

Newsletter of the Physical Research Laboratory

THE SPECTRUM



***National Space day & Independence Day
Celebration***

September 2024



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The Author



Hirdesh Kumar

Propagation Characteristics of Acoustic Waves in the Quiet-Sun Lower Solar Atmosphere: MAST Observations

(Hirdesh Kumar, Brajesh Kumar, Shibu K. Mathew, A. Raja Bayanna, and S. P. Rajaguru)

Solar atmosphere provides conducive environment for the generation, propagation, and dissipation of various mechanical waves. These waves are considered to play an important role in the heating and dynamics of the solar atmosphere. Acoustic waves are generated inside the convection zone of the Sun. These waves are trapped inside the acoustic cavities formed interior of the Sun. The acoustic cutoff frequency of the quiet-Sun photosphere is 5.2 mHz and these waves (< 5.2 mHz) are evanescent in the solar atmosphere. In contrast, high frequency (> 5.2 mHz) acoustic waves propagate into the higher solar atmosphere. Exploiting the potential of the Narrow Band Imager (NBI) instrument installed with the Multi-Application Solar Telescope (MAST) operational at Udaipur Solar Observatory (USO), Physical Research Laboratory (PRL), Udaipur, India, we observed a quiet-Sun region located within the disk centre of the Sun for 1h 50m duration. The photospheric Fe I 6173 Å spectral line is scanned at 35 wavelength positions, while chromospheric Ca II 8542 Å line is scanned at 27 wavelength positions. We used the bisector method on the observed spectral line profiles to get seven height line-of-sight velocities within Fe I line and nine height line-of-sight velocities within Ca II line. The fast Fourier transform is used at each pixel over the observed full field of view by the NBI/MAST to obtain phase shift and coherence. The frequency and height-dependent phase shift integrated over the regions having an absolute line-of-sight magnetic field of less than 10 G indicates the nonevanescence nature of low-frequency acoustic waves within the photosphere and photosphere–chromosphere interface regions (c.f. Figure 1). We also report that the nonevanescence nature persists beyond the photosphere, encompassing the photospheric–chromospheric height range. Additionally, our observations reveal a downward propagation of high-frequency acoustic waves indicating refraction of these waves from higher layers in the solar atmosphere (c.f. Figure 1). This study contributes valuable insights into the understanding of the complex dynamics of acoustic waves within different lower solar atmospheric layers, shedding light on the nonevanescence nature and downward propagation of the acoustic waves.

Source/Reference of the Work: <https://iopscience.iop.org/article/10.3847/1538-4357/ad5d60>

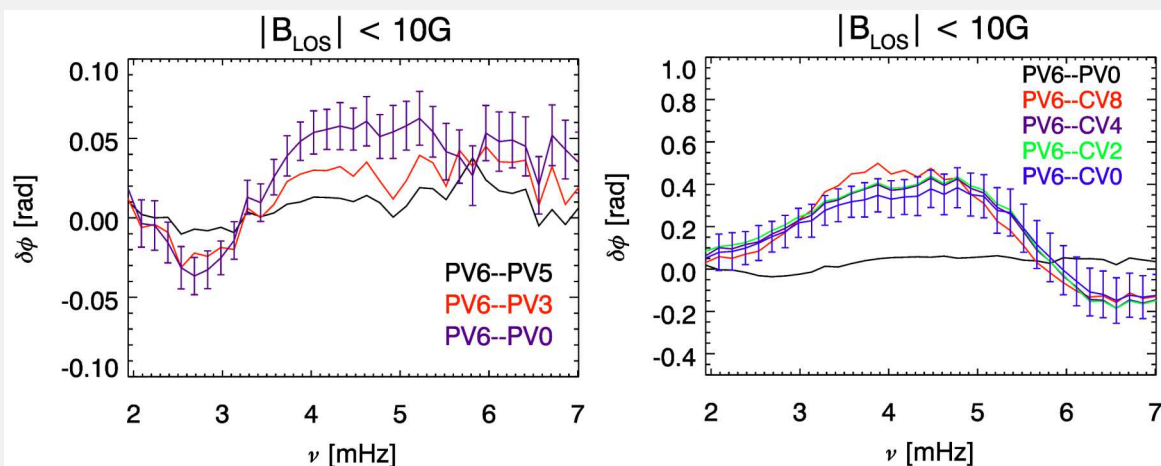


Figure 1 : Phase shifts measured within photosphere (left panel) and photosphere-chromosphere (right panel) interface displayed as a function of frequency integrated over the pixels having $|B_{LOS}| < 10$ G and coherence greater than 0.5 over the full FOV.

The Author



Vineet Rawat

Peering into the heart of the giant molecular cloud G148.24+00.41: A deep near-infrared view of the newly hatched cluster FSR 655

(Vineet Rawat, M. R. Samal, D. K. Ojha, Brajesh Kumar, Saurabh Sharma, J. Jose, Ram Sagar, and R. K. Yadav)

A star cluster is a group of stars that are gravitationally bound to one another and share a common origin. It is believed that the majority of the stars, if not all, form in such clustered environments. As they contain a large number of stars from the same parental cloud, they serve as an important astrophysical laboratory for studying star formation and stellar evolution. However, the formation and subsequent evolution of massive star clusters as bound entities is still not clear. During the early phases of their formation and evolution, they are heavily obscured by the dust and, therefore, mostly visible at infrared wavelengths. FSR 655 is one such embedded cluster located at the heart of a massive (mass $\sim 10^5$ Msun) molecular cloud, G148.24+00.41, which is around 11,000 light years away from us. In this work, a detailed investigation of the FSR 655 cluster is done using near-infrared data taken with the 3.6m Devasthal Optical Telescope (DOT), located in Nainital. The central ~ 2 pc $\times$ 2 pc area of the cloud, shown in Figure 1(c), was imaged with the telescope, reaching 5 sigma limiting magnitudes of 20.5, 20.1, and 18.6 mag in the J (1.250 μ m), H (1.635 μ m), and Ks (2.150 μ m) bands, respectively. Using the Ks-band luminosity function and comparing it with the synthetic clusters, the age of the cluster is found to be ~ 0.5 Myr, suggesting the cluster is extremely young. The present stellar mass of the cluster is estimated to be ~ 180 Msun and the cluster is currently forming stars at a rate of ~ 330 Msun Myr $^{-1}$, with an efficiency of $\sim 20\%$. The cluster is found to be connected to an extended gas reservoir through a filamentary network and the filaments are found to be inflowing matter to the cluster's gravitational centre. With the current star formation rate, the possibility of the cluster becoming a massive cluster of mass ~ 1000 Msun is also discussed. Overall, this study sheds light on how a low-mass cluster could grow into a massive cluster.

Source/Reference of the Work: <https://iopscience.iop.org/article/10.3847/1538-3881/ad630d>

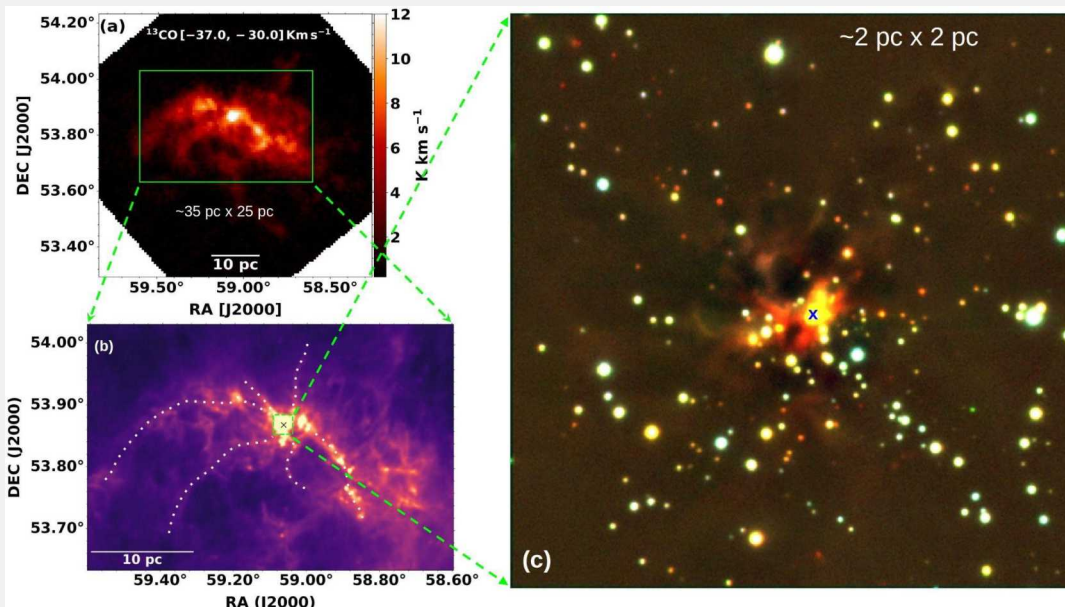
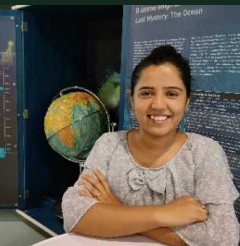


Figure: (a) The image shows the ^{13}CO gas distribution of the cloud G148.24+00.41. (b) Herschel 250 μ m image of the inner region of the cloud along with its filamentary structures. The green dashed box shows the central area of size ~ 2 pc $\times$ 2 pc, which is observed with the near-infrared camera, "TANSPEC," mounted on the 3.6m DOT, located in Nainital. (c) The near-infrared color-composite image (red: Ks-band; green: H-band, and blue: J-band) of the FSR 655 cluster.

The Author



Shreya Mehta

Insights into the Ocean Alkalinity Enhancement (OAE) by means of Mesocosm Experiments

(Shreya Mehta, Himanshu Saxena, Sipai Nazirahmed, Jitender Vasuja, Saloni Mishra, Abul Qasim, Arvind

With the passage of years the mountains once draped in pristine-white throughout the winters no longer stay the same, the rivers are no longer fresh and the sky is hardly blue. The cold chilly winds have lost their brisk touch. The global warming is not just an abstract concept, its real, and we are experiencing it every day. The headlines of extremes climatic events from across the world have become very frequent, giving a clear indication there is need to put an end to Fossil Fuel Era. Clearly, we have seen a global rise of 1.1°C temperature from the preindustrial period because of the anthropogenic emissions. To combat this and limit the warming below 1.5°C or 2.0°C by the year 2100 along with reducing CO₂ emissions we need Negative Emission Techniques (NETs) or Carbon Dioxide Removal (CDR) methods. Ocean Alkalinity Enhancement (OAE) is one of the NETs but uncertainties surround the feasibility and consequences of implementing OAE on a global scale. To address this, we conducted our first mesocosm experiment at NITTE University, Mangalore, Karnataka in November 2022. The primary objective was to identify the minerals capable of enhancing ocean alkalinity. Magnesite demonstrated the highest potential for releasing alkalinity into seawater, while surprisingly, olivine, often discussed for CO₂ sequestration, did not increase alkalinity. To gain a better understanding of magnesite's CO₂ sequestration ability and to clarify olivine's role in this context, we planned our second mesocosm experiment.

We conducted the 2nd mesocosm experiment at the Central Marine Fisheries Research Institute, Veraval, Gujarat in October 2023. We set up 10 mesocosm tanks, 1000 L each and provided with artificial light source. We selected two minerals – magnesite and olivine. Each mineral was added in four tanks in different concentrations to achieve a 10%, 20%, 30%, and 40% increase in total alkalinity, respectively, and the remaining two tanks served as controls. The salinity, temperature, and pH were measured in situ, whereas samples were collected for the measurements of alkalinity and Dissolved Inorganic Carbon (DIC) to see the effect of mineral dissolution on the CO₂ flux. We also aim to study the process of carbon and nitrogen fixation for which we did the incubation experiments using ¹³C and ¹⁵N tracers. To study the change in the phytoplankton community, we collected samples for DNA and flow cytometry analysis. Our expectations are that this study will provide valuable insights into the effectiveness, risks, and feasibility of OAE as a CDR method. The story of mesocosm experiments are not just a tale of minerals and molecules but a narrative of hope, uncertainty, and the relentless pursuit of understanding the delicate balance between human activities and our planet.



Glimpses of the experiments

National Space Day (NSPD) and 105th Vikram Jayanti Celebration

The Physical Research Laboratory (PRL) celebrated the National Space Day (NSpD) and 105th Vikram Jayanti across its four campuses on 12 August 2024.

To commemorate the successful soft landing of the Vikram Lander of the Chandrayaan-3 Mission and the deployment of the Pragyaan Rover on the Moon on 23 August 2023, the Government of India has declared the 23rd day of August of every year as the National Space Day (NSpD). With this achievement, India joins the elite group of space-faring nations, becoming only the fourth to land on the surface of the Moon and the first nation to land near the south pole of the Moon.

To mark this special day in the history of the Indian space programme, the Department of Space is organizing nationwide celebrations during August 2024 to engage and inspire the youth of the Nation towards space science and its applications.

This special day was celebrated in all four campuses of PRL on 12 August 2024, coinciding with the celebration of 105th Vikram Jayanti, the birth anniversary of Dr. Vikram Sarabhai, the Founder of PRL and father of the Indian Space Program.

The celebration started in morning of 12th August at 8.30 a.m. with the garlanding of the statue of Dr. Vikram Sarabhai at Main campus of PRL in Navrangupura, Ahmedabad. On this occasion, Dr. Mallika Sarabhai, Dr. Kartikeya Sarabhai, Shri Yeshwant U Chavan (Principal Chief Commissioner of Income Tax Gujarat), Dr. Dinesh Awasthi (Vice Chancellor L J University), along with other invited dignitaries, graced the garlanding ceremony, which were followed by the tree plantation, as well as inauguration of the Open House Exhibition through a Rainwater Harvesting plant in PRL.

The Open House was OPEN on all four campuses of PRL, at Navrangpura and Thaltej campuses in Ahmedabad, Udaipur Solar Observatory in Udaipur, and PRL's Mt. Abu Observatory at Mt. Abu. The Open House exhibition provided a rare opportunity for curious minds to interact in person with renowned scientists of PRL, visit scientific exhibits displayed in the Open House, and participate in other exciting events at PRL campuses.

PRL received an overwhelming response; more than 3000 students and public visited the PRL's two campuses in Ahmedabad, and above 340 students visited the Udaipur Solar Observatory in Udaipur. The visitors comprised of school students from class 8 to 12, UG and PG students across all disciplines, college, university, and school teachers, as well as science communicators and parents. The visitors visited several laboratories, science exhibits and infographics at campuses. In addition, there were live quiz and lectures on common scientific interests.

This event was a humble effort by PRL to ignite young minds to take up challenging career options and contribute their talent for nation-building in future.

At Mt Abu Observatory of PRL, the 2-day NSpD-2024 event was organised during 30-31 July, where more than 350 students and teachers participated.



*Few
Glimpses of
NSpD &
Vikram
Jayanti
Celebration*



National Space Day Celebrations At Udaipur Solar Observatory On 12th August 2024

The maiden National Space Day (NSpD-2024) was celebrated at the Udaipur Solar Observatory (USO-PRL) on 12th August 2024 on the occasion of Vikram Sarabhai Jayanti, the founder of PRL and father of the space programme in India, which was a fitting tribute in view of India's recent ground-breaking success with the Chandrayaan-3 moon mission. NSpD-2024 was conducted simultaneously at the Navrangpura and Thaltej campuses of PRL on 12th August. The event was organised in two sessions at USO, with visitors in the forenoon session comprising school children and teachers from 7 private and 7 government institutions. There were a total of 112 students and 31 teachers who visited USO in the morning session.

A batch of 60 visitors were escorted to the island Observatory, while the rest of the group were taken to different stations in the office premises. Visits on the island and office premises were thus conducted simultaneously. On the island, USO researchers explained the history of the Observatory, the different telescopes and instruments that were developed and deployed over a period of time, the current generation of telescopes on the island, and the science that was being pursued at USO using different post-focus instruments. The visitors were shown the SPAR telescope used for imaging the full-disk of the Sun and the 50-cm Multi-Application Solar Telescope (MAST). At the MAST facility, students and teachers saw the stowed telescope under the retractable cloth dome, the field-stop employed to permit a small field-of-view, as well as the different mirrors and folding configurations used to divert the light into the observing floor below. Down at the observing floor, the working of the telescope control system and the different instruments, such as the adaptive optics system, the narrow-band imager, as well the high- and low-resolution spectrographs, were also explained to the visitors. The office security personnel were present along with USO staff at the jetty to ensure the safe boarding and de-boarding of visitors during their visit to the island.

Whilst the tour was being conducted on the island, students and teachers in the office premises were further divided into smaller batches of 20-30, where they interacted with the USO faculty, staff, and students at different locations and visited the other facilities on the campus. The USO students wing on the first floor was converted into a poster-viewing area where several posters were put on display detailing various aspects such as the characteristics of our Sun, an overview of solar physics and research at USO, sunspots, prominences/filaments, coronal heating, flares and eruptions, and space weather, which were manned by the PhD research scholars. The second station was in the seminar hall where faculty members gave short presentations on the different space missions accomplished by ISRO, upcoming national projects, and an overview of the research undertaken at USO. The remaining two stations were at the GONG and e-CALLISTO facilities, where the visitors were explained the working principles of the instruments, to ascertain the internal structure of the Sun, and analyse the conditions of the solar corona using radio frequencies, respectively. The forenoon session ended around 01:30 pm. The next batch of visitors, comprising college/university students, began their tour around 02:15 pm. The second session witnessed a larger group of 148 students and 22 faculty members from 10 colleges/universities in and around Udaipur. In addition, there were 6 media personnel who had been invited to cover the event at USO. The visitors were grouped in a similar manner as the previous session, with the last group leaving the campus at around 07:00 pm.

NSpD-2024 was a grand success at USO, thanks to the excellent planning, coordination, and execution of the various tasks assigned to the security and house-keeping personnel, research scholars, administrative and technical staff, and faculty who ensured that the visitors had a fruitful and engaging experience at the event which concluded without a glitch.



Glimpses from the event

95th PRL Ka Amrut Vyakhyaan (PKAV)



The 95th PRL Ka Amrut Vyakhyaan was delivered by Shri Nilesh M. Desai (Director and Distinguished Scientist, Space And Application Centre, Ahmedabad), on 14th August, 2024. He delivered the Vyakhyaan on a very interesting topic, i.e. the use of space technologies for societal benefits. In particular, the contribution made by the Space Application Center in this direction. Title of his talk was “Trends in Indigenous Space Technologies for Societal Applications”.

Shri Desai started the Vyakhyaan reminding the vision of Dr. Vikram Sarabhai, i.e. to use space technologies for societal benefits. Subsequently, he discussed the various space programmes undertaken and the technologies developed by ISRO for the space explorations and various societal applications. He then introduced the Space Application Centre (SAC), discussing its multi-disciplinary capabilities to meet the requirements of the Indian space programme. He highlighted SAC's contribution in making the state-of-the-art spaceborne payloads, sensors and instruments, which serve as the brains of India's remote sensing, communication, navigation and planetary missions. He discussed the breakthroughs achieved by SAC scientists related to various indigenous space and ground segment technologies including NavCom, electro-optical sensing, lidar and radar technologies, and their applications for societal benefits. He emphasised the SAC's involvement in the exploitation of satellite data and development of various tools to carry out niche applications in the areas of agriculture, environment, climate change and oceanography in order to truly realise the vision and mission envisaged by Dr. Vikram Sarabhai. Towards the end of the Vyakhyaan, he discussed the future trends in the space technologies and the programmes undertaken by SAC on various fronts such as developing technologies for Lunar PNT system, quantum communication, quantum radars, sub-mm wave astronomy, and constellation satellite systems. He also briefly discussed the use of AI/ML in space applications. Overall, his talk was very illuminating on the use of various space technology applications for the socio-economic benefits of the country and the emerging challenges to meet the future requirements.



YouTube Link: <https://www.youtube.com/live/tSU78dirBX4>

Independence Day celebration 2024 at PRL

The 78th Independence Day was celebrated with great enthusiasm at PRL Main campus, Library lawn on Thursday, August 15th, 2024.

Prof. Anil Bhardwaj, Director, PRL hoisted the National flag, which was followed by the National Anthem. As per protocol, the CISF held a parade on this occasion. Independence day address was delivered by Prof. Anil Bhardwaj, highlighting PRL's scientific, administrative, and other activities carried out during the year. Merit and service awards were given to CISF cadets thereafter.

The prize distribution for various events was carried out i.e. Annual Badminton, Annual Table Tennis competition and SOLIS competition. A token of appreciation was also given to the winners of Inter-Centre Sports Meet (ICSM)-2023.

Shri. Omkar Gupta, Junior Research Fellow performed a patriotic song as part of a cultural function. Tri-color balloons were also released by the children to mark the day of Independence followed by the tree plantation by PRL members and their family members.



Glimpses from the event

Celebration of the First National Space Day at Bharat Mandapam

To commemorate the historic landing of the Chandrayaan-3 mission on the Moon last year, the Government of India declared 23 August as National Space Day (NSpD). Several outreach activities were being organized by ISRO, PRL, and other institutes across the country leading up to the maiden Space Day celebration on 23 August 2024. The celebration was organized in Bharat Mandapam, where delegates from various ISRO/DOS centers, space industries, and academia participated in person, and the entire event was telecasted live on YouTube. School students were also invited for the inaugural session and exhibition of the NSpD event. A team of 12 members from PRL also participated in the celebration held in Delhi.

The Hon'ble President of India graced the occasion and inaugurated the program. It was a moment of pride that the Hon'ble President mentioned the recently published results from the PRL-lead APXS experiment on the Chandrayaan-3 Pragyan rover in the inaugural address. The Hon'ble President awarded prizes to the winners of the Robotics Challenge and Bharatiya Antariksh Hackathon (BAH), which ISRO organized as part of NSpD celebrations. Two teams that received the BAH award were mentored by PRL colleagues. In the subsequent session of the NSpD event, the peer-reviewed data sets from all payloads of the Chandrayaan-3 mission were released to the public by the Hon'ble Minister of State (Space) in the presence of Chairman ISRO, Director PRL, and other dignitaries. There were also exhibitions by various ministries and institutes focusing on effectively using space infrastructure for varied applications and emerging space industries showcasing their capabilities. There were also exhibits from ISRO showing the prototypes for major future projects such as Chandrayaan-4, Surya: the Next Generation Launch Vehicle (NGLV), and Bharatiya Antariksh Station (BAS). Winners of the robotic challenge and BAH were also given the opportunity to showcase their work. Panel discussions on varied topics related to the Space sector were also arranged as part of the program, which concluded with a movie screening on Chandrayaan-3 and a Mohiniyattam rendering of the story of the quest to reach the Moon.



PRL team at NSpD Event at Bharat Mandapam, Delhi

पंद्रहवा पीआरएल अमृत राजभाषा व्याख्यान (पर्व)



"पीआरएल अमृत राजभाषा व्याख्यान (पर्व)" का 15वां व्याख्यान 28 अगस्त, 2024 को आयोजित किया गया। इस अवसर पर मुख्य वक्ता श्री नीरज कुमार पाठक, संयुक्त निदेशक, रक्षा मंत्रालय, नई दिल्ली थे।

श्री. नीरज कुमार पाठक रक्षा मुख्यालय प्रशिक्षण संस्थान, नई दिल्ली में अतिथि संकाय के रूप में वर्षों से जुड़े रहे हैं, जहाँ उन्होंने कार्यालय पद्धति, प्रशासन और स्थापना सहित विविध दक्षता निर्माण विषयों पर कई कार्यशालाएँ आयोजित की हैं। वे रसायन शास्त्र के स्नातकोत्तर तथा वित्तीय प्रबंधन की डिग्री के साथ मेलबर्न और क्वालालम्पुर के संस्थानों से प्रशिक्षण प्राप्त करने का अल्पकालिक अनुभव रखते हैं।

व्याख्यान का शीर्षक था "पर्वतारोहण और साहसिक खेल"।

व्याख्यान के दौरान श्री पाठक ने विस्तार से बताया कि आसमान को लपक कर पकड़ लेने को व्याकुल गगनचुम्बी पर्वत शिखर सदैव मानव हृदय को चुनौती देते रहे हैं। उन्होंने बताया कि पर्वतारोहण यानि पर्वतारोहण बर्फ से कठिन पर्वतों और उनके दुर्गम शिखरों पर पहुँचने का खेल है। भारत की कई हस्तियों ने अनेकानेक चोटियों पर तिरंगा फहरा कर भावी पीढ़ियों को पर्वतारोहण के लिए प्रेरित किया है।

उन्होंने आगे बताया कि पर्वतारोहण के संग साहसिक खेलों का फलक भी काफ़ी विस्तृत है। शारीरिक चुनौतियों, मानसिक दृढ़ता, पारस्परिक सामंजस्य और जीवनोपयोगी कौशल आदि के विकास हेतु विविध साहसिक खेल यथा राफ़्टिंग, क्लाइम्बिंग, रैपलिंग, माउंटेन बाइकिंग, कैनोइंग, ग्लाइडिंग आदि प्रचुर अवसर उपलब्ध कराते हैं। ये न केवल हमारी क्षमता का विकास करते हैं बल्कि आनन्द व रोमांच के रास्ते हर कीमत पर जीत हासिल करने का जज़्बा भी पैदा करते हैं।

उन्होंने भारत में इन गतिविधियों को संचालित करने वाली विभिन्न सरकारी प्रायोजित योजनाओं और संस्थानों के बारे में बताया।

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

The 15th lecture of "PRL Amrut Rajbhasha Vyakhyaan (PARV)" was held on August 28, 2024. The eminent speaker for the occasion was Shri. Neeraj Kumar Pathak, Joint Director, Ministry of Defense, New Delhi.

Shri. Neeraj Kumar Pathak has been associated for years, as guest faculty at Defense Headquarters Training Institute, New Delhi where he has conducted many workshops on diverse skill building topics including office methodology, Administration, and establishment. He possess a Master degree in Chemistry and a degree in Finance Management and he has short-

term experience of training from institutes in Melbourne and Kuala Lumpur.

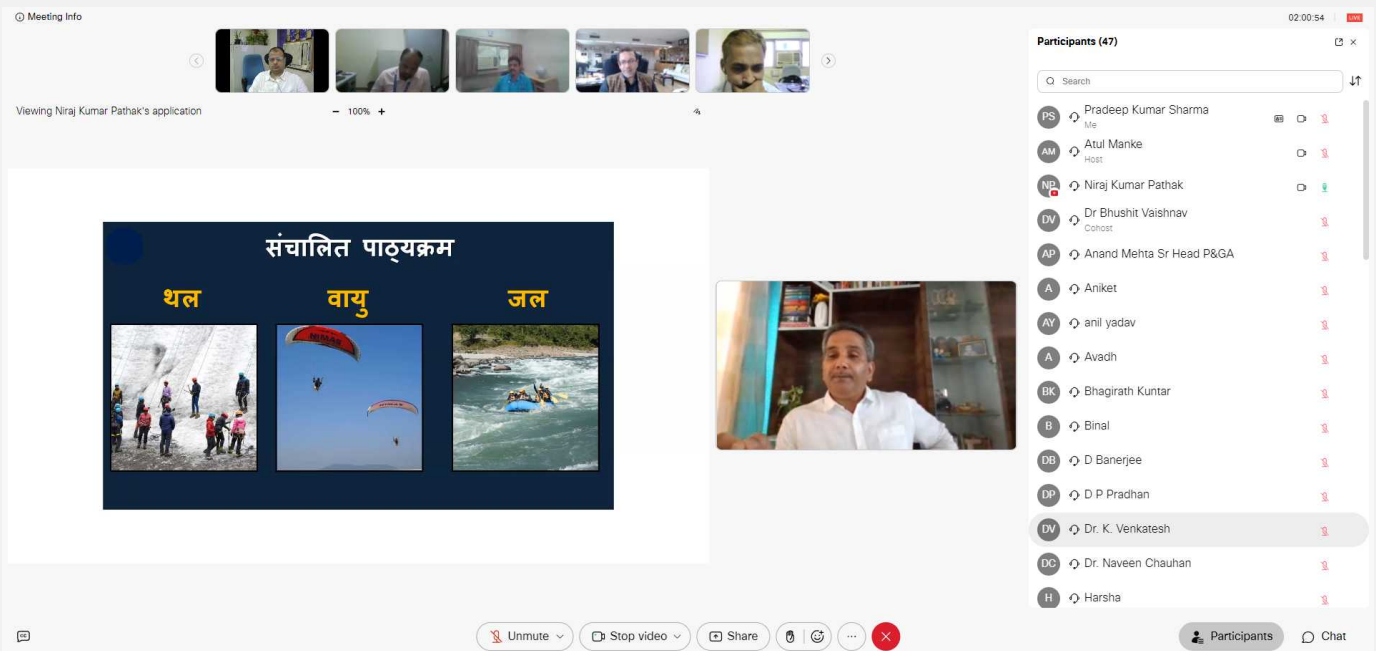
The lecture was titled “पर्वतारोहण और साहसिक खेल”।

During the vyakhyan, Mr. Pathak elaborated that eagerness to grab and hold the sky has always challenged the human heart. He explained that Mountain climbing i.e. mountaineering is the sport of reaching difficult snow-covered mountains and their inaccessible peaks. Many personalities of India have inspired the future generations for mountaineering by hoisting the tricolor on many peaks.

He further informed the spectrum of adventure sports is also quite wide. Various adventure sports like rafting, climbing, rappelling, mountain biking, canoeing, gliding etc. provide ample opportunities for development of physical challenges, mental toughness, interpersonal harmony and life-use skills etc. These not only develop our capabilities but also create the spirit to win at all costs through fun and adventure. He explained about various government sponsored schemes and institutes which undertakes these activities in India.

He has also discussed about different dimensions of mountaineering and adventure and thrilling sports.

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



PRL Monthly Publications Digest**Astronomy & Astrophysics Division [3]**

1. Vineet Rawat, Manash Samal, D. K. Ojha, Brajesh Kumar, Saurabh Sharma, J. Jose, Ram Sagar, and R. K. Yadav, 2024, Peering into the Heart of the Giant Molecular Cloud G148.24+00.41: A Deep Near-infrared View of the Newly Hatched Cluster FSR 655, *Astronomical Journal*, Date of Publication: 30/08/2024, Impact Factor: 5.3
2. Swadesh Chand, Gulab C. Dewangan, Andrzej A. Zdziarski, Dipankar Bhattacharya, N. P. S. Mithun, Santosh V. Vadawale, 2024, Accretion Geometry of GX 339–4 in the Hard State: AstroSat View, *The Astrophysical Journal*, 972:1, Date of Publication: 22/08/2024, Impact Factor: 4.8
3. Santosh V. Vadawale, N. P. S. Mithun, M. Shanmugam, Amit Basu Sarbadhikari, Rishitosh K. Sinha, Megha Bhatt, S. Vijayan, Neeraj Srivastava, Anil D. Shukla, S. V. S. Murty, Anil Bhardwaj, Y. B. Acharya, Arpit R. Patel, Hiteshkumar L. Adalaja, C. S. Vaishnava, B. S. Bharath Saiguan, Nishant Singh, Sushil Kumar, Deepak Kumar Painkra, Yash Srivastava, Varsha M. Nair, Tinkal Ladiya, Shiv Kumar Goyal, Neeraj K. Tiwari, Shyama Narendranath, Netra S. Pillai, Arup Kumar Hait, Aaditya Patinge, Abhishek Kumar, Neeraj Satya, Vivek R. Subramanian, Sonal G. Navle, R. G. Venkatesh, Lalitha Abraham, K. Suresh, Amitabh, 2024, Chandrayaan-3 APXS elemental abundance measurements at lunar high latitude, *Nature*, Date of Publication: 21/08/2024, Impact Factor: 50.5

Atomic Molecular and Optical Physics Division [3]

1. Joseph Rosen, Simon Alford, Blake Allan, Vijayakumar Anand, Shlomi Arnon, Francis Gracy Arockiaraj, Jonathan Art, Bijie Bai, Ganesh M. Balasubramanian, Tobias Birnbaum, Nandan S. Bisht, David Blinder, Liangcai Cao, Qian Chen, Ziyang Chen, Vishesh Dubey, Karen Egiazarian, Mert Ercan, Andrew Forbes, G. Gopakumar, Yunhui Gao, Sylvain Gigan, Paweł Goćłowski, Shivasubramanian Gopinath, Alon Greenbaum, Ryoichi Horisaki, Daniel Ierodiaconou, Saulius Juodkazis, Tanushree Karmakar, Vladimir Katkovnik, Svetlana N. Khonina, Peter Kner, Vladislav Kravets, Ravi Kumar, Yingming Lai, Chen Li, Jiaji Li, Shaoheng Li, Yuzhu Li, Jinyang Liang, Gokul Manavalan, Aditya Chandra Mandal, Manisha Manisha, Christopher Mann, Marcin J. Marzejon, Chané Moodley, Junko Morikawa, Inbarasan Muniraj, Donatas Narbutis, Soon Hock Ng, Fazilah Nothlawala, Jeonghun Oh, Aydogan Ozcan, YongKeun Park, Alexey P. Porfirev, Mariana Potcoava, Shashi Prabhakar, Jixiong Pu, Mani Ratnam Rai, Mikołaj Rogalski, Meguya Ryu, Sakshi Choud, 2024, Roadmap on computational methods in optical imaging and holography [invited], *Applied Physics B*, Date of Publication: 29/08/2024, Impact Factor: 2.07
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Space & Atmospheric Sciences Division [1]

1. Dharmendra Kumar Kamat, Som Kumar Sharma, Kondapalli Niranjan Kumar, Prashant Kumar & Sourita Saha, 2024, Cloud characteristics in the Aravalli ranges of Western India: Insights from ground-based Lidar measurements, *Bulletin of Atmospheric Science and Technology*, Date of Publication: 22/08/2024, Impact Factor:

Planetary Sciences Division [2]

1. Yash Srivastava, Amit Basu Sarbadhikari, Akira Yamaguchi, Atsushi Takenouchi, James M. D. Day, Teresa Ubide, 2024, Magmatic evolution of KREEP-free lunar meteorite Asuka-881757 inferred from sector zoned clinopyroxene, pyroxene symplectites, and thermodynamic modeling, *Meteoritics & Planetary Science*, Date of Publication: 30/08/2024, Impact Factor:

2. Sana Ahmed, Vikas Soni, 2024, Modeling the plasma composition of 67P/C-G at different heliocentric distances, *Icarus*, Date of Publication: 05/08/2024, Impact Factor: 2.5

Udaipur Solar Observatory [4]

1. Hirdesh Kumar, Brajesh Kumar, Shibu K. Mathew, A. Raja Bayanna, S. P. Rajaguru, 2024, Investigation of Phase Shift and Travel Time of Acoustic Waves in the Lower Solar Atmosphere Using Multiheight Velocities, *The Astrophysical Journal*, Date of Publication: 23/08/2024, Impact Factor: 4.8

2. Ranadeep Sarkar, Nandita Srivastava, Nat Gopalswamy, and Emilia Kilpua, 2024, Modeling the Magnetic Vectors of Interplanetary Coronal Mass Ejections at Different Heliocentric Distances with INFROS, *The Astrophysical Journal Supplement Series*, Date of Publication: 07/08/2024, Impact Factor: 8.6

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4. Denny M. Oliveira, Robert C. Allen, Livia R. Alves, Séan P. Blake, Brett A. Carter, Dibyendu Chakrabarty, Giulia D'Angelo, Kevin Delano, Ezequiel Echer, Cristian P. Ferradas, Matt G. Finley, Bea Gallardo-Lacourt, Dan Gershman, Jesper W. Gjerloev, John Bosco Habarulema, Michael D. Hartinger, Rajkumar Hajra, Hisashi Hayakawa, Liisa Juusola, Karl M. Laundal, Robert J. Leamon, Michael Madelaire, Miguel Martínez-Ledesma, Scott M. McIntosh, Yoshizumi Miyoshi, Mark B. Moldwin, Emmanuel Nahayo, Dibyendu Nandy, Bhosale Nilam, Katariina Nykyri, William R. Paterson, Mirko Piersanti, Ermanno Pietropaolo, Craig J. Rodger, Trunali Shah, Andy W. Smith, Nandita Srivastava, Bruce T. Tsurutani, S. Tulasi Ram, Lisa A. Upton,

Bhaskara Veenadhari, Sergio Vidal-Luengo, Ari Viljanen, Sarah K. Vines, Vipin K. Yadav, Jeng-Hwa Yee, James W. Weygand, 2024, Predicting Interplanetary Shock Occurrence for Solar Cycle 25: Opportunities and Challenges in Space Weather Research , Space Weather, Date of Publication: 02/08/2024, Impact Factor: 4.1

Awards & Honours

- (1) **Prof. Varun Sheel**, Professor, Senior Professor, Planetary Sciences Division of PRL has been awarded the **Scientific High Level Visiting Fellowship 2024 (SSHN)** by the French Government under the Indo-French research cooperation.
- (2) **Prof. S Ramachandran**, Senior Professor, Space & Atmospheric Sciences Division of PRL has been nominated as a **member of the National Expert Committee (NEC) of the Climate Change Programme (CCP)**, reconstituted by the DST.
- (3) **Prof. R D Deshpande**, Senior Professor, Geosciences Division & Registrar, PRL has been nominated as a **member of Research Council of CWRDM (Centre for Water Resources Development and Management)** by the Kerala State Council for Science, Technology and Environment for the period of 3 years (2024-2027) .
- (4) **Prof. Anil Bhardwaj**, Distinguished Professor and Director, PRL has been selected for the **2024 Basic Sciences Award of the International Academy of Astronautics (IAA)**.

Visitors

1. **Ms. Hazel Vernier** from Le Laboratoire de Physique et de Chimie de l'Environnement et de l'Espace, (LPC2E) France visited PRL, Ahmedabad during the period from 07.08.2024 to 21.08.2024 in connection with Chemical Analysis of aerosol samples from upper troposphere lower troposphere (UTLS) region under CEFIPRA project as a part of ISRO-NASA BATIAL Campaign.
2. Around 260 students and 53 teachers/faculty members from various schools and colleges of Rajasthan have visited Udaipur Solar Observatory, Udaipur to witness the National Space Day (NSpD2024) celebration on 12th August 2024. In addition, there were 6 media personnel who had been invited to cover the event at Udaipur Solar Observatory, Udaipur.
3. Around 90 students, 10 teachers and 20 volunteers from various schools and colleges of Rajasthan have visited Infra-Red Observatory, Mount Abu to participate in the National Space Day (NSpD-2024) and Vikram Jayanti celebration held on 12th August 2024. In addition, there were 30 individuals/family groups/educators visited Mount Abu Observatory during August 2024.

Hearty welcome to our new members



NAME: MR. SUBE SINGH GURJAR

DESIGNATION: JUNIOR RESEARCH FELLOW

DATE OF JOINING: 02.08.2024

DIVISION/AREA: ASTRONOMY & ASTROPHYSICS DIVISION



NAME: MS. ACHINTYAA

DESIGNATION: JUNIOR RESEARCH FELLOW

DATE OF JOINING: 05.08.2024

DIVISION: THEORETICAL PHYSICS DIVISION

Superannuation



Name of the employee

Smt. Sujata Krishna

**Designation at the time of
superannuation**

Senior Project Attendant

Date of Birth 14.08.1964

Date of Joining PRL 01.01.2002

Date of Superannuation 31.08.2024

Obituary

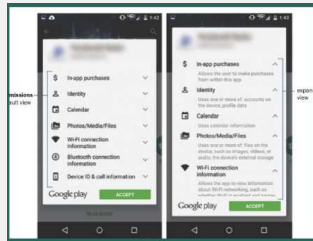


Late Shri B.N. Charola Tradesman-G	
Date of Birth	01.06.1942
Date of Joining	27.04.1970
Date of retirement	31.05.2002
Date of Death	27.08.2024

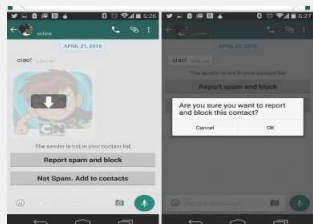


Cyber Security Awareness – WhatsApp Security

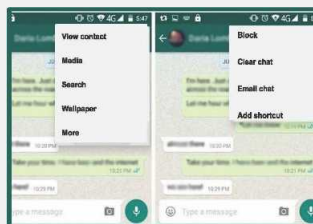
Jigar Raval, Computer Networking & Information Technology Division



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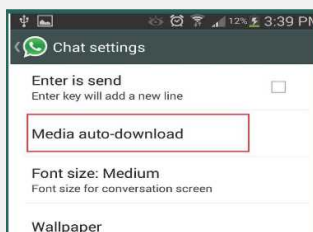
Never accept files or begin download from the messages sent to you from unknown numbers.



To block an unknown number, open that particular chat window go to more option and block.



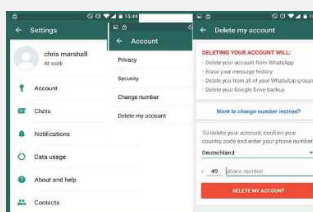
Never send/share private information like bank account details, PINs or passwords through WhatsApp.



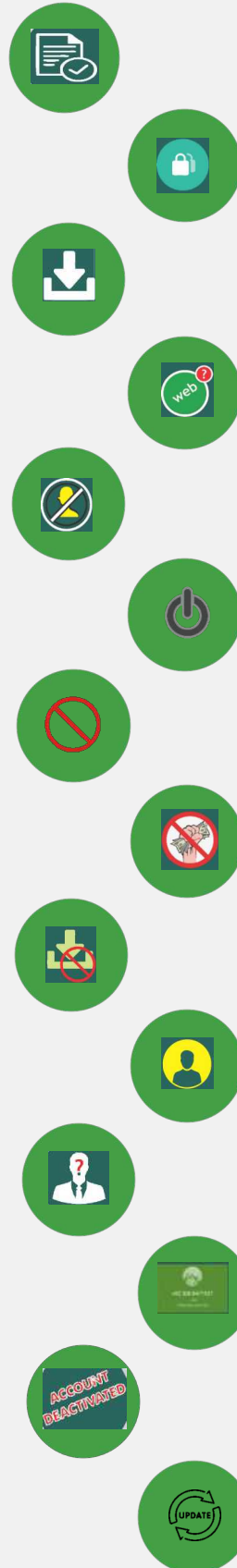
Keep automatic downloads files/media files disabled.



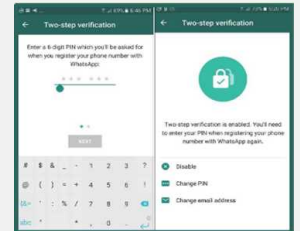
Never respond to suspicious messages received from unknown numbers.



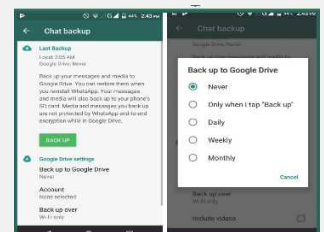
Deactivate/Delete WhatsApp Account if you lose your phone.



Enable two-factor authentication, to ensure that nobody can set up your WhatsApp account without knowing the



Make sure cloud backups are OFF. They are not safe for any critical information when sharing with the cloud



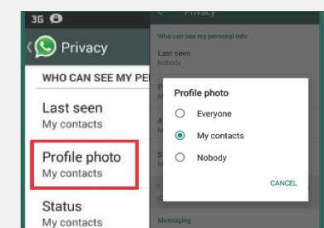
Manage WhatsApp Web effectively, Ensure logout from all the computers/devices after use.



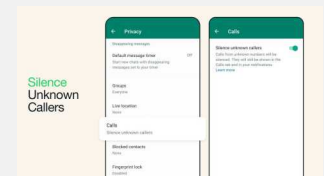
Never trust message that claims to come from WhatsApp and demands payment for the service.



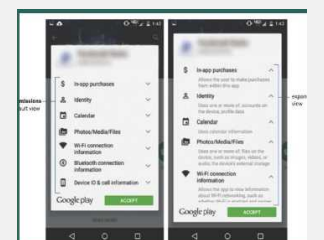
Restrict Access to Your Profile Photo, Status, Last Seen to your contacts list. OR Apply restriction suitably.



Enable Silence unknown callers to protect you from suspicious fraud calls going through and allow you to decide which



Always keep updated version of WhatsApp and keep Antivirus updated with the latest signature.



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