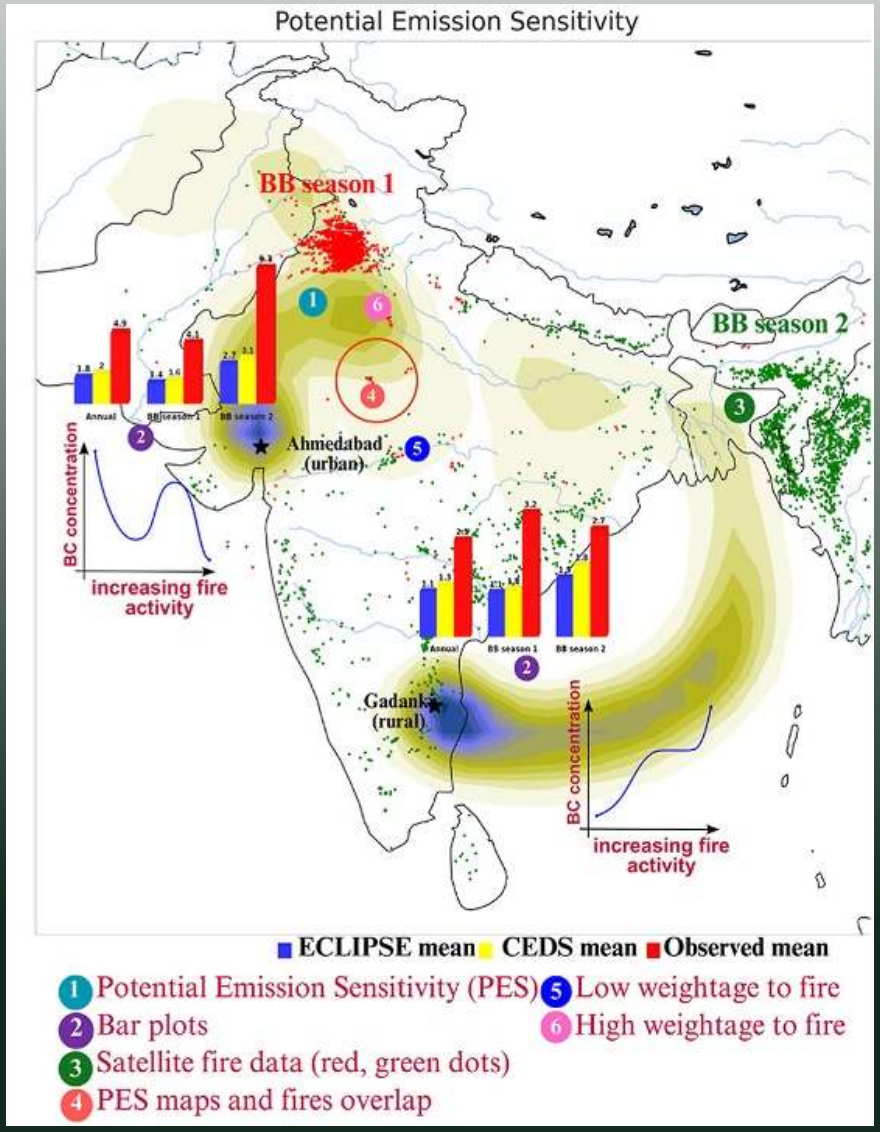
Newsletter of the Physical Research Laboratory

# THE SPECTRUM




## Image of the Month

*Air pollution source region (termed as potential emission sensitivity map) of Ahmedabad and Gadanki overlaid with fires detected using a satellite in two different seasons. Column plots show comparison of modelled and observed concentrations of black carbon.*

*July 2025*

# Table of Contents

## The Author

Harish Gadhavi

## Black carbon emission fluxes over Indian subcontinent

*(Arora, A., **Gadhavi, H.**, Ramachandran, S., Rajesh, T.A.)*

This study explored how accurately current estimates capture black carbon (BC) pollution over India, especially from open biomass burning such as crop residue and forest fires. We compared model-based estimates with real measurements from two distinct sites: Ahmedabad, an urban city, and Gadanki, a rural village. Using satellite fire data and an atmospheric transport model called FLEXPART, we traced how pollution from fires travels to these locations. We found that widely used emission inventories underestimate black carbon levels by nearly half. In rural areas like Gadanki, open fires significantly contribute to BC pollution, whereas in urban regions like Ahmedabad, residential sources—such as the use of wood and dung for cooking—play a more dominant role. To better understand these contributions, we developed a new technique that combines satellite fire detection with atmospheric modeling, allowing them to assess the impact of fires without relying on often-inaccurate emission data. This approach revealed that while open biomass burning is an important contributor, especially in rural settings, it is not always the main cause of underestimation in emission inventories. Our findings are important for improving air pollution forecasts, designing more effective emission control policies, and protecting both public health and the climate.

**Source/Reference of the Work:** https://doi.org/10.1016/j.atmosenv.2025.121367

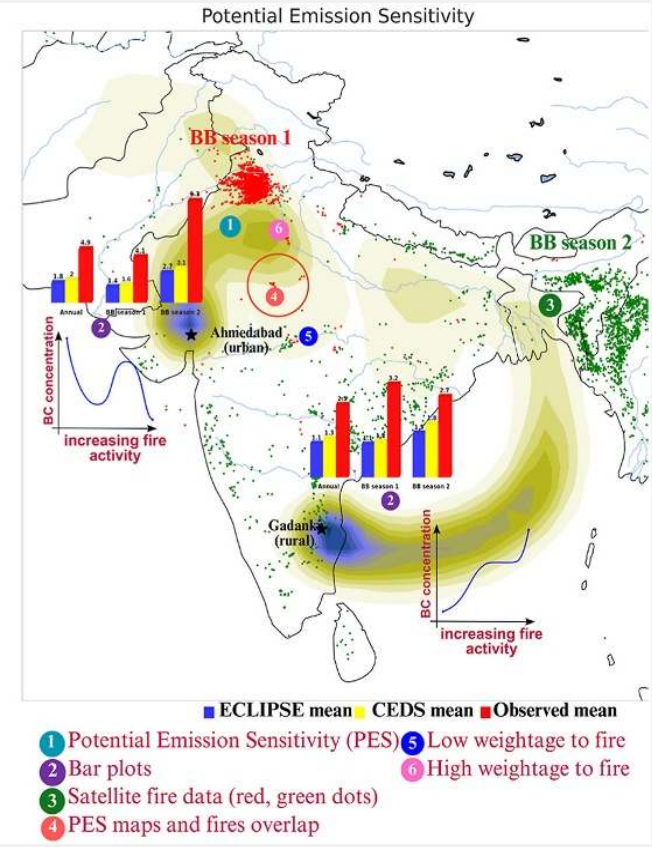



***Figure Caption:*** *Air pollution source region (termed as potential emission sensitivity map) of Ahmedabad and Gadanki overlaid with fires detected using a satellite in two different seasons. Column plots show comparison of modelled and observed concentrations of black carbon.*

## Spectroscopic and photometric insights into the early evolution of Nova V6594 Sgr

### The Author

Ruchi Pandey

*(**Pandey, R.**, Srivastava, M. K., Maiti, A., Kumar, V., Munari, U., Dallaporta, S., Vagnozzi, A., Banerjee, D. P. K., Joshi, V., and Cazzato, P.)*

Novae are explosive stellar phenomena in binary systems where a white dwarf accretes hydrogen-rich material from a companion star, forming an accretion disc that eventually triggers a thermonuclear runaway, causing a sudden brightness surge of 7–19 magnitudes without destroying the white dwarf. The spectral evolution of novae is complex, influenced by a variety of factors, including variable accretion rates, nuclear reactions, ejecta dynamics that are influenced by optical depth, transitions between non-blackbody and blackbody-like continua, dust formation, and shock interactions. In this study, we investigate Nova V6594 Sgr, discovered in outburst on March 25, 2021, using multi-epoch optical photometry and spectroscopy. We classify it as a fast nova with decline timescales of $t_2$ ~ 25 and $t_3$ ~ 39 days, and moderate reddening estimated at E(B−V) = 0.36±0.04. Archival surveys reveal a progenitor with an effective temperature of ~ 7200 K (see Figure 1). Dust formation is detected around 40 - 45 days after the outburst From the blackbody fit, the dust mass was estimated assuming a carbonaceous composition, yielding $M_{AC}$ = (2.40±1.04) $D^2$kpc×$10^{-10}$ $M_\odot$ and $M_{GR}$ = (5.18 ± 2.36) $D^2$kpc×$10^{-10}$ $M_\odot$ for amorphous carbon and graphitic grains, respectively, where D is the distance to the nova in kiloparsecs (kpc). Spectroscopic analysis indicates the development of P-Cygni profiles, where slower absorption components emerge prior to the optical peak and transition to faster features after the peak (see Figure 2). This behaviour aligns with variations in optical depths and interactions among internal ejecta. The continuum emission transitions from a non-blackbody spectrum, primarily influenced by free–free processes, to a shape resembling a blackbody, indicative of the formation of a pseudo-photosphere. A basic photoionization model of V6594 Sgr indicates that its fundamental properties lie within the typical parameter space of classical nova evolution. Overall, our findings offer valuable insights into the complex dynamics of nova outbursts, especially during the poorly understood pre-peak phase.

**Source/Reference of the Work**: https://doi.org/10.1093/mnras/staf933

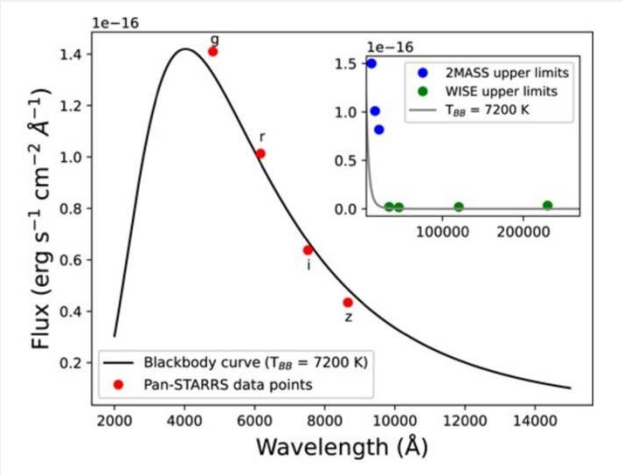



***Figure Caption***: *The blackbody curve with the temperature of 7200 K. Dereddened flux corresponding to the Pan-STARRS g,r,i,z band magnitudes are shown in solid circles.*

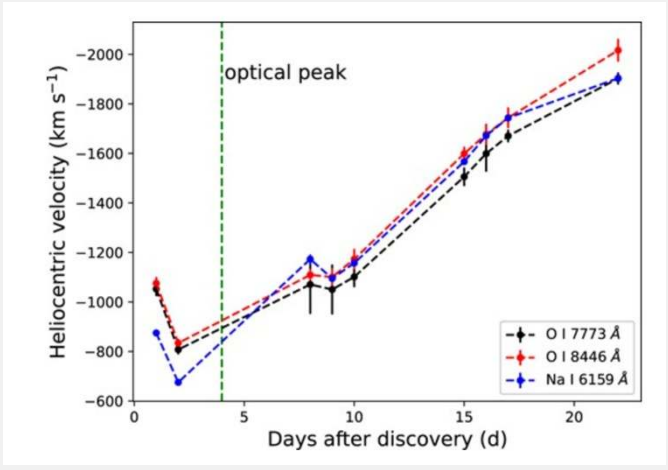



***Figure Caption***: *Evolution of velocities of the blue-shifted absorption trough centre of O i 7773, 8448 Å, and Na i 6159 Å emission line.*

## Variation in horizontal component of geomagnetic field during the April 2023 space weather event over ±75° longitude sectors: Insights

(***Rao**, S.S*, Srivastava, N. & Chakrabarty, D.)*

**The Author**

S. S. Rao

The present study focuses on analyzing the latitudinal variation in H along two longitude sectors (±75°) during the passage of a CME which occurred on April 21, 2023 resulting in a geomagnetic storm (Dst -213nT) during April 23-24, 2023 using the data from INTERMAGNET magnetometer network. The geomagnetic storm of 23–24 April 2023 was a double-dip storm, with both dips in Dst index occurring below −100 nT and having unique features of pre-existing small magnetic flux rope, CME shock (without an SSC), CME sheath, and magnetic cloud (MC) region. In this view, it is very interesting to see the response of the geomagnetic field during a complex scenario of different resulting electric fields of magnetospheric and ionospheric origin. Compared to the earlier studies wherein step-like impulses at 00–450, Gaussian-like impulses at 450–650, and reverse impulses at 650–900 latitudes are observed and reported, the preliminary impulse (PI) in the present study is not followed by the main impulse and also has a different pattern. Notably, a beat-type impulse is observed at the American mid-latitude station. The amplitude of the shock time PI is observed to decrease towards low latitudes over the Indian sector. In contrast, it is observed to decrease from low to mid-latitudes in the American sector. The larger amplitude of H-variation during the passage of the CME sheath than the MC is observed, particularly over mid-latitude in the Indian sector. Since the passage of the CME sheath coincides with the night sector and the passage of MC meets with the pre-noon sector, still the larger amplitude of H-variation during the CME sheath occurs when the night-time currents are mainly of magnetospheric origin due to very low ionospheric conductivity.

Source/Reference of the Work: https://doi.org/10.1029/2025JA033827

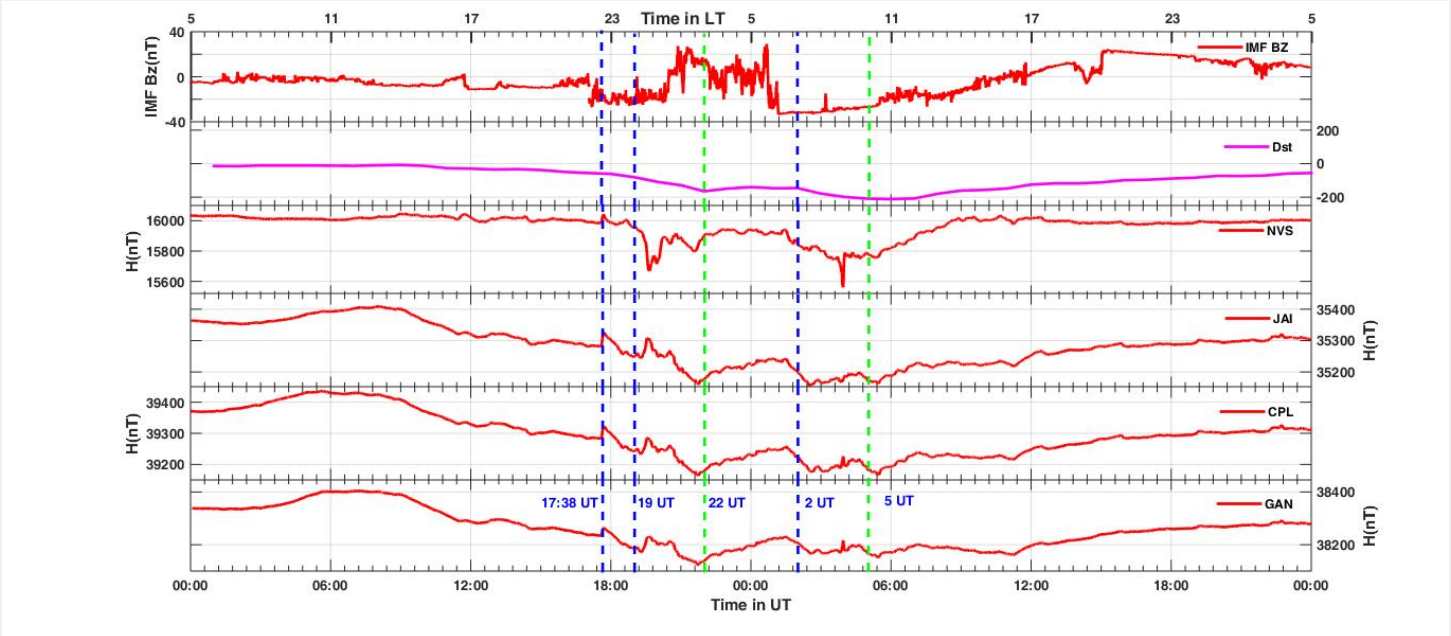



**Figure Caption:** Variation of IMF Bz (top panel), Dst (second top panel) and H-component (lower panels) at different latitudes along the Indian longitude sector during April 23-24, 2023 geomagnetic storm. The first vertical blue line marks the arrival of shock (17:38 UT on April 23). The second and third vertical blue lines mark the I- and II-dips in IMF Bz, and the first and second vertical green lines mark the I- and II-dips in Dst.

## Overestimation of the bottom-side ionospheric TEC in the IRI model over low latitude regions

(***Venkatesh, K.,*** *Kava, H., Pallamraju D. and Seemala G. K.)*

### The Author

Venkatesh Kavutarapu

Ionospheric Total Electron Content (TEC) is the most crucial parameter, accurate knowledge of which is essential to estimate the range delays experienced by radio signals traversing the ionosphere. It is known that the TEC variations estimated by the International Reference Ionosphere (IRI) model show large differences from observed values over the low latitudes. While studies on the topside ionospheric contributions to the errors in the modelled TEC by the IRI are under active consideration, there have been no studies on the role of the contribution of the bottom-side ionosphere. As ionosondes provide the true information on the bottom-side TEC, in this work a comparative study has been carried out in discerning the role of various parameters that go into the estimates of bottom-side density profiles and electron content in the IRI model (TECb_iri), using digisonde observations over Ahmedabad.
It is found that the bottom-side ionospheric TEC (TECb_iri) is largely overestimated by the IRI model during daytime (0800 and 2000 LT) irrespective of the season and solar activity as shown in Figure a. The positive correlation between the model errors in TECb and B0 (Figure 1c) infers that the miss-modelling of B0 is the significant contributor for the discrepancies in TECb_iri. This study further demonstrates that the variations in the vertical distribution of the bottom-side ionospheric plasma and the behaviour of F-layer peak parameters driven by vibrant electrodynamic processes are not suitably mapped in the temporal and seasonal changes in B0 in the IRI model. These results are first of its kind and provide crucial insights for implementing modifications/updates in the IRI in order to characterize the ionospheric TEC with improved accuracies over the low latitudes.

**Source/Reference of the Work**: https://doi.org/10.1029/2025JA033827

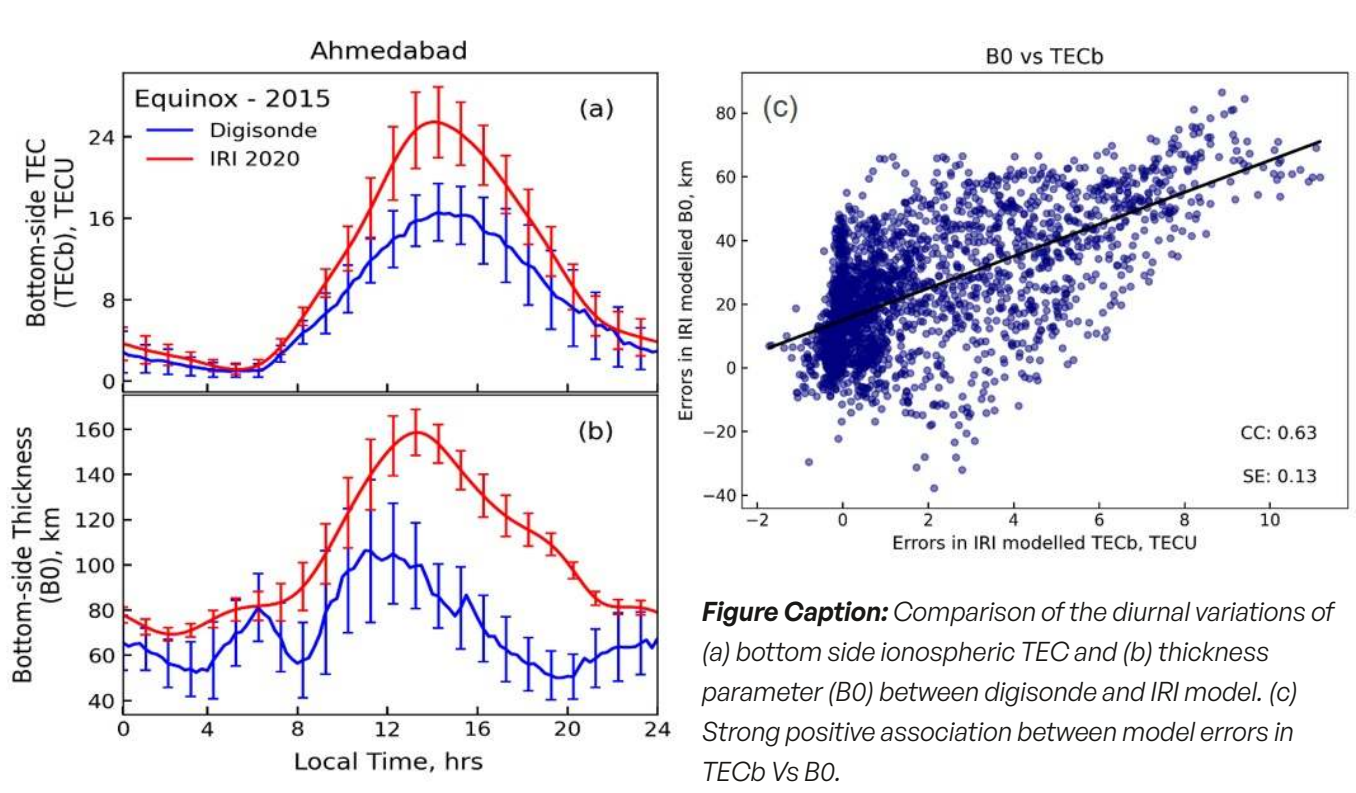



***Figure Caption:*** *Comparison of the diurnal variations of (a) bottom side ionospheric TEC and (b) thickness parameter (B0) between digisonde and IRI model. (c) Strong positive association between model errors in TECb Vs B0.*

## Unveiling Physical Conditions and Star Formation Processes in the G47 Filamentary Cloud

**The Author**

Omkar Jadhav

*(**Jadhav, O. R.** , Dewangan, L. K. , Ismail, A. H., Bhadari, N. K., Maity, A. K., Yadav, R.K., Salouci, M., Sanhueza, P., and Sharma, S.)*

Infrared observations from space-based telescopes, such as Spitzer and Herschel, have revealed the presence of mid-infrared (MIR) bubbles/HII regions embedded within filamentary structures in massive star-forming regions. These MIR bubbles, powered by massive stars, interact with their environment through radiative and mechanical feedback, significantly shaping the parental filamentary structures. The evolution of such filamentary structures is governed by a complex interplay between magnetic fields, turbulence, and gravity. Hence, in order to explore the role of magnetic fields, turbulence, and gravity, we present a multi-wavelength analysis of the G47 filamentary cloud (distance ~4.44 kpc) hosting MIR bubbles/ HII regions (see Figures a and c). Sub-millimeter polarimetric observations reveal that the magnetic field lines orientation is predominantly perpendicular to the major axis of the filament, while in lower-density regions, the field lines exhibit a curved or parallel configuration (see Figure b). In Figure d, position–position–velocity (PPV) diagram show two distinct velocity components toward the G47 cloud, likely driven by the expansion of embedded HII regions. This expansion is likely responsible for the curved magnetic field orientations. The energy budget calculations reveal B-field energy dominates the cloud dynamics, accounting for over 80% of the total energy.

**Source/Reference of the Work**: https://www.doi.org/10.3847/1538-4357/adcee4

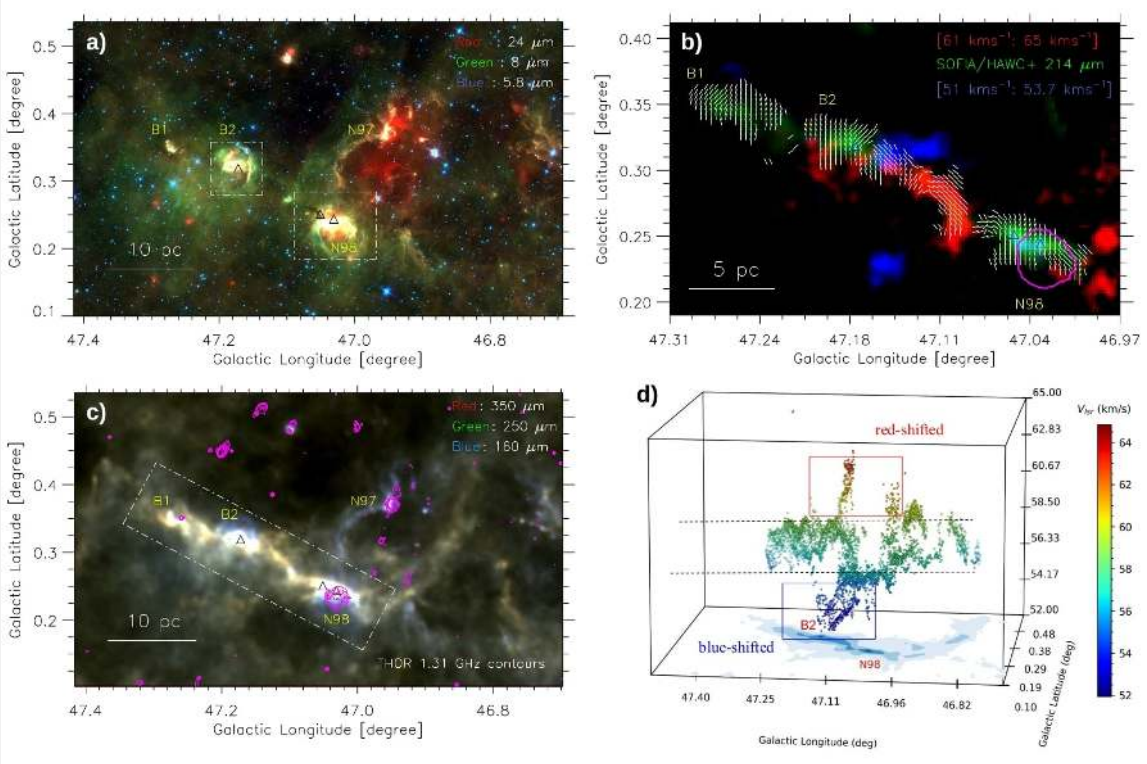



***Figure Caption:*** *a) Spitzer three color composite map of G47 cloud; b) Three color composite map showing multiple components toward the cloud; c) Herschel three color composite map; d) Position-position-velocity diagram of the G47 cloud.*

## Thermonuclear X-ray bursts and reflection features in low-mass X-ray binary Aql X-1

(***Mandal, M.***, *Pal, S., Jaisawal, G.K. , Lohfink, A., Naik, S., and Chauhan, J.)*

### The Author

Manoj Mandal

An accreting millisecond pulsar (AMSP) is a weakly magnetized neutron star that orbits a low-mass companion star in a binary system. The AMSPs are considered a unique laboratory for probing thermonuclear X-ray bursts and their effects on the truncated accretion disk at the magnetosphere boundary. Matter from the low-mass companion gets accreted onto the surface of the neutron star, compressed and heated up, causing thermonuclear bursts, which are unstable burnings of helium and/or hydrogen-helium mixture. Thermonuclear X-ray bursts show a sharp rise, followed by an exponential decay. We detected several thermonuclear bursts from the neutron star low-mass X-ray binary Aql X-1 using different X-ray instruments, NICER and NuSTAR. The burst profiles show a strong energy dependence (left panel of the figure). A detailed time-resolved spectral analysis is conducted to investigate the evolution of emission components during the burst. The relativistic disk reflection model is used to investigate burst-disk interactions and variations in disk properties. The bursting regime and underlying burning processes are further characterized by estimating the mass accretion rate. The time-resolved burst spectra can be described using the variable persistent emission method, indicating that the soft excess may arise from enhanced mass accretion onto the neutron star, potentially due to the Poynting-Robertson drag. Alternatively, the disk reflection model can also be used to explain the soft excess emission during a burst, which supports the anticipation of the interaction of burst photons with the accretion disk. Alternatively, the soft excess can be modeled using the disk reflection model, and its contribution is found to be approximately 20% of the total emission, as observed during the NICER burst. During the burst, the flux of the reflection component is found to be strongly correlated with the flux of the blackbody component. The measurement of the mass accretion rate indicates that the hydrogen burns stably, and helium burning drives the thermal instability. Based on the time to accumulate the critical column of fuel, the burst may be a “pure He” burst or a “mixed H/He” burst. However, the longer burst duration suggests that a mixed H/He fuel or an H-rich fuel may power the burst. We also detected X-ray reflection features, including a broad iron line at 6.4 keV and a Compton hump at approximately 20 keV, using broadband NuSTAR, NICER, and Swift spectral studies (right panels of the figure). Using reflection spectral modeling of persistent spectra, several disk parameters, including the inner disk radius and the angle of inclination of the disk with respect to the observer, are determined. Using these results, the strength of the magnetic field at the poles of the neutron star is estimated to be in the order of $10^9$ Gauss, assuming the inner disk is truncated at the magnetosphere boundary.

**Source/Reference of the Work**: https://doi.org/10.1016/j.jheap.2025.100387

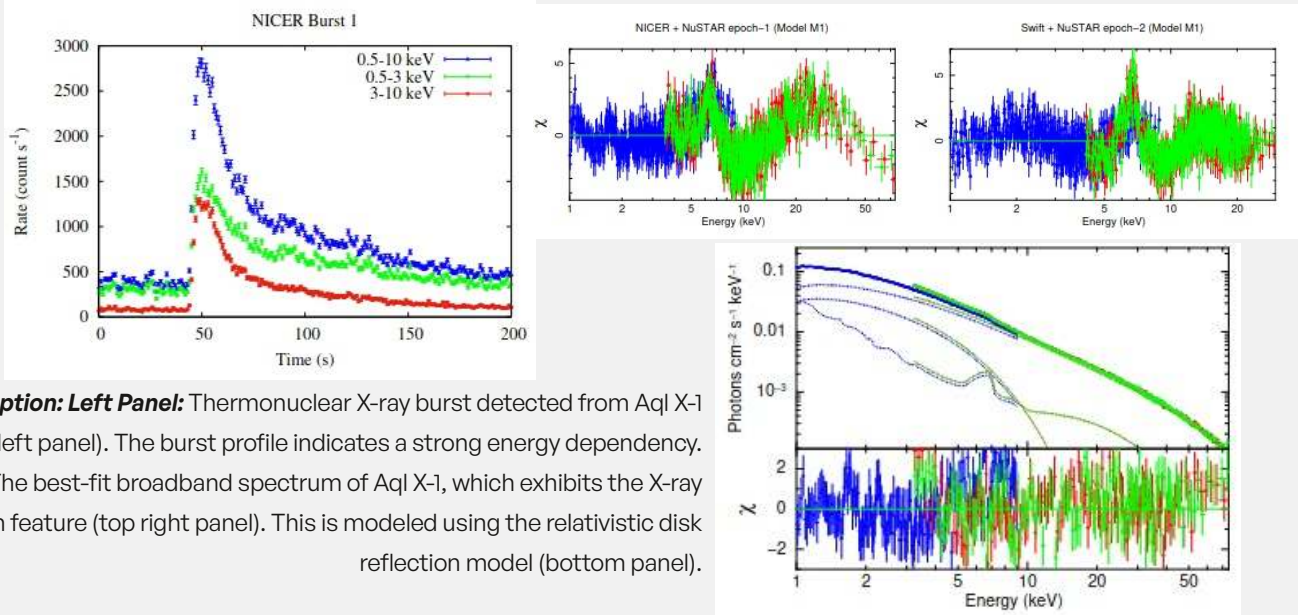



***Figure Caption: Left Panel:*** Thermonuclear X-ray burst detected from Aql X-1 using NICER (left panel). The burst profile indicates a strong energy dependency. ***Right Panel:*** The best-fit broadband spectrum of Aql X-1, which exhibits the X-ray reflection feature (top right panel). This is modeled using the relativistic disk reflection model (bottom panel).

## Establishment of the new Quantum Materials and Nanophotonics Laboratory

A new research facility, the Quantum Materials and Nanophotonics Laboratory, has been established within the AMOPH division of PRL. The laboratory is dedicated to the fundamental investigation of quantum materials and the exploration of their potential applications in emerging quantum technologies. Current research efforts are centered around the following cutting-edge themes:

1. Quantum materials under extreme conditions such as ultra-low temperature (4K) and ultra-high pressure (50 GPa): Raman scattering.

2. Quantum materials in plasmonic cavities: strong light-matter coupling

3. Quantum dot based single photon sources for quantum technology

The laboratory has developed the following state-of-the-art, custom-built experimental facilities:

**I. Dark-field microspectroscopic setup:** This unique setup is capable of measuring light scattering from individual nanoparticles as small as 50 nm. Additionally, it can detect light emission from a single quantum dot.

**II.Raman spectrometer integrated with cryogenic (4K) optical cryostat:** This setup enables Raman and photoluminescence measurements across a wide temperature range—from 600 K down to 4 K—and under varying pressure conditions, from atmospheric pressure up to 50 GPa.

**III. Time resolved laser scanning system integrated with cryogenic (77K) optical cryostat:** This setup is capable of measuring the single-photon purity of quantum light sources over a broad temperature range, from 77 K to 600 K. It also enables the measurement of excited-state lifetimes in various systems within the same temperature range.

**IV. Nanofabrication facility:** A state-of-the-art nanofabrication facility has been established, enabling the fabrication of advanced electronic and photonic chips with feature resolutions as fine as 10 nanometers.

### Scientific Results from the laboratory:

Several noteworthy studies have been conducted using the advanced facilities developed in the laboratory. Some of these findings have already been published in the following international peer-reviewed journals:

(1) “Achieving strong exciton-plasmon coupling via substrate engineering” Sahil Rathi, Satyendra Nath Gupta, **Journal of Nanophotonics, 2, 026005 (2025)**

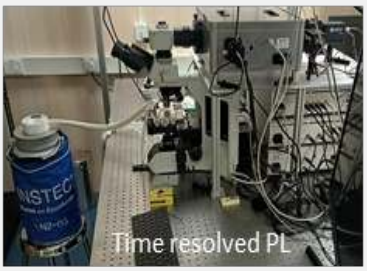
(2) “Effect of magnetic ordering on the phonons of Co3Sn2S2: Temperature-dependent Raman study” Sahil Rathi, Kapil Kumar, VPS Awana, Satyendra Nath Gupta, **Physica B: Condensed Matter, 712, 417276 (2025)**

(3) “Decorated Graphene Quantum Dots on “Puckered” Graphene Quantum Sheets for Photosensing Applications” Rajib Mahato, Maruthi Mala, Verkala Tanuj Kumar, Hrishi Viral Harsora, Albin Tony, Sahil Rathi, Satyendra Nath Gupta, Anagh Bhaumik, **ACS Applied Optical Materials, 2025.**


Nanofabrication


4K Raman

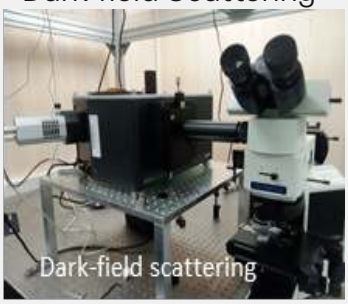
Time-resolved PL





Thin Film Deposition

Dark-field Scattering





Laser Writer

*Glimpses of facilities and instruments within the newly established Quantum Materials and Nanophotonics Laboratory*

## Celebration of World Blood Donor Day 2025
## "GIVE BLOOD, GIVE HOPE: TOGETHER WE SAVE LIVES!"

World Blood Donor Day is a global celebration held annually on the 14th of June every year. To commemorate World Blood Donor Day 2025, Dispensary PRL scheduled Blood Donation Camp on 17th June 2025 in association with Sarvoday Charitable Trust Blood Centre, Ahmedabad.

Prior to the commencement of the camp, efforts had been conducted through various channels to raise awareness & encouragement. Registration forms had been made available online & streamlining the registration process. Dispensary team communicated with PRL employees, Research Fellows, Contractual staff, CISF and others to make this camp successful by coming in a large number to donate their blood. To ensure a smooth and organized event, blood donors' arrivals had been scheduled in phases to avoid any overcrowding.

Blood Donation Camp commenced at Navrangpura Dispensary on 17 June 2025 from 09:00 am. Total 41 voluntary donors had registered themselves in advance to contribute their gesture as a unit of blood. Total 50 blood donors had visited the camp to donate their blood. 4 out of them were deferred due to some medical reasons and 46 donors were found suitable for blood donation. The camp activity concluded at 01:00 pm. Hence, 46 units of blood were collected within 4 hours of the Blood Donation Camp.

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


*Glimpses from the event*

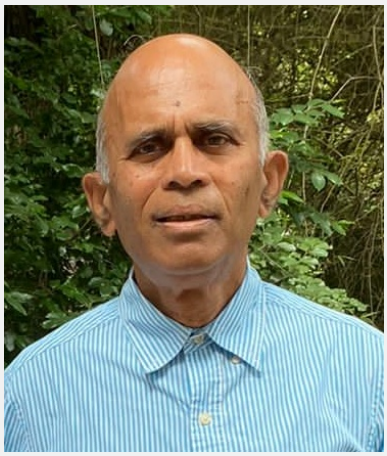
## Visit of Students from Shiksha Sambal

Students from Shiksha Sambal visited Udaipur Solar Observatory on 17.06.2025. Shiksha Sambal is a flagship programme of Hindustan Zinc Limited (HZL) in association with Vidya Bhawan Society (VBS) for providing quality education to underprivileged rural children at the senior school level. Located in 72 Government Secondary and Senior Secondary schools in 7 districts of Rajasthan, Shiksha Sambal engages with about 8000 students.

Dr. Binal D. Patel from USO gave an introductory lecture to the students regarding Sun and Solar activity and space weather connection. Prof. Brajesh Kumar addressed the students and explained about different observational facilities at USO. Dr. Anshu explained the importance of observing the Sun in radio wavelengths. Students were very inquisitive and interacted with the research scholars and the staff at USO.

*Glimpses from the event*

## 105th PRL ka Amrut Vyakhyan



The 105th PRL Ka Amrut Vyakhyaan was delivered by Prof. G. Baskaran (Professor Emeritus, IIT Madras, and Perimeter Institute for Theoretical Physics and Matscience) on 18th June 2025.

In this Vyakhyaan, Prof. Baskaran discussed the Quantum Origin of Modern Artificial Intelligence, a topic that is very important in the current scenario of the rise of AI.

Prof. Baskaran started the Vyakhyaan by introducing the hypothesis by SN Bose of quantized spin-1 angular momenta carried by photon quanta and quantized spin-1/2 electron spin angular momentum by Pauli. He argued that this heralded the revolutionary developments in the hands of Dirac and others. Heisenberg antiferromagnetic exchange interaction, Hund's ferromagnetic coupling and RKKY oscillatory interactions between two localized spins are special quantum phenomena, that follow from Fermi statistics obeyed electrons, emerged. Metals like Cu, containing dilute magnetic impurities such as Mn, results in a frustrated spin glass phase, described by the theory of Edwards-Anderson. Spin-glass theory, inspired Hopfield's neural network model for associative memory exhibited by brain. Resulting Boltzman machine, Deep Learning algorithm, ChatGPT etc., have resulted in modern AI with ongoing surprises and puzzles.

Overall, Prof. Baskaran's Vyakhyaan was a highly illuminating discussion on Modern Artificial Intelligence, and the role of quantum mechanics in its development.

Youtube link:
https://www.youtube.com/watch v=zFZB9BKtE5c&pp=ygURMTA1IHBybCBrYSBhbXJ1dCA%3D

## Celebration of International Day of Yoga 2025

The 11th International Day of Yoga was celebrated on 21.06.2025 at the PRL Main campus. The theme for this year's event was "Yoga for One Earth, One Health."
The program commenced with an overview of the importance of the International Day of Yoga by Mr. Pradeep Kumar Sharma. Smt. Harsha Parmar introduced the guest Mr. Shishu Ranjan, Inspector, CISF and a Yoga Practitioner.

Mr. Shishu Ranjan conducted the yoga session by explaining the benefits of warm-up exercises, which help make the body more flexible for yoga practice. He demonstrated a series of warm-up exercises and discussed the different types of yoga positions, including standing poses, sitting poses, and lying poses. Following this, Mr. Shishu Ranjan provided a step-by-step demonstration of various asanas (yoga postures). All participants practiced and performed the sitting, standing, and lying asanas while he concurrently explained their importance. At the end of the session, all participants engaged in pranayama (breathing exercises) followed by Yog Nidra, a systematic relaxation process often practiced in Savasana (corpse pose) to promote deep relaxation and reduce stress.

After the yoga session, Mr. Shishu Ranjan was honored by Prof. Anil Bhardwaj, Director, PRL, who presented him with a pot of tulsi. Mrs. Priti Poddar delivered the vote of thanks at the conclusion of the session.

निरीक्षण की कुछ झलकियां
**Glimpses from the Event**

## Bharat Ratna Dr. B. R. Ambedkar Jayanti celebration

On the occasion of Dr. B. R. Ambedkar Jayanti, a lecture was organized on Tuesday, 24th June 2025, at the Bay area of the 2.5m Telescope building in Gurushikhar, Mount Abu. The event was held in a hybrid mode, featuring distinguished speaker Shri Darshan Gola, Director/IG of the Internal Security Academy in Mount Abu. PRL members from the Ahmedabad and Udaipur campuses joined the lecture online, and students from two local schools in Mt. Abu were also invited to attend.

The lecture was titled "भारतीय संविधान और डॉ. अंबेडकर का कार्य: सभी के लिए एक संदेश"|

To commemorate the birth anniversary of Dr. B. R. Ambedkar, the program began with a lamp-lighting ceremony and the offering of floral tributes to the portrait of Bharat Ratna Dr. B. R. Ambedkar.
During the lecture, Shri Darshan Gola summarized Dr. B. R. Ambedkar's contributions to the Indian Constitution, which established principles of social justice, equality, and fraternity. He also highlighted Dr. Ambedkar's work as an economist, social reformer, and political leader, noting that his efforts shaped key policies and institutions that continue to influence India today.
Shri. Darshan Gola further discussed Dr. Ambedkar's role in introducing labor reforms, which included reducing working hours, providing maternity benefits, and establishing the principle of equal pay for equal work.
At the end of the session, an engaging Q&A segment was held, allowing the audience to gain new insights and learn more about the subject.
The programme concluded with a vote of thanks, followed by a tree planting ceremony.

*Glimpses from the event*

## पीआरएल अमृत राजभाषा व्याकरण 25
## PRL Amrut Rajbhasha Vyakhyaan (PARV) 25

"पीआरएल अमृत राजभाषा व्याकरण (PARV)" का 25वां व्याख्यान 25 जून, 2025 को के.आर. रामनाथन सभागार में आयोजित किया गया था। इस अवसर के प्रख्यात वक्ता डॉ. सूर्यकांत गुप्ता, वैज्ञानिक अधिकारी-जी, प्लाज्मा अनुसंधान संस्थान, गांधीनगर थे।
The 25th lecture of "PRL Amrut Rajbhasha Vyakhyaan (PARV)" was held on June 25, 2025 at K. R. Ramanathan Auditorium. The eminent speaker for the occasion was Dr. Suryakant Gupta, Scientific Officer-G, Institute for Plasma Research, Gandhinagar.

डॉ. सूर्यकान्त बी. गुप्ता ने 'देवी अहिल्या विश्वविद्यालय', इंदौर से 'इलेक्ट्रॉनिक्स और संचार' में स्नातकोत्तर और एमबीए की उपाधियां प्राप्त की है। उन्होंने 'कार्लसरूहे इंस्टीट्यूट ऑफ टेक्नोलोजी', जर्मनी से 'सूचना और संचार प्रौद्योगिकी' में पीएचडी की उपाधि प्राप्त की है। उनके पास भारत सरकार के अंतरिक्ष विभाग, परमाणु ऊर्जा विभाग, और फ़ोर्सचुंग्ससेंत्रुम कार्लसरूहे, जर्मनी जैसी प्रतिष्ठित राष्ट्रीय और अंतर्राष्ट्रीय वैज्ञानिक प्रयोगशालाओं में 30 से अधिक वर्षों का शोधकार्यों का अनुभव है। डॉ गुप्ता ने 2 पीएचडी तथा 50 से अधिक स्नातकोत्तर छात्रों का मार्गदर्शन किया है तथा भारत और विदेशों में 60 से अधिक आमंत्रित व्याख्यान दिए हैं। वह आईईटीई के फेलो और एचबीएनआई के नोडल अधिकारी भी हैं। वर्तमान में वे प्लाज़्मा अनुसंधान संस्थान, गांधीनगर में वैज्ञानिक अधिकारी-जी के पद पर कार्यरत हैं।
Dr. Suryakant B. Gupta has done post-graduation in Electronics and Communication and MBA from Devi Ahilya Vishwavidyalaya, Indore. He has done PhD in Information and Communication Technology from Karlsruhe Institute of Technology, Germany. He has more than 30 years of research experience in prestigious national and international scientific laboratories like Department of Space, Department of Atomic Energy, Government of India, and Forschungscentrum Karlsruhe, Germany. Dr. Gupta has mentored 2 PhD and more than 50 postgraduate students and has delivered more than 60 invited talks in India and abroad. He is also a Fellow of IETE and Nodal Officer of HBNI. Presently, he is working as Scientific Officer-G at Institute for Plasma Research, Gandhinagar.

व्याख्यान का शीर्षक था/ The vyakhyaan was titled "पर्यावरण हितैषी 'प्लाज्मा तकनीक' का हमारे दैनिक जीवन में योगदान"
व्याख्यान में डॉ. गुप्ता ने चर्चा की कि समाज का सतत विकास", वैज्ञानिक और औद्योगिक प्रगति के बहुत करीब से जुड़ा हुआ है। अब तक यह प्रगति, उच्च उत्पादकता से जुड़ी हुई थी और प्राकृतिक संसाधनों के संरक्षण के बारे में बहुत कम सोचा गया था। आखिरकार, औद्योगीकरण के लाभों का आनंद लेने के बाद, हमें इसके प्रतिकूल प्रभाव का एहसास होने लगा है। आजकल, जलवायु परिवर्तन, कैंसरकारी और ग्रीन हाउस गैसों का उत्सर्जन, ओजोन परत का नुकसान और नदी प्रदूषण चर्चा का एक बहुत ही आम विषय बन गए हैं।
In the lecture, Dr. Gupta discussed that sustainable development of society is very closely linked to scientific and industrial progress and so far this progress was linked to higher productivity and little thought was given to the conservation of natural resources. Eventually, after enjoying the benefits of industrialization, we started realizing its adverse effects. Nowadays, climate change, emission of

carcinogenic and greenhouse gases, depletion of ozone layer and river pollution have become a very common topic of discussion.

उन्होंने यह भी बताया कि प्लाज़्मा तकनीक के द्वारा, प्रचलित पारंपरिक प्रदुषित तकनीकों के प्रतिकूल प्रभावों का सफलतापूर्वक निदान करने के साथ-साथ भविष्य की जरूरतों को भी पूरा करने हेतु नई पर्यावरण हितैषी तकनीकों का विकास किया जा सकता है। ऐसे क्षेत्र जहाँ गुणवत्ता, उत्पादकता, पर्यावरण अनुकूलता, सटीकता, ऊर्जा, पर्यावरण, स्वास्थ्य और सामरिक आवश्यकताओं को प्राथमिकता दी जाती है वहां प्लाज़्मा आधारित तकनीकें बहुत महत्वपूर्ण भूमिका निभा सकती हैं।
He also explained that through plasma technology, we can successfully address the adverse effects of the prevailing conventional polluting technologies as well as develop new environmentally friendly technologies to meet future needs. Plasma based technologies can play a very important role in areas where quality, productivity, environmental friendliness, precision, energy, environment, health and strategic needs are given priority.

व्याख्यान के बाद एक रोचक प्रश्नोत्तर सत्र हुआ, जिसने दर्शकों को विषय पर नए दृष्टिकोण और अधिक जानकारी प्रदान की। इसके बाद डॉ. गुप्ता को पीआरएल के निदेशक ने सम्मानित किया।
The lecture was followed by an interesting Q&A session, which provided the audience with new perspectives and further information on the topic. Thereafter, Dr. Gupta was felicitated by Director, PRL.

YouTube link:
https://www.youtube.com/watch v=lU2MdZ3fy6U&pp=ygUNcHJsIGFobWVkYWJhZA%3D%3D

## राजभाषा विभाग स्वर्ण जयंती समारोह
## Official Language Department Golden Jubilee Celebration

राजभाषा विभाग के 50 वर्ष पूरे होने के उपलक्ष्य में 26 जून 2025 को भारत मंडपम्, नई दिल्ली में "राजभाषा विभाग स्वर्ण जयंती समारोह" का आयोजन किया गया। इस समारोह की अध्यक्षता माननीय गृह एवं सहकारिता मंत्री माननीय श्री अमित शाह जी द्वारा की गई। भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद से उपरोक्त समारोह में सहायक निदेशक (रा.भा.), सहायक (राजभाषा), उदयपुर सौर वेधशाला से वरिष्ठ प्रशासनिक अधिकारी तथा माउंट आबू वेधशाला से राजभाषा प्रभारी वैज्ञानिक/इंजीनियर-एस.डी. ने भाग लिया।

To commemorate the completion of 50 years of the Official Language Department, "**Official Language Department Golden Jubilee Celebration**" was organized on 26 June 2025 at Bharat Mandapam, New Delhi. The ceremony was chaired by Honorable Home and Cooperation Minister Honorable Shri Amit Shah ji. The representatives of PRL participated in the above celebration among which Assistant Director (OL), Assistant (Rajbhasha) from Physical Research Laboratory, Ahmedabad, Senior Administrative Officer from Udaipur Solar Observatory and Scientist/Engineer-SD in charge of Official Language from Mount Abu Observatory.


स्वर्ण जयंती समारोह के कुछ चित्र **Glimpses from the Event**

## 3rd CNIT Division Nukkad – Chai Pe Byte of the Year 2025
## "Phishing Unmasked: How to Spot and Stop Online Scam"

The 3rd CNIT Division Nukkad – Chai Pe Byte on "Phishing Unmasked: How to Spot and Stop Online Scam" was held on June 26, 2025 in hybrid mode during 10:00hrs to 11:30hrs. There were 36 participants attended the session. In the session, 90% discussion was in Hindi and 10% discussion was in the English.

The primary objective of the "Chai Pe Byte" initiative is to facilitate knowledge sharing and experience exchange, identify and address IT related concerns of users, and explore potential solutions. This initiative aims to foster a stronger bond between the CNIT division and PRL colleagues, ultimately enhancing the overall effectiveness and efficiency of PRL's IT services and facilities.

In the lead-up to the event, the CNIT division conducted a simulated phishing email mock drill to check the overall status of cybersecurity awareness within the PRL fraternity. As part of this mock drill exercise, a mock phishing email was sent to PRL users who access their email through the "Squirrelmail / Horde" web-based platform.

Mr. Jigar Raval opened the session with a warm welcome to all participants, setting the tone for an engaging and insightful presenta-tion titled "Phishing Unmasked: How to Spot and Stop Online Scams." His talk provided a deep dive into the structure of emails, ex-posed the common tactics used in phishing campaigns, and unraveled the various deceptive methods cyber criminals employ to distribute fraudulent emails.

In addition to explaining the technical layers behind email filtering and logging systems currently in place within the PRL email infrastructure, Mr. Jigar Raval placed a strong emphasis on the role of individual vigilance. He highlighted how cultivating simple, consistent safety habits in our daily digital routines—such as verifying sender addresses, avoid clicking suspicious links or opening attachments, use of strong and unique passwords, enabling of multi-factor authentication and staying alert to unusual requests—can serve as powerful defenses against cyber threats. His message underscored the idea that while technology provides essential safeguards, our everyday awareness and responsible online behavior form the first line of defense.

In addition to discussing cybersecurity, Mr. Jigar Raval shed light on an often-overlooked environmental concern: the carbon footprint of everyday digital communication. He emphasized that even routine activities like sending emails contribute to greenhouse gas emissions due to the energy consumed by data centers, devices, and networks. Citing a BBC.org report (Ref.: https://www.bbc.com/future/article/20200305-why-your-internet-habits-are-not-as-clean-as-you-think), he explained that a single email can emit anywhere from 0.2g to 26g of $CO_2$ depending on its length and attachments. Mr. Jigar encouraged adopting simple habits—such as avoiding unnecessary emails, limiting attachments, and unsubscribing from irrelevant mailing lists—to help reduce this impact. He stressed that small changes in our digital behavior can collectively make a significant difference. This perspective not only broadens our understanding of sustainability but also empowers individuals to take action in their daily routines.

Dr. Namit Mahajan, Chair of the IT-Cyber Security Committee at PRL, highlighted the vital importance of safety and security in our increasingly digital world. He reinforced his message through compelling real-life examples that underscored the risks we face and the practical steps we can take to counter

them. By sharing these incidents, Dr. Mahajan effectively demonstrated how understanding past cyber incidents can sharpen our ability to identify warning signs and respond proactively to potential threats.
The session also had a live demonstration by Mr. Girish Padia, Mr. Vaibhav Rathore, Mr. Tejas Sarvaiya, and Mr. Dinesh Mehta, who showcased how attackers manipulate parameters like the Real Name, Sender Email Address, Web links and Attachments to deceive recipients. To conclude, participants engaged in a quiz (URL: https://phishingquiz.withgoogle.com/) to reinforce their understanding of the material presented.

The session provided valuable insights into phishing tactics and equipped attendees with actionable strategies to defend against them. Participants learned how to analyze email headers and inspect sender's details. Finally, the importance of Awareness/Vigilant Nature, Multi-Factor Authentication (MFA) and Antivirus etc. were highlighted as a vital layer of defense in modern cyber security practices.All participants demonstrated enthusiastic engagement throughout the event and sincerely appreciated the dedicated efforts of the CNIT Division. Their active involvement enriched the overall learning experience and made the session truly interactive. The report is available on CNIT Division Website under Intranet Access URL - https://www.prl.res.in/prl-eng/cc/intranet/chaipebyte.

*Glimpses from the event*

## PRL Monthly Publications Digest (June 2025)

### Atomic, Molecular and Optical Physics [7]

1. A. R. Vernon, C. L. Binnersley, R. F. Garcia Ruiz, K. M. Lynch, T. Miyagi, J. Billowes, M. L. Bissell, T. E. Cocolios, J. P. Delaroche, J. Dobaczewski, M. Dupuis, K. T. Flanagan, W. Gins, M. Girod, G. Georgiev, R. P. de Groote, J. D. Holt, J. Hustings, Á. Koszorús, D. Leimbach, J. Libert, W. Nazarewicz, G. Neyens, N. Pillet, P.-G. Reinhard, S. Rothe, B. K. Sahoo, S. R. Stroberg, S. G. Wilkins, X. F. Yang, Z. Y. Xu, and D. T. Yordanov, 2025, Reduction in Nuclear Size and Quadrupole Deformation of High-Spin Isomers of 127,129In, Physical Review Letters, Date of Publication: 26/06/2025, Impact Factor: 8.1

2. A. R. Vernon, C. L. Binnersley, B. K. Sahoo, J. Billowes, M. L. Bissell, T. E. Cocolios, R. P. de Groote, G. J. Farooq-Smith, K. T. Flanagan, R. F. Garcia Ruiz, G. Georgiev, W. Gins, F. P. Gustafsson, R. Heinke, J. D. Holt, A. Kanellakopoulos, J. Karthein, Á. Koszorús, D. Leimbach, K. M. Lynch, T. Miyagi, W. Nazarewicz, G. Neyens, P.-G. Reinhard, C. M. Ricketts, S. R. Stroberg, S. G. Wilkins, X. F. Yang and D. T. Yordanov, 2025, Variations in the charge radii of indium isotopes between , Physical Review C, Date of Publication: 26/06/2025, Impact Factor: 3.4

3. Rajib Mahato, Maruthi Mala, Verkala Tanuj Kumar, Hrishi Viral Harsora, Albin Tony, Sahil Rathi, Satyendra Nath Gupta, Anagh Bhaumik, 2025, Decorated Graphene Quantum Dots on “Puckered” Graphene Quantum Sheets for Photosensing Applications, ACS Applied Optical Materials, Date of Publication: 14/06/2025, Impact Factor:

4. A. Chakraborty and B. K. Sahoo, 2025, Demonstrating correlation trends in the electric dipole polarizabilities of many low-lying states in Cs i through first-principles calculations, Physical Review A, Date of Publication: 12/06/2025, Impact Factor: 3.0

5. Andrew Forbes, Mohamed Swilliam, Kayn A Forbes, Yijie Shen, Chao He, Shuyuan Xiao, Jorg B Gotte, Goutam K Samanta, et. al., 2025, (Editorial) A perspective on 25 years of advances as reported in the Journal of Optics, Journal of Optics, Date of Publication: 10/06/2025, Impact Factor: 2

6. Sahil Rathi, Satyendra Nath Gupta, 2025, Achieving strong exciton–plasmon coupling via substrate engineering, Journal of Nanophotonics, Date of Publication: 03/06/2025, Impact Factor: 1.1

7. B. K. Sahoo, 2025, Precise determination of electric quadrupole moments and isotope shift constants of Yb+ in pursuance of probing fundamental physics and nuclear radii, Phys. Rev. A 111, L060801 (2025), Date of Publication: 02/06/2025, Impact Factor: 3.0

### Astronomy & Astrophysics Division [03]

1. Swagat R. Das, Saumya Gupta, Jessy Jose, Manash Samal, J. Gregory Herczeg, Zhen Guo, Surhud More and Prem Prakash, 2025, Subaru Hyper-Supreme Cam observations of IC 1396: Source catalogue, member population, and sub-clusters of the complex, Astronomy & Astrophysics, Date of Publication: 27/06/2025, Impact Factor: 5.8

2. Pandey, R. , M. K. Srivastava, A. Maiti , V. Kumar , U. Munari , S. Dallaporta , A. Vagnozzi , D.P.K. Banerjee , V. Joshi , and P. Cazzato, 2025, Spectroscopic and photometric insights into the early evolution of Nova V6594 Sgr, Monthly

Notices of the Royal Astronomical Society, Date of Publication: 09/06/2025, Impact Factor: 4.7

3. Jadhav, O. R., L. K. Dewangan, A. Haj Ismail, N. K. Bhadari, A. K. Maity, R. K. Yadav, M. Salouci, S. Patricio and Saurabh Sharma, 2025, Unveiling Physical Conditions and Star Formation Processes in the G47 Filamentary Cloud, The Astrophysical Journal, Date of Publication: 05/06/2025, Impact Factor: 4.9

**Planetary Sciences Division [01]**

1. R. P. Bourman, S. Buckman, D. K. Panda, D. Banerjee, C. V. Murray-Wallace & W. Preiss, 2025, Age and origin of the Ngankipari Formation in the Noarlunga and Willunga embayments, southern South Australia, Australian Journal of Earth Sciences, Date of Publication: 11/06/2025, Impact Factor:

**Space and Atmospheric Sciences Division [02]**

1. Venkatesh, K., Kava, H., Pallamraju, D., & Seemala, G. K., 2025, Overestimation of the bottom-side ionospheric TEC in the IRI model over low latitude regions, Journal of Geophysical Research: Space Physics, Date of Publication: 14/06/2025, Impact Factor: 2.6

2. Dharmendra Kumar Kamat, Som Kumar Sharma, Prashant Kumar, Kondapalli Niranjan Kumar, Aniket Patel, Sourita Saha, Hassan Bencherif, Aditya Vaishya & Ruchita Shah , 2025, Dynamics of mid-level stratiform clouds over the semi-arid regions of Western India: a post-monsoon case study, Modeling Earth Systems and Environment, Date of Publication: 28/05/2025, Impact Factor: 2.7

**Geosciences Division [06]**

1. Amzad Hussain Laskar, P. Saranya, Mao-Chang Liang, L. N. Sahu, N. S. Maurya, A. S. Maurya, 2025, Hydrological Dynamics in Giant Tropical Rivers: A Case Study of the Ganga River, Hydrological Processes, Date of Publication: 24/06/2025, Impact Factor: 2.8

2. Kunal Karan, Dharmaveer Singh, Amzad Hussain Laskar, Jacob Noble, Nikhil Kumar, Debrupa Chatterjee, John P. Wilson, 2025, Spatial disaggregation of coarse-scaled gridded rainfall data using open-source earth observation in a semi-arid region for water resources management, Advances in Space Research, Date of Publication: 18/06/2025, Impact Factor: 2.8

3. Hao, Y., Strahl, J., Khare, P., Cui, T., Schneider-Beltran, K., Qi, L., Wang, D., Top, J., Surdu, M., Bhattu, D., Bhowmik, H. S., Vats, P., Rai, P., Kumar, V., Ganguly, D., Szidat, S., Uzu, G., Jaffrezo, J., Elazzouzi, R., Rastogi, N., Slowik, J., E.I.Haddad, I., Tripathi, S. N., Prevot, A.S.H., and Dallenbach, K. R, 2025, Transported smoke from crop residue burning as the major source of organic aerosol and health risks in northern Indian cities during post-monsoon, Environment International, Date of Publication: 16/06/2025, Impact Factor: 10.3

4. Lekshmy, P.R., A. A. Christy, S. Krishnadas, M. Midhun, K. Thirumalai, M. G. Yadava, S. Kumar, K. Mohankumar , 2025, Anomalous oceanic moisture supply conceals expected stable water isotopic depletion during monsoon extreme rain events in Kerala, India, Science of Total Environment, Date of Publication: 13/06/2025, Impact Factor: 8.2

5. Paikaray S., P. Singh, S. Chander, A. Bhardwaj, A. K. Sudheer, S. Kumar , 2025, Groundwater hydrogeochemistry, regional vulnerability and trace metal enrichments around Indus Basin agricultural fields of SE Punjab, India, Water, Air, Soil Pollution, Date of Publication: 12/06/2025, Impact Factor: 3.8

6. Vineet Goswami, Santosh K. Rai , 2025, Analytical Procedures and Key Challenges in the Analysis of Strontium Isotopes: Applications, Technical Aspects, and Limitations, Analytical Isotope Geochemistry , Date of Publication: 08/06/2025, Impact Factor:

**Udaipur Solar Observatory Division [02]**

1. Sandeep Kumar, Nandita Srivastava, Dana-Camelia Talpeanu, Marilena Mierla , Elke D'Huys , and Marie Dominique, 2025, On the role of source surface height and magnetograms in solar wind forecast accuracy, Journal of Space Weather and Space Climate, Date of Publication: 30/06/2025, Impact Factor: 2.9

2. Rao, S.S., Srivastava, N. and Chakrabarty, D., 2025, Variation in horizontal component of geomagnetic field during the April 2023 space weather event over ±75° longitude sectors:Insights, Journal of Astrophysics and Astronomy, Date of Publication: 27/06/2025, Impact Factor: 1.6

## List of Visitors

1. Prof. Andrew Stephen Hillier, Department of Mathematics and Statistics, University of Exeter, U.K. visted Udaipur Solar Observatory, PRL, Udaipur on 03.06.2025 in connection with Scientific discussion on future collaborative works on Solar Physics and also to deliver a talk in the USO divisional seminar.

2. The following foreign nationals have visited Physical Research Laboratory, Ahmedabad, Udaipur Solar Observatory, Udaipur and Infra-Red Observatory, Mount Abu during 10.06.2025 to 30.06.2025 in connection wth attending short course on Solar Physics and Planetary Science under CSSTEAP :-

| Sl.No | Name & Designation | Name and Place of the Institute |
|---|---|---|
| 1 | Mr. Shah Md. Shajib Hossain, Assistant Meteorologist | Bangladesh Meteorological Department BMD, Dhaka |
| 2 | Md. Md Naim Islam Talukder, Scientific Officer | Bangladesh Space Research and Remote Sensing Organization (SPARRSO), Dhaka |
| 3 | Mr. Oralymbekov Daulet Researcher | Research Centre Kazakhstan |
| 4 | Mrs. Gultansyk Medeuova Leading Weather Forecaster | Almaty Branch of RSE Kazakhstan |
| 5 | Dr. Sengthong Bounyavong Deputy Head of the Graduate Studies | Department of Physics Faculty of Natural Science National University of Laos Lao PDR |
| 6 | Ms. Uyanga Uyanga Otgonbayar, Dean of Department of IT | Khasbaatar Street 11th Khoroo Bichil Khorool Bayangoli Mongolia |
| 7 | Mrs. Zhibek Kaliabarova Leading Meteorological Engineers | Almaty Branch of RSE Kazakhstan |

3. A team of 47 meritorious students from rural area of six districts of Rajasthan, selected under Shiksha Sambal Programme, along with four co-ordinators, visited the Udaipur Solar Observatory, Udaipur on 17.06.2025 for educational purposes.

4. Thirty-five student participants of IPR's Summer School, along with one co-ordinator, visited the Udaipur Solar Observatory, Udaipur on 20.06.2025 for acdemic purposes.

5. Mr. Lionnel Jean Mounier from Thermo Fisher Scientific India Pvt Ltd. Sandesh Bhavan, Vadodara visited Physical Research Laboratory, Ahmedabad on 27.06.2025 for scientific discussion on scientific equipment, Isotope Ratio Mass Spectrometer (IRMS).

6. During June 2025, the following have visited Infrared Observatory, PRL, Mount Abu:-

- Director, IIT, Jodhpur
- IG, CRPF, Mt. Abu
- DFO, Mt. Abu
- CCF, Jodhpur
- Six (6) DOS/ISRO staff members
- Twenty Four (24) Defense Personnel
- Forty Two (42) students
- Thirty Six (36) General Public

## NEW JOINEES

**NAME:** MR. VAMSHI LAUDYA

**DESIGNATION:** ASSISTANT

**DATE OF JOINING:** 11.06.2025

**DIVISION/AREA:** PURCHASE SECTION

**NAME:** DR. BHAVESH PANT

**DESIGNATION:** POST DOCTORAL FELLOW

**DATE OF JOINING:** 12.06.2025

**DIVISION/AREA:** ATOMIC, MOLECULAR & OPTICAL PHYSICS DIVISION

**NAME:** DR. NIKHIL VANGETY

**DESIGNATION:** POST DOCTORAL FELLOW

**DATE OF JOINING:** 13.06.2025

**DIVISION/AREA:** ATOMIC, MOLECULAR & OPTICAL PHYSICS DIVISION

**NAME:** DR. SUBHANKA MAL

**DESIGNATION:** POST DOCTORAL FELLOW

**DATE OF JOINING:** 16.06.2025

**DIVISION/AREA:** ATOMIC, MOLECULAR & OPTICAL PHYSICS DIVISION


**NAME:** MR. CHINMOY DEY

**DESIGNATION:** POST DOCTORAL FELLOW

**DATE OF JOINING:** 16.06.2025

**DIVISION/AREA:**THEORETICAL PHYSICS DIVISION

**NAME:** MR. SUNNY PANCHAL

**DESIGNATION:** ASSISTANT

**DATE OF JOINING:** 26.06.2025

**DIVISION/AREA:** ACCOUNTS SECTION

**NAME:** MR. NIKHIL SHARMA

**DESIGNATION:** JUNIOR PERSONAL ASSISTANT

**DATE OF JOINING:** 27.06.2025

**DIVISION/AREA:** ATOMIC, MOLECULAR & OPTICAL PHYSICS DIVISION

**NAME:** MR. KUNWAR RUDRA PRATAP SINGH

**DESIGNATION:** ASSISTANT

**DATE OF JOINING:** 27.06.2025

**DIVISION/AREA:** ADMINISTRATION GENERAL DIVISION

**NAME:** MR. ROHIT VERMA

**DESIGNATION:** ASSISTANT

**DATE OF JOINING:** 30.06.2025

**DIVISION/AREA:** ACCOUNTS SECTION

## SUPERANNUATION

| | | |
|---|---|---|
| Name of the employee | : | Mr. P.S. Rajput |
| Designation at the time of retirement | : | Senior Technician ‘A’ |
| Division /Area | : | Astronomy & Astrophysics (Mt.Abu) |
| Date of Birth | : | 01.07.1965 |
| Date of Joining | : | 20.01.1988 |
| Date of superannuation | : | 30.06.2025 |

**Compiled, Designed and Published by**

**The Newsletter Team**

| | |
|---|---|
| Prof. Navinder Singh | Chair |
| Dr. Amitava Guharay | Co-Chair |

**Data Collection and Proofreading Team**

| | |
|---|---|
| Dr. Satyendra Nath Gupta | Member |
| Dr. Yogita Uttam Kadlag | Member |
| Dr. Sanjay Kumar Mishra | Member |
| Dr. Rohan Eugene Louis | Member |
| Dr. Paramita Dutta | Member |
| Mr. Senthil Babu T J | Member |
| Dr. Manash Ranjan Samal | Member |

**Formatting and Editing Team**

| | |
|---|---|
| Mr. A Shivam | Member |
| Dr. Pragya Pandey | Member |
| Ms. Shreya Pandey | Member |
| Mr. Kushagra Upadhyay | Member |
| Mr. BS Bharath Saiguhan | Member |
| Mr. Jacob Sebastian | Member |
| Mr. Shivansh Verma | Member |
| Ms. Jyoti Limbat | Member |
| Mr. Rutuj Gharate | Member |
| Ms. Srishti Sharma | Member |
| Mr. Abhishek Kumar | Member |

*For any suggestions or query, please contact us at: newsletter@prl.res.in*

## Follow PRL on Social Media

https://x.com/PRLAhmedabad

https://www.facebook.com/PhysicalResearchLaboratory

https://www.youtube.com/c/PRLAhmedabad_webinars

https://www.instagram.com/prl1947/

https://www.linkedin.com/in/prl-ahmedabad-89600122b

https://www.threads.net/@prl1947

https://www.threads.net/@prl1947

## PRL Contact

https://www.prl.res.in/prl-eng/home

Website (English)

Website (Hindi)

Physical Research Laboratory
(A unit of Dept. of Space, Govt. of India)
Navrangpura, Ahmedabad - 380009
Phone: (079) 26314000
Fax: (079) 26314900
E-Mail: director@prl.res.in

भौतिक अनुसंधान प्रयोगशाला
(अंतरिक्ष विभाग, भारत सरकार की यूनिट)
नवरंगपुरा, अहमदाबाद - 380009
दूरभाष: (079) 26314000
फैक्स : (079) 26314900
ई - मेल: director@prl.res.in