



Newsletter of the Physical Research Laboratory

THE SPECTRUM



Image of the Month

The location of the Lal, Mursan, and Hilsa craters on the Mars discoverd by PRL Scientists

June-July 2024



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Josephson diode effect in Superconductor/Quantum dot/Superconductor junction

The Author



Debika Debnath

(Debika Debnath, Paramita Dutta)

Unidirectional operation mechanisms have made diodes an inevitable part of modern electronic devices. Starting from the semiconductor diodes, there has been recent development of superconducting (SC) diodes where the dissipationless nonreciprocal current flows. Unlike the semiconductor diodes, where the source of the unidirectional current is the voltage bias, a SC phase difference driven current flows through the SC/quantum dot (QD)/SC junction and forms a Josephson diode (JD). The principal mechanism of getting the JD effect lies in breaking two symmetries of the system, (i) inversion symmetry (IS) and (ii) time-reversal symmetry (TRS). In our model JD, we have considered the intrinsic Rashba spin-orbit interaction in the QD which breaks the IS of the system. Whereas, application of an external magnetic field breaks the symmetry of the up and down spin electrons in the system, that causes the TRS breaking. Using the nonequilibrium transport mechanism of the Keldysh Green's function we have calculated the Josephson current and our result shows a large nonreciprocity in the forward (IC+) and reverse current (IC-) through the junction. We have also shown that by using a gate-voltage in the QD, we can highly tune the rectification coefficient of the diode. We have also find that by changing the Rashba interaction coefficient, magnetic field and the gate potential, it is also possible to change the direction of the current flow through the junction. Therefore, our proposed JD model has the potential to be used as a SC device.

Source/Reference of the Work:10.1103/PhysRevB.109.174511



(a) Model diagram of SC/QD/SC junction; (b) Rectification coefficient of the JD with respect to Rashba spin-orbit interaction coefficient for different magnetic fields



The Author



Rajiv R Bharti

International Astronomical Union named three craters after PRL Former Director and two small towns in India

(Rajiv R Bharti, Isaac Smith, Sanjay K. Mishra, Neeraj Srivastava, and Shital Shukla)

On the recommendation of the PRL, the International Astronomical Union (IAU) Working Group for Planetary System Nomenclature approved naming the three craters on Mars. These craters are situated in the Tharsis region on Mars. The details of these craters are as follows:

1. Lal crater: https://planetarynames.wr.usgs.gov/Feature/16288

It is about 65 km wide crater, centered at -20.98° and 209.34°.

The name is given after the renowned Indian geophysicist and former Director of PRL, Prof. Devendra Lal. He was the director of PRL from 1972 to 1983.

2. Mursan crater: https://planetarynames.wr.usgs.gov/Feature/16289

It is a ~10 km wide crater and superimposed on the eastern side of the rim of the Lal crater. It is named after a town in Uttar Pradesh, India (the birth place of Prof. Anil Bhardwaj, Director, PRL).

3. Hilsa crater: https://planetarynames.wr.usgs.gov/Feature/16290

It is also a ~10 km wide crater and superimposed on the western side of the rim of the Lal crater. It is named after a town in Bihar, India (the birth place of Mr. Rajiv Ranjan Bharti, Scientist/ Engineer-SE of the planetary science division).

Scientific importance:

The entire area of Lal crater, in the Tharsis volcanic region on Mars, is covered with lava. There are geophysical evidences of material other than lava in this crater, with a 45-m thick sedimentary deposit in the subsurface of the crater, obtained using subsurface radar SHARAD/ MRO. This discovery provides compelling evidence that the water has moved large volumes of sediment into the crater now named "Lal Crater". This finding also confirms that Mars was once wet and water has flown on the surface. Two small superimposed craters, on either side of the Lal Crater, named Mursan and Hilsa, provide the timeline for the infilling process of the Lal Crater and suggest that the infilling has been episodic.



The location of the Lal, Mursan, and Hilsa craters on the Mars





Identification of Earth's late accretion by large impactors through mass independent Cr isotopes

The Author

(**Yogita Kadlag**, Aryavart Anand, Mario Fischer-Gödde, Klaus Mezger, Kristoffer Szilas, Steven Goderis, Ingo Leya)



Yogita Kadlag

For a long time, scientists believed that the "late veneer" (the material that Earth accumulated in its initial stage of formation) was an important source of Earth's water and other gases. The type and makeup of the space objects that hit Earth can be studied by looking at certain elements and isotopes in rocks formed by impacts.

When studying Earth's mantle rocks (which are 3.8 billion years old or younger), scientists found specific values for certain chromium isotopes. Rocks created by large impacts (from objects over 50 km in size) between 3.4 billion and 66 million years ago had varying levels of these isotopes.

In the early Earth (more than 3 billion years ago), the objects that hit Earth were mostly similar to a type of meteorite called carbonaceous chondrites. Later, a mix of different meteorite types hit Earth. This change over time might be due to the breakup of different asteroid families.

The data shows that after 3 billion years ago, very little carbonaceous material (less than 0.01%) was added to Earth's mantle, meaning that these late impacts didn't

significantly contribute to Earth's water or other gases. A more technical account of this research can be found in the link provided below.

Source/Reference of the Work: https://doi.org/10.1016/ j.icarus.2024.116143





Sources and processes affecting the abundances of atmospheric NHx using $\delta {\rm 15N}$ over northwestern Indo-Gangetic plain

The Author



Chandrima Shaw

(Chandrima Shaw, Neeraj Rastogi, Ajayeta Rathi, Sanjeev Kumar, Rohit Meena)

Ammonia (NH3) is the primary component among all reactive nitrogen species in the atmosphere and is crucial for the formation of secondary inorganic aerosols. Recently satellite observations have identified the Indo-Gangetic Plain (IGP) as a significant global hotspot for NH3 emissions. However, the key sources and atmospheric processes influencing its concentration remain poorly understood. The present study was done in order to identify the sources of NH3 during winter at a semi-urban location in Patiala (30.3°N, 76.4°E, 249 m amsl) in the IGP, using stable isotopic signature of total nitrogen and NH4+ present in PM2.5 particles. In this study a noticeable diurnal variation in the stable isotopic signature of total nitrogen (δ_{15} N-TN) and ammonium (δ 15N–NH4+) was observed, although the average concentrations of TN and NH4+ were similar between day and night. A mixing model analysis of δ_{15} N–NH3 revealed that non-agricultural emissions (NH3 slip: 47 ± 24%) were the dominant source of atmospheric NH3, compared to agricultural emissions ($24 \pm 11\%$), combustion sources ($19 \pm 14\%$), and biomass burning (10 ± 8%). The study found minimal diurnal variation in NH3 source contributions. Additionally, $\delta_{15}N-NH4+$ showed a significant negative correlation with ambient relative humidity (RH) and daytime NO3--N concentration, suggesting the possibility of NH4NO3 volatilization during the day due to lower RH and higher temperatures. This process might lead to isotopic enrichment of the remaining NH4+ in the aerosol phase. This research, the first of its kind in India, underscores the importance of non-agricultural NH3 emissions in the agriculturally dominated IGP region and highlights the impact of local meteorological conditions on isotopic fractionation of δ_{15} N in aerosol NH4+.

Source/Reference of the Work: https://doi.org/10.1016/j.chemosphere.2024.142356



 δ^{15} N-based major sources of NH₃ over an agriculture dominated site in the Indo-Gangetic Plain





Discovery of a hot post-AGB star in Galactic globular cluster E3

The Author



Ranjan Kumar

(**Ranjan Kumar**, Ayush Moharana, Sonika Piridi, Ananta C. Pradhan, Krzysztof G. Helminiak, Natalia Ikonnikova, Alexander Dodin, Ryszard Szczerba, Mirek Giersz, Devendra K. Ojha, and Manash R. Samal)

Post-asymptotic giant branch (PAGB) stars are luminous supergiant stars of intermediate mass in a very late phase of stellar evolution. They are rarely found in GCs, due to their very short lifetime (less than 500,000 years), yet are very important for understanding the death throes of intermediate mass stars. We have discovered a new PAGB star in a Galactic globular cluster (GC) E3, one of the faintest and least massive (mass ~ 2,900 Msun) GC in the Milky Way galaxy, located some 32,600 light years away. This discovery was made by analysing the data from AstroSat's (AstroSat is India's first dedicated multi-wavelength space telescope. Astrosat satellite is a dedicated mission of ISRO on Astronomy) Ultraviolet Imaging Telescope (UVIT) and Gaia Space Observatory. The newly found PAGB star is about 4.61 times larger than the Sun, has a mass in the range of 0.51-0.55 Msun, and its effective temperature is ~17,500 K. The star has a metallicity of approximately -0.7 dex, in agreement with the cluster's metallicity, and turned out to be carbon and oxygen enriched. The radial velocities of the star show a variation of about 6 km/s between the two epochs of observation. This indicates a binary nature of the star, and simulations suggest a binary period of 39.12 or 17.83 days. The companion object is likely an evolved post-main sequence star with an estimated mass of 0.5-0.8 Msun. The observed carbon and oxygen abundances suggest that the star has undergone the so-called third dredge-up (3DU) process, in which a star brings up the processed materials to the surface through thermal pulses. Future multi-epoch spectroscopic observations are necessary to better constrain the binary nature of the star and its late stellar evolution.

Source/Reference of the Work: https://doi.org/10.1051/0004-6361/202449777





Figure Caption: (Left panel) UVIT F169M filter image of E3. The half-light and tidal radius of E3 (Rh = 2.1' and Rt = 8.49'), Harris 1996, 2010) are well within the field of view of UVIT. The red arrow indicates the probable post-AGB star. In the inset (upper right corner) the optical V-band image of the cluster (up to half-light radius) is shown. The PAGB star is easily distinguishable as one of the cluster's brightest stars in both images. (Right panel) BP–RP versus MG CMD in the absolute magnitude plane. The BaSTI-IAC isochrone of age 11 Gyr, [Fe/H] = -0.70 dex is overplotted as a red solid line. The zero-age HB (ZAHB) and terminal-age HB (TAHB) loci are shown as solid pink and dashed lines, respectively. The black dashed line shows different subcategories of PAGB and post-HB stars).



On Higgs + jet production at next-to-leading power accuracy

(Sourav Pal, Satyajit Seth)

The Author



Sourav Pal

The Standard Model (SM) of particle physics stands as one of the most successful theories, explaining nature at the fundamental scale. The precise theoretical calculations play an important role in discovering particles using the data obtained from the Large Hadron collider (LHC). The last missing piece of the SM, the Higgs boson, was discovered in 2012 at the LHC. Since then despite precise experimental data from the LHC, no compelling evidence has been found for particles beyond the SM.

This necessitates a better understanding of the already existing SM, such that any small deviation from the SM will indicate a discovery of new physics. At the LHC, strong force dominates over the other forces present in nature, which makes the study of theory of strong interaction (QCD) most important. Fixed order corrections by taking into account higher order perturbative terms in the strong coupling constant, and resummation including certain enhanced logarithms to all orders in the perturbation series are the two ways to ameliorate the theoretical accuracy. There are many different types of logarithms in a generic expression of a physical quantity, out of which leading power (LP) and next-to-leading power (NLP) logarithms are the most important object of studies. The LP logarithms have been studied in the literature for the last three decades, however, the NLP logarithms are comparatively less studied due to the complexities present in their calculation. In this work, we propose a new and simple method to calculate NLP corrections using the Spinor-Helicity technique and apply it for Higgs plus one jet production via gluon fusion at the LHC. The results presented in this paper will help in understanding the universal structure of the NLP logarithms and essentially will help in performing resummation to achieve percent-level accuracy of the theoretical predictions. The generalisation of the developed method for other processes and other channels are undergoing and will be published in the near future.

Source/Reference of the Work:

https://journals.aps.org/prd/abstract/10.1103/PhysRevD.109.114018





Optical and physical characteristics of aerosols over Asia: AERONET, MERRA-2 and CAMS

(Kamran Ansari and S. Ramachandran)



The Author

Kamran Ansari

Atmospheric aerosols exert a significant influence on the Earth's energy balance and climate. The large spatiotemporal variations, diverse sources, and shorter lifetimes result in aerosols being the largest contributor to uncertainty in quantifying the present climate and change, and this uncertainty is found to be higher over Asia. The future projection of the climate impact of aerosols over Asia may not be highly accurate due to limitations in simulating the observed aerosol trends and the non-availability of regional distribution of aerosol parameters based on high-quality observations on a seasonal scale. In this context, for the first time, a comprehensive study on the regional and spatial distributions of columnar aerosol characteristics utilizing highquality ground-based Aerosol Robotic Network (AERONET) datasets over Asia (including Central, South, South-East, and East Asia), along with spatiotemporal collocated validation of two high-spatially resolved models (Modern-Era Retrospective Analysis for Research and Applications-2 (MERRA-2) and Copernicus Atmosphere Monitoring Service (CAMS)), is conducted. Aerosol optical depth (AOD) is the highest over South Asia in each season, followed by South-East, East, and Central Asia. Combined influence of both fine mode anthropogenic aerosols and coarse mode dust aerosols from seasonal transport lead to higher AOD over South Asia with significant spatiotemporal variations. Over Asia, the CAMS model performs better than MERRA-2pcd for AOD. The underestimation in model simulated AODs is higher when AOD is high (more pollution). Biases in model AODs are higher over Asia compared to the other regions of the globe, and it is lower over North America, Europe, and Australia. These findings over a global aerosol hotspot region, along with other regions of the globe, are crucial for accurate simulation and fine-tuning of aerosol characteristics by regional and global models, and for reducing uncertainties in the assessment of radiative and climate impact of aerosols. Source/Reference of the Work: https://doi.org/10.1016/j.atmosenv.2024.120470



Figure: Selected observational sites over (a) Asia (43 sites) and (e) Rest of the world (20 sites: 4 sites in each region) are shown in the map. Regional variations in annual mean (b, f) aerosol optical depth (AOD), Ångström exponent (AE), fine mode fraction (FMF), (c, g) volume size distribution, and (d, h) fine and coarse volume fractions over Asia and Rest of the world, respectively.



Accretion properties of a low-mass active galactic nucleus: UGC 6728

The Author



Sachindra Naik

(Prantik Nandi, Sachindra Naik, A. Chatterjee, S. K. Chakrabarti, S. Safi-Harb, N. Kumari, and N. Layek)

Active Galactic Nuclei (AGNs) are the accreting super massive black holes (SMBH) of mass in the range of 10^{-5} - 10^{-9} M \odot , located at the centre of almost every galaxy. These are considered to be powerful sources (luminosity up to 10e48 erg/sec) in the Universe that emit in the entire range of the electromagnetic spectrum. The ultraviolet/optical photons originating from a thermal accretion disc are inverse Comptonized in the hot corona of relativistic electrons near the black hole and produce X-ray continuum emission. Therefore, X-ray emission from the AGNs is vital to probe the physical processes in extreme gravity. We carried out a comprehensive X-ray analysis of the AGN UGC 6728 for the first time, utilizing approximately 15 years of data from 2006 to 2021. Throughout this period, we observed significant variations in the X-ray luminosity of the source. The X-ray luminosity exhibits fluctuations on a yearly timescale, with a factor of approximately 2.4 variations observed in the 2016-2017 observations. This study encompasses both spectral and temporal aspects of this source. Our analysis revealed that UGC 6728 exhibits a bare nucleus, with no significant contribution from intrinsic hydrogen column density (NH) along the line of sight. The variability observed in the X-ray luminosity of the source is not attributed to the changes in NH, further confirming the bare nature of the nucleus. The spectral slope in the X-ray band shows systematic variation over time, indicating a transition from a relatively hard state to a comparatively soft state. We propose that these changes are driven by the underlying accretion dynamics around the central SMBH. Through spectral fitting using Two Component Advective Flow (TCAF) model (see figure), we estimate the mass of the central SMBH to be MBH = 7.13×10^{-5} M \odot , classifying UGC 6728 as a low-mass AGN. Furthermore, the high-energy X-ray photons in this source are likely generated through inverse Compton scattering of low-energy X-ray photons within the Compton cloud, highlighting a connection between emissions in these two energy ranges. A strong, soft excess component was observed during the initial phase of our observations, which substantially diminished over time. This variation in the soft excess is interpreted in the context of changes in the accretion dynamics around the SMBH.



Source/Reference of the Work: https://doi.org/10.1093/mnras/stae1529

Figure Caption: TCAF model fitted X-ray spectra of UGC 6728 from 2016 Swift and NuSTAR observations, along with the residuals obtained from the spectral fitting.





Deformation of the Gruithuisen region lava tube under compressional stress on the Moon

The Author

Kimi Khungree Basumatary

(K.B. Kimi, Harish, K.S. Sharini, Anil Chavan, and S. Vijayan)

Billions of years ago, molten rock flowed on the Moon's surface, known as lava flow. As this hot lava moved, the outer layer would cool and harden, while the inside remained molten and continued to flow. Eventually, the lava inside would drain away, leaving behind hollow tunnels. These tunnels are known as lava tubes. There are reported lava tubes on the Moon, one of which is located in the Gruithuisen region (~35 °N, 44 °W). The lava tube in the Gruithuisen region has unique shapes compared to others, ranging from curved channels to ellipses with raised features. This study focuses on the distinctive shapes of the lava tube in the Gruithuisen region. The findings suggest that as the Moon cooled and shrank over time, immense stress was placed on its crust, causing it to crack and fold, forming surface features known as wrinkle ridges. The same stress that created these wrinkle ridges also affected the lava tubes. Additionally, the gravitational pull of Earth contributed to the stress, squeezing and deforming the lava tubes into exceptional shapes.

The study of the deformed lava tube offers valuable insights into the powerful stresses that have shaped the Moon lava tube. The journey from a volcanic hotspot to a quieter, cooler body has been marked by numerous physical changes, each leaving its mark on the Moon's surface. This deformed lava tube is one such captivating story of the Moon's dynamic past, offering a glimpse into the processes that have shaped it into the Moon we see today

Source/Reference of the Work: https://doi.org/10.1130/G52143.1



Figure Caption: a) Geomorphological map of the Gruithuisen region (35 °N, 44 °W), displaying collapsed pits, raised features, potential eruptive vents, and wrinkle ridges. b) Close-up view of a chain of collapsed pits and raised features, and c) Collapsed pit-16 and raised features in LROC-NAC images. d) Aligned model 4 with pit 16.







The Author

Nurul Alam

SpaceCat: A Union Catalogue of DOS/ISRO Libraries

(Nurul Alam)

The Antariksh Gyaan Committee has handed over the responsibility of developing SpaceCat, a Virtual Union Catalogue for DOS/ISRO libraries to the PRL Library. The project's objective is to create a unified system to enhance resource sharing and accessibility across DOS/ISRO centers. To ensure metadata interoperability, the MARC standard for cataloging and indexing has been adopted.

Bibliographic data from DOS/ISRO centers were collected in MARC format for consistency. A comprehensive review of global union catalogue systems was conducted to identify best practices and suitable technologies.

Development Phases of SpaceCat:

• **Phase I:** Prototype instances were developed using Koha (version 22.11.10), integrating bibliographic data and undergoing initial testing.

• **Phase II**: VuFind (version 9.3) was installed and configured on a LAMP stack, offering a userfriendly discovery interface with advanced search features.

• **Phase III:** Koha was seamlessly integrated as the backend ILS and VuFind as the frontend DI, using direct database calls and KohaRest.

Demonstration and Testing: The prototype was presented to the Antariksh Gyaan Committee on October 13, 2023. Based on their recommendations, the system was redeployed on SpaceNET and underwent extensive testing. This approach ensures efficient access to and management of library resources across all DOS/ISRO centers, enhancing resource sharing and user interaction.

Prototype Development: A prototype Virtual Union Catalogue was developed on SpaceNET (10.201.1.31/vufind), providing centralized access, metadata aggregation, decentralized management, and a discovery service for simultaneous searches across multiple catalogs.

The feasibility report submitted to the Antariksh Gyaan Committee, DOS/ISRO confirms that developing a Union Catalogue for DOS/ISRO libraries is both viable and beneficial. By adopting common standards and leveraging open-source technologies like Koha and VuFind, the project can achieve its goals of enhanced resource sharing and improved accessibility.

SpaceCat Union Catalogue of ISRO/DOS Librar	ries	🚮 Login Language 🗸	SpaceCat Union Catalogue of ISRO/DOS Librar	ies		⊴ ितॉग इन करें भाषा v
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92nd PRL Ka Amrut Vyakhyaan (PKAV)



Deciphering the origin and evolution of our solar system from the chemical composition of 67P

Abstract of the Vyakhyaan



The 92nd PRL Ka Amrut Vyakhyaan was delivered by Prof. Kathrin Altwegg (An Emeritus Professor of the Department of Space Research and Planetology and the former director of the Centre for Space and Habitability, University of Bern) on 22nd May 2024. She delivered the Vyakhyaan on the origin and evolution of the solar system. The title of the talk was "Deciphering the Origin and Evolution of our Solar System from the Chemical Composition of 67P".

Understanding the Solar system's evolution is one of the fundamental facets of planetary sciences. Prof. Altwegg's Vyakhyaan encompassed the breathtaking journey of the European Space Agency's Rosetta spacecraft to comet 67P/ Churyumov-Gerasimenko and its investigation. As the project manager and co-investigator for the ROSINA instrument on Rosetta, she elucidated how Rosetta data led to many discoveries about the origin and processing of material in the early Solar System. ROSINA obtained fundamental properties of the comet by analysing the gases emanating from its nucleus. More than 100 parent molecules have been identified in the cometary coma, ranging from the highly volatile N2, Ar, CO and CH4 to semi-volatiles like NH4CI. Data taken during dusty periods around perihelion reveal a wealth of organic hydrocarbons, which includes pure and heteroatomic species like naphthalene and benzoic acid. The average elemental abundance of these organics compares very well with the Rosetta dust mass spectrometer COSIMA results, except for the higher H/C ratio, which implies a connection between these two reservoirs. Besides detecting many organic molecules and salts never seen in space, ROSINA could also measure isotopic abundances for noble gases, oxygen, and D/H in several molecules. Most isotopic ratios are non-solar, pointing to the heterogeneous nature of the protoplanetary disk. Some of the findings point to unprocessed ice from the prestellar stage, which allows us to study chemistry in the presolar cloud more or less "in situ". Prof. Altwegg concluded by describing how these findings can be compared to measured abundances from ISM to clouds to protoplanetary disks to understand the processes that finally led to planet formation and maybe life. Finally, she took questions and answered generously. Her talk was illuminating and generated lots of enthusiasm.



Available online at: https://www.youtube.com/watch?v=krSZ8lljiwc&t=3658s



12वां पीआरएल अमृत राजभाषा व्याख्यान (पर्व)

गजादीक अज्ञादीक अमत महोत्यव

पीआरएल अमृत राजभाषा व्याख्यान (पर्व)

PRL AMRUT RAJBHASHA VYAKHYAAN (PARV)







"पीआरएल अमृत राजभाषा व्याख्यान (पर्व)" का 12वां व्याख्यान 31 मई, 2024 को आयोजित किया गया। इस अवसर पर मुख्य वक्ता डॉ. नित्येश भट्ट, विभागाध्यक्ष और प्रोफेसर, सूचना प्रबंधन विभाग, निरमा विश्वविद्यालय अहमदाबाद थे। दिसंबर 2021 से उन्हें तीन वर्षों के लिए निरमा लिमिटेड चेयर प्रोफेसर इन मैनेजमेंट के रूप में मान्यता दी गई है। उन्होंने एम.एल. सुखाड़िया विश्वविद्यालय, भारत से एमबीए (मार्केटिंग) और पीएचडी (ई–गवर्नेंस) की डिग्री प्राप्त की है। उन्हें शिक्षा और कॉर्पोरेट प्रशिक्षण में 24 वर्षों से अधिक का अनुभव है।

व्याख्यान का शीर्षक था "उद्योग 4.0 का संक्षिप्त विवरण"।

डॉ. नित्येश ने व्याख्यान के दौरान बताया कि चौथी औद्योगिक क्रांति , जिसे उद्योग 4.0 के नाम से भी जाना जाता है, डिजिटल तकनीकों का एक संग्रह है जिसमें मानव अस्तित्व के हर पहलू को पूरी तरह से बदलने की शक्ति है। इसमें क्लाउड कंप्यूटिंग, रोबोटिक्स, ऑटोमेशन, बिग डेटा, रोबोटिक्स और आर्टिफिशियल इंटेलिजेंस जैसी आधुनिक तकनीकें शामिल हैं।

उन्होंने आगे बताया कि जब 4.0 को व्यवसायों पर लागू किया जाता है, तो ये तकनीकें वास्तविक समय में निर्णय लेने, उत्पादकता बढ़ाने, लचीलेपन को सक्षम बनाती हैं और हर पहलू यानी विनिर्माण, उत्पाद विकास, वितरण और अन्य औद्योगिक प्रक्रियाओं को सक्षम बनाती हैं। यह डेटा की तीव्र वृद्धि, निर्बाध कनेक्टिविटी, बहुआयामी विश्लेषण, मानव–मशीन इंटरैक्शन आदि सहित विघटनकारी रुझानों से प्रेरित है। व्याख्यान के बाद एक रोचक प्रश्नोत्तर सत्र आयोजित किया गया, जिससे श्रोताओं को विषय के बारे में नई अंतर्दृष्टि और अतिरिक्त जानकारी प्राप्त हुई।

The 12th "PRL Amrut Rajbhasha Vyakhyaan (PARV)" was held on May 31, 2024. The eminent speaker for the occasion was Dr. Nityesh Bhatt, Department Chair and Professor, Department of Information Management, Nirma University Ahmedabad. Since Dec. 2021, he has been recognized as Nirma Limited Chair Professor in Management for three years. He holds MBA (Marketing) & Ph.D (e-Governance) degrees from M.L. Sukhadia University, India. He has more than 24 years of experience in academia and corporate training.

The lecture was titled "उद्योग 4.0 का संक्षिप्त विवरण" .Dr. Nityesh explained during the talk that the Fourth Industrial Revolution (4IR), also known as Udyog 4.0, is a collection of digital technologies that have the power to completely alter every aspect of human existence. It encompasses modern technologies such as cloud computing, robotics, automation, big data, robotics, and artificial intelligence (AI). He further elaborated that when 4IR applied to businesses, these technologies enable real-time decision making, increased productivity, flexibility and enables every aspect i.e. manufacturing, product development, distribution, and other industrial processes. It is driven by disruptive trends including rapid growth of data, seamless connectivity, multi-dimensional analytics, human-machine interactions, etc. Following the lecture, there was an engaging Q&A session that provided the audience with new insights and additional information about the subject.



93rd PRL Ka Amrut Vyakhyaan (PKAV)



Radiation, nuclear energy and environment



The 93rd PRL Ka Amrut Vyakhyaan was delivered by Dr. Dinesh K. Aswal, (Director of health, safety and environment group of BARC), on 12th June 2024. He delivered the Vyakhyaan on the topic of nuclear energy and its importance on developing a sustainable world, titled "Radiation, nuclear energy and environment".

Nuclear energy is obtained from nuclear fission, nuclear decay and nuclear fusion reactions and has several socioeconomic benefits, but there are many negative myths that exist in the mind of common people in regard to its effect on the environment and life of living beings. Dr. Aswal started the Vyakhyaan the role nuclear energy could play for developing a sustainable world, India's position in the global scenario of Human Development Index (HDI) and how India could improve the HDI index using nuclear energy as a source of energy. He stresses that nuclear energy is a low-carbon clean energy and hence a reliable source of electricity compared to other sources of energy. He then discussed the pros and cons of nuclear energy, including the existing radiation protection philosophy, which is based on a linear no-threshold (LNT) model for cancer risk assessment. He stressed upon that the LNT model does not consider the adaptive response of biological systems, and has created unnecessary fear of radiation in public. Subsequently, he reviewed the past studies, scientific biases, ethical and moral challenges, nuclear fallout, and the development of international policies in regard to nuclear energy. He emphasised the role of nuclear energy in various beneficial effects related to health and societal growth of humankind. In particular, he stressed upon that there is a need to carry out extensive scientific studies (especially at low doses) and to move away from the LNT model to a more realistic Hormesis model, which suggests low doses of ionizing radiation are beneficial for biological tissues; thus have a positive role against diseases. His talk was illuminating on many aspects of nuclear energy.



Available online at: https://youtube.com/live/oOFLFJZ5wr4?feature=share



13वां पीआरएल अमृत राजभाषा व्याख्यान (पर्व)



पीआरएल अमृत राजभाषा व्याख्यान (पर्व)

PRL AMRUT RAJBHASHA VYAKHYAAN (PARV)





"पीआरएल अमृत राजभाषा व्याख्यान (पर्व)" का 13वां व्याख्यान 21 जून, 2024 को आयोजित किया गया। इस अवसर के मुख्य वक्ता श्री सिबा प्रसाद होता, रजिस्ट्रार, भारतीय प्रौद्योगिकी संस्थान,इंदौर थे।

ुश्री सिबा प्रसाद होता ने बेहरामपुर विश्वविद्यालय से बी.ए. किया है और उत्कल विश्वविद्यालय से एम.ए. और एम.फिल. की डिग्री प्राप्त की है। श्री सिबा प्रसाद होता ने 1998 में राष्ट्रीय रक्षा अकादमी (एनडीए), पुणे में व्याख्याता के रूप में

अपना कैरियर शुरू किया। वे मानव संसाधन प्रबंधन में राष्ट्रीय पर्यावरण इंजीनियरिंग अनुसंधान संस्थान (एनईईआरआई –सीएसआईआर), नागपुर में शामिल हुए और 2005 तक वहाँ सेवा प्रदान की। उन्होंने वर्ष 2012–14 तक अंतरिक्ष विभाग (डीओएस), अहमदाबाद के अंतर्गत भौतिक अनुसंधान प्रयोगशाला में वरिष्ठ क्रय एवं भण्डार अधिकारी के रूप में कार्य किया। उन्हें 1993 में पूर्व प्रधानमंत्री स्वर्गीय श्री पी.वी. नरसिम्हा राव द्वारा राष्ट्रीय सद्भावना युवा पुरस्कार से सम्मानित किया जा चुका है।

व्याख्यान का शीर्षक था"विश्व स्तरीय संस्थान निर्माण की कहानी: सीख और चुनौतियाँ"।

श्री सिबा प्रसाद ने व्याख्यान के दौरान बताया कि दुनिया भर में, हर देश विश्व स्तरीय संस्थानों का निर्माण करना चाहता है, क्योंकि ऐसे संस्थान मानव सभ्यता की आकांक्षाओं के प्रमाण हैं और आने वाली पीढ़ियों के लिए मार्गदर्शक प्रकाश स्तंभ के रूप में कार्य करते हैं। समय– समय पर भारत में भी शिक्षा, अनुसंधान और नेतृत्व के लिए ऐसे प्रतिष्ठित संस्थानों के निर्माण और विकास के प्रयास किए गए हैं। तक्षशिला और नालंदा जैसे महान संस्थान हमारी सामूहिक मानस और लोक–कथाओ का हिस्सा हैं।

उन्होंने आगे बताया कि कैसे "आईआईटी–इंदौर" अपनी अनूठी उपलब्धियों के साथ अपनी स्थापना के 16वें वर्ष में प्रवेश कर चुका है। यह इंजीनियरिंग के लिए सर्वश्रेष्ठ 15 राष्ट्रीय संस्थानों में से एक है और उच्चतम शोध प्रकाशनों के साथ वैश्विक स्तर पर शीर्ष 500 संस्थानों में भी शामिल है।

उन्होंने इस आयोजन के कई उपसमूहों द्वारा अपनाए गए जटिल मार्ग पर भी जोर दिया, जिसमें शिक्षाविद, भूमि अधिग्रहण, बुनियादी ढांचे और सुविधा निर्माण जैसे विषयों पर चर्चा की गई। इसके अतिरिक्त, यह प्रबंधन विधियों, मानवीय विशेषताओं और सामाजिक आउटरीच को दुनिया भर में फैलाने का एक प्रयास है जो वैश्विक रूप से मान्यता प्राप्त संस्थान के निर्माण में सहायक है।

व्याख्यान के बाद एक इंटरैक्टिव प्रश्नोत्तर सत्र आयोजित किया गया, जिसमें उपस्थित लोगों को विषय पर नए दृष्टिकोण और अतिरिक्त जानकारी दी गई।



The 13th "PRL Amrut Rajbhasha Vyakhyaan (PARV)" was held on June 21, 2024. The eminent speaker for the occasion was Mr. Siba Prasad Hota, Registrar, Indian Institute of Technology,Indore.

Shri Siba Prasad Hota has done B.A from Behrampur University and has obtained the degree M.A. and M.Phil. from Utkal University. Shri Siba Prasad Hota started his professional career in 1998 as a Lecturer at the National Defense Academy (NDA), Pune. He joined National Environmental Engineering Research Institute (NEERI- CSIR), Nagpur in Human Resource Management and served till 2005. He worked as Senior Purchase and Store Officer in Physical Research Laboratory under Department of Space (DOS), Ahmedabad from 2012-14. He has been awarded the National Sadbhavna Youth Award by former Prime Minister Late Shri P.V.Narasimha Rao in 1993.

Mr. Siba Prasad explained during the talk that around the world, every country wants to build world-class institutions, because such institutions are testament to the aspirations of human civilization and act as guiding beacons for future generations. Periodically, attempts have also been made to establish and grow similar esteemed establishments for learning, research, and leadership in India. Remarkable establishments like as Takshashila and Nalanda continue to be ingrained in our collective memory and customs.

He further elaborated that how "IIT-Indore" has entered its 16th year of establishment with its unique achievements. It is among the best 15 National Institutes for engineering and also among the top 500 institutes globally with highest research publications.

He also emphasized the intricate path taken by the event's several subgroups, which addressed topics including academics, land acquisition, infrastructure, and facility development. Additionally, it's an attempt to spread management methods, humanitarian features, and social outreach across the globe that go into building a globally recognised institution.

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



CNIT Division Nukkad - Chai Pe Byte on "MIS Report Generation Online Portal"

The 6th CNIT Division Nukkad – Chai Pe Byte on MIS Report Generation Online Portal was held on June 06, 2024. There were 42 participants attended the session. This session was specially organized for colleagues of Director's Office, Registrar's Office, Administration, Accounts, Stores & Purchase sections who require various types of day-to-day MIS report. In the session, 70% discussion was in Hindi and 30% discussion was in the English.

The main objective of the initiative "Chai Pe Byte" is to share the experiences & knowledge, understand users' IT related problems, find their possible solution and strengthen the overall bonding between CNIT Division and PRL colleagues, which in turn will improve the overall functioning of PRL IT services/facilities.

Mr. Atul Manke welcomed all participants and briefly explained the overall objective of this session. Ms. Srishti Sharma presented the online portal developed which provides various types of the reports which are required by different sections. She also demonstrated with live examples and shown how the portal generate different reports. The portal has given facility to download the report in different file formats like Txt, XIs, PDF, CSV. This online utility will help all the respective colleagues to generate the different types of reports automatically.

The report is available on CNIT Division Website under Intranet Access URL - https://www.prl.res.in/prl-eng/cc/intranet/chaipebyte.





20 years of Celebrating Giving: Thank You, Blood Donors!

World Blood Donor day is a global celebration held annually on the 14th of June . The children suffering from Thalasemmia require blood transfusion at an inverval of around 15 days for their survival. In view of this Physical Research Laboratory conducted Blood Donation Drive on 14th June, 2024 for Thalassemia Children, registered and getting regular blood transfusion under Shree Jalaram Abhyudaya Sadbhavna Trust, Ahmedabad. Presently, this trust takes care of regular blood transfusions services on charity basis for more than 250 thalassemia children per month.

Prior to the commencement of the camp, extensive pre-arrangements have been made to guarantee its success. Efforts have been conducted through various channels to raise awareness & encouragement. Registration forms have been made available online & streamlining the registration process. Dr Samir Dani & his team communicated with PRL employees, scholars, contractual staff, CISF and others to make this drive successful by bringing a large number of voluntary blood donors to donate their blood under this drive. To ensure a smooth and organized event, the donor arrivals have been scheduled in phases to avoid any overcrowding and facilitate the smooth operation.

The Blood Donation Drive has been arranged at Navrangpura dispensary PRL. A total of 77 voluntary donors have registered themselves in advance to contribute their gesture as a unit of blood. Shree Jalaram Abhyudaya Sadbhavna Trust in collaboration with Sarvodaya Blood Bank has successfully c onducted Blood Donation Camp at PRL Dispensary Navrangpura Campus. The drive began at 8:30 am and lasted for 5½ hours. A total of 81 donors donated their blood in the 5.5 hours of blood donation drive.

PRL Dispensary wishes the heartiest thanks to all donors for their selfless act of saving lives through their voluntary Blood Donations.







PRL Annual Table Tennis Tournament 2023-2024

This season's Table tennis tournament 2023-24 organized by the staff welfare committee on the 4th and 5th of May, was an electric display of table tennis prowess. The tournament brought together students, faculty, and staff of PRL including 26 men and 6 women participants for an intense, action-packed competition over two days. Just as in the previous year, there are five categories of competition, including one for veterans.

The tournament kicked off with an inspiring speech by the institute's director, Prof. Anil Bhardwaj, emphasizing the importance of sportsmanship and the positive impact of extracurricular activities on students' overall development. The matches were intense and filled with thrilling rallies including a few setbacks including Prof. Kuljeet Kaur Marhas defeating the defending champion Prof. Anil Bhardwaj in the veteran category and Mr. B.G. Tagore defeating 7 times champion Prof. Goutam K Samanta in the open singles category.

The prize distribution ceremony was held on the 15th of August where all the winners (enclosed herewith) were awarded with trophies. The tournament was not just about competition; it was also a platform for everyone to bond and forge friendships. The Table Tennis Tournament at PRL was a resounding success, leaving a lasting impression on all participants. It reaffirmed the institute's commitment to promoting a holistic learning environment and fostering a sense of community among its students and staff.

EVENT	Results			
CATEGORIES	Winner	Runner up	Third Place	
VETERANS	dr. d. Pallam Raju	DR. KULJEET KAUR MARHAS	DR. ANIL BHARDWAJ	
Women Singles	DR. MONIKA DEVI	MS. SONAM JITARWAL	****	
Mix Doubles	DR. MONIKA DEVI DR. GOUTAM SAMNATA	MS. SONAM JITARWAL MR. TINKAL LADIYA	DR. KULJEET KAUR MARHAS MR. PRADEEP KUMAR SHARMA	
Open Singles	MR. ANIRBAN GHOSH	DR. RAVINDRA PRATAP SINGH	MR. ATUL ASHOK MANKE	
Open Doubles	MR. RAM LAKHAN AGRAWAL MR. ANIRBAN GHOSH	MR. SENTHIL BABU T. J. MR. B G THAKOR	DR. RAVINDRA PRATAP SINGH MR. ATUL ASHOKE MANKE	
Lucky Doubles	dr. goutam samnata Mr. B g thakor	MR. TINKAL LADIYA DR. MONIKA DEVI	MR. ANIRBAN GHOSH MR. VAIBHAV KATYAL	
Team Event	Amoph Dr. Goutam Samnata Mr. Anirban Ghosh Mr. Vaibhav Katyal Dr. Monika Devi	SERVICES MR. RAM LAKHAN AGRAWAL MR. ATUL ASHOK MANKE MR. ALOK SHRIVASTAVA MR. KESHAV PRASAD	ADMIN MR. SENTHIL BABU T. J. MR. PRADEEP KUMAR SHARMA MR. B G THAKOR	



Celebration of Yoga Day at USO

IThe International Yoga Day was enthusiastically celebrated at the Udaipur Solar Observatory, (USO) on June 21, 2024. The yoga session was conducted by Dr. Shubha Surana, a yoga teacher in Mohanlal Sukhadia University, Udaipur. The session started with the brief introduction of Prof. Surana by Prof. Bhuwan Joshi. Subsequently, Ms. Surana explained the necessity of yoga in maintaining mental and physical health to the USO family. She further elaborated on this year's theme: Yoga for Self and Society. She along with her team demonstrated various stretching exercises, breathing techniques and Yog asanas which were also performed by the USO members. As a token of gratitude, she was gifted a sapling. The program ended with light and healthy breakfast.



Yoga day Celebration at USO



Celebration of International Day of Yoga-2024

The 10th International Day of Yoga (IDY-2024) was celebrated on Friday, 21st June 2024, at the Library Lawn of the PRL Main Campus. The theme for IDY-2024 was "Yoga for Self and Society." To emphasize the importance of "Women Empowerment," the event was coordinated by female members of PRL.

The program began with an introduction by Smt. Harsha Parmar, who provided an overview of the significance of the International Day of Yoga. Smt. Priti Poddar then introduced the special guests: Mr. V. Ranganathan, a seasoned Yoga Practitioner, and Ms. Priti Iyengar, an accomplished Yoga Teacher.

Mr. V. Ranganathan commenced the yoga session by explaining the benefits of warm-up exercises, highlighting their role in enhancing flexibility before practicing yoga. Ms. Priti lyengar demonstrated the warm-up exercises, followed by Mr. Ranganathan's explanation of the different categories of yoga postures, including standing, sitting, and lying poses.

Ms. Iyengar then led a step-by-step demonstration of various asanas, such as Balasana, Tadasana, Vajrasana, Bhramari Asana, and Titli Asana. All participants actively engaged in practicing these sitting, standing, and lying postures, with explanations of their significance provided throughout the session. Ms. Iyengar also demonstrated yoga techniques suitable for the workplace, with a special focus on the theme "Yoga for Lifestyle Diseases." The session concluded with a Pranayama practice.

Following the yoga session, Prof. Anil Bhardwaj, Director of PRL, honored Mr. V. Ranganathan by presenting him with a Tulsi plant. Similarly, Ms. Priti lyengar was felicitated by Prof. D. Pallam Raju, Dean of PRL, who also gifted her a Tulsi plant. The event was smoothly compered by Smt. Richa Prashant Kumar.

The session concluded with a vote of thanks delivered by Mrs. Rumkee Dutta.





PRL Monthly Publications Digest (May & June 2024)

Astronomy & Astrophysics Division [04]

1. R. Kumar, A. Moharana, S. Piridi, A. C. Pradhan, K. G. Helminiak, N. Ikonnikova, A. Dodin, R. Szczerba, M. Giersz, D. K. Ojha and M.R. Samal, 2024, Discovery of a hot post-AGB star in Galactic globular cluster E3, Astronomy and Astrophysics Letter, Date of Publication: 08/05/2024, Impact Factor: 6.5

2. N.K. Tiwari, S.V. Vadawale, N.P.S. Mithun, C.S. Vaishnava, B. Saiguhan, 2024, DarsakX: A Python package for designing and analyzing imaging performance of X-ray telescopes, Astronomy and Computing, Date of Publication: 06/05/2024, Impact Factor: 2.5

3. Abhijit Kayal and Veeresh Singh, 2024, X-ray spectral properties of dust-obscured galaxies in the XMM–SERVS coverage of the XMM-LSS field, Monthly Notices of the Royal Astronomical Society, stae1191,, Date of Publication: 03/05/2024, Impact Factor: 5

4. Abhijit Chakraborty, Kapil Kumar Bharadwaj, Jajaendra Siva Sehu Vara Prasad Neelam, Rishikesh Sharma, Kevikumar Ashokbhai Lad, Ashirbad Nayak, Nikitha Jithendran, Vishal Joshi, Vivek Kumar Mishra & Nafees Ahmed, 2024, The PRL 2.5m Telescope and its First Light Instruments: FOC and PARAS-2, Bulletin de la Société Royale des Sciences de Liège, Date of Publication: 25/06/2024, Impact Factor:

Geosciences Division [13]

1. Govind Oinam, A. Krishnakanta Singh, M. Santosh, Mallickarjun Joshi, Amrita Dutt, Shoraisam Khogenkumar, Biraja Prasad Das, R.K. Bikramaditya, 2024, Plagioclase ultraphyric basalts of the Abor magmatic complex: Implications for a plumbing system at the eastern Himalaya, Lithos, Date of Publication: 25/05/2024, Impact Factor: 3.5

2. Shaw, C., Rastogi, N., Rathi, A., Kumar, S. and Meena, R., 2024, Sources and processes affecting the abundances of atmospheric NHx using 15N over northwestern Indo-Gangetic Plain, Chemosphere, Date of Publication: 20/05/2024, Impact Factor: 8.8

3. Bhowmik, H. S., Tripathi, S. N., Puthussery, J. V., Verma, V., Dave, J., and Rastogi, N., 2024, Reactive Oxygen Species generation from winter Water-Soluble Organic Aerosols in Delhi's PM2.5, Atmospheric Environment: X, Date of Publication: 09/05/2024, Impact Factor: 4.6

4. Siddhartha Sarkar, Abdur Rahman, Mohammad Atif Khan, Ajayeta Rathi, P. Ragavan, Arvind Singh, Sanjeev Kumar, 2024, Isotopic Evidence for Degradation of Particulate Black Carbon in the Ocean, Geophysical Research Letters, Date of Publication: 08/05/2024, Impact Factor: 5.2

5. Rahul Kumar Agrawal, Ranjan Kumar Mohanty, Ajayeta Rathi, Shreya Mehta, M. G. Yadava, Sanjeev Kumar, Amzad Hussain Laskar, 2024, Estimation of groundwater residence time using radiocarbon and



stable carbon isotope ratio in dissolved inorganic carbon and soil CO2, Radiocarbon, Date of Publication: 02/05/2024, Impact Factor: 8.3

6.Attri Pradeep, Devleena Mani, M. Satyanarayanan, D.V. Reddy, Devender Kumar, Siddhartha Sarkar, Sanjeev Kumar, Prashant Hegde , 2024, Atmospheric aerosol chemistry and source apportionment of PM10 using stable carbon isotopes and PMF modelling during fireworks over Hyderabad, southern India, Heliyon, Date of Publication: 01/05/2024, Impact Factor: 4

7. Salana, S., Yu, H, Dai, Z., Subramanian, P.S.G., Puthussery, J. V., Wang, Y., Singh, A., Pope, F. D., Leiva G, M. A., Rastogi, N., Tripathi, S. N., Weber, R. J., and Verma, V., 2024, Inter-continental variability in the relationship of oxidative potential and cytotoxicity with PM2.5 mass, Nature Communications, 15, 5263, Date of Publication: 20/06/2024, Impact Factor: 16.6

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9.M. A. Xenopoulos, B Lamberty, A. Desai, D. Huntzinger, P. Buchanan, A. E. East, Arvind Singh, P. Wooden, K. Jewett, M. Ricci, 2024, AGU Publications Updates Authorship Policy to Foster Greater Equity and Transparency in Global Research Collaborations, AGU Advances, Date of Publication: 09/06/2024, Impact Factor: 8.4

10.Yogita Kadlag, Aryavart Anand, Mario Fischer-Gödde, Klaus Mezger, Kristoffer Szilas, Steven Goderis, Ingo Leya, 2024, Identification of Earth's late accretion by large impactors through mass independent Cr isotopes, Icarus, Date of Publication: 07/06/2024, Impact Factor:

11.Siddhartha Sarkar and Sanjeev Kumar, 2024, Water stagnancy and wastewater input enhance primary productivity in an engineered river system, River, Date of Publication: 04/06/2024, Impact Factor:

12. Abdur Rahman, Rayees A. Shah, M.G. Yadava, Sanjeev Kumar, 2024, Carbon and nitrogen biogeochemistry of a high-altitude Himalayan lake sediment: Inferences for the late Holocene climate, Quaternary Science Advances, Date of Publication: 03/06/2024, Impact Factor: 4.5

13.Siddhartha Sarkar, Ajayeta Rathi, M. Atif Khan, Sanjeev Kumar, 2024, Demystifying the particulate black carbon conundrum in aquatic systems, Environmental Research Communications, Date of Publication: 02/06/2024, Impact Factor: 2.9



Space & Atmospheric Sciences Division [02]

1. Shubham Dhaka, Shipra Lakshmi, Narendra Ojha, Andrea Pozzer, Amit Sharma, 2024, Contribution of regional versus trans-regional anthropogenic sources to the particulate matter over western India derived from high-resolution modeling, Atmospheric Environment: X, Date of Publication: 24/05/2024, Impact Factor: 4.6

2. Manasi Gogoi, Arup Borgohain, Shyam S. Kundu, Som Sharma, Arundhati Kundu, Pradip K. Bhuyan, N. V. P. Kiran Kumar, Nilamoni Barman & S. P. Aggarwal , 2024, Investigation of the atmospheric boundary layer characteristics over a high altitude station in North East India using measurements and reanalysis datasets, Theoretical and Applied Climatology, Date of Publication: 13/05/2024, Impact Factor: 3.4

Theoretical Physics Division [05]

1. A.Das, S.Goswami, Vishnudath K.N. and T.K.Poddar,, 2024, Freeze-in production of sterile neutrino dark matter in a gauged U(1)' model with inverse seesaw,, Nucl. Phys. B {1004}, 116568 (2024), Date of Publication: 22/05/2024, Impact Factor: 2.8

2. Amartya Pal, Arijit Saha, and Paramita Dutta, 2024, Transport signatures of Bogoliubov Fermi surfaces in normal metal/time-reversal symmetry broken d-wave superconductor junctions, New Journal of Physics, Date of Publication: 20/05/2024, Impact Factor:

3. Debika Debnath and Paramita Dutta, 2024, Gate-tunable Josephson diode effect in Rashba spin-orbit coupled quantum dot junctions, Physical Review B, Date of Publication: 06/05/2024, Impact Factor:

4. Amartya Pal, Paramita Dutta, and Arijit Saha, 2024, Fermi arc mediated transport in an inversion symmetry broken Weyl semimetal nanowire and its hybrid junctions, Physical Review B, Date of Publication: 14/06/2024, Impact Factor:

5. Sourav Pal, and Satyajit Seth, 2024, On Higgs + jet production at next-to-leading power accuracy, Physical Review D, Date of Publication: 12/06/2024, Impact Factor: 5.0



Udaipur Solar Observatory [04]

1. Satyam Agarwal, Ramit Bhattacharyya, 2024, Study of magnetic relaxation in MHD simulations of energetically different flares, Physics of Plasmas, Date of Publication: 08/05/2024, Impact Factor: 2.2

2. Binal D. Patel, Bhuwan Joshi, Alphonse C. Sterling, and Ronald L. Moore, 2024, Source Region and Launch Characteristics of Magnetic-arch-blowout Solar Coronal Mass Ejections Driven by Homologous Compact-flare Blowout Jets, The Astrophysical Journal, Date of Publication: 28/06/2024, Impact Factor: 4.8

3. Ananya Rawat and Girjesh Gupta, 2024, Exploring Magnetic Coupling of the Solar Atmosphere Through Frequency Modulations of 3-min Slow Magnetoacoustic Waves, Bulletin de la Société Royale des Sciences de Liège, Date of Publication: 11/06/2024, Impact Factor:

4. Yogesh Kumar Maurya, Ramit Bhattacharyya, and David I Pontin, 2024, Generation and annihilation of three dimensional magnetic nulls in extrapolated solar coronal magnetic field: data-based Implicit Large Eddy simulation, Physica Scripta, Date of Publication: 07/06/2024, Impact Factor: 2.9

Atomic, Molecular and Optical Physics [01]

1. Somesh Chamoli, Anmol Mishra, Achintya Kumar Dutta, Richa Sharma Kesarkar, and B. K. Sahoo, 2024, Relativistic equation-of-motion coupled-cluster-theory analysis of blackbody radiation shift in the clock transition of Zn i, Phys. Rev. A 109, 063111 (2024); https://doi.org/10.1103/PhysRevA.109.063111, Date of Publication: 10/06/2024, Impact Factor: 3.0

Planetary Sciences Division [02]

1. Alam, M., Paul, J., Upadhyay, N., Nalluveettil, S. et al., 2024, Development of Deployment Mechanism for RAMBHA-LP Payload Onboard Chandrayaan-3 Lander, SAE Technical Paper 2024-26-0455, Date of Publication: 01/06/2024, Impact Factor:

2. Kimi, K.B., Harish, Sharini, K.S., Anil Chavan, and Vijayan S, 2024, Deformation of the Gruithuisen region lava tube under compressional stress on the Moon, Geology, Date of Publication: 01/06/2024, Impact Factor: 5.3



Awards & Honours

(1) **Dr. Sunil Kumar**, PDF, Space And Atmospheric Sciences Division of PRL has won The Prestigious Jack Eddy Fellowship.

(2) **Mr. Rajiv R Bharti**, Dr. Sanjay K Mishra, Dr. Neeraj Srivastava from the Planetary Sciences Division of PRL. The International Astronomical Union (IAU) has approved the names of three craters proposed by these PRL scientists. One is named after a former Director of PRL, and the other two are named after small towns in India.



VISITORS

1. The following five Defense Space Agency (DSA) personnel visited PRL on 9 May 2024 to discuss about INDUS X Space Challenges.

a. Col. R. Jithendra (R&D)

- b. Gp Capt VK Bajpai, OSD IAS
- c. Wg Cdr K Nagaraj (Space Info & Analysis)
- d. Wg Cdr Dr. S Senthil Kumar (PNT & Concepts)

e. Wg Cdr Hari Prasad (Space Ops (Weather))

2. 35 students and 3 coordinators of the Advanced B.Sc. (Physics) Summer Programme visited PRL Main campus on 21st May 2024. Visit was scheduled for half a day which included three talks given by faculty members of PRL and 5 lab visits.

3.54 participants along with 6 coordinators ISRO's Yuvika 2024 visited PRL on 15th May 2024. The visit was scheduled for half a day which included a lecture on Astronomy and interaction with PRL scientists in several labs.

4. Dr. Shih-Chu Liao from ISS Inc., USA visited PRL during May 13-17, 2024 in connection with installation of Scientific Equipment 'Time-Resolved Laser Scanning Microscope'.

5. Dr. Gwenael Berthet from CNRS, France visited PRL, Ahmedabad during May 13-17, 2024 in connection with Scientific discussion on CEFIPRA project as Co-PI and interaction with Scientists and Research Scholars.

6. Ms. Sandhya Ramesh, Senior Editor of Science at The Print India, visited Infra-Red Observatory, PRL, Mount Abu on 9th June 2024.

7. Dr. Vijay Kumar Srivastava, Vice-Chancellor of The Maharaja Sayajirao University, Vadodara visited PRL and met Director in June 2024.

8.The following Russian Nationals have visited PRL, Ahmedabad on 28.06.2024 in connection with discussion with Scientist/Engineers on Scientific Equipment SNSPDs procured from Scontel LLC.

a. Mr. Pavel Morozov

b. Mr. Divochiy Alexander



OBITUARY



Late Dr. R.K. Pant Engineer-SF

Date of Birth 05.11.1935

Date of Joining PRL 05.11.1973

Date of Retirement 30.11.1995

Date of Death 04.05.2024

Teary Eyes' for our Departed Member



Heartily welcome to our new members



Name: DR. TANMOY CHAKRABORTY

Designation: ASSISTANT PROFESSOR

Date of Joining: 24.05.2024

Division: ATOMIC, MOLECULAR & OPTICAL PHYSICS



Name: MR. SOURABH GOYAL Designation: ASSISTANT (RAJBASHA) Date of Joining: 29.05.2024 Division: ADMINISTRATION GENERAL



Name :MS. SHREYAKUMARI M. PATEL Designation: PROJECT ASSOCIATE-I-JC BOSE Date of Joining: 30.05.2024 Division: PLANETARY SCIENCE DIVISION





Name: MR. RAJAN SHARMA Designation: LIBRARY ASSISTANT-A Date of Joining: 18.06.2024 Division: UDAIPUR SOLAR OBSERVATORY, UDAIPUR



Name: MR. JATAV SANDIP KAMLESHBHAI Designation: ASSISTANT Date of Joining: 19.06.2024 Division: PLANETARY SCIENCES DIVISION



Name :MR. MALIWAD KODARBHAI DAHYABHAI Designation: MULTI-TASKING STAFF Date of Joining: 21.06.2024 Division: ADMINISTRATION GENERAL



Name :MS. GARIMA Designation: JUNIOR RESEARCH FELLOW-DST-CRG Date of Joining: 26.06.2024 Division: GEOSCIENCES DIVISION



SUPERANNUATION



Name of the employee	Shri S. Venkataramani
Designation at the time of superannuation	Scientist/Engineer-SG
Date of Birth	25.05.1964
Date of Joining PRL	21.11.1986
Date of Superannuation	31.05.2024

Good Luck for your future endeavours



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