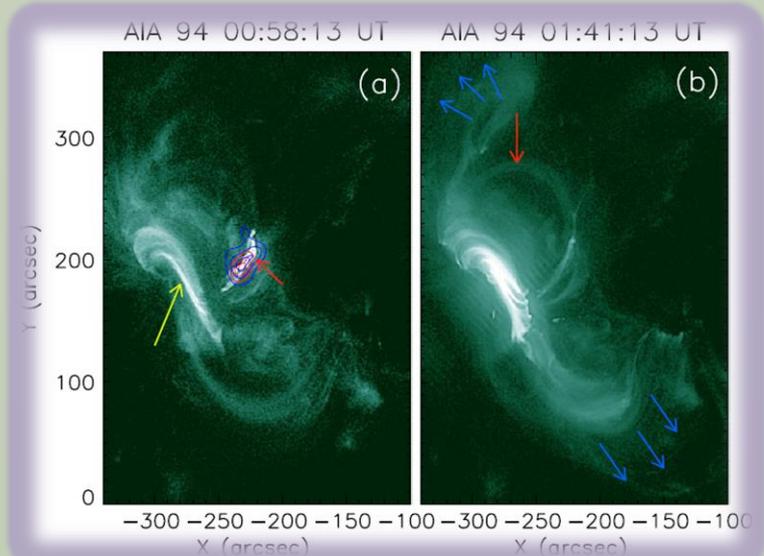
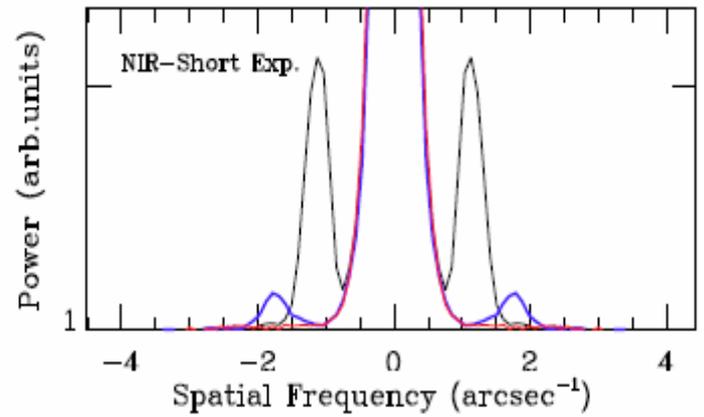
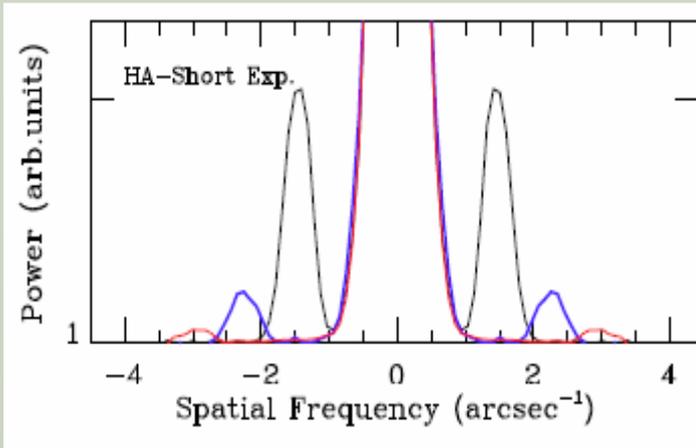




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MARCH 2020



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भारत

Fizeau Mask Interferometry of Solar Features Using the Multi-application Solar Telescope at the Udaipur Solar Observatory

(A. Raja Bayanna, P. Venkatakrishnan, Sridharan Rengaswamy, Shibu K. Mathew)

Efforts are made to demonstrate high-resolution observations of the solar atmosphere using aperture masking interferometry. Covering the telescope pupil with a Fizeau mask, consisting of two small circular apertures separated by a vector distance known as the baseline, is the first step towards interferometric imaging. A mask with two circular holes of diameter 7 cm each and separated by a distance of 19 cm was placed in the pupil plane of the Multi-application solar telescope (MAST) at Udaipur Solar Observatory. The experiment was extended with baselines of 29 cm and 38 cm. Observations were carried out in two spectral bands, centred at 656.3 nm ($H\alpha$) and 861.0 nm (near-infrared; NIR) using filters of bandwidth 1 nm and 330 nm, respectively. We find that both in $H\alpha$ and the NIR, fringes were visible above the background at a large number of places showing a ubiquitous distribution of unresolved sources uniformly over the field of view (Figure 1). It is seen that the fringe period and the fringe contrast decreases with an increase in the baseline length (Figure 2). The measured fringe visibilities at baselines of up to 38 cm, indicates a resolution several times higher than the seeing limit. In order to understand the effect of the spectral bandwidth on fringe visibility, the latter was calibrated using numerically estimated speckle transfer function including the bandwidth decorrelation function. The calibrated visibilities indicate that it is advantageous to observe at NIR due to the large atmospheric coherence diameter and coherence time despite the larger bandwidth. The results of the present experiment are encouraging to attempt diffraction limited imaging with sparse aperture sampling using Golay masks.



A. Raja Bayanna

<https://doi.org/10.1007/s11207-020-1597-1>

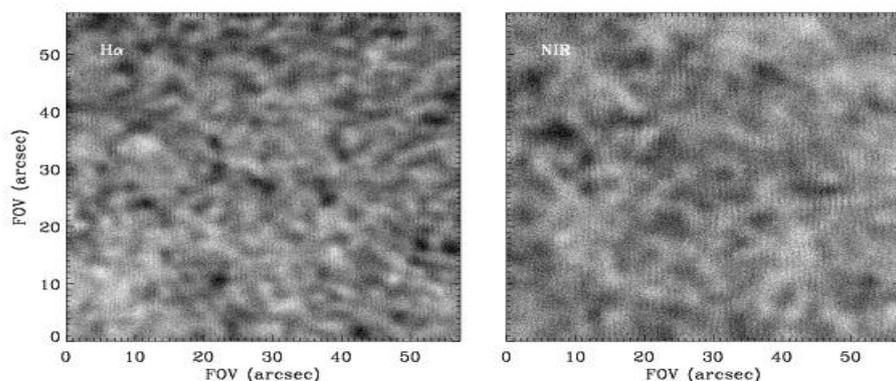


Figure Caption 1: Cut-outs of images obtained using Fizeau mask with smaller baseline (19 cm). Images on the left and right are actual images showing the fringes observed in $H\alpha$ and NIR wavelengths on 27th April and 1st May 2018, respectively.

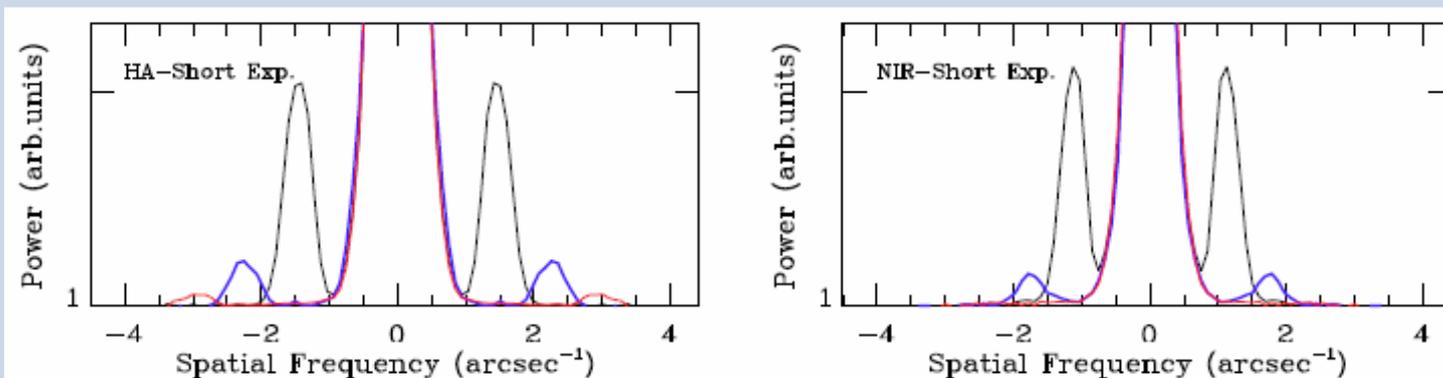


Figure Caption 2: Averaged power spectrum of the observations with $H\alpha$ and NIR filters are shown on the left and right panels, respectively. Black, blue, and red colours indicate baselines of 19 cm, 29 cm, and 38 cm, respectively.

Effects of dry deposition on surface ozone over south Asia inferred from a regional chemical transport model

(A. Sharma, N. Ojha, T. U. Ansari, S. Sharma, A. Pozzer, S. S. Gunthe)

Surface ozone has harmful effects on human health and vegetation, besides the fact that it plays a key role in the atmospheric chemistry. The distribution of ozone is strongly affected by the dry deposition process, nevertheless, such impacts are not well known quantitatively over the south Asian region. In this direction, we performed regional-scale chemical transport modeling using the Weather Research and Forecasting Model coupled with chemistry. We found that the dry deposition of ozone reduces its levels by as much as 40% over the Indo-Gangetic Plain and some parts of western and central India. A significant contrast is revealed in the effects of dry deposition on ozone both spatially and temporally, and lower effects of dry deposition are simulated over urban stations in particular during night time. The south Asian ecosystem is suggested to sustain an important sink of surface ozone via the dry deposition. This investigation fills a gap in the studies of dry deposition over the south Asian region, where it is anticipated that this ozone sink can get perturbed due to potential changes in the land use and land cover.



Narendra Ojha

<https://doi.org/10.1021/acsearthspacechem.0c00004>

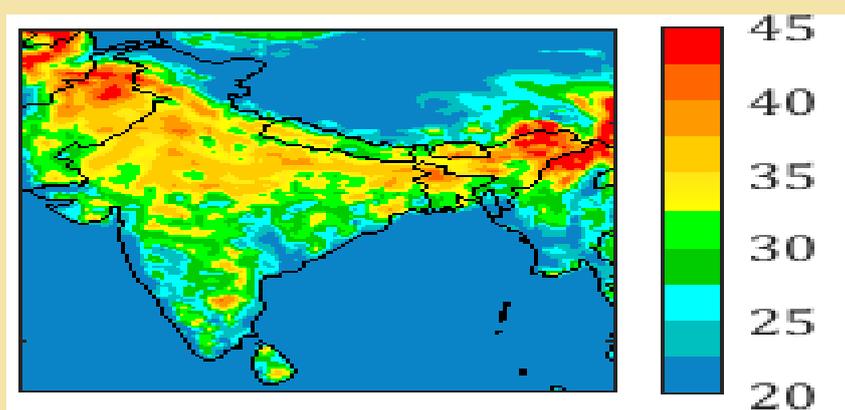


Figure Caption: Model simulated percentage reduction in surface ozone due to dry deposition process over south Asia for April 2013.

SpaceCat: Designing an Integrated Library System-Discovery Interface-based Virtual Union Catalogue for Indian Space Research Organization Libraries

(M.N. Alam and P. Mukhopadhyay)

The aim of the library services is to fulfil the information needs of library end-users. The union catalogue plays an important role in sharing resources amongst the libraries and serves as discovery tool for the end-users to know about the existence of an item; location; availability; etc. There are several forms of union catalogues such as physical, virtual, distributed, and centralized. Making a choice for one of these models depends upon the factors like contribution of records by the member libraries or the list of their holdings, cost, network dependencies, system, users and so on, all of whom may have their own policies. As DOS/ISRO libraries are geographically distributed, Virtual Union Catalogue based on physical and virtual model would be the best possible solution that can provide single OPAC based federated search service for access among the DOS/ISRO libraries. In order to implement the proposed SpaceCat, a few prototype Koha instances of randomly selected seven libraries of DOS/ISRO along with few sample bibliographic records for each prototype Koha instances have been created. Further the web scale discovery system – VuFind has been integrated with the Koha ILS in order to map and harvest MARC data and configure the system as a server, followed by the modification of the server configuration file. This work showcases SpaceCat, that can act as an information discovery and retrieval system to help end-users of entire DOS/ISRO community to quickly access the holdings' information from different geographically distributed DOS/ISRO institutes in a pin-pointed, exhaustive, and expeditious manner.



Md Nurul Alam

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SpaceCat Login Language

Search: All Fields Find Advanced

Browse by Call Number

- 000 - Computer science, information & general works
- 500 - Science
- 600 - Technology

Browse by Format

- Book
- Serial

Browse by Library

- IIRS Library
- IIST Library
- IPRC Library
- ISROHQ Library
- PRL Library
- SAC Library
- VSSC Library

Search Options

- Search History
- Advanced Search

Find More

- Browse the Catalog
- Browse Alphabetically
- Explore Channels
- Course Reserves
- New Items

Need Help?

- Search Tips
- Ask a Librarian
- FAQs

Figure Caption :
Screenshots of homepage and search interface of prototype SpaceCat-Virtual Union Catalogue

SpaceCat Login Language

Search: All Fields Find Advanced Retain current filters

Suggested Topics within your search.

ATMOSPHERE 6 MATHEMATICS 6 OCEANS 6 PLANET EARTH 6

Showing 1 - 6 results of 6 for search "", query time: 0.11s

Sort: Relevance

Remove Filters

Author: CALDERHEAD B ET AL

Institution

- IIRS, Dehradun 1
- IIST, Trivendrum 1
- IPRC, Trivendrum 1
- ISROHQ, Bangaluru 1
- Space Application Centre, Ahemdabad 1
- VSSC, Tribundum 1

Library

1 **MATHEMATICS OF PLANET EARTH : A PRIMER** by CALDERHEAD B ET AL. Published 2018. Call Number: 551.1:51 CAL. Located: VSSC Library : General Stacks. Book Available. Save to List

2 **MATHEMATICS OF PLANET EARTH : A PRIMER** by CALDERHEAD B ET AL. Published 2018. Call Number: 551.1:51 CAL. Located: ISROHQ Library : General Stacks. Book Checked Out. Save to List

3 **MATHEMATICS OF PLANET EARTH : A PRIMER** by CALDERHEAD B ET AL. Save to List

Identification of Pre-flare Processes and Their Possible Role in Driving a Large-scale Flux Rope Eruption with Complex M-class Flare in the Active Region NOAA 12371

(Prabir K. Mitra, Bhuwan Joshi, Avijeet Prasad)

Often, a flare is preceded by pre-flare (and/or precursor) phases where small-scale energy release can be observed in mostly soft X-ray (SXR), extreme ultra-violet (EUV), and optical wavelengths. In this work, we show how a series of small-scale precursor activities lead to the destabilization of a meta-stable flux rope which is analogous to the 'Domino effect'. Our observation suggests that the active region underwent a prolonged phase of flux enhancement followed by a relatively shorter period of flux cancellation prior to the onset of the flare which led to the build up and activation of a hot channel (shown by the yellow arrow in Figure 1(a)). Non-Linear Force Free Extrapolation results reveal a set of twisted flux rope co-spatial to the hot channel (sky colored lines in Figure 2). Our analysis reveals strong, localized regions of photospheric currents of opposite polarities at the adjacent precursor location (the location of the pink lines in Figure 2), thereby making the region susceptible to small-scale magnetic reconnection. Precursor reconnection activity from this location (shown by the red arrow in Figure 1(a)) induced a slipping reconnection in the yellow lines shown in Figure 2. This slipping reconnection was observed as a moving flash along a semicircular arc from the precursor location towards the northern leg of the hot channel (indicated by the red arrow in Figure 1(b)) which led to the destabilization of the flux rope (shown by the blue arrows in Figure 1(b)).



Prabir K. Mitra

<https://doi.org/10.1007/s11207-020-1596-2>

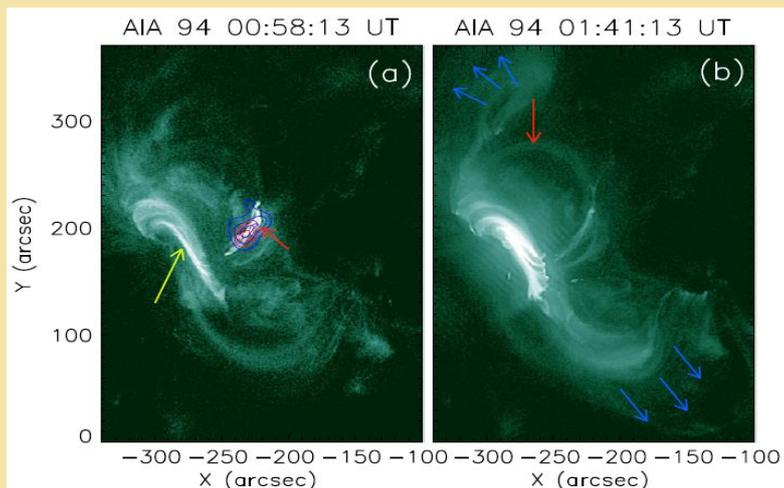


Figure 1. Panel (a): AIA 94 Å images of AR NOAA 12371 showing the activated hot channel and the adjacent precursor activity (indicated by the yellow and the red, respectively). Panel (b): The moving flash that triggered the eruption of the hot channel (long the arc indicated by the red arrow). The eruption of the hot channel is shown by the blue arrows. The contours in panel (a) represent RHESSI X-ray sources in 6–12 keV (red) and 12–25 keV (blue) bands.

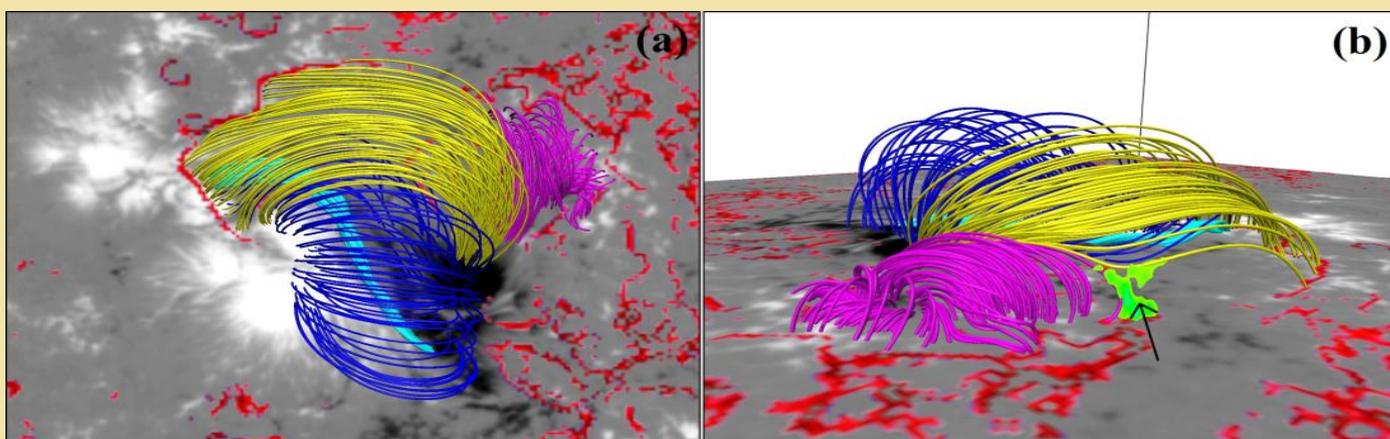


Figure 2. Model coronal field lines showing the pre-flare configuration of AR NOAA 12371 from top (panel (a)) and side (panel (b)) views. The arrow in panel (b) indicates a quasi-separatrix layer. The red areas in the background are characterized by high Q-values which is susceptible for slipping reconnection.

Re Aluminisation of 1.2 M telescope Mirrors at PRL Mount Abu Observatory



Mirrors used in astronomical telescopes are one of the primary components of their optical system. Aluminum coated mirrors used in telescopes are exposed to the local environment, and as a result, mirror surface degrades over the time. The degradation leads to decrease in reflectivity and increase in light scattering and infrared emissivity. In order to achieve better reflectivity, mirrors are routinely re-coated. The aluminization of mirrors is a delicate process as it involves the handling of big optical system.

At PRL Mount Abu Infra Red Observatory, 1.2 M telescope Primary & Secondary mirrors realuminized between 11th February to 20th February 2020 by Observatory staff & AAD-TO team in in-situ Aluminising facility at Mt. Abu observatory. This was the 9th time; mirrors are re aluminized between years 2002 to 2020.

After removal of the old coating the mirror is then placed in a vacuum chamber and 99.999% pure aluminum wire placed on tungsten filaments inside the chamber. After achieving a vacuum level of 5×10^{-5} m bar, the filaments were heated. by thermal vapour deposition, Aluminium coating of thickness 1540Å achieved.

The realuminization of the mirrors has greatly enhanced the light gathering efficiency of the telescope. The facility has been extensively and successfully used by BARC's Mount Abu based observatory for the aluminizing their 0.6 M mirrors. So far more than 200 mirror coating done for BARC.

This facility is also being used for the coating of USO telescope optics like 6 inch mirrors & field stops optics for MAST. For SAC also CFRP disc antenna samples, aluminium coating done.

National Science Day at PRL

National Science Day (NSD) in India is celebrated on 28th February each year to mark the discovery of the Raman Effect. The primary focus of the NSD celebration is to widely spread the message about the importance of science in the daily life of people. As a result, this event is celebrated all over the country in schools, colleges, universities and other academic, scientific, technical, medical and research institutions.

PRL celebrated NSD on 29th February 2020 by conducting various competitive events among the students selected through a screening test held on 5th January 2020. This year three new exam centers viz. 1. Mehsana, 2. Jamnagar, and 3. Amreli was introduced. Five students were awarded the ArunaLal scholarship selected through personal interview. In NSD-2020, a total of 1188 students appeared in the screening test out of which 1035 and 153 students opted offline and online exam, respectively. The highest marks scored is 107 out of 120. In total, 137 students were selected to participate in various events organized in PRL.

Additionally, to popularize girl child education, PRL invited 104 girl students from schools across Gujarat to visit PRL. Centre toppers of the 18 exam centres were also awarded prizes. In addition, 12 prizes for poster/model competition were given to the students who presented their models/posters on the topics i) My idea of science with Gaganyaan, ii) Learning Science with Fun. This year a maiden activity for teachers was organized, and seven teachers presented innovative teaching models developed by them. In addition, two talks viz. 1. Global Warming and Climate change, and 2. Women in Science: Challenges and way forward were delivered. Screening of a science documentary, “The Climate Challenge,” was done, and interaction of participating students and teachers with PRL scientists was the noteworthy activity.



Workshop on Ground-based Instrumentation for Solar Astronomy

A one day workshop on **Ground-based Instrumentation for Solar Astronomy** was organised by the Udaipur Solar Observatory, PRL and the Indian Institute of Astrophysics (IIA) on 13th February 2020 during the **38th Annual Meeting of the Astronomical Society of India** at IISER Tirupati. The objective of the workshop was to discuss the ongoing instrumentation efforts at different institutions/observatories engaged in ground-based solar observations in different wavelengths. The workshop also provided a platform for discussions and possible collaborations on Instrumentation and Science using the 0.5 m Multi Application Solar Telescope (MAST) at USO and the proposed 2 m National Large Solar Telescope (NLST). The Workshop comprised four sessions as follows –

1. MAST back end instrumentation and observations.
2. NLST - The main telescope, proposed science and back end instruments.
3. Coordinated observations with other Ground and Space-based instruments.
4. Adaptive Optics and high resolution imaging for solar observations.



Participants of the Workshop included Scientists, Engineers, PhD students, and Post-docs from USO-PRL, IIA, NCRA, and MPS Göttingen.



Swachhta Pakhwada at USO, 1 -15 February 2020

Staff members and students of USO/PRL took the “Swachhta Shapath” on 31st January, 2020 in the Seminar Hall. Mass cleanliness and sanitation drive was carried out in the office premises on 10th February, 2020. This involved cleaning the area around the canteen and workshop. A quiz competition was held on 12th February as per the instructions the PRL Swachhta Committee, on the topic of ‘Swachhta’. Twelve staff members, including students and trainees, participated in the quiz. An essay competition with the theme “Beat the Plastic Pollution” was also conducted on 13th February 2020 in which seven staff members took part. The cleaning of office rooms, removal of waste materials/records from the office rooms were carried out on a routine basis during the Pakhwada period.



Visit of B.Sc. Students from Pandit Deendayal Petroleum University Gandhinagar

A group of 26 B.Sc. students and 5 faculty members from **Pandit Deendayal Petroleum University (PDPU)** Gandhinagar visited USO-PRL on 31st January 2020. After a brief introduction on the Sun and research activities at USO, the group were shown the GONG and e-CALLISTO facilities in the campus.



Swachhata Pakhwada at PRL, 1 -15 February 2020

With an aim to create awareness related to cleanliness, Swachhata Pakhwada was observed in PRL from 01st Feb to 15th Feb, 2020. A mass pledge was administered to all staff members to mark the beginning of the pakhwada. Cleanliness drives were conducted during the pakhwada at all PRL campuses and residential colonies. To encourage a sense of responsibility, the cleanliness drive was followed by drawing and essay competition for the kids. As theatre and drama can be used to effectively teach the society of their present conditions and problems, two schools (KV, SAC and Zydus School for excellence) were invited to present skit on the importance of cleanliness. To create awareness towards health and hygiene, a medical and hygiene camp was also conducted at Shela village by a team led by PRL doctors, Dr. Samir Dani and Dr. Shital Patel. As a part of this camp, more than 200 hygiene kits were distributed to the participating villagers and the students.

The role of the cleaning and house-keeping staff is of paramount importance in maintaining overall cleanliness. Hence, they were sensitized about their contribution to keep the surroundings clean and the health benefits of cleanliness. A lecture was also arranged for them with regard to segregation of waste.



It is true that swachhata starts on an individual level, hence, it is very important to make the all staff members aware about it. In this context, two invited talks were arranged during the closing ceremony of Swachhata Pakhwada on 14th Feb, 2020. The talks were delivered by Shri Paresh Vyas from AMC and Dr. Mona Iyer from CEPT on "Awareness on Solid Waste Management specially emphasizing on the Plastic Wastes" & "Awareness on E- Waste Management" respectively. Finally, following the principle of 3 R's i.e. reduce, reuse and recycle, various measures have been undertaken to make PRL a plastic free campus.



Events & Activities

Colloquia

- Aditi Sen (Professor H, Harish-Chandra Research Institute, Allahabad), the only female SSB winner in Physics in India. She delivered a special colloquium on “Quantum Communication Network” on 11 February 2020. The colloquium was followed by an informal interactive session among PRL colleagues and Prof. Aditi Sen.

Awards and Honours

- Mr. Arijit Roy, (JRF, AMOPH Division) has won the American Chemical Society (ACS) Poster Prize, for his poster on “Shock processing of carbon nanopowder” presented at the 3rd National Conference in Chemistry held at IIT-Gn(Gandhinagar).
- Dr. Neeraj Rastogi, (Associate Professor, GSDN) has been invited to serve as a member of the Editorial Advisory Board of the Asian Journal of Atmospheric Environment(Asian J. Atmos. Environ.), which is an open access peer reviewed journal.

Superannuation



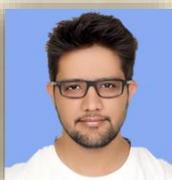
Prof. P. Janardhan, Dean and Senior Professor (H grade), from Astronomy & Astrophysics division, PRL superannuated on 29th February 2020, giving twenty-seven years of service to PRL. We, at PRL, gratefully acknowledge all the contributions made to the institution during his service and wish Prof. Janardhan a very healthy and peaceful superannuated life ahead.

In a farewell ceremony held at PRL, colleagues of Prof. Janardhan remembered their associations with him, and the session was concluded with the tree plantation ceremony.

The Editorial Team



Bijaya Sahoo



Prashant Jangid



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Garima Arora



Deekshya Sarkar



Pragya Pandey



Vivek Mishra



Rohan Louis