end database. It consists of an open-source search and analytics engine which can store structured or unstructured data in a NoSQL format, and offers lightning-fast searches and analytics.

### Integration of the SIEM system with Proxy Servers

In order to enhance network security, users of the IGCAR campus network are allowed to access the internet only through a user authentication system constituted by a set of proxy servers. The user activities logged by the proxy servers are critical in investigating cyber security events. Therefore, the SIEM system was configured to fetch and process the raw logs generated by the proxy servers, extract the relevant information and store them in the Search node. Various dashboards have been developed to analyse the internet access data and report the statistics in real-time (see Fig. 1 for a dashboard that lists the intranet IPs with unusually high internet access failure to success ratio). Python based modules are also being developed to perform in-depth analysis of the threat alerts by correlating proxy logs with NIDS logs.



## Women's Day Celebrations at IGCAR 2023

March 1- 7, 2023



Felicitation to school children

Women's Day was celebrated from March 1- 7, 2023, at IGCAR. The celebrations included competitions and felicitating girl students who have excelled in studies, sports and cultural events. Distinguished women in law and justice, news broadcasting and financial advice were invited to share their experiences and educate the audience.

Ministry of Women and Child Development had directed DAE to create awareness about the schemes developed by the government for the welfare of women and to felicitate achievement by women during the week of March 1 to March 8 through various celebrations.

IGCAR organized competitions like slogan writing, posters, elocution and skits on topics related to Women's empowerment. Such competitions are the best method to spread the concept and the various schemes for women's

empowerment. More than 150 employees participated in the competitions. Forty employees played six skits on topics including Women's empowerment, Gender Equality, the Role of working women in society, The benefit of treating women with dignity, Innovative methods to protect women and Government schemes for women. The best slogan is portrayed on the Figure-1.

Ms. Leela Meenakshi IIS, Joint Director, All India Radio, spoke on her experiences in the News services field on March 3, 2023. Ms Renu Maheswari, SEBI registered investment advisor and co-founder Finscholarz Wealth Managers, spoke on "Know Your Money" on March 6, 2023. IWSA organized this lecture.

IGCAR organized an awareness lecture by Ms. Sulekha Beevi, Member Judicial Customs Excise and Service Tax



Felicitation to Mehetva founder member Mrs Blossom Rodriguez,



International Women's day celebrations

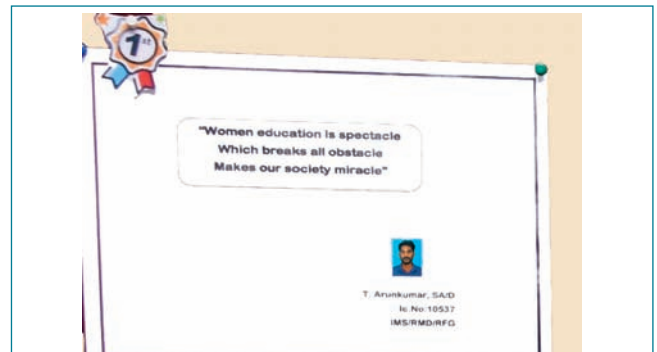


Felicitating Sri Raghupathy , Director, RDTG,EIG and RFG

Appellate Tribunal, Chennai Region, on March 7, 2023. The cases between Bajaj & Gill, the Vishakha case, etc., were discussed in this lecture. During the interactive session, the speaker explained the law to protect women against sexual harassment in the workplace.

As a token of appreciation, a memento was gifted to all women employees of IGCAR and CISF at Kalpakkam on Women's day.

Mehetva is a school at Kalpakkam township where training is given to special children was founded by three women in 1996 and has been run successfully by them since then. The school requires specialized training for teachers and other



First prize - Slogan Competition

staff to handle the children. On Women's day celebrations 2023, IGCAR honored the founding members of Mehetva, Ms.Blossom

Rodriguez and present organizing member Ms. Chitra.

A total of 50 students from the neighbouring schools AECS1, AECS2, AECS Anupuram, KV1, KV2 and two Tamil Medium schools from Sadras and Pudupattinam were honored.

Reported by  
Ms. S. Rajeswari  
Safety, Quality & Resource Management Group





**Annual Report**  
and  
Audited Statement  
of Accounts  
**2023– 24**



**Institute of Physics**

**Bhubaneswar**

## About the Institute

Institute of Physics, Bhubaneswar is an autonomous research institution within the Department of Atomic Energy (DAE), Government of India. The Institute was established in 1972 by the Government of Odisha and continues to receive financial assistance from DAE and Govt. of Odisha.

The Institute has a vibrant research programme in the fields of theoretical and experimental condensed matter physics, theoretical high energy physics and string theory, theoretical nuclear physics, ultra-relativistic heavy-ion collisions and cosmology, quantum information and experimental high energy nuclear physics. The accelerator facilities include a 3MV Pelletron accelerator and a low-energy implanter. These are being used for studies in low energy nuclear physics, ion beam interactions, surface modification and analysis, trace elemental analysis, materials characterization, and radiocarbon dating studies. One of the important areas in the Institute is in the field of Nanoscience and Nanotechnology in general and surface and interface studies in particular. The Institute has several advanced facilities for sample preparation and for the study of various physical and chemical properties of nanostructures and bulk condensed matter systems. The Institute is actively involved in the International Collaborations with CERN (Switzerland), BNL (USA), ANL (USA), GSI (Germany), and other laboratories abroad. The Institute is also participating in various research activities related to India-based Neutrino observatory.

The Institute offers Ph.D. programme in Physics. Selected students are required to successfully complete one-year course work at the Institute. The selection for the doctoral programme is through the Joint Entrance Screening Test (JEST). Candidates who have high CSIR-UGC NET or GATE scores are also eligible for admission to the doctoral program.

The Institute campus has housing facilities for the employees and hostels for the scholars and post-doctoral fellows. Compact efficiency apartments are available for post-doctoral fellows and visitors. Both indoor and outdoor games and sports facilities are also available in the campus. The Institute has a mini-gym in the New Hostel. The Institute also has a guest house, auditorium, and dispensary in the campus. The Foundation Day of the Institute is celebrated on 4th of September every year.

---

## 5.1 MAJOR EXPERIMENTAL FACILITIES

### ION BEAM FACILITIES

The Ion Beam Laboratory houses the NEC 3 MV tandem Pelletron Accelerator which is one of the major facilities used by researchers from all over the country. The accelerator provides ion beams of energies typically 1-15 MeV starting from protons and alphas to heavy ions. Commonly used ion beams are that of H, He, C, N, Si, Mn, Ag and Au. Multiple charge states are possible for the MeV energy positive ion beams. Argon is used as the stripper gas to produce positive ions. The most probable charge state for heavy ions (carbon or above) is 3+ for terminal potentials above 2 MV.

The beam hall has six beam lines. The beam line at  $-45^\circ$  is used for Rutherford Backscattering (RBS), Elastic Recoil Detection Analysis (ERDA), Proton induced X-ray Emission (PIXE), Ultra high vacuum (UHV) and ion channeling. A general purpose scattering chamber suitable for PIXE experiments is available in the  $0^\circ$  line. This beam line also has the potential to perform external PIXE experiments in atmosphere. The  $15^\circ$  beam line is equipped with a raster scanner and is being used for ion implantation. There is a UHV chamber for surface science experiments in the  $30^\circ$  beam line. The  $45^\circ$  beam line houses the micro-beam facility.

The electron cyclotron resonance (ECR) ion source for ion implantation, nanoscale patterning, ion-beam induced epitaxial crystallization, ion beam mixing, ion-beam shaping and synthesis of embedded nanostructures and so on. At Surface Nano structuring and Growth (SUNAG) Laboratory, we have facilitated a low energy (50eV-2 keV), broad beam (1 in. diameter) electron cyclotron resonance (ECR) source based ion beam etching facility for creating self-organized surface nanostructures.

### MICROSCOPY FACILITIES

The High Resolution Transmission Electron Microscope (HRTEM) facility consists of two components: Jeol 2010 (UHR) TEM and Associated Specimen Preparation system. High-Resolution Transmission Electron Microscopy (HRTEM) with an ultra-high resolution pole-piece (URP22) working at 200 keV electrons from LaB<sub>6</sub> filament assures a high quality lattice imaging with a point-point to resolution of 0.19 nm.

### ARUPS FACILITIES

The Angle Resolved Ultraviolet Photoelectron Spectrometer (ARUPS) is equipped with facilities for doing both angle integrated valence band measurements as well as angle resolved valence band measurements. The angle resolved studies are possible on single crystals.

### PULSED LASER DEPOSITION (PLD) SYSTEM





---

PLD system helps growing epitaxial thin films of various materials albeit the most preferred materials are oxides. The newly installed system was developed in a piece-wise manner by procuring several modules from different sources. We are depositing epitaxial bi- and multi-layer thin films of superconducting (viz. YBCO) and colossal magneto-resistance (viz. LSMO) on suitable substrates.

### **MAGNETIC PROPERTY MEASUREMENT FACILITY**

The SQUID-VSM lab consists of the Quantum Design MPMS SQUID-VSM EVERCOOL system. The magnetic property measurement system (MPMS) is a family of analytical instruments configured to study the magnetic properties of samples over a broad range of temperatures and magnetic fields. Extremely sensitive magnetic measurements are performed with superconducting pickup coils and a Superconducting Quantum Interference Device (SQUID).

### **OPTICAL PROPERTY MEASUREMENT FACILITY**

The Micro Raman facility is operated in backscattering geometry. Confocal mapping capabilities with sub-micron spatial resolution are possible. A wide range of excitation wavelengths, using laser, is possible allowing control of the penetration depth into the material, and thus, control of the volume sampled.

## **5.2 COMPUTER CENTRE**

The computer centre facilitates the scientific community dedicatedly in terms of scientific computation and In-House IT facilities. The centre is responsible for managing information and communication technology infrastructure in the Institute. The centres activity ranges from administration (server, network, etc.), and hosting various services to laptop/desktop & user support. The Centre provides support in a hybrid environment consisting of different operating systems such as Unix-based (Cent OS, Redhat, Fedora, Ubuntu), MS Windows and MAC OS. Our Data centre activities have a state-of-the-art mechanism to handle system administration which includes mail services, a centralized storage solution with a backup facility and in-house development of web and intranet and gigabit network connectivity. In order to accomplish our Data centre activities, we have installed high-end servers, core, distribution, access layer network switches, Firewall (UTM) and load balancer. Wireless network is available across all the buildings in campus. Internet facility is extended to residence area through Asynchronous Data Subscriber Line (ADSL).

The centre manages over 200 Desktops, Laptops, Software and License (Mathematica, Matlab, Origin etc.), and Closed Circuit Television (CCTV) based surveillance systems installed at several offices and laboratories. A number of heavy duty printers are installed at different locations of academic building for general printing over LAN using terminal and through Web using online printing facility.

Institute has leased line Internet connectivity from one Internet Service Provider (ISPs) of 100 Mbps and 1 Gbps network connectivity by National Knowledge Network (NKN). The Institute





operates over its own IP addresses from the Indian Registry for Internet Names and Numbers (IRINN). The Institute is a part of the EDUROAM facility.

The centre provide technical support for administrative work, such as accounting, personnel management, stores management. Several software packages such as MSOffice, Wings 200 Net, Tally and multilingual software are in use.

The center conducts training, workshop and awareness programs in relevant areas time to time.

### **5.3 SAMKHYA (सांख्य): High Performance Computing Facility**

SAMKHYA (सांख्य) - High Performance Computing (HPC) Facility at the Institute is a hybrid environment that consists Sixty (60) Compute Nodes, two (2) Master Nodes, Four (4) I/O nodes (OSS & MDS) and 50 TB of object storage, QDR Infiniband interconnect and 1 Gbps Local Area Network. The infrastructure is of two (2) precision ACs (10 tons of refrigeration each) and uninterrupted supply through three (3) 40KVA & one (1) 60 KVA UPS to facilitate the system. The facility consists of 1440 CPU cores, 40 NVIDIA Tesla K80 cards and 40 Intel Xeon Phi 7120P.

This facility has been ranked in the list of top supercomputers in India by CDAC, Bengaluru (January 2018 report at <http://topsc.in>). The facility is acknowledged in various publications by the user community.

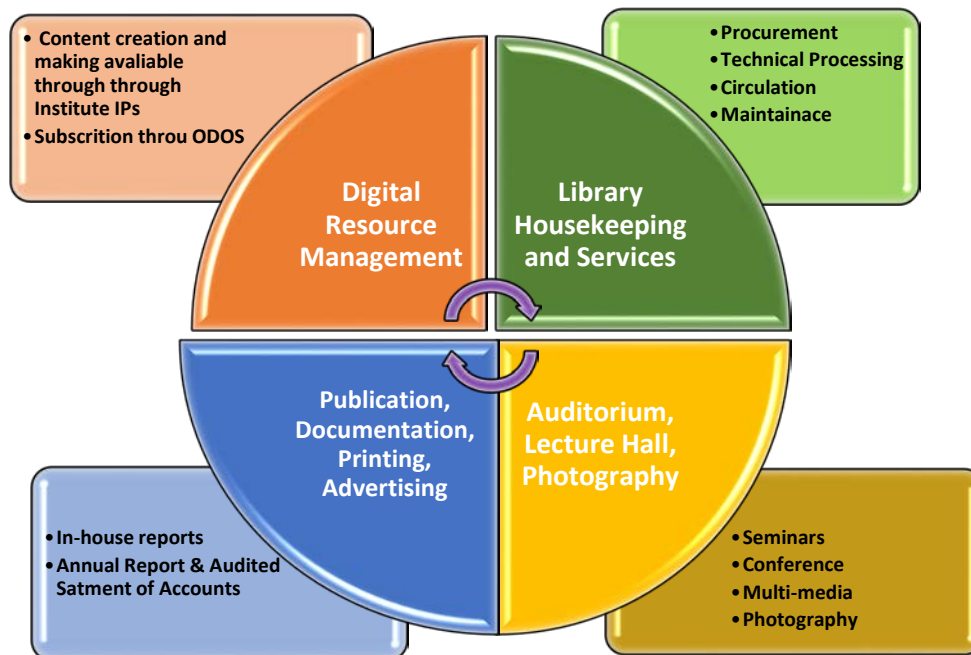
### **5.4 ANUNET FACILITY**

Institute of Physics is a node on ANUNET with the provision to connect other units of DAE directly by VSAT link for voice and data communication. Seismic monitoring equipment has been installed in the Institute and seismic data is being continuously transmitted to Bhabha Atomic Research Centre (BARC) for analysis using ANUNET. The link is also used to connect with DAE and another institute on ANUNET through video conferencing setup.

In addition to members of the Institute, the computer facility is also being used by Researchers from several other universities and colleges in Odisha for their academic work.

### **5.5. LIBRARY**

The primary objective of the IOP Resource Center is to carefully select, acquire, process, and disseminate scientific and technical resources in both print and digital formats to the research community of IOP and its visitors of the institute. However, the IOP General Library is dedicated to serve the IOP community for the general purpose reading and fostering a culture of reading. Besides its standard library services, the IOP Library provides various additional services, such as reprography, printing, publishing, advertising, photography, videography, document delivery, and an auditorium with lecture hall services. The IOP Library also actively participates in outreach programs and hosts conferences and seminars. A visual representation of the IOP Library's operations is shown in the accompanying figure.



The Library facility is open to both members of the Institute and individuals from other academic institutions, particularly DAE members and those affiliated with the Department of Higher Education of the Government of Odisha. For a comprehensive overview of the Library's holdings, users can visit the Library Portal at <http://www.iopb.res.in/~library>.

The Library offers a diverse collection that includes over 17,600+ print books, 7,500+ e-books, and 23,643 bound Journals. Subscriptions are being renewed for 135 e-journals, along with selected print Journals, Magazines, and Newspapers. Additionally, the Library has obtained perpetual access rights to electronic archives of publications such as IOP (UK), John Wiley, Springer Physics and Astronomy, Scientific American, World Scientific, and Annual Reviews Archives (OJA). Furthermore, the Library provides access to e-books in the Lecture Notes in Mathematics and Physics series, ensuring perpetual access to back-files.

As a core member of the DAE Consortium, the IOP Library has access to over 500 journals from leading publishers such as Elsevier, Springer-Nature, and Wiley through the ODOS (One DAE One Subscription) initiative. This initiative aims to revolutionize open access research within the DAE, following the model of ONOS (One Nation One Subscription).

The Library has subscribed to iThenticate, an Anti-Plagiarism Web Tool, to uphold the academic integrity of the Institute. This tool is accessible through the library portal at <http://www.iopb.res.in/~library/plagiarism.php> and can be utilized within the Institute's IP ranges. Additionally, the Library has also subscribed to Grammarly Tool, a cloud-based software service provided by Grammarly Inc., USA, which assists researchers in writing and citation auditing.

As part of the resource sharing program, the Library assists users in obtaining articles from other libraries. Users can also request articles for academic purposes through Digital Inter-Library Loan. Notably, the IOP Library was the first library in Odisha to be automated using the Integrated Library Management System (ILMS). It has then migrated to an RFID-based Smart Library Solution powered by the KOHA (a widely used Open-source ILMS) in the year 2018. This system

supports various library housekeeping activities, including acquisition, cataloguing, circulation, and serial control, with automated check-in and check-out functionalities. To search for books and journals, users can utilize the Library's WEB-OPAC, accessible at <https://www.iopb.res.in/~library/> or <http://10.0.1.16/>.



The Library manages the publication, printing, and advertisement (PRD) division of the Institute, as well as provides reprographic services. To ensure that scientists and the research community at IOP are well-informed about the efficient utilization of e-resources and technology-enabled services, the Library organizes training-cum-demo sessions at regular intervals. Additionally, the Library offers various extension services, including facilitating study tours, inters for Library and Information Science (LIS) students and supporting their projects and dissertations.

## 5.6 AUDITORIUM:

IOP boasts a splendid auditorium within its campus, purposefully designed for hosting a wide range of events such as Colloquiums, Seminars, Workshops, Conferences, Cultural activities, and Social programs on a regular basis. The auditorium is equipped with top-notch facilities, ensuring a high-quality experience for attendees. It has a seating capacity of over 330 people, providing ample space for gatherings and events.

## 6.6. ADMINISTRATIVE PERSONNEL

### Prof. Pradip Kumar Sahu, Registrar

#### (i) Director's Office:

1. Bira Kishore Mishra (Up to 31.05.2023)
2. Saubhagyalaxmi Das
3. Lipika Sahoo
4. Rajan Biswal
5. Sudhakar Pradhan

#### (ii) Registrar's Office

1. Abhishek Mahraik
2. Ms. Titili Amrit (From 03.01.2024)
2. Abhimanyu Behera (Up to 31.05.2023)

#### (iii) Establishment

1. M.V. Vanjeeswaran
2. Bhagaban Behera
3. Baula Tudu
4. Rajesh Mohapatra
5. Pramod Kumar Senapati
6. Ranjit Pradhan (Up to 15.09.2023)
7. Samarendra Das
8. Pradip Kumar Naik
9. Gandharba Behera (Up to 31.01.2024)

#### (iv) Stores & Transport

1. Purabi Paramita
2. Keshab Chandra Dakua
3. Sarat Chandra Pradhan
5. Jahangir Khan

#### (v) EPABX

1. Arakhita Sahoo
2. Daitari Das

#### (vi) Accounts

1. Debendranath Sahoo
2. Priyabrata Patra
3. Raj Kumar Sahoo
4. Purabi Paramita
5. Prativa Choudhury
6. Bijaya Kumar Swain

#### (vii) Maintenance

1. Arun Kanta Dash
2. Debaraj Bhuyan
3. Brundaban Mohanty
4. Deba Prasad Nanda
5. Naba Kishore Jhankar
6. Martin Pradhan
7. Chandra Mohan Hansdah

#### (viii) Estate Management

1. Saroj Kumar Jena.
2. Tikan Kumar Parida
3. Bijaya Kumar Das
5. Sanatan Pradhan
6. Bhaskara Mallick
7. Pitabas Barik
9. Kapila Pradhan
10. Dhoba Naik
11. Charan Bhoi
12. Jatindra Nath Bastia
13. Basanta Kumar Naik
14. Ramakanta Nayak
15. Ramesh Kumar Patnaik

#### (ix) Library

1. Dr. Basudev Mohanty
2. Ajita Kumari Kujur
3. Kisan Kumar Sahoo
5. Kailash Chandra Jena  
(Up to 30.09.2023)

(x) **Computer Centre**

1. Makrand Siddhabhatti
2. Nageswari Majhi
3. Jyoti Ranjan Behera

9. Bala Krushna Dash
10. Soumya Ranjan Mohanty
11. Purna Chandra Marndi
12. Srikanta Mishra
13. Ranjan Kumar Sahoo

(xi) **Laboratory**

1. Sanjib Kumar Sahu
2. Dr. Sachindra Nath Sarangi
3. Khirode Chandra Patra
4. Madhusudan Majhi
5. Ramarani Dash
6. Santosh Kumar Choudhury
7. Dr. Biswajit Mallick
8. Pratap Kumar Biswal



(xii) **Workshop**

1. Subhabrata Tripathy

(xii) **Purchase Section**

1. Aviram Sahoo
2. Ghanashyam Pradhan

**6.7. LIST OF RETIRED MEMBERS**

<b>RETIRED MEMBERS :</b>	
	
Dr. Mrs. Shikha Verma	Shri Birakishore Mishra
Professor	Sr. Pvt. Secretary
Date of Joining : 10.10.1994	Date of Joining : 01.04.1991
Date of Retirement : 30.04.2023	Date of Retirement : 31.05.2023

# ANNUAL REPORT 2023-2024



प्लाज़्मा अनुसंधान संस्थान  
Institute for **Plasma Research**  
Bhat, Gandhinagar 382428

## **A6. Scientific, Technical & Civil Support**

A6.1 Scientific Information Resource Centre (SIRC)

A6.2 Mechanical Engineering Services Division (MESD)

A6.3 Air Handling Unit and Air Conditioning Services

A6.4 Civil Infrastructure

### **A6.1 Scientific Information Resource Centre (SIRC)**

Scientific Information Resource Centre (SIRC) is providing specialized Information Resources and Publication Management services using up-to-date tools to the scientific community involved in the Research and Development activities of Plasma Physics and Fusion Science and Technology.

During the year 2023- 24 a total budget of Rs. 33945702.00 was utilized and added the following to its collection:

139 Scientific and Technical Books were added to the collection, 87 Books were procured through a Books Exhibition organized at the Institute on 24<sup>th</sup> January 2024, 13 Hindi books, 176 Reprints, and 31 Pamphlets were also added to the library collection.

IPR has signed a Transformative Agreement with IOPP, UK. The Read & Publish agreement allows access to the entire IOP Journals collection and also Publishing in IOP's fully Open Access journals. IPR is also a part of the DAE's Transformative Agreements with publishers viz. Springer-Nature and Wiley under One DAE One Subscription (ODOS) consortium. Library has also subscribed to 60 periodicals and added 1 new online journal title as well as 2 journal archives to the e-collection and continued to subscribe to major databases such as SCOPUS, APS-ALL, Online Archives of core journals.

Library through its Digital Display Board provides interactive and up-to-date Current Awareness Services. Library is also delivering email-based FYI-Fusion News Alerts services to IPR, CPP and ITER-India users. Total 360 News items were sent/displayed and archived as an Alerting Service. Library continued to collaborate with DAE units and other National and International libraries to provide Inter-Library Loan (ILL) services. 90.75% of the requests made by staff members were satisfied through ILL service. IPR Library provided documents to other institutes against their queries and 100% of the total need were satisfied.

In 2023-24, Library provided 25797 photocopies/ prints and 6409 scanned copies to the users.

Publication Management Services were carried out efficiently and SIRC continued to subscribe to anti-plagiarism software tool for checking similarity index of the publications. A total of 661 manuscripts (Abstract/Papers) and 05 Patent information were broadcasted to the Staff through the Pre-Publication Broadcasting System and Pre-Patent Broadcasting System respectively on the Intranet portal. A new feature for Conference and Awards information submission has been developed and implemented on the INTRA portal.

SIRC published the following during the year 2023-24: Internal Technical Reports – 68; Internal Research Reports – 124; IPR Publications in Journals – 176; IPR Publications in Conference Proceedings – 22; Book Chapters – 5.



Hands-on Training was imparted to the three Multi-Tasking Staff deputed at the Library. Library Internship was provided to Four library science students from Gujarat University, Ahmedabad. Orientation was given to newly joined members, Research Scholars and SSP students. Library is actively participating and contributing to other Institutional activities, such as Swacchata Pakhwada, Safety Week, National Science Day, etc. Library is also actively involved in OLIC and promoting usage of Hindi language.

## **A6.2 Mechanical Engineering Services Division (MESD)**

MES division has four sections namely Engineering Design & Analysis Section (EDAS), Inspection & Quality Section (IQS), Drafting Section and Workshop Section. The activities undertaken by the division is conforming to full product cycle which includes concept to commissioning. The major tasks are design and analysis of the product/system, preparation of the engineering drawings, fabrication/manufacturing and inspection, testing and commissioning. The division is also supporting the inspection of incoming stock items at Store. The division comprises of team of Mechanical Engineers, draftsman and technicians. MESD division has provided the services to different divisions such as SST-1, Aditya, Magnet, Cryogenic, Neutronics, Remote handling, NBI, Fusion Blanket, Cryopump, Fundamental Physics etc. MESD also provided the extensive services to FCIPT also.

The EDAS of MESD has been actively executing various tasks related to design, analysis, fabrication, inspection and testing. Since its inception in April 2017, section has satisfactorily completed and report is submitted for more than 170 tasks for different divisions. The design is carried out using ASME, WRC codes, vacuum protocol etc. The FEM analysis is performed to ensure the structural integrity of the system/product. The different kind of analysis such as structural, thermal and coupled is being carried out routinely using ANSYS.

The IQS of MESD has been actively executing various tasks related to Welding Procedure Specification, Manufacturing and Inspection Plan, Material testing, Quality Assurance, Quality Control, Different kinds of Non-Destructing testing etc. The activity related to assembly, disassembly, interference checking, new components assembly etc. of the different components for SST-1 are also supported by this section. During the year, IQS division also completed more than 20 tasks.

The Drafting section of MESD is equipped with 6 licences of CATIA-V5 R13 installed on work stations for 3D modelling and 2D drawing preparation, HP inkjet printer T2300 plotter. Section has been supporting the users for designing and preparation of engineering drawings for various systems of IPR. During the year, section has executed more than 600 job cards for 3D modelling and 2D engineering drawing preparations. Section is also supporting the poster printing for different conferences and presentations.

The Workshop section of MESD is equipped with modern versatile machineries including machining and fabrication (shearing, rolling, TIG welding etc.) facilities catering for needs of IPR, FCIPT, ITER-India and CPP for the fabrication of a system/product required by users. Workshop

ranging from Vacuum Vessel, Magnets and their power supplies, Blanket system, Divertor system, Remote handling, Thermal Shield to Tokamak complex building. A total of ~5000 technical document has been archived so far.

### HR Development and collaborations

As a part of HR development, 3 IPR PhD students worked at ITER for 6 months on specific physics problems which were an extension of the problem being pursued towards fulfilment of their degree programs. The extension problems were designed in consultation with specific mentors in the ITER Physics group and are of interest to ITER as well. The students have completed 70-80% work on these problems during their stay at ITER which has not only involved learning of specific codes but also development and benchmarking of additional codes relevant to such problems and the physics aspects. The learnings, findings, experiences are being compiled in the form of a report.

Additional young scientists and engineers from ITER India, IPR are also collaborating with their counterparts at RFX, Neutral beam test Facility (NBTF) in Padua. NBTF has two test beds, the SPIDER test bed for 100 kV H- beams and MITICA for producing and characterizing 870 keV H and 1 MeV D negative and neutral beams.

## **B.2 ACTIVITIES OF LASER INTERFEROMETRY GRAVITATIONAL WAVE OBSERVATORY (LIGO - INDIA)**

### Activities towards development of Vacuum and Mechanical systems

One more out-gassing measurement system with few upgrades is setup this year in LIGO laboratory at IPR. The major vacuum components of this facility have been procured and facility is setup which is now ready for its operation (Figure B.2.1). This outgassing system is helium leak tested to  $1 \times 10^{-10}$  mbar-l/s. The gate valves procured for this system have been integrated and tested successfully. Complete outgassing system is currently undergoing vacuum baking to 150°C to improve on its vacuum performance. Trial of inserting ~150 number of coupons from different ports available on the outgassing system was carried out to understand the complexity and the limitations involved. The complete system with 150 coupons inside was also evacuated to  $10^{-8}$  mbar range at the initial stage.

During the period of consideration in this report to set up LIGO-India – Vacuum Integrated System Test Assembly (LI-VISTA) LIGO India division managed two procurement contracts related to 20 m vacuum vessel and the 80K Cryopump both along with vacuum equipment and control display unit (Figure B.2.1).

The 20 m vacuum vessel has been delivered, assembled and integrated with vacuum equipment & control display unit. The integrated vacuum vessel testing has also been completed during which operation of all equipment, operation data logging and output of vacuum gauges were monitored through a control unit. Helium leak testing, baking to 150<sup>0</sup> C and soaking for desired duration is performed prior to demonstration of vacuum as per specifications.

The fabrication of 80k Cryopump vacuum vessel and testing at factory has also been completed. The system has been delivered at IPR site and its installation and integration of vacuum equipment is in progress.

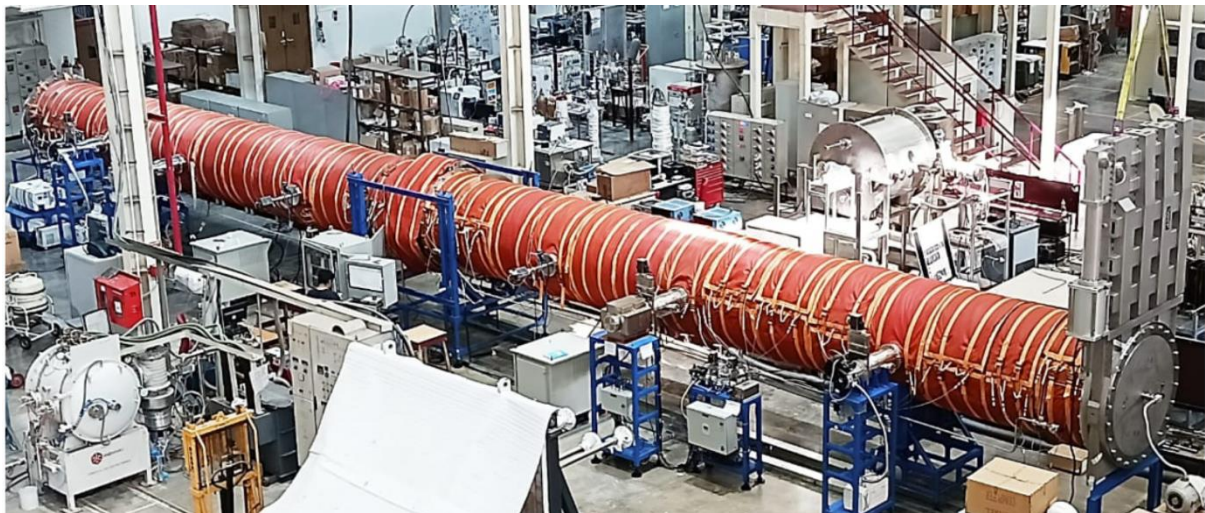
Subsequently these two systems will be integrated after site acceptance tests to fully establish the LI-VISTA facility for its intended functional operation.

Further, tender for procurement of "Centralized LN<sub>2</sub>/GN<sub>2</sub> transfer line" in New Laboratory building housing the LI-VISTA facility has been initiated.

Both the outgassing systems, baking furnace, SOLIDWORKS CAD facility, CDS/VCMS prototype test racks with associated electronics/computers/workstations are also installed and setup in the laboratory.

#### Activities towards development of Control and Data System (CDS)

The prototyping activities at IPR continue on standalone CDS test rack setup for LIGO India project. The existing test rack includes single IO chassis and a Supermicro make frontend computers (FE) connected through fiber optic cable. The FE is configured for the real-time LIGO CDS software running over Debian-10 Linux. The configured CDS Workstation is being used for analyzing engineering channels' data using LIGO tools.



*Figure B.2.1: 20 m integrated vacuum vessel at IPR LIGO Lab.*

A prototype Vacuum Control and Monitoring System (VCMS) Rack to operate and monitor existing outgassing measurement system is setup at IPR, following LIGO USA slow controls configuration. The 'Beckhoff' make automation hardware along with 'TwinCAT3' Software is used in existing outgassing system as well as other upcoming vacuum systems. The activities to interface the existing VCMS with EPICS based CDS using TwinCAT-IOC software have partially been completed for outgassing system. Similarly, this interface will be configured for other upcoming vacuum system. Finally this will help to monitor and control various vacuum parameters remotely for majority of LIGO India vacuum system prototype at IPR (Figure B.2.2 and B.2.3).



# ANNUAL REPORT

& AUDITED STATEMENT OF ACCOUNTS

# 2023-2024



National Institute of Science Education and Research, Bhubaneswar



# Central Library

Nestled at the heart of the campus, the Central Library stands tall as a beacon of knowledge, offering an unparalleled array of essential resources and specialized services to meet the ever-evolving needs of seekers. With a fervent dedication to fostering discovery, the library maximizes its resources to enrich the academic and professional pursuits of students, faculty, and staff alike.

Spanning an impressive 69,089 square feet, the Library boasts a prime location and a wealth of materials spanning Biology, Chemistry, Mathematics, Physics, Earth & Planetary Sciences, Humanities, and Computer Sciences. Occupying the first and second floors of its grand building, the Central Library provides a bustling hub of activity. With ample seating for up to 400 individuals at a time, it offers a dynamic environment conducive to focused study and groundbreaking research.

## LIBRARY HOURS:

<b>Regular Opening Time</b>	9.00 AM to 11.00 PM
<b>Institutional Holidays</b>	9:00 AM to 5:30 PM

## LIBRARY AT A GLANCE:

The total collection of the central library as of 31st March 2024 stands as follows:

Type of Resources	Volume
<b>Purchased Books</b>	25105
<b>Gratis Books</b>	1912
<b>Bound Volume Journals</b>	1458
<b>E-Books</b>	10141
<b>Electronic Databases (Bibliographic)</b>	5
<b>Electronic Databases (Full-Text)</b>	26
<b>Electronic Journals</b>	11130
<b>CD/DVD</b>	226
<b>PhD Thesis &amp; MSc. Dissertations</b>	588
<b>Children's Collection</b>	405
<b>Hindi Collection</b>	269
<b>Odia Collection</b>	246
<b>Popular Science Collection</b>	50
<b>Newspapers</b>	07
<b>Magazines</b>	23

*“The library is the temple of learning, and learning has liberated more people than all the wars in history.” - Carl T. Rowan*

The Central Library makes every effort to expand academically by procuring a wide range of renowned magazines and newspapers. These resources have been carefully selected, so users can enhance their learning experience outside of textbooks with up-to-date information on current events as well as research in various disciplines. The following information outlines these sources:

**Newspaper:** The Samaj (ସମାଜ), The Sambad (ସମ୍ବାଦ), The New Indian Express, The Times of India, The Hindu, The Economic Times, Dainik Jagaran (दैनिक जागरण).

**Magazines:** India Today, The Week, Outlook, Sportstar, Time, Yojana, Frontline, Champak, The Economist, Science Reader, Science Reporter, Discover India, Reader's Digest, Magic Pot, Tinkle, Highlight Champ, Highlight Genies, Tell Me Why, Magic Read & Colour, Student Edge, Bhavana, Physiotimes, Natural Geographic Kids.

## LIBRARY SERVICES:

The Central Library Offers The Following Services:

1. Ask Librarian (librarian@niser.ac.in)
2. Reading Area
3. Circulation (Issue, Return, Renewal & Reservation)
4. RFID integrated KIOSK for Self-Check-out and Self Check-in
5. Web-OPAC
6. Overnight Book Lending
7. QR Code
8. Reference and Information Services
9. User Awareness
10. Library Orientation Program
11. Current Awareness Service
12. Document Delivery Services
13. Anti-Plagiarism Software – iThenticate
14. Screen Reader through JAWS Software
15. Subject Guides
16. User Guides
17. Special Collection (Hindi, Odia, Popular Science)
18. Children's Library
19. Publications & Citations
20. Newsletter (Bi-Annual)
21. Information & News Casting
22. Library Website
23. Institutional Digital Repository
24. Indian Research Information Network System (IRINS)

25. Library Brochure
26. National Digital Library of India Membership
27. New Arrivals of Books
28. Research Support: Citation Styles
29. Table of Contents (Print Journals)

### INFRASTRUCTURE FACILITIES:

- Air-conditioned reading area accommodating up to 400 users concurrently
- CCTV surveillance for enhanced security
- Central Board Room and Conference Room
- Cashless payment option via UPI for late fee collection
- Computers provided for accessing e-resources
- Wi-Fi connectivity throughout the premises
- Designated silent zone for uninterrupted study
- E-reading section for digital resources
- Scholar's Zone for focused research
- Spacious seminar halls with modern equipment capable of accommodating national and international conferences
- Digital kiosks available for convenient access to the catalog and for book renewal purposes

### RESEARCH SUPPORT TOOLS:

- Ithenticate (Turnitin): Originality and plagiarism check software
- Grammarly: Writing support tool
- Web VPN: Enables off-campus access to e-resources through NISER.
- Quick Start Guides: Access Mendeley, Zotero, and RefWorks quick start guides on the website for user convenience.
- SciFinder-n: Offering comprehensive access to scientific information, facilitating efficient exploration and discovery.

### E-RESOURCES:

#### E-Databases (Bibliographic Databases):

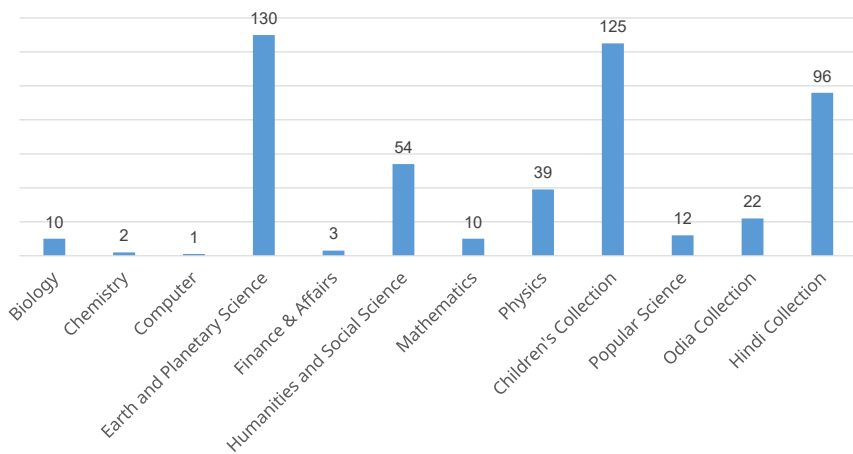
- CCDC – CSD Enterprise License (CCDC)
- MathSciNet (AMS)
- Science of Synthesis (Thieme)
- Sci-Finder-n (CAS- ACS)

#### E-Journals:

American Association for Cancer Research (AACR), American Association for the Advancement of Science (AAAS), American Chemical Society (ACS), American Economic Association (AEA), American Institute of Mathematical Sciences (AIMS), American Institute of Physics (AIP), American Mathematical Society (AMS), American Meteorological Society (AMS), American Physical Society (APS), American Society for Microbiology (ASM), Annual Reviews, Association for Computing Machinery (ACM), Bioscientifica, BMJ, Cambridge University Press (CUP), Cold Spring Harbor Laboratory (CSHL), De Gruyter, Duke University Press, Elsevier, Emerald, European Mathematical Society (EMS), Heldermann Verlag, IEEE, Institute of Mathematics Polish Academy of Sciences (IMPAN), International Press, IOP Publishing, IOS Press, John Hopkins University Press (JHUP), Journal of Visualized Experiments (JOVE), JSTOR, Khayyam Publishing, Lippincott Williams and Wilkins (LWW), Magnolia Press, Mary Ann Liebert, Mathematical Science Publishers (MSP), Microbiology Society, Optical Society of America (OSA), Oxford University Press (OUP), Portland Press, Princeton University Press, National Academy of Sciences (PNAS), Project Euclid, Rockefeller University Press (RUP), Royal Society of Chemistry (RSC), SAGE, Society for Industrial and Applied Mathematics (SIAM), Society for Neuroscience, Springer Nature, Taylor and Francis (T&F), The Company of Biologists, The Geological Society of America (GSA), The Royal Society, Thieme, Wiley, World Scientific.

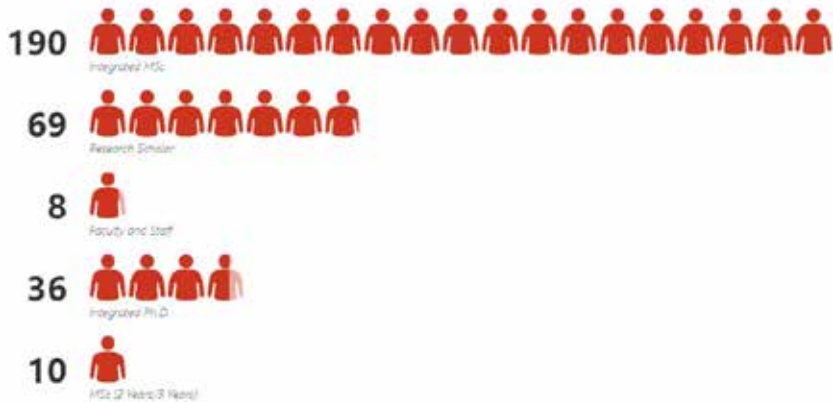
#### E-Books:

- Cambridge University Press (8 titles) – Perpetual Access
- Elsevier (561 titles)
- Oxford University Press (1 title) – Perpetual Access
- Pearson (8 titles) – Perpetual Access
- Springer Link (9567 titles) – Perpetual Access
- Taylor & Francis (4 titles) – Perpetual Access
- Wiley (63 titles) – Perpetual Access
- Thieme (16 titles)



**504**  
books were added to the library's collection in print format.

**313**  
new patrons were added during the 2023-24 period.



Number of document requests fulfilled through the Document Delivery Service.  
**360**

**162**  
MSc Dissertation added to central library repository.

**65**  
PhD Thesis added to central library repository.

**28391**  
Total number of books borrowed from the library



Nationwide librarians from Akashvani Kendra branches visited the NISER Library, exploring resources and engaging in discussions with the Scientific Officers, fostering collaboration and discovering common ground.



# Computer Centre

## OVERVIEW

The Computer Centre at NISER provides vital IT services including network management, Email, Web Services, HPC support, Desktop support software, and hardware maintenance. It caters to academic, research, and administrative needs, ensuring seamless operations across the campus.

## KEY SERVICES

- **Computer Lab Setup & Maintenance:** Managing labs for academic and research use.
- **Networking:** Offering wired and wireless connectivity across the institute.
- **Email & Web Services:** Managing official email accounts & Institute website has been developed and hosted with inhouse CMS portal using Laravel web application framework.
- **Hardware & Software Support:** Installing, configuring, and troubleshooting IT systems.
- **High-Performance Computing (HPC) & Data Centre:** Providing advanced computing resources for research.
- **Office Automation:** IMS is being managed and supported by computer center it contains automation of each and every department including online applications for students, staff and faculty recruitment.
- **Home Folder & Personal Website:** Offering personal data storage and hosting for researchers.
- **IT Support:** Providing ongoing technical assistance.
- **Service Ticketing System:** Implementing a system for tracking IT issues and requests.
- **HPC Training:** Trained 5 summer students on HPC usage from sri sri university, Cuttack.

## CAMPUS NETWORK UPGRADES

Computer Centre have initiated a Detailed Project Report (DPR) for upgrade of the network infrastructure. The existing network infrastructure is configured for IPv6 as per the mandate of Govt of India using Dual Stack Mechanism. IPv6 adoption is completed in the major part of the campus network and few remaining segments are in the pipeline.

The major portion of the network is already migrated to open standards to ensure compatibility of the existing network devices with any OEM and to facilitate the rollout of DPR, which is expected to be approved soon.

## FACILITIES

- **CC Lab:** A well-equipped computer lab for students and researchers.
- **Datacentre:** Hosts servers and HPC resources, with 3 high-density (55KW) RDHx server racks, chiller units, and UPS systems for optimal performance.

## STATISTICS (01-04-2023 TO 31-03-2024)

Help Topic	Tickets Close
Desktop Support	78
Network Support	72

## HIGH-END COMPUTING SERVERS (HPC) INSIDE DATACENTER

- **Kalinga Cluster** – 97 nodes
- **Astro Cluster** – 16 nodes
- **Noether** – 5 nodes
- **Virgo Cluster** – 5 nodes
- **Kanaad HPC** – 4 nodes
- **Bihan Cluster** – 10 nodes

## SINGLE-NODE SERVERS INSIDE DATACENTER (TOTAL : 21)

Includes **Xanadu, Chandra, Aquila, Hercules, Amazon, Himalaya** and others, each with 1 node, supporting various academic departments.

# Tata Memorial Hospital Annual Report 2023–2024



Excellence in Cancer Care, Education, and Research




## Library Sciences

Head, Mrs Deepali Kuberkar



The library currently has a seating capacity of 52 users at a time, including a computer cell. However, the library has become a hub for bona fide users visiting to obtain useful information; this is reflected in terms of about 67 users visiting per day to use an array of commercial and public domain resources. To achieve this, in addition to regular library orientation programs, the library has organized a few training sessions for the benefit of users. Moreover, library professionals offer hands-on instructions and practical tips for effective and efficient searches in a tailor-made manner. Web-OPAC allows users to search for library holdings effectively. Another way for off-campus users is to avail themselves of the My Loft facility. We have now extended this facility to other centers, and we conducted training sessions for the same.

The library caters to the ever-growing demand for end users by subscribing to 103 journals, of which 100 are available online. It has also provided access to more than 30 journals from DAE-Elsevier. Approximately 50 titles on the Ovid platform were accessible online. In addition, the library subscribed to three prominent e-databases, viz., BNF, CINHAL-NRC, and TNM. During this period, the library purchased about 42 books. The current library collection includes about 8,576 books, 20,422 bound volumes, and a thesis and dissertation collection of over 1,300 in print and CD formats.



When users want to assume the role of the author, the library supports their endeavors by providing various metrics such as Journal Index Factor (JIF), h-index, and others. In this context, using iThenticate software, the library considers 65 requests for plagiarism checks. Library professionals also educate young users about similar public domain sources and paraphrasing tools. The library indexed 424 full-text staff publications.

During this period, the library received 247 requests for 651 articles and fulfilled 588 of them (90%). Additionally, the patrons made 2,001 reprographic requests, resulting in 14,36,457 copies.

# Medical Oncology Molecular Laboratory

**Officer in Charge, Dr Kumar Prabhash**

The Department of Medical Oncology- Molecular Laboratory, a state - of - the - art molecular laboratory, was started in 2005 and was the first diagnostic lab in Tata Memorial Hospital (TMH) to perform molecular tests, to begin with Reverse Transcription Polymerase Chain Reaction (RT-PCR) and later Real-time Quantitative Polymerase Chain Reaction (RQ-PCR). The laboratory was the first to standardize and implement the Next-Generation Sequencing (NGS) test and liquid biopsy in diagnostics at our institute. The lab developed new molecular and genomic tests, initially on research basis and once standardized and proven useful, these tests were later offered on service basis not only to patients registered at TMH, but also to patients across the country at very affordable cost. Since 2019, the diagnostic services are transferred to molecular pathology and laboratory is focusing on research, development, and education.

## Clinical Services

Laboratory actively conducts weekly molecular tumor board in collaboration with medical oncology, pathology, and other clinical units to deliberate upon the molecular markers and therapeutic regimens for cancer patients.

## Academics

Since 2016, the department is regularly conducting quarterly Preceptorship Program for EGFR mutation analysis in Non-Small Cell Lung Cancer (NSCLC). From 2017 onwards, a one-year training program in molecular oncology that involved intense training in various PCR techniques and Next Generation Sequencing is being conducted.

Academic training during Jan 2023-Dec 2023:

Faculty training: 1 faculty

Molecular training program: 2 students

Observer training: 9 students

Classes for coursework: core course work for PhD, DM and MD students

Dissertation training: 4 students under Dr Anuradha Choughule and Dr Pratik Chandrani

Enrollment of PhD students for Health Sciences: 5 STUDENTS – 3 under Dr Pratik Chandrani and 2 under Dr Kumar Prabhash

Academic workshops/conferences:

Laboratory is also involved in organization of various educational workshops and conferences.

- 1) Annual Workshop on Molecular and Pathological Oncology as a part of Year-end Review – Lung Cancer Updates
- 2) Annual Workshop on Molecular Oncology as a part of Masterclass in Lung Cancer is co-organized with our clinical team: Chief Convener Dr Anuradha Choughule and Co-Convener -Dr Pratik Chandrani
- 3) A supplement of genomics analysis and clinical biology was delivered at DBT sponsored event in collaboration with Dr Ashok Varma.
- 4) Various cancer genomics, computational biology, and clinical biology talks were delivered at international and national events organized/hosted by NIRRH,CRSF, SoMex, M S University, Mizoram university, Parul university etc.
- 5) International Cancer Congress (ICC) 2023: Co-organized Basic Biology module along with Dr Amit Duttat Jio Conventional Centre

## Research

Ongoing ResearchProjects:

1. A study of profilinggenomic alterations in cancer patients is initiated in collaboration with 8 DMGs.
2. Study to test the feasibility and proof-of-concept utility of liquid biopsy in disease monitoring and therapeutic resistance in lung and head and cancer are ongoing.
3. Centre for Computational Biology, Bioinformatics and Crosstalk laboratory is designed and being established.
4. Genomic profiling in Thyroid carcinoma is ongoing wherein a detailed genetic study of various thyroid cancer subtype is undertaken by the lab.
5. A collaborative initiative for BTIS SubDIC project has been funded by DBT for 5 years. Lab will be providing scientific and human resources to establish and run the proposed BTIS facility.
6. A few pilot studies to explore Beta Adrenergic receptor in Bone and soft tissue,Wnt signaling pathway in Metronomic therapy, molecular characteristics of gallbladder cancer etc. are ongoing.
7. Collaborative study to evaluate the prevalence of EGFR mutation status in small cell lung cancer, molecular profile of EGFR resistance, cost-effective solutions for Osimertinib etc. are underway.
8. Collaborative work to develop CTC as monitoring tools in head and neck and lung cancer



# Clinical Biochemistry

Head, Dr Tanuja Shet



Located on 5<sup>th</sup> floor, Annexe building, Tata Memorial Hospital the department of Biochemistry is a NABL accredited laboratory that provides 24 hours' laboratory support and generates highest revenue amongst the laboratories. It has two high throughput biochemistry analysers from Beckman, two integrated Biochem-immunoassay analysers one each from Abbott and Roche, and many more different instruments to cater to our ever-increasing test menu.

## Service

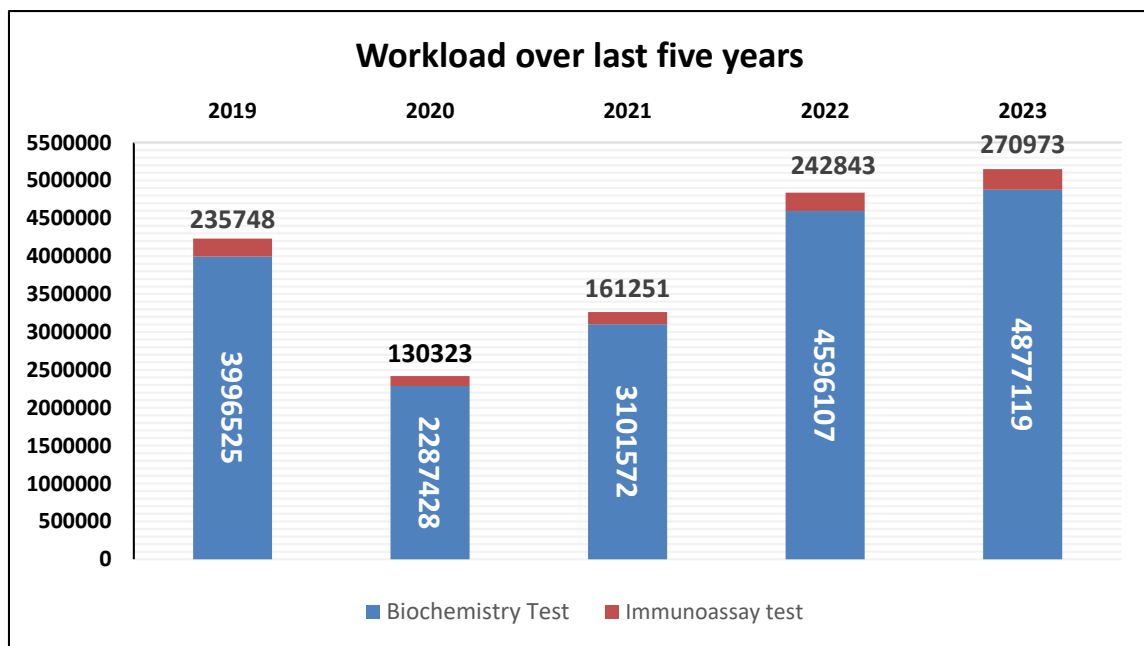
The Department of Clinical Biochemistry provides 24x7 emergency services for extensive repertoire (> 225 tests) of clinical chemistry assays like glucose, electrolytes, minerals, organ function tests (LFT, RFT etc.) We have expanded our test menu based on clinical need. Our panel covers several diseases like diabetes, hepatocellular carcinoma and host of hormone assays and drug monitoring tests e.g. Chromogranin, PIVKA, Hyper glycosylated beta HCG, AMH, Inhibin B, ICGC (Indocyanine Green Clearance test), Haptoglobin, Levitiracetam, IgE, IFE-IgD&IgE, IL6, Ammonia, Troponin, Insulin, C-Peptide, Progesterone, Thyroglobulin, ACTH, IGF-1, HGH (Human Growth Hormones) and DHEA-S. We have introduced HPLC, (D10) the gold standard method for testing HbA1c as a service, which allows for accurate testing of HbA1c and excludes all haemoglobin related errors. After introducing this test, we have encountered abnormal haemoglobins in 93/ 50,958(0.18%) samples tested.

The laboratory performs extensive myeloma workup for patients with Quantification of Immunoglobulin done by rate nephelometric and immunoturbidimetric techniques by the Beckmann Immage 800 system and the Binding Site's Optilyte machine (Free Light Chains) respectively. Serum protein electrophoresis is done on the Sebia Minicap (Capillary Electrophoresis) and immunofixation on the Sebia Hydrasys2 system. IgD and IgE myelomas are extremely rare forms and constitutes only 1-2 % of all myelomas. This test helps us to correctly diagnose these rare forms of Myeloma/ MGUS having IgD or IgE involvement which otherwise may be labelled as light chain disease. We have till date been able to identify 2 cases of IgD and one case of IgE with the help of this test.

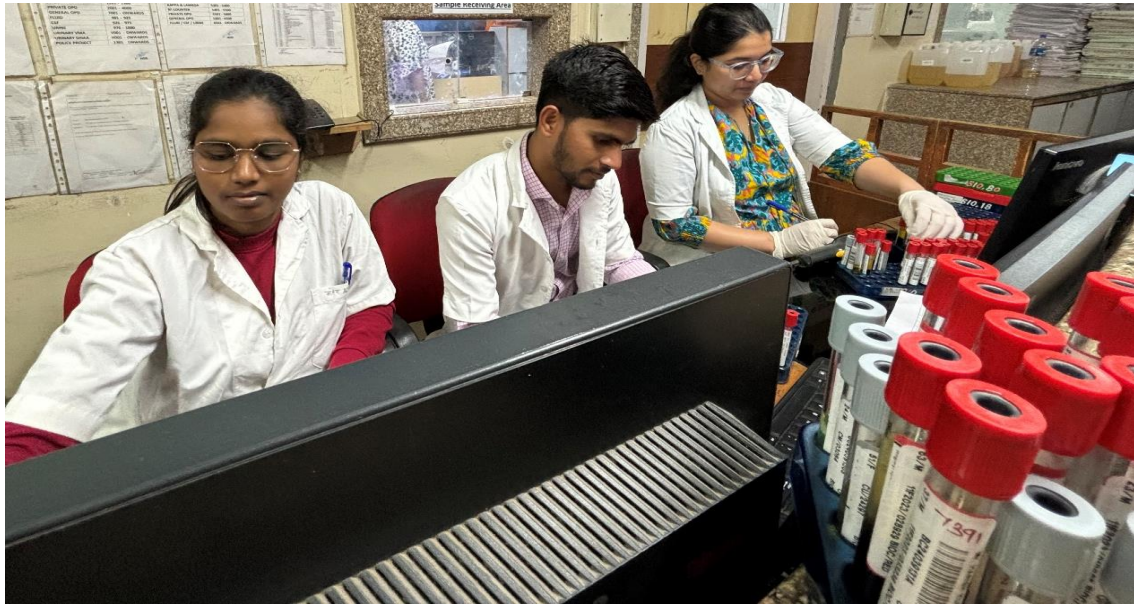
Quality is our mandate and the laboratory has performed exceptionally well in Proficiency testing programmes like EQAS, RIQAS and CAP with >95percentageconcordance for all parameters.

**Workload over five years: -**

A comparative analysis of our workload in 2022 and 2023 is shown in Graph 1. We have performed 28,130 more tests this year with 12% increase in workload. In spite of high workload our TAT times are maintained. We are in process of interlinking our systems for faster TAT.









***Other initiatives:***

*TMC Clinical chemistry consortium:* - This consortium seeks to harmonise assays across these the various centres of TMC. Continuous interaction and discussion is the way forward.

*Performance Evaluation:* We have evolved a self-sufficient revenue generation model for our institute in the form of Performance evaluation for Tumor Marker Validation for different manufacturers and this in turn has allowed us to start new tests.

## **Education**

The department offers the Advanced Clinical Biochemistry training course twice a year and through it ten students get trained in various aspects of clinical chemistry improving their understanding on the basic principles and techniques in the biochemistry laboratory. Department is involved in training phlebotomist and nursing staff for drawing blood and sample collection. Besides the above the Department conducts classes for Post graduate (MD, Pathology) students in Biochemistry, Tumor Markers and Serum Protein Electrophoresis. In the last year we have 40 students from different postgraduate streams availing the Short term observer ship/internship for one month to three months. During this time the students coordinate with permanent staff and work on small projects.

## Hematopathology Laboratory

**Officer in Charge, Dr Sumeet Gujral**

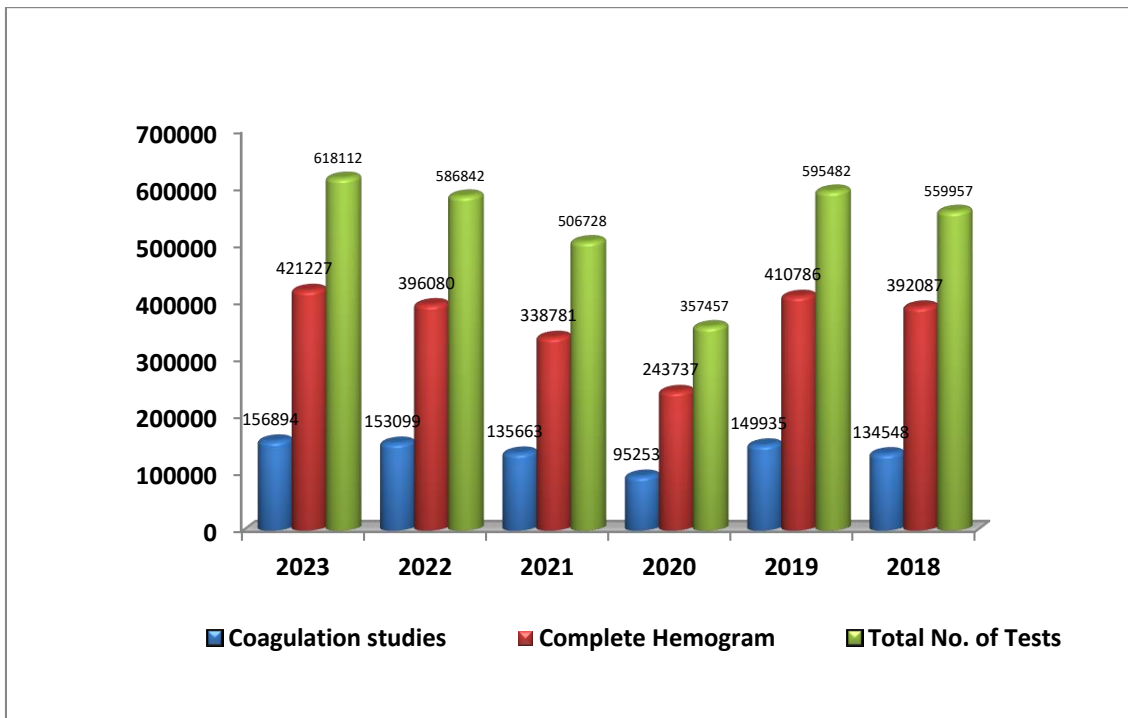
Hematopathology Laboratory is a service laboratory for the primary diagnosis of hematological malignancies, monitoring of patients while on therapy for all malignancies and preoperative and postoperative hematological workup of surgical patients. The laboratory caters various routine laboratory investigations such Complete Blood Count (CBC), Reticulocyte count, Coagulation Profile (PT, APTT, D-Dimer, Fibrinogen), Peripheral blood smear examination, cytochemical staining like Myeloperoxidase (MPO), Non-specific Esterase (NSE), Leukocyte Alkaline Phosphatase (LAP), Tartarate Resistant Acid phosphatase (TRAP) and Body Fluid Examination.

The following are the total number of tests done in the laboratory in the year 2023.

<b>Name of the Tests</b>	<b>Total No. of Tests performed</b>
Routine Hematology	
Complete Hemogram	<b>421227</b>
Manual Differential Counts / Malarial Parasites / Reticulocyte counts / RBC Morphology	<b>35643</b>
ESR	<b>2548</b>
Coagulation studies	
Prothrombin Time	<b>75335</b>
Activated Partial Thromboplastin Time	<b>75585</b>
Fibrinogen	<b>3801</b>
Fibrinogen Degradation Products (D-Dimer )	<b>1546</b>
Cytochemistry	<b>2427</b>

Routine Hematological Tests:-





## Service

The Laboratory has state of the art hematology analyzers and coagulation analyzers which are interfaced to hospital information system to cater to the requirements of the patients.

The routine hematology laboratory runs 24 hours and process more than 1500 tests in a day with results being available to the patients within 3 hrs for most of the routine tests.

Laboratory also does for Manual Differential count of D8 ALL patients and Ascitic Fluid Examination of GI patients for SBP on urgent basis on Clinician's requests. The laboratory does testing for functional iron deficiency using CHR.

The laboratory is responsible for Transporting Body fluids ( CSF, Ascitic Fluid, Pleural Fluid etc.) from Lab to RF counter and then the samples are transported from TMH to ACTREC by RF counter (4 times a day from Monday to Friday & 02 times a day on Saturday).

Up-gradation of coagulometer and CBC analyzers.

1. Sysmex XN1000 two CBC analyzer were upgraded in place of DXH800.
2. ACL TOP 350 1 & 2 were upgraded In place of elite pro Coagulometer.
3. This up-gradation result reducing TAT and upgrade of new technology.
4. Online reagent inventory is maintained for CBC & Coagulation test.



## Education

**The laboratory does the following courses.**

- a) Complete blood count- CME for Medical lab technologists – One course every year
- b) Complete blood count-Bench to Clinic course for Pathologists – One course every year
- c) Complete blood count – Bench to Clinic course for technologists – Once in a year
- d) 6 months Advanced Training program for technologists – 6 trainees in a year

In addition the laboratory trains and shares its knowledge and expertise to medical community in other parts of India. Fifty M.D. pathologists from various parts of the country came as observer for training in CBC, Coagulation, Morphology, Cytochemistry, Body Fluid and Quality Control.

### **CMEs and Workshops:**

1. 10<sup>th</sup> Basic Hematopathology Course, 7<sup>th</sup> – 8<sup>th</sup> July, 2023 at TATA Memorial Hospital, Mumbai. Attended by 310 post-graduates and pathologists from all over India.
2. 11<sup>th</sup> CME for Medical Lab. Technologists 15<sup>th</sup> & 16<sup>th</sup> December, 2023 at Tata Memorial Hospital, Mumbai. Attended by 70 Technical staff & 230 Students from all over India.

## Research

The following research studies conducted during 2020 in the laboratory and posters are presented in various conferences titled as.

- 1) Coagulation especially D-Dimer tests in covid Positive Patients.
- 2) Comparison of WBC differential system flags of Beckman Coulter DxH 800 with ADVIA 2120i and Peripheral blood smear examination from Tertiary Cancer Centre.
- 3) Detection of malaria parasite on DXH-800 using Volume Conductivity Scatter (VCS) Parameters
- 3) Efficacy of biomarkers in sepsis
- 4) Validation of system flags for platelet on automated cell counters and screening on peripheral blood smear
- 5) Detection of sepsis using volume, conductivity and scatter Parameters of Beckman coulter DxH 800
- 6) Population based biological reference interval for Cellular Hemoglobin Distribution width (CHDW) parameter
- 7) Correlation of Abnormal cells population and Myeloperoxidase (MPO) activity in Acute Leukemia – Automated and Manual method

- 8) Review of Quality Control for better performance and management
- 9) Comparative evaluation of schistocytes count by automated methods and microscopic determination.
- 10) Laboratory has done validation study for various flags generated by newly upgraded CBC analyzers.

## Staff Achievements

### Dr Sumeet Gujral

- Member of Technical committee of National Accreditation board for Testing and Calibration laboratories (NABL) in Medical testing
- Member of drafting committee for NABL 112 standards document in hematology
- Committee for ICMR Standard Operating Procedures (SOP's) on "Immunophenotyping of Hematolymphoid Neoplasms"
- Membership of Editorial Boards of reputed publications
- Editorial Board of "Clinical Cytometry, Part B".
- Editorial Board of "Indian Journal of Cancer"
- Editorial Board of "Indian Journal of Pathology and Microbiology"
- Editorial Board of "National Journal of Basic Medical Sciences"

### Dr PG Subramanian

- Lead assessor in NABL and member of Technical committee in hematology.
- Member of Editorial board of Pediatric Hemato-oncology Journal
- President of Clinical of The cytometry society of India.

### Dr Nikhil V Patkar

- Awarded Wellcome-DBT through an inter mediate fellowship of funding with Rs. 3.66 crore for a project titled 'Acute myeloid leukemia and the dynamics of relapse'.
- From all over India, only four research projects were funded in 2015, aimed specifically at clinicians and public health researchers, and this was the only clinical research project awarded.
- Wellcome Trust-DBT India Alliance Senior Fellowship (2022-Current). This is a competitive fellowship scheme that is co-funded by the Wellcome Trust, UK and Department of Science and Biotechnology, Govt of India for established researchers. Acute myeloid leukemia and the clonal dynamics of relapse. Funding: Rs 4.7crores, (~ USD 650,000) Wellcome Trust UK and Department of Science and Biotechnology, Govt of India.

**11. Institutional Efforts/Initiatives in Providing an Inclusive Environment (Tolerance and harmony towards cultural, regional, linguistic, communal, socio-economic, and other diversities):**



Glimpses of the Staff Club Indoor tournaments

**12. Sensitization of Students and Employees to Constitutional Obligations (Values, rights, duties, and responsibilities of citizens):**

**EMPLOYEES WATCHING SKIT ON CORRUPTION**





## SENSITIZING STUDENTS OF NEARBY VILLAGE ON BRIBE AND CORRUPTION



### ANTI RAGGING OATH TAKING CEREMONY



**13. Institution Celebrates/Organizes National and International Commemorative Days, Events, and Festivals:**

**TALK ON WOMEN'S DAY**





#### 14. Outreach Activities, Sports Activities, and Other Events (Including yoga, physical fitness, health, and hygiene activities):

Outreach activities of Institute for Plasma Research for the period between April 2024 – December 2024 are summarized as below

##### Off-Campus Events (Plasma Exhibitions)

##### April 2024

- The off-campus exhibition events had been organized by IPR Outreach Division at **Gitanjali Institute of Technical Science, Udaipur, Rajasthan** in the month of April'24 and as National Technology Day, Science City, Ahmedabad. The event in Udaipur - The Fourth State of Matter, held from **15th to 19th April, 2024**. This program was a part of IPR's scientific outreach activity in various states of India under the auspices of "70 years of DAE" celebrations. The event was inaugurated by the Director of GITS, Dr. Narendra Singh Rathore. About 60 students of 1<sup>st</sup> Year Engineering course participated as volunteers. Over 3000 students from over 48 schools and colleges in Udaipur visited the exhibition. A quiz program was also conducted for school students and Tokamak assembly competition was conducted for the volunteers.



##### May 2024

- Institute for Plasma Research (IPR), Gandhinagar (Gujarat), in association with **Gujarat Science City, Ahmedabad and GUJCOST** celebrated the National Technology Day by organizing a series of events at the Gujarat Science City, Ahmedabad on **11th May, 2024** with the theme "**Technology for Viksit Bharat**". This program is a part of IPR's scientific outreach activity under the auspices of "70 years of DAE" celebrations. The event was inaugurated by Dr. Narottam Sahoo, Advisor and Member Secretary, GUJCOST. The programme consisted of an exhibition on plasma, its applications as well as introductory talks on plasma for visiting students and training program on plasma, its applications and nuclear fusion for science teachers, students and public. UG students of MG Science College Ahmedabad participated as student volunteers for the exhibition. Over 1500 people visiting the science city also visited the exhibition.







July 2024

- Institute for Plasma Research (IPR), Gandhinagar (Gujarat), in association with Smt. P.D.Shroff Sanskardeep Vidhyalaya, Ankleshwar (Gujarat) organized an exhibition on Plasma, "The Fourth State of Matter" during **09-11 July, 2024**. This program is part of IPR's scientific outreach activity in various states of India under the auspices of "70 years of DAE" celebrations. The event was inaugurated by the district collector, Mr. Tushar Sumera. The programme consisted of an exhibition on plasma, its applications as well as introductory talks on plasma for visiting students and training program on plasma, its applications and nuclear fusion for science teachers. Thirty two students of 9th and 10th standard from the host school were trained by IPR staff to explain the various exhibits to visiting public. Over **1700** students and teachers from over **17** schools and colleges in Ankleshwar and Bharuch visited the exhibition.







## August 2024

- Institute for Plasma Research (IPR), Gandhinagar (Gujarat), in association with **Parvathaneni Brahmaya Siddhartha College of Arts & Science, Vijayawada** (Andhra Pradesh) organized an exhibition on Plasma, "The Fourth State of Matter" during **05-09 August, 2024**. This program is part of IPR's scientific outreach activity in various states of India under the auspices of "70 years of DAE" celebrations. The programme consisted of an exhibition on plasma, its applications as well as introductory talks on plasma for visiting students and training program on plasma, its applications and nuclear fusion. Seventy two students from the host college were trained by IPR staff to explain the various exhibits to visiting public. Over **5000** students and teachers from over **72** schools and colleges in and around Vijayawada visited the exhibition.







- Institute for Plasma Research (IPR), Gandhinagar (Gujarat), in association with Bhavan's Vivekananda College, Secunderabad (Telangana) organized an exhibition on Plasma, "The Fourth State of Matter" during **12-14 August, 2024**. This program is part of IPR's scientific outreach activity in various states of India under the auspices of "70 years of DAE" celebrations. The programme consisted of an exhibition on plasma, its applications as well as introductory talks on plasma for visiting students and training program on plasma, its applications and nuclear fusion. **76** students from the host college were trained by IPR staff to explain the various exhibits to visiting public. Over **1750** students and teachers from over **19** schools and colleges in and around Secunderabad visited the exhibition







- Institute for Plasma Research (IPR), Gandhinagar (Gujarat), in association with Mukтажivan English School, Maninagar, Ahmedabad (Gujarat) organized an exhibition on Plasma, "The Fourth State of Matter" during **21-23 August, 2024**. This program is part of IPR's scientific outreach activity in rural areas across Gujarat under the auspices of "70 years of DAE" celebrations. The event was inaugurated by the **Director, Mukтажivan group of Education**. The programme consisted of an exhibition on plasma, its applications as well as introductory talks on plasma for visiting students and training program on plasma, its applications and nuclear fusion. 32 Students of 11th and 12th standard from the host school were trained by IPR staff to explain the various exhibits to visiting public. Over **1200** students and teachers from nearby schools visited the exhibition.







September 2024

- Institute for Plasma Research (IPR), Gandhinagar (Gujarat), in association with Sir Pratap School Idar (Gujarat) organized an exhibition on Plasma, "The Fourth State of Matter" during **25-27 September, 2024**. This program is part of IPR's scientific outreach activity in various states of India under the auspices of "70 years of DAE" celebrations. The programme consisted of an exhibition on plasma, its applications as well as introductory talks on plasma for visiting students and training program on plasma, its applications and nuclear fusion for school and college students and teachers/faculty. Over **2000** students and teachers from over **22** schools and colleges in Idar visited the exhibition.





October 2024

- Institute for Plasma Research (IPR), Gandhinagar (Gujarat), in association with **Noble University, Junagarh (Gujarat)** organized an exhibition on Plasma, "The Fourth State of Matter" during **08-10 October, 2024**. This program is part of IPR's scientific outreach activity in various states of India under the auspices of "70 years of DAE" celebrations. The programme consisted of an exhibition on plasma, its applications as well as introductory talks on plasma for visiting students and training program on plasma, its applications and nuclear fusion for school and college students and teachers/faculty. Students from the host school were trained by IPR staff to explain the various exhibits to visiting public. Over **4450** students and teachers from over **31** schools and colleges in and around Junagarh visited the exhibition





- The Outreach Division organized on 13-9-2024 an **induction programme** for the new recruits (TO-C, ITSO and SA-B) who joined on or after January 2024. The new recruits were informed about their responsibilities and obligations as per IPR's administrative rules & procedures which would include matters related to leave, attendance, conduct, pension and other general administrative matters to be followed by the staff. The speakers were

Dr. Paritosh Chaudhury

Mr. Gattu Ramesh

Mr. Niranjana Vaishnav, CAO

Mr. Tejas Parekh

Visit to IPR labs (Aditya, SST1, Neutronics, robotics & remote handling, ITER India labs) were also organized





- The Department of Atomic Energy (DAE) has significantly contributed to numerous national and international programs over the past seven decades. To honour these achievements and chart a course for future advancements, DAE organized its inaugural **Conclave from October 22-26, 2024, at National Institute of Science Education and Research (NISER) Bhubaneswar** as part of its Platinum Jubilee Celebrations. This landmark event brought together experts and participants from all DAE units and its aided institutions, offering a vibrant platform to showcase their scientific and



technological accomplishments. The institute actively participated in the Conclave, presenting its cutting-edge research and developmental activities through five posters and 16 videos, highlighting its contributions to advancing plasma science and technology. Additionally, many models were also presented by the IPR Outreach Division, further enhancing the interactive experience at the event. Director IPR has delivered a comprehensive talk, shedding light on its pioneering work and vision for the future. The following five posters were presented from IPR that included those from IPR Outreach Division:

1. Plasma Pyrolysis Technology for Safe Disposal of Organic Waste
2. AI & High-Performance Computing for Scientific Research & Medical Diagnosis
3. 14 MeV Neutron Generators: Bridging the Gap between Research
4. Fundamental Plasma Research Activities at IPR
5. TOKAMAK: A Pathway to Nuclear Fusion

This event underscored DAE's enduring legacy and its commitment to fostering innovation and collaboration across its institutions, paving the way for ground-breaking advancements in science and technology. The Outreach division of IPR also displayed their poster



## November 2024

- IPR Gandhinagar participated in "**Amalthea 2024**", Annual Technology exhibition organized by Indian Institute of Technology (IIT), Gandhinagar during **9-10 November 2024**. Amalthea is a student-run annual technical summit. The event consisted of several tech exhibitions including robotics, AI and mobility based innovations. Several industry and national R & D institutions participated in the event. IPR exhibited working and static models related to Tokamak, ITER, Wiggler Experiment, Plasma for Grooming and Ion thruster. Around **800** visitors from schools, colleges and industry visited IPR exhibition stall during the event.



- Plasma Exhibition was organized in **Dr. B.C. Roy Engineering College (BCREC), Durgapur from 1 Nov'24 to 14 Nov'24**. The event was organized by Dept. of Basic Science and Humanities, BCREC in collaboration with IIPC, BCREC and The Viswagandha Society, Durgapur, whose mission is to enrich the scientific minds of Young Bengal through interfaces with Scientific Organizations of the country. The Inaugural Session comprised collective watering of sapling by distinguished guests, followed by a felicitation ceremony where the Principal BCREC, Dr. Sanjay S Pawar, Chief Advisor, BCREC Group of Institutions, Dr. Saikat Maitra, HOD BSH, Dr. Saurav Ranjan Das, HOD ECE, Dr. Mrinmoy Chakraborty, Shri and Madam Kabiraj did the honours. About 640 students and 70 teachers from different educational institutes attended the exhibition with great zeal.





- Plasma Exhibition was organized in **Rani Durgavati Vishwavidyalay (RDV)** Jabalpur by IPR Outreach. Member of Parliament (Jabalpur) Shri Ashish Dubey, Inaugurated the exhibition. The Vice Chancellor of RDV Prof. Rajesh Kumar Verma presided over the event, the faculty members of the Department Physics and Electronics of RDV (Prof. Rakesh Bajpai, Dr. R. K. Dubey, Dr. Rinkesh Bhatt, Dr. D. K. Pandey, Dr. (Mrs.) Pallavi Shukla, University staff members, faculty members of local degree and PG colleges, students and teachers of local schools, and foremost the science enthusiasts and volunteers among the students of UG & PG science courses of RDV. The overwhelming response of enthusiastic school and college students while going through the exhibitions was very pleasing, satisfying and encouraging. About **1600 students and teachers from about 30 colleges** and schools and members of **Ordinance Factory Jabalpur** visited the exhibition, which had both static and working models and resource materials and attended the lectures delivered by the members of Outreach Division.









- Institute for Plasma Research (IPR) Gandhinagar (Gujarat) in association with Shri Sardar Patel And Swami Vivekanand School (Ahmedabad) organized an exhibition on plasma, "The fourth state of matter" during **28th & 29th November 2024**. This program is part of IPR's scientific outreach activity in various states of India under the auspices of 70 years of DAE Celebrations. **The event was inaugurated by Shri Vadibhai Patel (ex. principal of GLS college Ahmedabad) and their past student Shri Deven Mistry and Shri Ajaybhai chokshi Managing Director of Shri Vivek Education Trust.** About 2200 students and teachers visited the exhibition and quenched their curiosities on plasmas.







## December 2024

- For the first time a 2-day Hands-on **Basic Science Camp** for School students from class 10<sup>th</sup> to 12<sup>th</sup> was conducted by Outreach Division on **7th and 8th Dec 2024** (Sat & Sun) at Outreach Hall, IPR. The theme for this hands-on camp is **Electricity, Electromagnetism and Electromagnetic Induction**. For the first camp, the children of IPR staff were invited. 22 students registered and 20 students participated on both the days. The students were provided with practical booklet, writing materials, brief explanation about each experiment. The experiments were conducted in four half-day sessions supervised by scientists of IPR: Mr. Sunil Belsare, Mr. Prakash Parmar, Dr. Jyoti Sankar



Misra, Ms. Pramila, Ms. Praveena, Ms. Minsha Shah, Mr. Deepak kumar, Mr. Abhishek, Mr. Rahul Kumar, Mr. Pritesh Kumar Ray, Mr. Saurav kumar, Ms. Priyanka Patel and members from Outreach Division: Dr. Nirav Jamnapara, Mr. Manu Bajpai, Mr. Narendra Chauhan, Mr. Rahul Vishwkarma, Mr. Anand Kumar and Mr. Gattu Ramesh Babu. Special thanks to Mr. Dasharath Sonara and Ms. Aneesh for developing superconducting and temperature dependency experiment for this science camp.







- Plasma Exhibition in the 39<sup>th</sup> National Symposium on Plasma Science and Technology (Pandit Deendayal Energy University – PDEU) was organized. It was inaugurated by Shri K. N Vyas (Ex-Secretary, DAE). IPR-Director Dr. Shashank Chaturvedi was the guest of honour. Nearly 400 students and 20 teachers visited exhibition.



