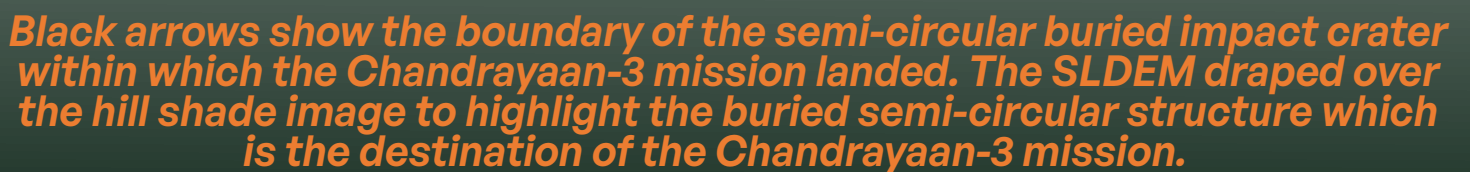




THE SPECTRUM



October 2024

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Unlocking the Secrets of the Universe with Deep Learning

(Akanksha Bhardwaj, **Partha Konar** and Vishal Ngairangbam)

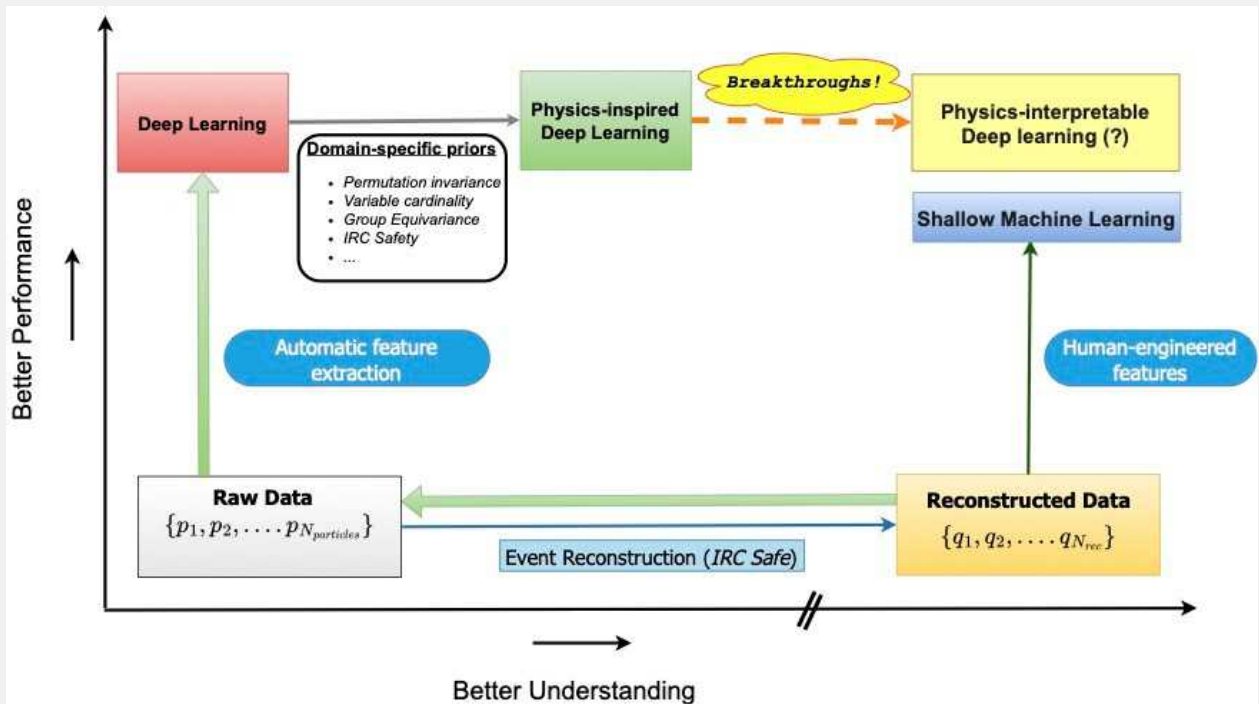
The Author



Partha Konar

Deep machine learning (DML) techniques have rapidly become indispensable tools in various branches of physics and the natural sciences. Their ability to extract meaningful information from complex, high-dimensional datasets has revolutionized data analysis and modelling. While DML's capabilities might suggest that human expertise is becoming obsolete, physics-inspired feature extractors offer significant advantages. These features provide a deeper understanding of the extracted information, leading to improved performance and interpretability of deep learning models. This review delves into the application of deep learning in particle physics, focusing on automatic feature extraction. By examining the benefits of physics-inspired architectures, we gain insights into how prior physics knowledge can enhance the naturalness of data representations, particularly in the context of point cloud analysis. Additionally, we explore the potential of graph-based methods for analysing LHC phenomenology. Through a systematic exploration of these topics, we aim to demonstrate the transformative power of deep learning in advancing our understanding of fundamental physics. By combining the strengths of human expertise and machine learning, one can unlock new frontiers of knowledge and discovery.

Source/Reference of the Work: <https://doi.org/10.1140/epjs/s11734-024-01306-z>



A schematic diagram on the plane of classifier performance and understanding of deep learning algorithms and its comparison to shallow machine learning methods

Chasing Dark Matter: A Quest for Understanding

(Anupam Ghosh and Partha Konar)

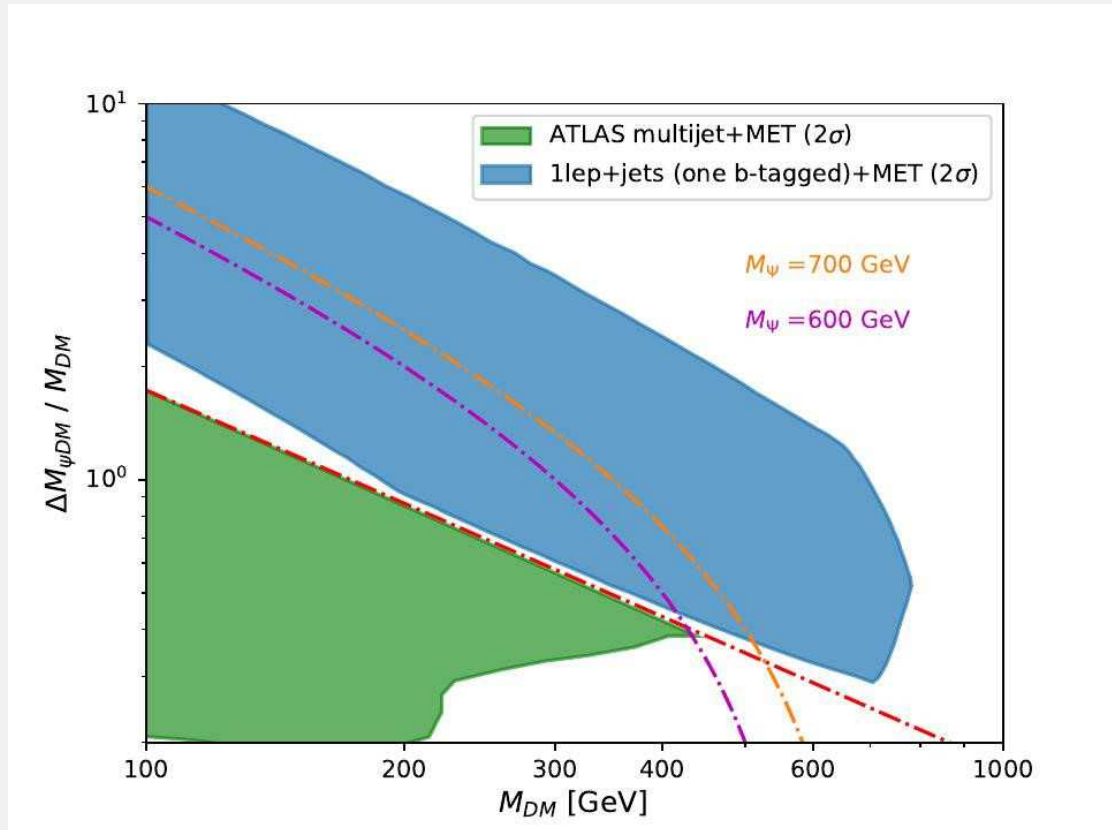
The Author



Anupam Ghosh

Our Universe is composed primarily of dark matter (DM), a mysterious substance that, despite its abundance, remains largely elusive. Despite its invisibility, dark matter's gravitational influence is evident across various cosmological scales, from galaxies to the Universe as a whole. PRL scientists are working to unravel the mystery of DM. Their present work shows that the Inert Higgs Doublet Model (IDM), augmented by Peccei-Quinn (PQ) symmetry, presents a compelling framework for understanding dark matter. This model incorporates both Weakly Interacting Massive Particles (WIMPs) and axions as potential dark matter candidates. Interestingly, the PQ symmetry, originally proposed to address the strong CP problem, also ensures the stability of these WIMPs. This scenario offers a unique opportunity to explore dark matter at the Large Hadron Collider (LHC) through sophisticated machine-learning applications. By studying the interactions between visible particles, scientists can potentially infer the presence and properties of dark matter.

Source/Reference of the Work: [https://doi.org/10.1007/JHEP09\(2024\)104](https://doi.org/10.1007/JHEP09(2024)104)



Excluded regions at a 95% CL in the plane of WIMP mass vs. Vector-like quark (VLQ) mass plane. Here, VLQ predominantly interacts with the third generation of the SM quark, and the corresponding exclusion contour is the blue region. In case VLQ interacts with the first two generations of the SM quarks, then the exclusion contour is filled green region.

The Author



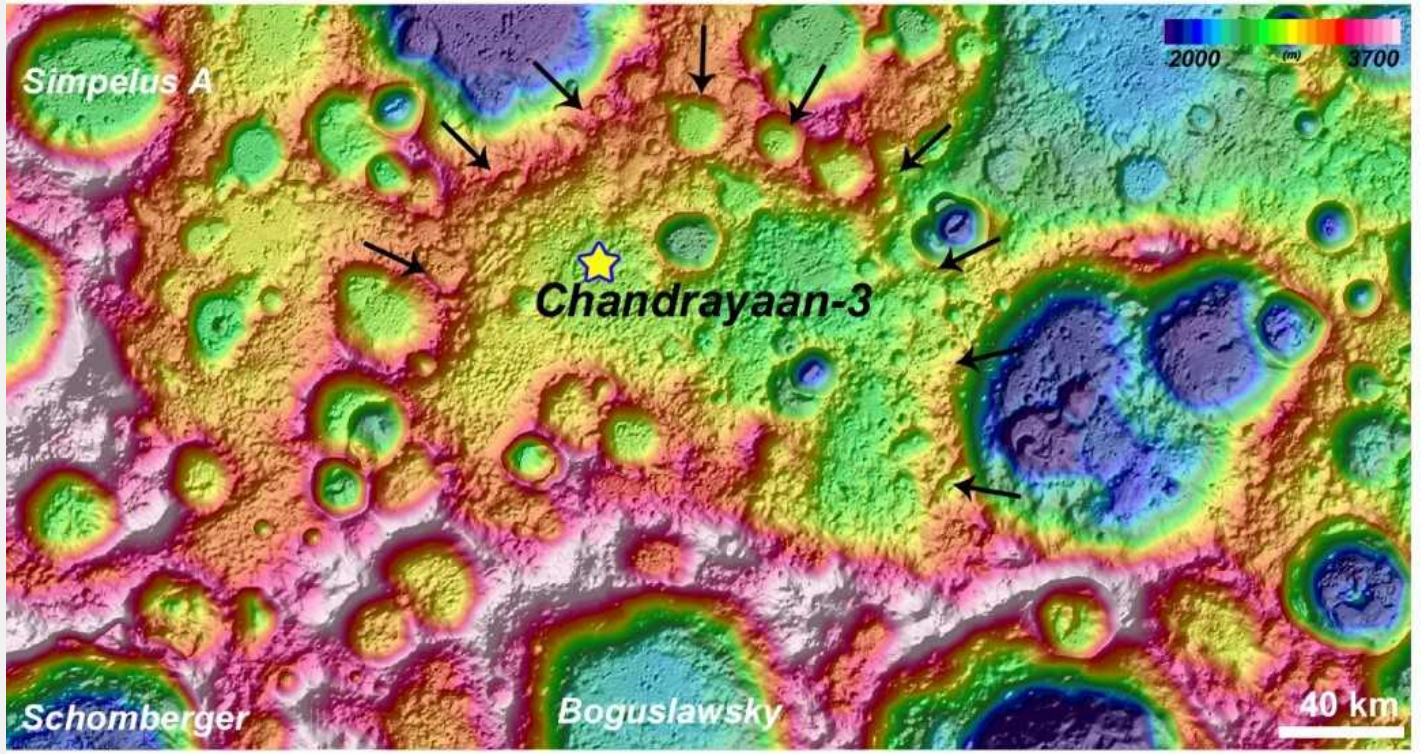
S Vijayan

CHANDRAYAAN-3 LANDING SITE EVOLUTION BY SOUTH POLE-AITKEN BASIN AND OTHER IMPACT CRATERS

(S Vijayan, KB Kimi, Anil Chavan, R Aditi, U Thahira, V Rama Subramanian, Rishitosh K Sinha, Santosh Vadawale, M Shanmugam, NPS Mithun, Arpit R Patel, S Amit Basu, KV Iyer, K Suresh, Ajay Prashar, G Rima, Anil Bhardwaj)

The Chandrayaan-3 mission with the Vikram-lander and the Pragyan rover landed in the high latitude highland region near the south pole of the Moon. The landing site is located ~350km from the South Pole-Aitken basin rim, an ancient and the largest impact basin in the Solar System. This landing site has undergone the complex emplacement sequence of SPA basin ejecta followed by the nearby and distant impact basins and complex crater ejecta materials. We found that the SPA basin is the major contributor, which deposited nearly ~1400 m of ejecta materials, and 11 other basins deposited ~580 m of ejecta. The other complex craters contributed up to ~90 m of ejecta. Meanwhile, secondary craters of a few km's in diameter located adjacent to the Vikram lander contributed to ~0.5 m ejecta, which are crucial target materials for the Pragyan rover insitu analysis. The regional exploration around the Chandrayaan-3 landing site revealed a near semi-circular like structure, with highly degraded in nature. This semi-circular structure encompassed the Statio Shiv Shakti (yellow star) as shown in the Figure. Further detailed geomorphological and topographical analysis revealed that the semi-circular structure is a heavily degraded crater structure or a buried impact crater with a diameter of ~160km. This semi-circular structure was highly degraded due to the mantling of thick ejecta deposits from the South Pole-Aitken (SPA) basin and followed by many other complex craters throughout the geological history of the Moon. This buried crater is one of the oldest crater on the Moon, and the Chandrayaan-3 Vikram lander and Pragyan rover landed and roved within this buried crater, which is hosting the SPA basin ejecta material and some of the most deeply excavated materials on the Moon.

Source/Reference of the Work: <https://doi.org/10.1016/j.icarus.2024.116329>



Black arrows show the boundary of the semi-circular buried impact crater within which the Chandrayaan-3 mission landed. The SLDEM draped over the hill shade image to highlight the buried semi-circular structure which is the destination of the Chandrayaan-3 mission.

Minimal Type-I Dirac seesaw and Leptogenesis under A_4 modular invariance

(Labh Singh, **Monal Kashav** and Surender Verma)

The Author



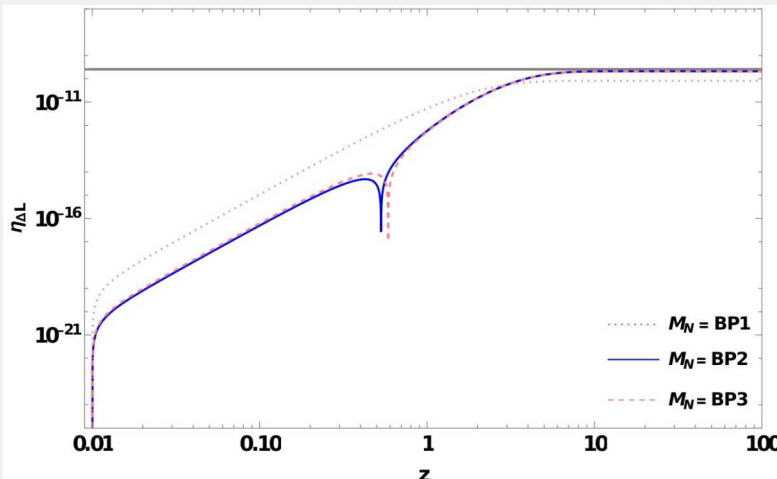
Monal Kashav

In particle physics, modular symmetries employ modular forms to analyze and predict patterns of particle interactions and flavor structures. Unlike conventional symmetries, modular symmetry offers the advantage that Yukawa couplings are not treated as free parameters. Specifically, it determines Yukawa couplings via the complex modulus, thereby eliminating the need for additional flavon fields.

In the context of a Dirac mass model utilizing the Type-I seesaw mechanism with A_4 modular symmetry, the Standard Model is extended to include right-handed neutrinos, heavy Dirac fermions, and a scalar field, all of which are singlets under $SU(2)_L$. Modular weights are carefully selected to exclude both Majorana and conventional Dirac mass terms. This framework successfully predicts neutrino oscillation parameters and necessitates a normal hierarchy for neutrino masses ($m_1 < m_2 < m_3$).

Despite the absence of Majorana mass terms, the model provides a viable mechanism for baryogenesis through leptogenesis. Heavy Dirac neutrinos can decay in a manner that violates CP symmetry, influenced by the complex modulus, and operate out of equilibrium, leading to equal and opposite asymmetries in the lepton sectors. Ultimately, the asymmetry in the left-handed sector accounts for baryon asymmetry through the electroweak sphaleron process. In Figure, we illustrate the evolution of the comoving number density of the lepton asymmetry as a function of $z = MN_I/T$. A larger Yukawa coupling not only generates lepton asymmetry but also enhances washout scattering processes, as indicated by the dotted red curve in Figure. However, smaller Yukawa couplings reduce washout effects and result in the saturation of lepton asymmetry (depicted by the blue and dashed pink curves) around $z \approx 6$, consistent with the observed value of ΔL . This resultant lepton asymmetry is subsequently converted into baryon asymmetry through the B+L violating electroweak sphaleron process.

Source/Reference of the Work: <https://doi.org/10.1016/j.nuclphysb.2024.116666>



The evolution of comoving number density of lepton asymmetry with $z = MN_I/T$ for different benchmark points. The required asymmetry in the lepton sector is represented by the solid horizontal line, which is then converted to the required baryon asymmetry through the electroweak sphaleron action.

The Author



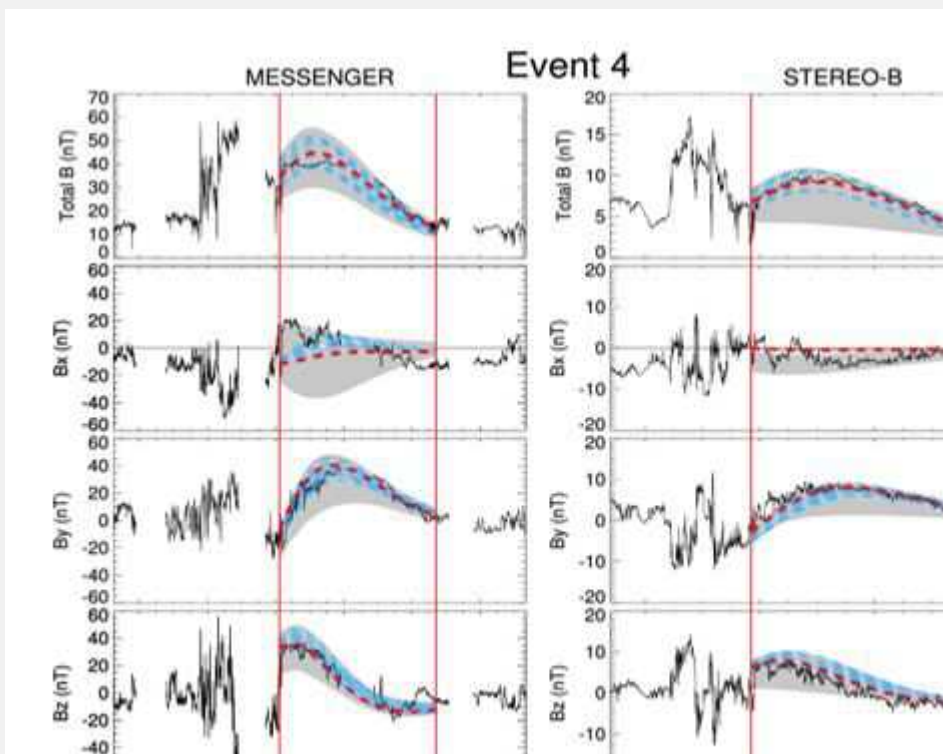
**Nandita
Srivastava**

Modeling the Magnetic Vectors of Interplanetary Coronal Mass Ejections at Different Heliocentric Distances with INFROS)

(Ranadeep Sarkar, **Nandita Srivastava**, Nat Gopalswamy, and Emilia Kilpua)

This work utilizes the state-of-the-art analytical model INTERplanetary Flux ROpe Simulator (INFROS) dedicated to forecasting the strength of the southward component (B_z) of the magnetic field embedded in interplanetary coronal mass ejections (ICMEs). Interplanetary evolution of six ICMEs and their interactions with high speed and high density streams was studied using INFROS. The selected ICMEs were observed in sequence by two radially-aligned spacecraft positioned at varying heliocentric distances, providing a unique opportunity to study their radial evolution. We determined the intrinsic flux rope (FR) properties of each ICME near the Sun obtained from the remote-sensing observations from spacecraft positioned at multiple vantage points, including STEREO, SOHO, and SDO. The near-Sun FR properties thus obtained were then used as input to INFROS in order to model the ICME evolution at different heliocentric distances. By comparing the model outputs with the in-situ observations of the ICMEs obtained at the radially aligned spacecraft, such as MESSENGER, VEX, STEREO, and Wind, we found that for the isolated CMEs, the model outputs at both spacecraft are in good agreement with in situ observations. However, for most of the interacting events, the model correctly captures the CME evolution only at the inner spacecraft beyond which the ICME evolution no longer remains self-similar. Our findings indicate that constraining the INFROS model with inner-spacecraft observations significantly enhances the prediction accuracy at the outer spacecraft for the CMEs undergoing self-similar expansion, achieving a 90% correlation between observed and predicted B_z profiles. We conclude that the assumption of self-similar expansion provides a lower limit to the magnetic field strength estimated at any heliocentric distance, based on the remote-sensing observations which is crucial from the perspective of forecasting space weather impact.

Source/Reference of the Work: <https://iopscience.iop.org/article/10.3847/1538-4365/ad5835>



The magnetic field profiles of the ICME sequentially detected by MESSENGER and STEREO-B for the CME of November 4, 2011. The black solid lines denote the observed magnetic vectors of the ICME while the gray-shaded regions are the ensemble results obtained from the model predictions. The cyan dashed lines represent the ensemble model results corresponding to the lowest impact distance at STEREO-B. The red curves mark the best fit of the magnetic vectors at MESSENGER.

Celebration of the Success of Chandrayaan-3 APXS

While the entire nation was gearing up to celebrate the first National Space Day on 23 August 2024 to commemorate the historic landing of the Chandrayaan-3 mission on the Moon, the first scientific results from the mission using observations with PRL-built Alpha Particle X-ray Spectrometer (APXS) got published in Nature. To celebrate the highly successful operations of the APXS instrument on the Pragyan rover for ten days on the Moon and the impactful scientific results from APXS observations, an event was organized in PRL at K R Ramanathan Auditorium on 6 September 2024 from 4.30 - 6.00 PM. In addition to the entire PRL members, superannuated PRL colleagues and colleagues from SAC, Ahmedabad, who have contributed to the APXS experiment, were also invited to reminisce about the journey from the inception of the experiment to scientific outcomes.

The event started with the welcome address of Prof. Anil Bhardwaj, Director, PRL. Rather than a set of very technical formal presentations, some of the APXS team members provided brief informal accounts on various exciting aspects of the APXS journey. Prof. Santosh Vadawale, principal investigator of APXS, shared his experience of the APXS experiment from an X-ray astronomer's perspective. Dr. M Shanmugam, Deputy Project Director of APXS, gave glimpses of the fifteen years of the journey from concept to realization of the instrument and some fascinating anecdotes. What went on behind the scenes to get from APXS observations to measurements of abundances was presented by Mithun N. P. S., and what we learned about the Moon from the APXS measurements was discussed by Dr. Amit Basu. The director then invited other members to share interesting experiences, and Dr. Arpit Patel narrated a story of a bitter-sweet experience during the integrated tests of APXS with the rover. It was heartening note that the auditorium was packed with the enthusiastic audience. The event concluded with a high tea.





Glimpses of the event

हिंदी माह Hindi Maah -2024

भारत सरकार, गृह मंत्रालय, राजभाषा विभाग एवं अंतरिक्ष विभाग के निर्देशानुसार, भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद के मुख्य परिसर सहित अन्य तीनों परिसरों थलतेज, माउंट आबू अवरक्त वेधशाला, उदयपुर सौर वेधशाला में 14 सितंबर 2024 से हिंदी माह बहुत ही हर्षोल्लास के साथ मनाया गया। हिंदी माह के दौरान विभिन्न कार्यक्रमों/प्रतियोगिताओं का आयोजन किया गया था-

As per the instructions of the Government of India, Ministry of Home Affairs, Department of Official Language and Department of Space, Hindi Month was celebrated with great enthusiasm from 14 September 2024 to 15 October 2024 in the Main campus of Physical Research Laboratory, Ahmedabad and the other three campuses, Thaltej, Mount Abu Infrared Observatory, Udaipur Solar Observatory. Various programs/competitions were organized during Hindi month.

इस वर्ष हिंदी दिवस की शुरुआत 14 सितंबर 2024 को हिंदी दिवस समारोह एवं चतुर्थ अखिल भारतीय राजभाषा सम्मेलन- 2024 भारत मंडपम, नई दिल्ली के माध्यम से हुई, एवं इस सम्मेलन की अध्यक्षता माननीय गृह एवं सहकारिता मंत्री महोदय श्री अमित शाह ने की थी। इस अखिल भारतीय हिंदी सम्मेलन में पी.आर.एल. के नामित सदस्यों द्वारा सहभागिता की गई।

This year Hindi Diwas was celebrated on 14th and 15th September 2024 with Fourth All India Official Language Conference- 2024 Bharat Mandapam, New Delhi, and this conference was chaired by the Honorable Home and Cooperation Minister, Shri Amit Shah. Nominated members of PRL participated in this Official Language Conference- 2024.

क्रमांक SI No.	नाम Name	पदनाम Designation
1	डॉ. गिरजेश आर. गुप्ता Dr. Girjesh R. Gupta	एसोसिएट प्रोफेसर Associate Professor
2	डॉ. सुनील चंद्रा Dr. Sunil Chandra	असिस्टेंट प्रोफेसर Assistant Professor
3	श्री प्रदीप कुमार शर्मा Shri Pradeep K. Sharma	वरिष्ठ प्रशासनिक अधिकारी Sr. Administrative Officer
4	श्रीमती सोनम जीतरवाल Smt. Sonam Jitarwal	वैज्ञानिक/इंजीनियर-एस.डी. Scientist/Engineer-SD
5	श्रीमती रुमकी दत्ता Smt. Rumki Dutta	सहायक निदेशक (रा.भा.) Assistant Director (O.L.)

हिंदी माह 2024 के दौरान पीआरएल में आयोजित कार्यक्रम/प्रतियोगिताएं

Events/Competitions organised in PRL during Hindi Month 2024:-

17 September 2024

उद्घाटन कार्यक्रम - हिंदी माह

17 सितंबर 2024

इस कार्यक्रम में हिंदी माह का उद्घाटन परंपरागत रूप से निदेशक, पीआरएल के संबोधन द्वारा हुआ।

Inaugural Program-Hindi Month

In this program, Hindi month was traditionally inaugurated with the address of Director, PRL.

कविता पाठ प्रतियोगिता

पी.आर.एल. के सदस्यों के लिए कविता पाठ प्रतियोगिता का आयोजन किया गया था। इसमें हिंदी में स्वरचित कविताएं प्रस्तुत करने का अवसर दिया गया। इस प्रतियोगिता में माउंट आबू एवं यूएसओ के सदस्यों ने भी ऑनलाइन माध्यम से प्रतिभागिता भाग लिया।

Kavita Path Competition

Recitation competition was organized for the members of PRL. In this, an opportunity was given to present self-composed poems in Hindi. Members of Mount Abu and USO also participated in this competition through online mode.

मातृभाषा से राजभाषा तक

हिंदी भाषा अपने आप में एक खूबसूरत बगिया स्वरूप है जो अपनी प्रांतिक बोलियों और भाषाओं के शब्दों और भावों को महकाए हुए है। हिंदी राजभाषा होने के साथ-साथ हमारे देश की विभिन्न संस्कृतियों की मोतियों को एक माला में संजो कर रखती है। इसी भाव को रेखंकित करते हुए, हिंदी माह में "मातृभाषा से राजभाषा तक" प्रतियोगिता का आयोजन किया गया। प्रतिभागियों द्वारा अपने प्रांत की बोली/भाषा जैसे तमिल, उड़िया, कुमाऊंनी, भोजपुरी, मगही, कन्नड़, मेवाती, मारवाड़ी, ढूँढाड़ी, गुजराती, संस्कृत, तेलुगु, निमाड़ी, मलयालम, पंजाबी, मराठी, भोजपुरी, बांग्ला, ब्रज भाषा आदि में भावपूर्ण कविता, लेख, कहानी, नाट्य, संगीत के छंदों में प्रस्तुत किए गए। उसके बाद उसी छंद का भाव-अनुवाद हिंदी भाषा में प्रस्तुत किया गया, तथा प्रस्तुति का स्रोत/लेखक/संक्षिप्त परिचय भी दिया गया।

Matribhasha Se Rajbhasha Tak

Hindi language is a beautiful blooming base in itself which has the fragrance of words and expressions of its regional dialects and languages. Being the Official Language, Hindi also beholds the cultural pearl string of our country and unites us. Highlighting this sentiment, a competition "Matribhasha Se Rajbhasha Tak" was organized during the Hindi month. The participants presented emotive poems, articles, stories, dramas, musical verses in regional dialect/language/mother tongue like Bengali, Bhojpuri, Brajbhasha, Dhundhari, Gujarati, Kannada, Kumaoni, Magahi, Marwadi, Mewati, Marathi, Malayalam, Nimadi, Oriya, Punjabi, Sanskrit, Tamil, Telugu etc. After that, the summary-translation of the same was presented in Hindi language, and the source/author/brief introduction of the presentation was also given.

19 सितंबर 2024

ऑनलाइन हिंदी टंकण प्रतियोगिता

यह पीआरएल के सभी परिसरों के सदस्यों के लिए थी एवं सभी को अपने स्थान से इस प्रतियोगिता में भाग लेने की सुविधा प्रदान की गई।

सुलेख प्रतियोगिता

इसका आयोजन केवल पीआरएल के ऑक्सिलरी स्टाफ और पीआरएल के सभी कॉन्ट्रैक्ट्यूअल सदस्यों के लिए किया गया था। यह प्रतियोगिता पीआरएल मुख्य, थलतेज, माउंट आबू एवं यूएसओ परिसरों में भी आयोजित की गई।

अनेकता में एकता

इस प्रतियोगिता में प्रभागों/अनुभागों के चयनित सदस्यों को वाक्य/वाक्यांश/पैरा पहले से ई-मेल द्वारा परिचालित कर दिए गए। उन्हें अपने संबंधित प्रभाग/अनुभाग के सदस्य के साथ मिलकर चर्चा करते हुए एक कहानी

19 September 2024

Online Hindi Typing Competition

This was organized for the members of all the campuses of PRL and everyone was given the facility to participate in this competition from their workplace.

Sulekh Competition was organized for the auxiliary staff of PRL and all the contractual members of PRL. This competition was also organized at PRL Main, Thaltej, Mount Abu and USO campuses.

Anekta Mein Ekta Competition

In this competition, sentences/phrases/paragraphs were circulated in advance to the selected members of the Divisions/Sections through e-mail. They had to write a story by discussing it with the member of their respective division/section. A nodal member was selected by the head of the Divisions/Sections. Everyone submitted the complete story by 25 September 2024. This was a maiden event in PRL.

23 सितंबर 2024

हिंदी कहानी लेखन प्रतियोगिता

हिंदी कहानी लेखन प्रतियोगिता में पीआरएल सदस्यों के बच्चों (कक्षा 7 से 10 तक के) ने भाग लिया। दिए गए विषयों में अपने शब्दों में कहानी लिखनी थी। इसमें रचनात्मकता का स्वतंत्र रूप से उपयोग था। इसमें दो समूह बनाए गए - समूह 1 में कक्षा 7-8 एवं समूह 2 में कक्षा 9-10 के बच्चे।

कहानी लेखन के प्रस्तावित विषय हैं-

1. अगर मैं गगनयान का गगनयात्री होता (कक्षा 7-8)
2. एआई - मित्र या शत्रु (कक्षा 9-10)

23 September 2024

Hindi Story Writing Competition

Children of PRL members (classes 7 to 10) participated in the Hindi Story Writing Competition. They wrote stories in their own words on the given topics. There was an opportunity of using individual creativity in this. Two groups were formed in this - children of class 7-8 in group 1 and class 9-10 in group 2.

The proposed topics for story writing are-

1. If I was a Gaganyatri of Gaganyaan (class 7-8)
2. AI - Friend or Foe (class 9-10)

28 सितंबर 2024

गायन कार्यक्रम

पी.आर.एल. के सभी सदस्यों एवं उनके परिवारजनों से प्रतिभागिता आमंत्रित की गई थी।

गायन में पीआरएल के सदस्य एवं उनके परिवारजनों ने बहुत ही मधुर एवं मनोरंजक प्रस्तुति दिए। गायन के दौरान गरबा भी गाया गया एवं सदस्यों ने उत्साह से गरबा नृत्य भी प्रस्तुत किए।

28 September 2024

Gayan Program

Participation was invited from all the members of PRL and their families. The members of PRL and their families gave very melodious and entertaining performances in the singing. Garba was also sung during the Gayan Program and the members also performed Garba dance with enthusiasm.

01 अक्टूबर 2024

(1) 'हमारा कार्य' प्रतियोगिता

“हमारा कार्य” प्रतियोगिता दो श्रेणियों में की गई। विभिन्न वैज्ञानिक प्रभाग/ प्रशासनिक/सेवा/सुविधा के समूहों को, उनके द्वारा किए जा रहे कार्यों की अलग-अलग मौखिक पावरपॉइंट प्रस्तुति दी गई। हमारा कार्य प्रतियोगिता के दोनों श्रेणियों में प्रथम, द्वितीय, तृतीय स्थान के लिए अलग-अलग पुरस्कार एवं समूह के लिए चल-शील्ड थी।

1. वैज्ञानिक प्रभाग - समय-सीमा 8+2 मिनट

2. प्रशासनिक/ सेवा/ सुविधा क्षेत्र - समय-सीमा 5+1 मिनट

इस प्रतियोगिता में 16 (7 वैज्ञानिक एवं 9 प्रशासनिक एवं सेवाएं) टीमों ने भाग लिया।

01 October 2024

'Our Work' Competition

The “Our Work” competition was held in two categories. Groups from different Scientific Divisions/ Administrative/Service/Facility were given separate oral powerpoint presentations of the work being done by them. There were separate prizes for first, second, third place in both the categories of Our Work competition and a running shield for the group.

1. Scientific Division - Time limit 8+2 minutes

2. Administrative/ Service/ Facility Sector - Time limit 5+1 minutes

16 (7 Scientific and 9 Administrative & Services) teams participated in this competition.

04 अक्टूबर, 2024

शब्द प्रश्नोत्तरी

शब्द प्रश्नोत्तरी प्रतियोगिता में पी.आर.एल. को विभिन्न समूहों में संरचित करके हिंदी भाषा ज्ञान, वर्ग-पहेली, सामान्य-ज्ञान, मुहावरों, गानों आदि का चक्र के साथ यह प्रतियोगिता आयोजित की गई। प्रत्येक टीम में 5-5 सदस्य थे।

04 October, 2024

Word Quiz

In the Word Quiz competition, PRL were structured into different groups and the competition was organized with a cycle of Hindi language knowledge, crossword puzzle, general knowledge, idioms, songs etc. Each team had 5 members each.

15 अक्टूबर, 2024

लघुनाटिका

इसमें विभिन्न वैज्ञानिक/तकनीकी/प्रशासन क्षेत्रों के सदस्यों द्वारा विभिन्न विषयों पर लघुनाटिका प्रस्तुत की गई। लघुनाटिका वीडियो के रूप में प्रस्तुत की गई। प्रत्येक लघुनाटिका की निर्धारित अवधि अधिकतम 8 मिनट थी।

ऑन-स्टेज हिंदी नाट्य प्रस्तुति

इस कार्यक्रम में पीआरएल के सदस्यों द्वारा मंच पर हिंदी नाट्य प्रस्तुति दी गई।

नाटक का नाम : “आत्मा उद्धार का प्रयास क्वांटुमेनिया”

उपरोक्त अधिकांशतः प्रतियोगिताओं/कार्यक्रमों में पीआरएल के माउंट आबू अवरक्त वेधशाला, उदयपुर सौर वेधशाला परिसर के सदस्यों ने भी प्रतिभागिता की, साथ ही पीआरएल सदस्यों के परिवारजनों के लिए भी उपरोक्तनुसार कुछ कार्यक्रमों का आयोजन किया गया।

15 October, 2024

Laghunatika

In this, skits on various topics were presented by members of various scientific/technical/administrative areas. The skits were presented in the form of videos. The prescribed duration of each skits was maximum 8 minutes.

On-stage Hindi Drama Presentation

In this program, Hindi live drama presentation was given on stage by the members of PRL.

Name of the play: “Atma Uddhar Ka Prayas Quantumania”

In most of the above competitions/programs, members of PRL's Mount Abu Infrared Observatory, Udaipur Solar Observatory Campus also participated, as well as some programs were organized for the families of PRL members as above.







हिंदी माह समारोह 2024 की कुछ झलकियां
Glimpses of Hindi Month Celebration 2024

Symposium on “Emerging Trends in Hydrology Research: An Indian Perspective”

The growth of a research institution is often measured by the national and global impact of its work. Over the past four decades, PRL has been a leader in isotope hydrology research. To celebrate the achievements of PRL’s hydrology team and provide a platform for future directions, we organized a one-day symposium titled “Emerging Trends in Hydrology Research: An Indian Perspective” on 20 September 2024.

The symposium began with an inaugural session where Prof. Sanjeev Kumar, Head of GSDN, outlined the motivation behind the event, followed by a warm welcome address by Prof. Anil Bhardwaj, Director of PRL. The highlight of the opening session was an insightful plenary talk by Prof. Vimal Mishra from IIT Gandhinagar, titled “Drought in India: Past, Present, and Future.” His presentation set the stage for the day, offering a comprehensive look at one of India’s most pressing water-related challenges.

The symposium featured sessions on key topics such as Water Management, Rivers and Climate, and Stable Isotopes in Hydrology, covering the latest research trends and practical solutions for water-related issues in India. The event concluded with a special talk by Prof. R.D. Deshpande, titled “My Journey at PRL: Excitement in Hydrology Research... and Beyond.” As Prof. Deshpande approaches his superannuation, his reflections on decades of groundbreaking work were an inspiring close to the day, and PRL will continue to build on his rich legacy.

The symposium attracted over 100 participants from prestigious institutions across India, including BHU, Kashmir University, IITM Pune, IISER Pune, and IIT Roorkee, fostering a vibrant exchange of ideas and collaborative discussions.







Glimpses of the event

Venus Science Conference 2024



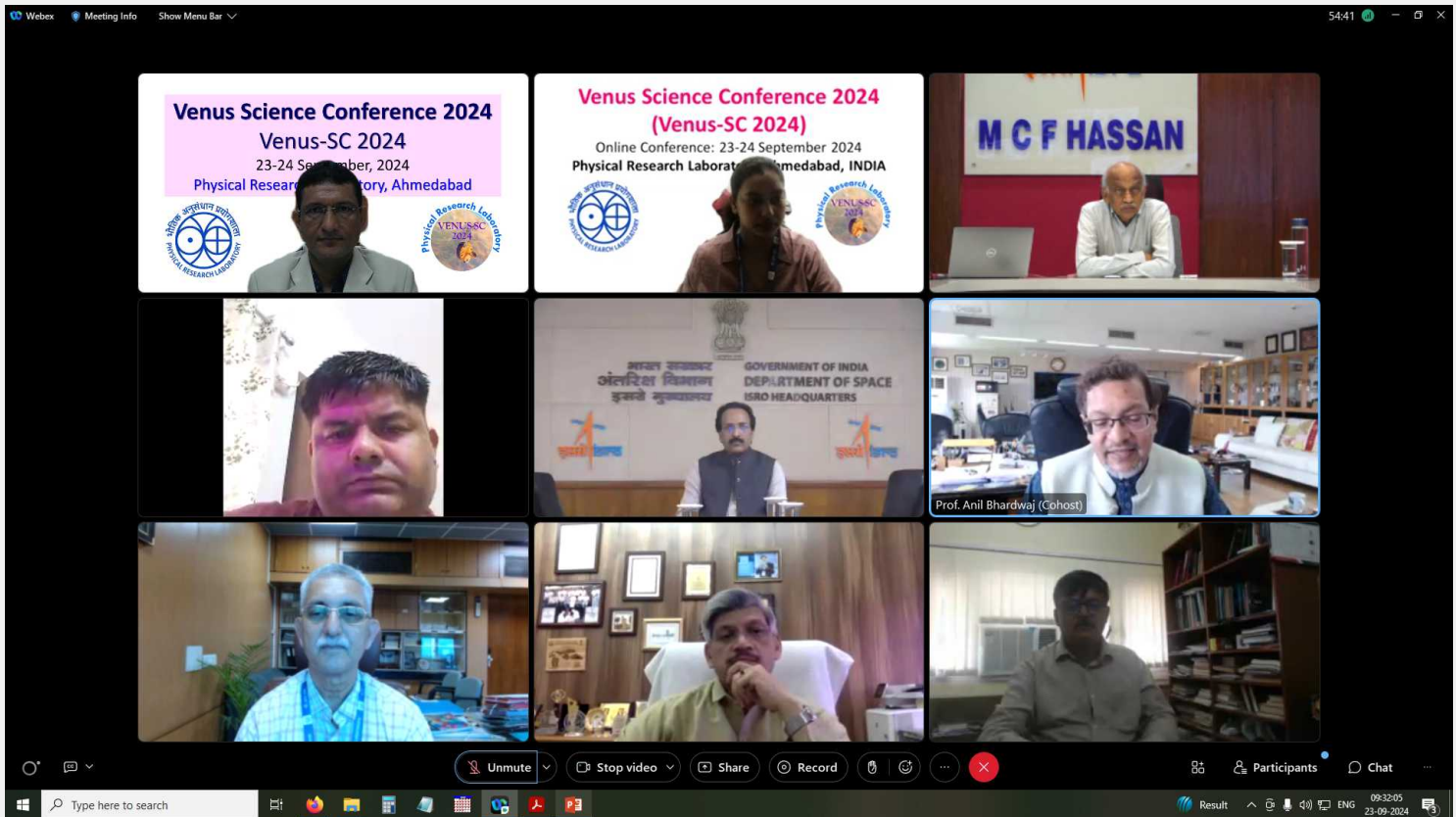
Planetary scientists have been exploring various planets like Venus, Mars, Jupiter, Saturn etc. for many decades and made a good progress in the field. Though, Venus, the sister planet of Earth, has been explored for a long duration, it is yet not understood fully. Many open research problems exist like evolution of Venusian surface, unknown UV absorber, lightning, super-rotation, meteoroid layer in lower ionosphere and space weather on Venus. The observations on Venusian science has been from the time of Venera in 1960s and many missions like Mariner, Pioneer Venus, Vega, Magellan, Venus Express, Akatsuki, IKAROS have provided lots of data to the community. In addition, other unintended missions like Galileo, Cassini, MESSENGER, Parker Solar Probe, BepiColombo and Solar Orbiter have also given flyby observations of Venus. The data analysis from the missions bring different scientific outcomes related to planet Venus and appear in the literature. Some conferences are organized over the globe to discuss the Venusian science, either within a planetary conference or as a dedicated conference.

Recently, the Physical Research Laboratory (PRL) has organised the FOURTH conference on Venus Science, Venus-SC 2024 (online) during 23-24 September 2024 IST. It focused on modelling, observations, data analysis, conceptual instrument design and scientific experiments for Venus exploration. The major research areas covered in the conference were surface, atmosphere, lightning, habitability, ionosphere, interplanetary dust, and solar wind interaction with the planet. Such gathering provides an opportunity to interact among the community over the globe and also, collaborate with people working in similar fields over a period of time.

Formally 180 delegates had registered for the conference, which included speakers for oral presentations, short oral presentations and other attendees. The oral presentations had 28 talks from universities/institutes within and outside India. The short oral presentations have 26 talks from India and outside institutions. A few examples of the talks are geological history of Venus, Sedimentary Process, mafic dyke, Akatsuki Radio Science Results, effect of magnetic fields, Microorganisms, general circulation, Lightning and its effect on chemistry, Heterogeneous Aerosols, Observations of Venus' O₂ Airglow and interplanetary dust in inner Solar system. This year, we have included dedicated time slots in each session for the scientific discussions among the domain experts. The panellists have suggested different science questions which should be addressed by future Venus Orbiter mission.

Those who attended the conference from outside of India included universities/institutes from places like US, UK, Japan, Sweden, Taiwan, Russia, Canada etc. The centres/institutes from within India covered SAC, SPL, PRL, CHARUSAT, Amity Uni., NARL, PSG College, IIT, Mahatma Gandhi College, University of Delhi etc. The Venus Science Conference included speakers spanning 4 time zones.

Honourable Dr. S. Somnath, Chairman ISRO & Secretary DOS as well as honourable Shri A. S. Kiran Kumar (Council Chair, PRL) had graced the inaugural session. There were 6 sessions covering all mentioned research areas. The session chairs were well experienced in the domain and they were from various ISRO/Non-ISRO centres. There was a concluding session at the end of the conference. Many people including Prof. Anil Bhardwaj (Director, PRL), Prof. D. Pallamraju (Dean, PRL), the SOC and LOC members, IT team,



Glimpses of the Event



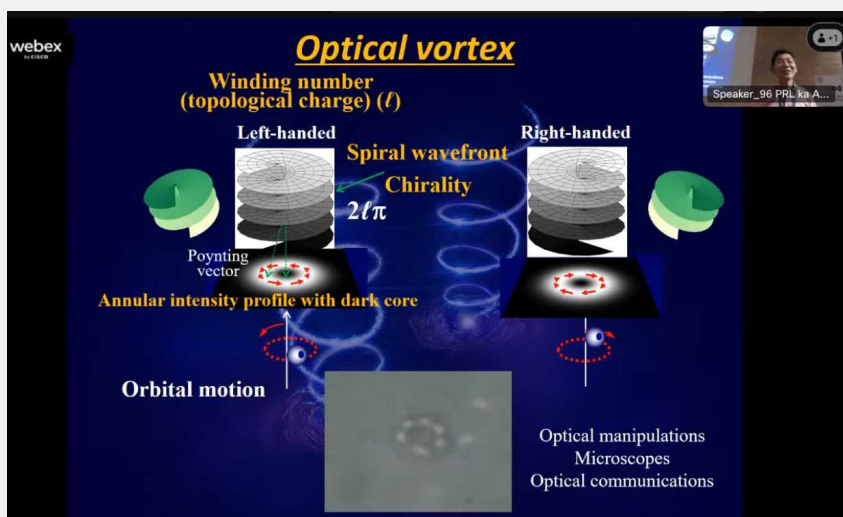
PRL Ka Amrut Vyakhyaan



The 96th PRL Ka Amrut Vyakhyaan was delivered by Prof. Takashige Omatsu, Director of the Molecular Chirality Research Center, Chiba University, Japan, on September 25, 2024. He delivered the Vyakhyaan on light matter interactions, titled “Structured Light for Materials Science”.

Prof. Omatsu's talk explored exciting advances in the field of photonics, focusing on how specially structured light can interact with materials in fascinating ways. These structured light beams, such as scalar and vector vortices, have unique properties, including spiral-shaped wavefronts that allow them to carry orbital angular momentum. Their unique structure makes them useful for applications like optical tweezers, high-speed communication systems, super-sharp microscopes, and precise material fabrication. One of the remarkable discoveries is how these light beams can twist materials at very small scales, creating intricate chiral (twisting) patterns. These patterns have opened new possibilities for designing advanced materials with unique properties, like those used in high-tech manufacturing and nanotechnology. Prof. Omatsu also discussed an exciting new concept: optical skyrmions. Inspired by skyrmions in magnetism, optical skyrmions are light patterns with complex, topologically protected polarization structures. These optical "quasiparticles" are being studied for their potential in revolutionary technologies, such as robust communication in turbulent environments, ultra-precise polarization measurements, and microscopes capable of capturing details smaller than the wavelength of light. While creating and mapping these optical skyrmions is challenging due to their intricate 3D structures, ongoing research is making progress. Prof. Omatsu shared innovative methods for manipulating materials with these advanced light patterns, demonstrating how this research combines fundamental science with real-world applications. His talk inspired the audience with the possibilities of structured light and optical skyrmions, sparking excitement for future breakthroughs in materials science and optical technology. His talk was both illuminating and inspiring, leaving the attendees energized and deeply enthusiastic about the subject.

YouTube Link: <https://youtube.com/live/PUJXnHp8Wqk?feature=share>





Student Conference on Optics and Photonics (SCOP) -2024 (25th-27th September, 2024)



In a spectacular convergence of knowledge and inspiration, the Physical Research Laboratory Student chapter recently hosted an unforgettable 9th edition of Student Conference on Optics and Photonics (SCOP) 2024, that left an indelible mark on attendees. The "SCOP-2024" held from 25-27 September 2024, welcomed an array of leading experts, researchers, and students in the field of optics and photonics, creating an electrifying atmosphere of knowledge and innovation. The conference provided an excellent platform for academic exchange, and collaboration, with sessions focusing on emerging research and practical applications.

The conference began with an inspiring inaugural session, graced by esteemed figures, PRL Director, Prof. Anil Bhardwaj; Dean, Prof. D. Pallamraju; and Registrar, Prof. R.D. Deshpande; along with all distinguished guests, faculty members, and participants from across India and abroad. The opening remarks were delivered by the organizing committee, followed by a keynote address by the Director of PRL, who emphasized the pivotal role of optics and photonics in driving technological advancements.



Day 1: Welcome of all participants to SCOP

The heart of the conference was a series of invited talks by prominent speakers, covering a wide range of topics, including quantum optics, photonic crystals, ultrafast spectroscopy, nanophotonics, biophotonics, optical materials, and optical communication. Each speaker provided insights into cutting-edge research, fostering lively discussions with the audience. The presentations ignited interest in future collaborations, particularly among young researchers. A key highlight was the diversity of topics, seamlessly blending fundamental theories with real-world applications.

A major highlight of SCOP 2024 was the 96th PRL Ka Amrut Vyakhyan, a prestigious lecture by Prof. Takashige Omatsu, Director, Molecular Chirality Research Center, Chiba University, Japan. The lecture not only celebrated PRL's rich legacy in research but also inspired participants to explore the frontiers of optical science.



Glimpses of 96th PRL Ka Amrut Vyakhyan

An interactive poster session was held to provide participants, especially students, with the opportunity to present their research. Participants actively discussed their work with peers and experts, gaining valuable feedback to improve their ongoing research projects.

On Day 2, an interactive panel discussion focused on “How Research in Academia and Industry Contributes to Everyday Science”, inviting experts from academia, industry, and government sectors. The session addressed practical aspects such as funding opportunities, career paths, and emerging areas in photonics research. The discussion was particularly engaging, with students posing insightful questions about future career prospects.



Day 2: Panel Discussion and interactive

The conference concluded on Day 3 with a formal closing session, during which the organizing committee summarized the key takeaways from the event. Certificates of participation were distributed, and the best poster presentations were recognized with awards. The attendees expressed their gratitude to the organizing team for the smooth execution of the event. The concluding remarks emphasized the importance of maintaining the momentum created by SCOP 2024 and continuing collaborations initiated during the conference.



Overall, SCOP 2024 was a resounding success, fostering meaningful discussions and collaborations in the optics and photonics community. Participants left the event energized to pursue new ideas and strengthen the research ecosystem in optics and photonics.



Day 3: Closing Ceremony; a group photo of organizing team and all the attendees

Link for SCOP Website: <https://prlstudentchapter.org.in/>

Link for abstract book of SCOP 2024:

https://drive.google.com/file/d/1mZC3ZThgwVQihJ91JUPaTZ2B9P9lCs8_/view

सोलहवा पीआरएल अमृत राजभाषा व्याख्यान (पर्व)



"पीआरएल अमृत राजभाषा व्याख्यान (पर्व)" का 16वां व्याख्यान 27 सितंबर, 2024 को आयोजित किया गया। इस अवसर पर मुख्य वक्ता श्री एम.जी. सोमशेखरन नायर, संयुक्त निदेशक (राजभाषा), इसरो मुख्यालय/अंतरिक्ष विभाग, बेंगलुरु थे। यह हिंदी-माह के उपलक्ष्य पर विशेष व्याख्यान था।

The 16th lecture of "PRL Amrut Rajbhasha Vyakhyaan (PARV)" was held on September 27, 2024. The eminent speaker for the occasion was Shri. M.G. Som Shekharan Nair, Joint Director (Official Language), ISRO Head Quarters/Department of Space, Bengaluru. This was Hindi-Maah special vyakhyaan.

श्री एम.जी. सोम शेखरन नायर ने वर्ष 1998 में वीएसएससी, तिरुवनंतपुरम में कनिष्ठ हिंदी अनुवादक के रूप में अपना करियर शुरू किया। उन्होंने हिंदी भाषा में स्नातकोत्तर, बी.एड. और अनुवाद में स्नातकोत्तर डिप्लोमा किया है। उन्होंने विभिन्न संगोष्ठियों में राजभाषा के विभिन्न पहलुओं पर कई व्याख्यान भी दिए हैं और 'इसरो की कार्य संस्कृति' और 'अंतरिक्ष और उसके परे' पुस्तकों के अनुवाद कार्य में विशेष सहयोग भी दिया है। राजभाषा हिंदी के कार्यान्वयन में उनका व्यापक अनुभव है।

Shri M.G. Som Shekharan Nair started his career in the year 1998 as Junior Hindi Translator in VSSC, Thiruvananthapuram. He has done Masters in Hindi language, B.Ed. and Post Graduate Diploma in Translation. He has also delivered many talks on various aspects of the Official Language in various seminars and has also provided special support in the translation work of the books 'Working Culture of ISRO' and 'Space and Beyond'. He has a vast experience in the implementation of the Official Language Hindi.

व्याख्यान का शीर्षक था The lecture was titled "राष्ट्र के समग्र विकास में स्वभाषा की भूमिका"। व्याख्यान के दौरान श्री नायर ने बताया कि दुनिया के सभी देश समाज, विज्ञान, शिक्षा आदि किसी भी क्षेत्र में व्यवहार के लिए अपनी भाषा का प्रयोग करते हैं। यह प्रवृत्ति न केवल देशवासियों को अपने लक्ष्य प्राप्ति में सहायक होती है, बल्कि सामरिक दृष्टि से भी देश की सुरक्षा सुनिश्चित करने में असाधारण योगदान देती है। किसी भी देश के समृद्ध होने के लिए उसका शक्तिशाली और आर्थिक रूप से सशक्त होना तो जरूरी है ही, लेकिन उसके सांस्कृतिक और साहित्यिक पहलू भी उतने ही महत्वपूर्ण हैं। बदलते वैश्विक राजनीतिक परिवेश में हर देश अपनी पहचान की रक्षा के लिए आत्मनिर्भर बनने की होड़ में लगा हुआ है।



During the Vyakhyaan, Mr. Nair explained that all countries in this world, use their own language for dealing in any field like Society, Science, Education etc. This trend not only helps the countrymen in achieving their goals, but from the strategic point of view it also makes an extraordinary contribution in ensuring the security of the country. For a country, to be rich and prosperous, it is important to be powerful and economically strong, but its cultural and literary aspects are also equally important. In the changing Global Political Environment, every nation is in a race to become self-reliant to protect its identity.

उन्होंने यह भी बताया कि कुछ विश्वविद्यालयों में व्यावसायिक पाठ्यक्रम अब भारतीय भाषाओं में पढ़ाए जा रहे हैं। कुछ शोध पत्र और पीएच.डी. भी भारतीय भाषाओं में किए जा रहे हैं। हालाँकि, स्थिति को सही मायने में बदलने के लिए गहन, व्यापक और ठोस प्रयास की आवश्यकता है।

He also mentioned that professional courses are now being taught in Indian languages at certain universities. Some research papers and Ph.Ds are being conducted in Indian languages as well. However, to truly transform the situation, a thorough, extensive, and concerted effort is necessary.

व्याख्यान के बाद एक चर्चात्मक प्रश्नोत्तर सत्र हुआ, जिसमें श्रोताओं को विषय पर नए दृष्टिकोण और अतिरिक्त जानकारी दी गई।

After the Vyakhyaan, there was an interactive Q&A session that gave the audience a fresh perspectives and extra details on the topic.

हिंदी कार्यशाला - अप्रैल-जून 2024 Hindi Workshop - April-June 2024

भारत सरकार, राजभाषा विभाग के नियम एवं अंतरिक्ष विभाग के निर्देशों के अनुसार प्रत्येक तिमाही में पी.आर.एल. में हिंदी कार्यशाला का आयोजन किया जाता है। इस श्रृंखला में, जुलाई-सितंबर 2024 तिमाही में 30 सितंबर 2024 को 1600 बजे से 1715 तक ऑनलाइन कार्यशाला आयोजित की गई थी। इस हिंदी कार्यशाला में प्रशिक्षक श्री प्रदीप कुमार शर्मा, वरिष्ठ प्रशासनिक अधिकारी थे। इसमें पी.आर.एल. के वेतन लेवल-4 से वेतन लेवल-8 तक के कार्मिकों एवं पीआरएल में शामिल हुए नवीन सदस्यों (सभी लेवल) एवं कार्यालय प्रशिक्षुओं को हिंदी के नियम तथा नोटिंग, ड्राफ्टिंग एवं संपर्क कौशल संबंधी प्रशिक्षण दिया गया। इस कार्यशाला में प्रशिक्षण प्राप्त करने पर सदस्यों को हिंदी के नियमों के अनुसार कार्यालयीन कार्य करने में सुगमता आएगी। कार्यशाला के आरंभ में श्रीमती रुमकी दत्ता, सहायक निदेशक (रा.भा.) द्वारा राजभाषा नियमावली, कार्यान्वयन संबंधी पहलुओं पर लघु चर्चा की गई। इस कार्यशाला में कुल 66 सदस्यों (स्थायी 39 एवं प्रशिक्षु 27) को नामित किया गया था।

As per the Rules of the Department of Official Language, Government of India and the instructions of the Department of Space, Hindi workshop is organized every quarter in PRL. In this series, an online workshop was organized on 30 September 2024 from 1600 hrs to 1715 hrs for the quarter July-September 2024. Shri Pradeep Kumar Sharma, Senior Administrative Officer was present as the faculty in this Hindi workshop. In this, PRL members from Pay Level-4 to Pay Level-8 and new members (all levels) and office trainees who joined PRL were imparted training on Official Language Rules, Noting, Drafting and communication skills. On receiving training in this workshop, members will be able to do office work as per the rules of Hindi. At the outset, a brief discussion on Official Language Rules and implementation related aspects was done by Smt. Rumkee Dutta, Assistant Director (O.L.). A total of 66 members (39 permanent and 27 trainees) were nominated in this workshop.

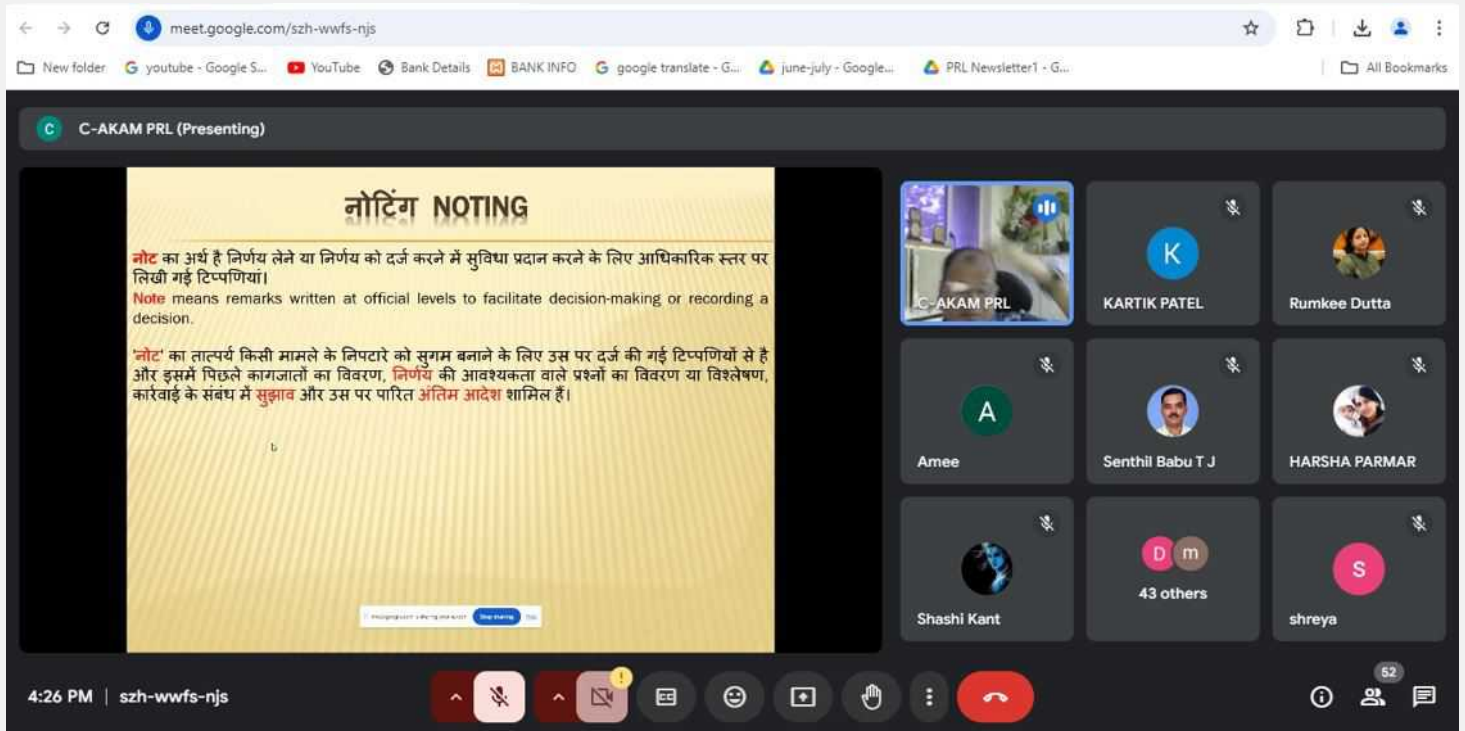


संचार नोटिंग और प्रारूपण
Communication Noting & Drafting

प्रस्तुति : प्रदीप कुमार शर्मा
Presented by : Pradeep Kumar Sharma

मैं जानता हूँ कि आप समझते हैं कि मैंने क्या कहा, लेकिन मुझे यकीन नहीं है कि आपने जो सुना वह वह नहीं था जो मैं कहना चाहता था। "I know that you believe you understand what you think I said, but I am not sure you realize that what you said is not what I meant!"
Quote from a U.S. government official

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C-AKAM PRL (Presenting)

नोटिंग NOTING

नोट का अर्थ है निर्णय लेने या निर्णय को दर्ज करने में सुविधा प्रदान करने के लिए आधिकारिक स्तर पर लिखी गई टिप्पणियाँ।
Note means remarks written at official levels to facilitate decision-making or recording a decision.

'नोट' का तात्पर्य किसी मामले के निपटारे को सुगम बनाने के लिए उस पर दर्ज की गई टिप्पणियों से है और इसमें पिछले कागजातों का विवरण, निर्णय की आवश्यकता वाले प्रश्नों का विवरण या विश्लेषण, कार्रवाई के संबंध में सुझाव और उस पर पारित अंतिम आदेश शामिल हैं।

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Participants: C-AKAM PRL, KARTIK PATEL, Rumkee Dutta, Amee, Senthil Babu T J, HARSHA PARMAR, Shashi Kant, 43 others, shreya

कार्यशाला की कुछ झलकियां

PRL Monthly Publications Digest**Astronomy & Astrophysics Division [2]**

1. Namita Uppal, Shashikiran Ganesh, Vincent Pelgrims, Santosh Joshi and Mrinmoy Sarkar, 2024, Linear polarization study of open clusters in the anticenter direction: Signature of the spiral arms, *Astronomy & Astrophysics*, Date of Publication: 27/09/2024, Impact Factor: 5.4
2. W. J. Cooper, H. R. A. Jones, R. L. Smart, S. L. Folkes, J. A. Caballero, F. Marocco, M. C. Gálvez Ortiz, A. J. Burgasser, J. D. Kirkpatrick, L. M. Sarro, B. Burningham, A. Cabrera-Lavers, P. E. Tremblay, C. Reyle, N. Lodieu, Z. H. Zhang, N. J. Cook, J. F. Faherty, D. García-Álvarez, D. Montes, D. J. Pinfield, A. S. Rajpurohit, J. Shi, 2024, The Gaia Ultracool Dwarf Sample – IV. GTC/OSIRIS optical spectra of Gaia late-M and L dwarfs, *MNRAS*, Date of Publication: 06/09/2024, Impact Factor: 4.8

Atomic Molecular and Optical Physics Division [3]

1. J. Karthein, C. M. Ricketts, R. F. Garcia Ruiz, J. Billowes, C. L. Binnersley, T. E. Cocolios, J. Dobaczewski, G. J. Farooq-Smith, K. T. Flanagan, G. Georgiev, W. Gins, R. P. de Groote, F. P. Gustafsson, J. D. Holt, A. Kanellakopoulos, Á. Koszorús, D. Leimbach, K. M. Lynch, T. Miyagi, W. Nazarewicz, G. Neyens, P.-G. Reinhard, B. K. Sahoo, A. R. Vernon, S. G. Wilkins, X. F. Yang and D. T. Yordanov, 2024, Electromagnetic properties of indium isotopes illuminate the doubly magic character of ^{100}Sn , *Nat. Phys.* (2024); <https://doi.org/10.1038/s41567-024-02612-y>, Date of Publication: 30/09/2024, Impact Factor: 19.684
2. Saurav Dutta, Nihar Ranjan Behera, Saroj Barik, Rajesh Kumar Kushawaha, Y. Sajeew, G. Aravind, 2024, Bimolecular photodissociation of interstellar 1-Cyanonaphthalene via Intermolecular Coulombic decay, *Journal of Chemical Physics*, Date of Publication: 23/09/2024, Impact Factor: 3.6
3. Malika Singhal, Madhusmita Panda, S.H. Shinde, Sandip Mondal, O. Annalakshmi, Naveen Chauhan, 2024, STUDY OF THERMOLUMINESCENCE CHARACTERISTICS OF QUARTZ FOR HIGH RADIATION DOSES (>1KGY): IMPLICATIONS FOR EXTENDING THE LUMINESCENCE DATING RANGE, *Radiation Measurements*, Date of Publication: 18/09/2024, Impact Factor: 1.6

Geosciences Division [5]

1. Priyanka Singh, Vijayananda Sarangi, Ravi Bhushan, S Nawaz Ali, Shailesh Agrawal, Pooja Tiwari, Masud Kawsar, Rajesh Agnihotri, Prasanta Sanyal, Kamlesh Kumar, Biswajeet Thakur, M C Manoj, Veerukant Singh, Ankur Dabhi, Anupam Sharma, Kuldeep Prakash and P Mortheikai, 2024, Presence and implications of petrogenic organic carbon in High Himalayan Crystalline lake sediment, *Radiocarbon*, Date of Publication: 26/09/2024, Impact Factor: 4.6

2. Vineet Goswami, Judith L. Hannah, Holly J. Stein, Per Ahlberg, Jörg Maletz, Frans Lundberg, Jan Ove R. Ebbestad, 2024, Re-Os geochronology and geochemical evolution of late Cambrian to Middle Ordovician Alum and Tøyen shales, Sweden, Global and Planetary Change, Date of Publication: 13/09/2024, Impact Factor: 4.0

3. M. Atif Khan, Sanjeev Kumar, Rajdeep Roy, Satya Prakash, Aneesh Lotliker, S. Baliarsingh, 2024, Tidal scale dissolved inorganic and particulate organic carbon dynamics in a tropical estuary, Marine chemistry, Date of Publication: 10/09/2024, Impact Factor: 3.0

4. Pradeep Attri, Devleena Mani, Siddhartha Sarkar, Sanjeev Kumar, Prashant Hegde, 2024, Stable isotope compositions, source apportionment and transformation processes of carbonaceous aerosols in PM₁₀ in the urban city of Hyderabad, India, Urban Climate, Date of Publication: 07/09/2024, Impact Factor: 6.0

5. Joshi, S., Rastogi, N., and Singh, A, 2024, Insights into the formation of secondary organic aerosols from agricultural residue burning emissions: A review of chamber-based studies, Science of The Total Environment, Date of Publication: 06/09/2024, Impact Factor: 8.2

Space & Atmospheric Sciences Division [2]

1. Kamran Ansari, S. Ramachandran, 2024, Global changes in aerosol single scattering albedo during COVID-19, Atmospheric Environment, Date of Publication: 15/09/2024, Impact Factor: 4.2

2. Tatsuhiro Yokoyama, Jeffrey Klenzing, Marco A. Milla, Claudia Stolle & Duggirala Pallamraju, 2024, Special issue "16th International Symposium on Equatorial Aeronomy (ISEA-16), 2022", Earth, Planets, and Space, Date of Publication: 02/09/2024, Impact Factor: 3.0

Planetary Sciences Division [2]

1. S Vijayan, KB Kimi, Anil Chavan, R Aditi, U Thahira, V Rama Subramanian, Rishitosh K Sinha, Santosh Vadawale, M Shanmugam, NPS Mithun, Arpit R Patel, S Amit Basu, KV Iyer, K Suresh, Ajay Prashar, G Rima, Anil Bhardwaj, 2024, Chandrayaan-3 landing site evolution by South Pole-Aitken basin and other impact craters, Icarus, Date of Publication: 24/09/2024, Impact Factor:

2. K. Durga Prasad and G. Ambily, 2024, Effect of COVID-19 global lockdown on our Moon, Monthly Notices of the Royal Astronomical Society: Letters, Date of Publication: 18/09/2024, Impact Factor: 4.8

Theoretical Physics Division [5]

1. Anupam Ghosh, Partha Konar , 2024, Unveiling desert region in inert doublet model assisted by Peccei-Quinn symmetry, JHEP 09 (2024) 104, Date of Publication: 18/09/2024, Impact Factor: 5
2. Saumyen Kundu, Sudipta Show, Partha Konar, Prasanta Kumar Das , 2024, Jet substructure probe to freeze-in dark matter in alternative cosmological background, The European Physical Journal Special Topics (EPJ ST) (2024), Date of Publication: 16/09/2024, Impact Factor: 2.6
3. Akanksha Bhardwaj, Partha Konar, Vishal S. Ngairangbam, 2024, Foundations of automatic feature extraction at LHC – point clouds and graphs, The European Physical Journal Special Topics (EPJ ST) (2024), Date of Publication: 11/09/2024, Impact Factor: 2.6
4. Namit Mahajan, Dayanad Mishra, 2024, , Phys. Rev. D 110, 053003 (2024), Date of Publication: 05/09/2024, Impact Factor:
5. Labh Singh, Monal Kashav and Surender Verma, 2024, Minimal type-I Dirac seesaw and leptogenesis under A4 modular invariance, Nuclear Physics B, Date of Publication: 02/09/2024, Impact Factor: 2.5

Awards & Honours

Ms. Malika Singhal, SRF, Atomic, Molecular and Optical Physics division of PRL has received The Best Oral Presentation Award in the "UK Luminescence and electron Spin Resonance Dating Meeting (UKLum-2024)" held at Oxford, UK during 11-13 September 2024.

Dr. Suryansh Dongre, PDF, Atomic, Molecular and Optical Physics Division of PRL has received The Best Oral Presentation Award at the "International Conference on Next-Generation Materials and devices (ICNMD-2024)" organized by the Department of Physics, Kalasalingam Academy of Research and Education, Srivilliputtur, Tamilnadu during 01 to 03 August 2024

Ms. Shreya Mehta, SRF, Geosciences Division of PRL has received The Best Poster Presentation Award at the national conference on "Women in Geosciences: Opportunities, Challenges and accomplishments" organized by National Center for Earth Science Studies (NCESS), Ministry of Earth Sciences Govt. of India, Thiruvananthapuram during 02-04 September 2024.

Visitors

1. **Mr. Christopher Francis Paul Park** from School of Earth and Planetary Science, Curtin University, Perth, Australia visited PRL on 03.09.2024 for scientific discussion to explore potential collaboration with PRL & interactions with Scientists and Research Scholars.
2. **Mr. Douglas Adam** from Elemental Scientific Lasers, United Kingdom visited PRL during 09.09.2024 to 13.09.2024 in connection with repair and servicing of the Femtosecond Laser Ablation System.
3. **Prof. Saurabh Basu** of Indian Institute of Technology, Guwahati visited PRL, Ahmedabad on 18.09.2024 for delivering a talk.
4. **Mr. Omatsu Takashige** from Molecular Chirality Research Centre, Chiba University, Japan visited PRL during 24.09.2024 to 27.09.2024 in connection with Scientific discussion and interaction with PRL Scientists and Research Scholars.
5. **Dr. Andreyev Oleksiy** of Ms. RAITH BV, Netherlands visited PRL from 24.09.2024 to 10.10.2024 in connection with installation of Ultra High Resolution Electron Beam Lithography System and impart of training to the concerned staff.
6. **Dr. Ranadeep Sarkar**, Postdoctoral Fellow from Space Physics Department, University of Helsinki visited Udaipur Solar Observatory on 30.09.2024 to deliver a talk.
7. **Fifteen persons** visited Mount Abu Observatory during September 2024.

Hearty welcome to our new members



NAME: DR. ALOK KUMAR RANJAN

DESIGNATION: POST DOCTORAL FELLOW

DATE OF JOINING: 17.09.2024

DIVISION/AREA: SPACE & ATMOSPHERIC SCIENCES
DIVISION



NAME: DR. SIBIN SEBASTIAN

DESIGNATION: POST DOCTORAL FELLOW

DATE OF JOINING: 18.09.2024

DIVISION: GEOSCIENCES DIVISION



NAME: MS. AASTHA KUMAYU

DESIGNATION: PROJECT ASSOCIATE-I-JC-BOSE-
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DATE OF JOINING: 19.09.2024

DIVISION: PLANETARY SCIENCES DIVISION



NAME: MS. TANUSHREE KAR

DESIGNATION: PROJECT ASSOCIATE-I-JC-BOSE-
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DATE OF JOINING: 23.09.2024

DIVISION: PLANETARY SCIENCES DIVISION

Superannuation



Name of the employee Dr. R. D. Deshpande

**Designation at the time of
superannuation** Senior Professor

Date of Birth 29.09.1964

Date of Joining PRL 21.02.1989

Date of Superannuation 30.09.2024

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