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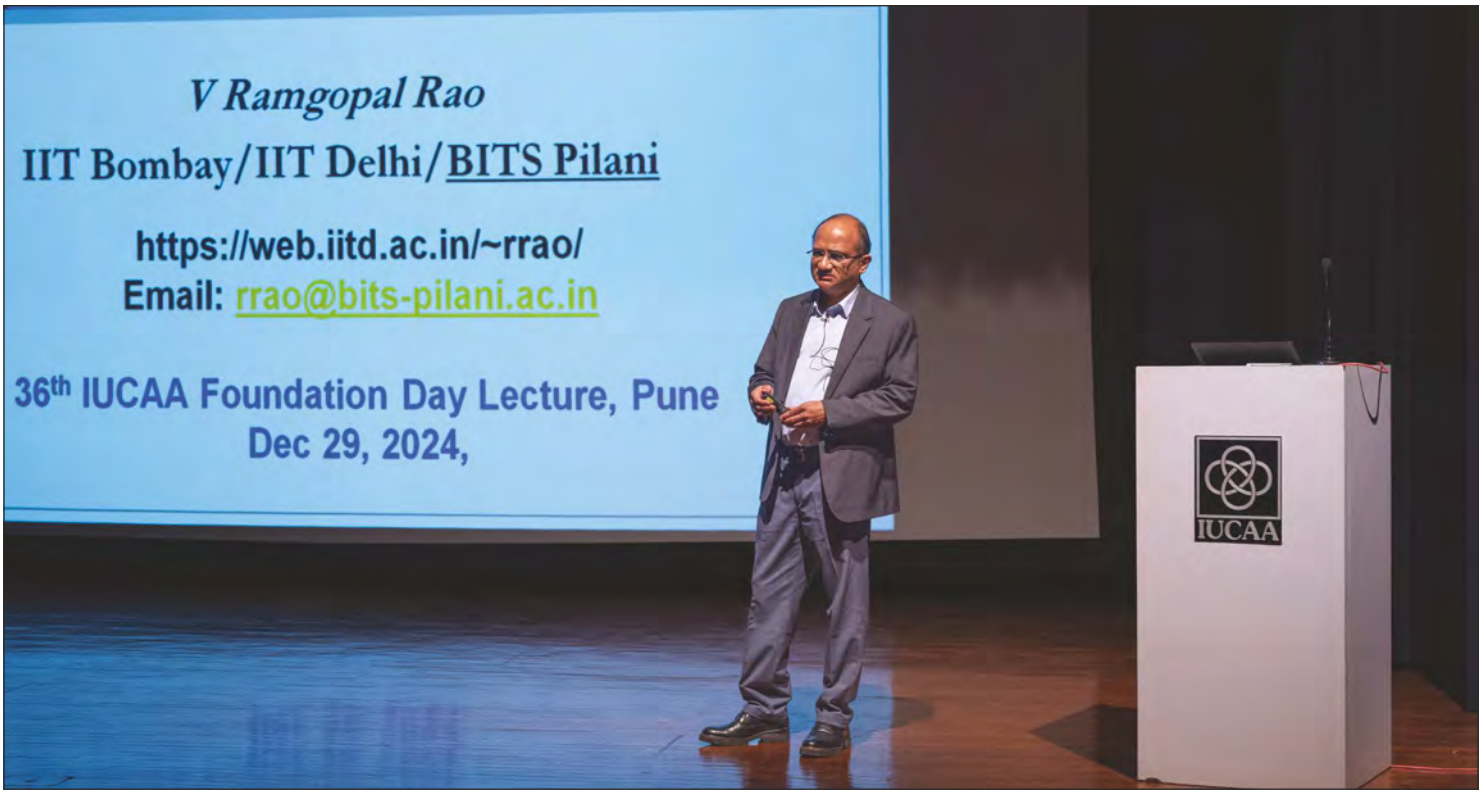
The Thirty-Sixth Foundation Day Lecture



The 36th Foundation Day Lecture was delivered on December 29, 2024, by Prof. V. Ramgopal Rao, Group Vice-Chancellor for the Birla Institute of Technology & Science (BITS) Pilani campuses located in Pilani, Hyderabad, Goa, Dubai and Mumbai. Prof. Rao's talk was titled **Unleashing India's Scientific Potential: Breaking Barriers and Igniting Innovation.**

An electrical engineer, Prof. Rao, served as the Director of IIT Delhi for 6 years from 2016 to 2021 and as a Chair Professor for Nanoelectronics at IIT Bombay and IIT Delhi before joining the BITS Group in 2023. An internationally acclaimed Nanoelectronics researcher, he has authored over 500 research papers and over 50 patents, which include 20 issued US patents.Besides his education and research activities, Prof. Rao is well-known for establishing major Nanoelectronics Programmes in India. For his research accomplishments, Prof. Rao was elected a Fellow of IEEE, a Fellow of the World Academy of Sciences (TWAS), the Indian National Academy of Engineering (INAE), the Indian Academy of Sciences (IASc), the National Academy of Sciences (NASI) & the Indian National Science Academy (INSA). Fifty-two PhD students have graduated under his supervision and work in leading academic institutions and semiconductor industries worldwide, including India.

Prof. Rao expressed his happiness at the opportunity to deliver the 36th Foundation Day lecture at IUCAA. Thanking the Director of IUCAA, he remarked that although it was his first visit to IUCAA, he appreciated the work done at IUCAA, such as its involvement in LIGO and other national missions. He was particularly impressed with IUCAA's Science Outreach program, which reaches out to a large number of schools to ignite an interest in science. Prof. Rao began his talk by discussing India's scientific potential and the need for innovation. He highlighted India's global ranking in terms of the number of educational institutions in the country, students' enrollment numbers, research publications, citations, patent filings, and innovation. Ranked no. 1 in the world for the number of institutions, Prof. Rao observed that India had a complex and diverse higher education system, which included state, private, and deemed universities, with many more being added. He said that India ranked second in the number of enrolled students. Regarding the research output, Prof. Rao said there was a significant output of research and publications from India, ranking it third or fourth globally. However, Prof. Rao voiced concern about the pressure to publish for institutional rankings. He further said that India ranked 6th worldwide in patent filings, adding that India has experienced double-digit growth in patent filings over the last five years, showcasing an increasing emphasis on innovation and intellectual property. While these metrics are satisfactory, Prof. Rao observed that India has struggled significantly with innovation and industry collaboration and is ranked 39th for innovation worldwide. India's low innovation ranking reflects poor translation of research into public good, impacting job creation and wealth generation. The collaboration between academia and industry in India is weak, where India ranks 66th worldwide. This lack of partnership limits the potential for technological advancements and new product development.

Regarding the number of Ph.D. students in India, Prof. Rao said that although the number of Ph.D. students in India is growing, India has only 300 scientists per million compared to the US, which has 4500 scientists per million. Prof. Rao remarked that every second faculty at the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) in Bengaluru was either a Bhatnagar awardee or a fellowship holder. However, the presence of such eminent scientists is insufficient to compete internationally, and the government should consider scaling up good institutions such as JNCASR and IUCAA.

Touching upon the quality of education in India, Prof. Rao informed the audience that, as per the statistics, in 2023, over 900,000 students left abroad for higher education. By 2025, it was estimated that Indian households will spend 75 billion to educate their children abroad. Prof. Rao observed that with growing income, an increasing number of households were sending their children to study overseas, primarily due to the lack of quality education in India. Prof. Rao strongly expressed the need to grant autonomy to institutions. He explained that, except for the top-level institutions in India, the quality of education elsewhere is dismal. He said that, in contrast, in the West, the quality of the faculty at MIT, Stanford, and second-tier universities for undergraduate education remains almost the same. Summing up, Prof. Rao expressed a critical need for better financial and governance models in universities to support research and sustain quality education, which is currently lacking in India. Regarding India's startup story, Prof. Rao commented that the absence of deep-tech product developments from academic institutions is evident, as most Indian unicorns are based on business model innovations rather than research-driven products.

Regarding breaking barriers to ignite innovation, Prof. Rao said this will require national, institutional, and individual action. In this regard, Prof. Rao strongly felt that the National Education Policy (NEP) could be a transformative movement for India's higher education landscape, emphasising the need for effective implementation for real change. He commented that the research done in India often mirrors the problems from North America and Europe, which can deter original innovation. What is required is a shift to local problem-solving. Commenting on the disparity in patenting between India and the US, he called for better support for innovation, highlighting the importance of intellectual property for startups and funding.

As regards the possible solutions for societal challenges in India, Prof. Rao said that it was imperative to integrate education, innovation, and research, which requires collaboration between academic institutions, industry, and government to drive impactful projects. He strongly felt that the overlap between education, innovation, and research could enhance the problem-solving capabilities in society.

Regarding the financial sustainability of educational institutions, Prof. Rao said that they increasingly rely on tuition fees, government grants, and alternative funding sources, which influence their operational capacity and educational quality over time. He said government

funding plays a critical role, especially in institutions like IITs, where a large portion of revenue is subsidised. Citing the example of institutions like Stanford, he said that they demonstrate a diversified funding model, where research grants and endowments supplement revenue from tuition fees. Such a model allows for greater operational flexibility and growth. Professor Rao highlighted the importance of collaborative initiatives between academic institutions and external stakeholders, which can lead to significant advancements in research and innovation. He said institutions could substantially increase their impact by incentivising faculty and fostering interdisciplinary work. He said that investment in faculty collaboration at IIT Delhi yielded impressive returns, generating 140 crores from an initial investment of 7 crores, demonstrating the effectiveness of strategic funding in research.

Prof. Rao said that creating a supportive ecosystem for startups within academic institutions can lead to successful entrepreneurial ventures among faculty and gave the example of IIT, Delhi. He said that initiatives such as granting sabbaticals for startup founders were seen to encourage innovation and entrepreneurship. During the COVID-19 pandemic, IIT Delhi prioritised research on related technologies, resulting in the filing of numerous patents and significant contributions to public health. This focus showcased latent talent within the institution. Prof. Rao presented a video highlighting the development of innovative sensor technologies to address critical issues. Scientists at IIT, Bombay, developed a cardiac diagnostic system to provide rapid heart disease assessments with just a drop of blood, enhancing emergency medical response.

Another example was an explosive detection technology created using the same innovative sensor platform, showcasing its versatility across different applications and enhancing security measures. A project focusing on agricultural sensors aims to monitor soil health, thereby improving farming practices and resource management through precise nutrient detection. Prof. Rao stressed that it was essential to encourage collaborations between academia and industry to advance technology and research in India, adding that by leveraging their strengths, they can create impactful solutions and drive economic growth. An example was the development of organic dosimeters for cancer therapy to help optimise radiation doses while minimising harm to healthy cells. Prof. Rao cited the success of startups like Nanosniff and Soil Sense, highlighting the potential of innovation in the agricultural and safety sectors. He said that these companies have transformed prototypes into market-ready products.

In conclusion, Prof. Rao explained that understanding the 'smile curve' concept emphasises that high value is generated during the product conceptualisation phase. He suggested that Indian startups should focus on innovative ideas rather than manufacturing alone. The audience much appreciated the enlightening talk, and a lively interaction with the audience followed.

The recorded lecture is available at the YouTube link:
https://www.youtube.com/live/z7Jm_SzEHC8?si=OOwQSZeSOAeeCE5f

Events at IUCAA

Gravitational-Wave Instrumentation Workshop

The Gravitational-Wave Instrumentation Workshop (GWIW) was held from November 10-29, 2024. The workshop introduced upper undergraduate and graduate students to GW instrumentation, focusing on various subsystems of the LIGO GW detector. The workshop took a novel approach, where a large portion of the participants' time was spent in IUCAA's in-house laboratories hosted in SITARA. The sixteen participants were divided into groups of three and covered five different modules pertaining to the different subsystems. Each module had an experiment, involving cutting-edge instruments, that each individual group had to conduct. The groups also had to accumulate and analyse data. The theoretical background covering the physical principles governing these experiments was covered in formal lectures. The novelty of the workshop and the unique exposure to GW instrumentation received an overwhelmingly positive response from the participants. The resource people were Suresh Doravari, Shivaraj Kandhasamy, Sanjit Mitra, and Manasadevi Thirugnanasambandam. The workshop was coordinated by Shasvath J. Kapadia (IUCAA).

Baryons Beyond Galactic Boundaries - 2024

The week-long international conference "Baryons Beyond Galactic Boundaries" was organised at IUCAA, Pune from December 02-06, 2024. The primary objective was to bring together leading experts and emerging researchers focused on investigating the diffuse baryons in the Circumgalactic Medium (CGM) and Intergalactic Medium (IGM). The conference aimed to explore these topics through various observational techniques and hydrodynamical simulations. It offered a comprehensive review of the field's advancements over the past two decades and discussed its future directions. The conference was attended by 89 participants, nearly half of whom travelled from abroad. The international participants represented a diverse range of countries, including Australia, France, Germany, Italy, Japan and the USA, highlighting the global reach of the conference and its significance in the international research community.

The conference featured a robust program with 55 oral presentations and 21 posters. These presentations covered various topics, including the latest discoveries, methodologies, and theoretical models related to CGM and IGM research. In addition, all poster presenters participated in 5-minute flash talks, offering concise and engaging overviews of their research. A key conference component was a parallel session dedicated to the future of IGM and CGM research. Participants were split into four independent teams, each tasked with discussing emerging topics, challenges, and opportunities in these fields. These teams collaborated to generate ideas for future developments and research priorities. At the conference's concluding session, the leaders of each team presented a summary of their group's discussions, offering insights and recommendations for advancing the field.

The conference provided an excellent platform for fostering collaboration among researchers worldwide. The event successfully advanced the dialogue surrounding CGM and IGM research through engaging presentations, in-depth discussions, and collaborative efforts. The discussions and outcomes from the conference will serve as a valuable foundation for future research initiatives and collaborations in the field. Sowgat

Muzahid (IUCAA) and R. Srianand (IUCAA) were the coordinators of the conference.

LIGO India All-hands

The LIGO-India project received approval from the Union Cabinet of India, and the detector is expected to start science runs by 2030. It promises a massive boost in science and technology. This mega-science project requires multidisciplinary expertise in vacuum technology, lasers & optics, quantum metrology, sophisticated electronics, data acquisition-cum-control, data handling, high-performance computing, etc. The detector building, including construction for housing the detector, is very complex; keeping that in mind, a project execution team have been identified with the distribution of work among them. Therefore, detector building demands collaboration among team members and extending among national and international institutions and universities to bring experts in this wide range of fields together and work together cohesively.

IUCAA, being one of the lead institutions for executing the project, organised an all-hands meeting at its premises on December 10-11, 2024, inviting all the project execution team members for planning and discussion. A few international experts who have contributed to building sub-systems for the LIGO US also shared their expert opinions and critically reviewed execution plans for the LI to help us for the betterment.

This type of meeting was the first of its kind and is planned to be organised once every three months on a rotation basis at all other nodal institutes. In brief, the outcomes of this first all-hands meeting are, (i) Identifying the overlapping expertise, (ii) Identifying the gap of expertise that needs to be filled up for the LI detector building, (iii) Setting up priorities/ flow of the work for the LI detector building, (iv) Identifying the major focus areas of RnD required for LI and its possible upgradation, (v) Discussions on possible major bottlenecks and strategy to overcome those, (vi) plan for EPO, etc. The meeting was organised by Subhadeep De (IUCAA).

17th Radio Astronomy Winter School

The 17th edition of the annual Radio Astronomy Winter School (RAWS) was organised jointly by IUCAA and NCRA–TIFR from December 14-24, 2024. Twenty-seven student participants were selected among more than 560 applications received. The educators, ten in all, comprised faculty members, research scholars, post-doctoral fellows, and scientific staff interested in adopting radio astronomy concepts and experiments in their college-level course curricula. The students were second and third-year undergraduates who had been introduced to radio astronomy for the first time. The lecture sessions started with a broad overview of radio astronomy and various radio observation techniques. The later lecture sessions covered stellar structure, radiative processes, cosmology, the Sun, galaxy clusters, pulsars, active galaxies, fast radio bursts, and multiwavelength astronomy, to emphasise the role of radio observations in revealing the nature of the systems. During the late morning and afternoon sessions, the participants worked in groups on experiments characterising detector noise, gain, and directionality. They also used a horn antenna to observe the 21-cm Hydrogen emission to obtain galaxy rotation curves. One of the highlights of the school was a day trip to the Giant Meterwave Radio Telescope, where the participants got a guided tour of the observatory's design and functioning by Subhashis Roy, Ashish Mhaske and Mekhala Muley, an engineer at GMRT. On the final day, the student groups presented one of their chosen experiments and competed in a game-style quiz on the topics taught in the school. The students' and faculty's enthusiasm and active participation helped make this an enjoyable educational event. The organising committee comprised Ashish Mhaske, Avinash Deshpande, Dhruba J Saikia, Jameer Manur, Prakash Arumugasamy, and Rajeshwari Dutta, all from IUCAA and Subhashis Roy from NCRA-TIFR.

Events outside IUCAA

International Conference on "Neutron star Equation Of State and Gravitational Waves" (NEOSGrav2024)

An international conference titled 'Neutron star Equation of State and Gravitational Waves' (NEOSGrav2024) was organised by IUCAA at Goa from October 01-04, 2024. The aim of the conference was to bring together experts from different domains in neutron star physics: theoretical modelling, numerical modelling, as well as multi-messenger astrophysical observations. The sessions covered invited talks and contributed talks on inter-disciplinary aspects, including fundamental physics, constraining the Neutron Star Equation of State (EOS) with electromagnetic and gravitational wave observations, as well as numerical simulations. Forty-five participants, including international and national invited speakers, faculty, research scholars and post-doctoral fellows, attended the conference in person, while eleven experts delivered invited talks online.

All the scientific sessions were held at the Kenilworth Hotel in Goa. In addition to the science sessions, there were two public talks during the event. The first public talk, *"How do you take the picture of a black hole"*, was delivered by Prof. Luciano Rezzolla (Goethe University of Frankfurt am Main, Germany) on October 01, 2024, at Hotel Kenilworth. The second public lecture, "When worlds collide" by Prof. Nils Andersson (University of Southampton, U.K.) was held at the Goa Science Centre and Planetarium, Panjim on October 04, 2024. A heritage walking tour in Panjim was also organised for the visitors by the Goa Science Centre. There was also an opportunity for the participants to interact during the networking evening.

The conference was organised by Debarati Chatterjee and her Ph.D. students (Bikram Keshari Pradhan, Suprovo Ghosh, Swarnim Shirke, Nilaksha Barman, Pranjal Tambe) from IUCAA, with support from the Scientific Organising Committee (Dipankar Bhattacharya, Ashoka University, Sukanta Bose, Washington State University, USA and Prayush Kumar, ICTS-TIFR, Bengaluru) and Local Organising Committee (Reshma Raut Dessai, Goa University and Anantharaman S.V., Ashoka University). The event received an overwhelming response from both the invited speakers as well as the participants.

Gravitational Waves and LIGO-India

An introductory workshop titled 'Gravitational waves and LIGO-India' was held at BITS Pilani, Pilani campus, organised by IUCAA, Pune, and the Department of Physics, BITS Pilani from October 15-19, 2024. Forty-five participants attended the workshop, with most of them from BITS, Pilani and the remaining participants from other institutes in the country. The primary objective of the workshop was to introduce a preliminary understanding of gravitational waves and their applications to the Masters-level and early-stage Ph.D. students from the Physics department and other motivated students from the engineering departments.

The workshop consisted of a series of lectures covering the fundamentals of gravitational wave physics. Starting with general relativity, the lectures included various topics, such as gravitational waves, source modeling, basics of parameter estimation, and instrumentation. There were dedicated hands-on sessions, where the participants were expected to gain tangible experience/skills and also learn about the cutting-edge technologies and research opportunities in the field. Faculty members and scientific staff from IUCAA and BITS Pilani took part in delivering the lectures. In addition to these, two public talks were delivered by Naresh Dadhich ('*Why Einstein (had I been born in 1844!)? Relativity for Everyone*' and Sanjeev Dhurandhar ('*Gravitational Waves: A New Window to the Cosmos*'), which were attended by a majority of undergraduate students. The workshop was coordinated by Apratim Ganguly (IUCAA) and Sajal Mukherjee (BITS Pilani).

North East Meet of Astronomers (NEMA) - X

The North-East Meet of Astronomers (NEMA) is an annual gathering of astronomers in North East India, initiated in 2015 by the Department of Physics, Tezpur University, with support from the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune. NEMA has played a crucial role in bringing together astronomy enthusiasts from different parts of North East India, including students, researchers, and faculty members from various institutions. It has provided a platform for collaboration and the exchange of ideas in different areas of Astronomy, Astrophysics, Cosmology, and Astro-particle Physics. Over the years, NEMA has expanded significantly, with different institutions across the region hosting the event, reflecting the dynamic growth of the astronomical community in North East India.

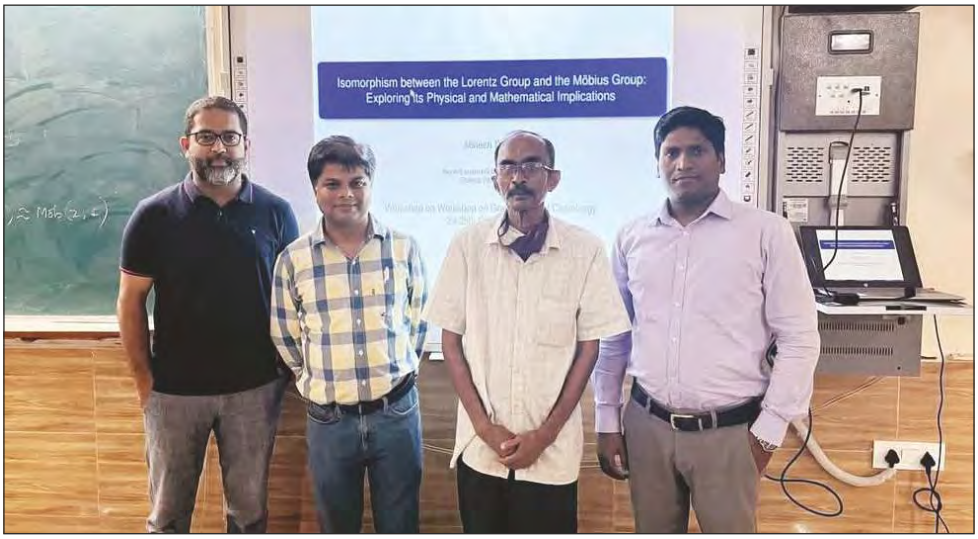
was held at Tezpur University during October 23-25, 2024. The three-day event featured oral and poster presentations, special lectures and extensive discussion

sessions. The talks and posters presented during NEMA-X covered a wide range of topics, including astrophysical plasma, solar physics, planetary science, black holes and compact objects, galaxies, active galactic nuclei (AGNs), interstellar dust, cosmology, neutrino physics, and machine learning. Ajit Kembhavi, Ranjeev Misra and Kanak Saha from IUCAA, Pune, attended the meeting and provided valuable feedback and suggestions for strengthening astronomy research in the region. Their recommendations emphasised fostering academic partnerships and increasing student engagement in different areas of Astronomy.

The event was coordinated by Rupjyoti Gogoi (Tezpur University) and Ranjeev Misra (IUCAA).

Workshop on Gravitation and Cosmology

The 'Workshop on Gravitation and Cosmology' organised by the Department of Mathematics and Statistics in collaboration with ICARD, Department of Physics, DDU Gorakhpur University, Gorakhpur, U.P., India, sponsored by IUCAA, Pune, was held on October 23-25, 2024. The workshop was proposed for the M.Sc., Ph.D. students and researchers working in the field of General relativity and Cosmology who are passionate about exploring the profound implications of gravitational theory on the understanding of the universe. Fifty participants attended the workshop from all over India, including Bihar, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Uttar Pradesh and West Bengal.



The workshop was structured as a series of lectures, tutorials, and hands-on sessions and covered a spectrum of topics, including the Mathematical Foundations of General relativity (GR), Raychaudhuri's equations, Space-time singularity, Gravitational Waves (GW), Data analysis in Gravitational waves, and Modified theories of gravity. The resource persons for the workshop were Subenoy Chakraborty (Jadavpur University, Kolkata), who delivered lectures on the Basics of GR and consequences of Raychaudhuri's equations; Apratim Ganguly (IUCAA, Pune) delivered lectures on data analysis of GW; Jibitesh Dutta (NEHU, Shilong) delivered lectures on modified gravitational theory and its applications in cosmology; Shantanu Rastogi (DDU, Gorakhpur University) delivered lecture on measuring scale in the universe. There were three tutorials/hands-on sessions for GW data analysis.

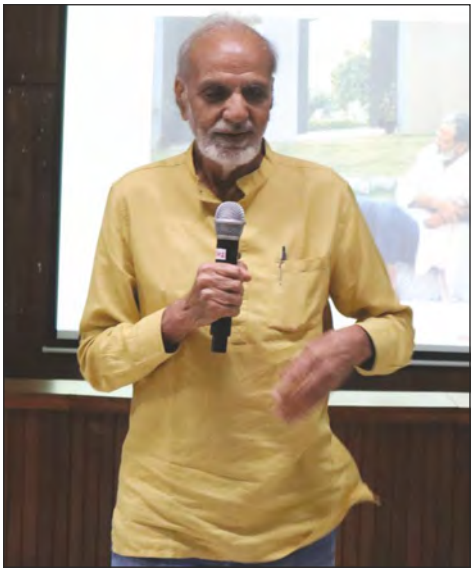
The workshop was participatory in nature, with participants from diverse backgrounds, which was supported by IUCAA under the ICARD programme. It was coordinated by Rajesh Kumar (DDU Gorakhpur University, Gorakhpur) and Apratim Ganguly (IUCAA).

Conference on Classical and Quantum Gravity

A conference on Classical and Quantum Gravity was held at the Department of Physics, Cochin University of Science and Technology (CUSAT), Kochi, on November 05–07, 2024. The event brought together researchers, Ph.D. scholars, and experts from across the country to engage in discussions on the latest advancements and challenges in gravitational physics. The conference also celebrated the significant contributions of Naresh Dadhich to the field of gravity and black hole physics on the occasion of his 80th birthday. The conference was inaugurated by Junaid Bushiri, Vice-Chancellor, Cochin University of Science and Technology.

The conference program featured comprehensive lectures covering various aspects of classical and quantum gravity, including recent trends in black hole research, higher-dimensional gravity, and the interface of fundamental forces with quantum gravity. Esteemed speakers including Romesh Kaul (Delhi University), Mohammad Sami (SGT, Gurugram), Banibrata Mukhopadhyay (IISc), Narayan Banerjee (IISER Kolkata), Sumanta Chakraborty (IACS, Calcutta), Amitabha Lahiri (SNBNCBS), T R Govindarajan (Krea University), Ghanshyam Date (CMI, Chennai), Ajit Kembhavi (IUCAA), Jose Senovilla (Bilbao, Spain) (online), Sayan Kar (IIT, Kharagpur) (online), Kandaswamy Subramanian (IUCAA) (online), Rituparno Goswami (UKZN) (online) and Luciano Razzolla (Frankfurt University, Germany) (online) provided insights into the latest developments and selected faculty members from India and abroad delivered talks online. The number of participants, including speakers, was fifty-five. The conference facilitated meaningful interactions and networking opportunities, particularly benefiting Ph.D. scholars. The structured sessions and ample break times allowed for in-depth discussions on open problems in the field. The event successfully fulfilled its objective of exposing early-career researchers to the frontiers of gravitational physics and promoting academic collaboration. The participants expressed appreciation for the engaging sessions and the opportunity to interact with leading experts in the field. The organising team, led by Joe Jacob, Charles Jose, Dawood Kothawala and Ninan Sajeeth Philip, ensured a smooth execution of the event.

The conference was coordinated by Joe Jacob (Newman College), Charles Jose (CUSAT) and Dawood Kothawala (IIT, Madras).



Introductory workshop on Astronomy and Astrophysics

The 'Introductory workshop on Astronomy and Astrophysics' was organised by the Cochin College, Kerala during November 13-15, 2024 in collaboration with IUCAA, Pune. A total of forty eight students from 25 colleges affiliated to the M.G. University and the University of Caliut, Kerala, Jain University, Christ University, Bengaluru etc. participated in the workshop. Rishi Mon (Vice Principal, The Cochin College) delivered the presidential address, Anupam Bhardwaj (IUCAA, Pune) inaugurated the event followed by felicitation address by Joe Jacob (ICARD Newman college, Thodupuzha).

The sessions were engaged by Anand Narayanan (IIST, Trivandrum), Ninan Sajeeth Philip (Airis4D and IUCAA), Anupam Bhardwaj (IUCAA), Sreejith Padinhatteeri (Manipal Centre for Natural Sciences, Manglore), Joe Jacob (ICARD Newman College), Jithesh V (CHRIST University) and Sudheesh T. P. (Newman College and Christ University). Anand Narayanan discussed sessions on 'Radial Velocity Method for Detection of Extrasolar Planets I & II', Ninan Sajeeth Philip on 'AI Applications in Astronomy', Anupam Bharadwaj on 'Stellar Evolution and Pulsation: I & II', Sreejith Padinhatteeri on 'Curious Mysteries of the 'Boring' Sun!' & 'Aditya-L1 and other global space missions to study the Sun', Joe Jacob on 'Structures of the Universe' & 'Galaxies-The building blocks of the Universe', Jithesh V on 'X Ray Universe: I & II' and Sudheesh T. P. on 'Exploring the Universe with Radio Astronomy'. The workshop concluded with a feedback session on November 15, 2024. The workshop was coordinated by Sathya Narayanan (Cochin College, Kerala) and Anupam Bhardwaj (IUCAA).

General Relativity: A century of observations

A three-day workshop titled 'General Relativity: A Century of Observations (GR-COBS)' was organised by the Department of Physics, Malda College, West Bengal, in collaboration with IUCAA, Pune, from November 21-23, 2024. The workshop provided students, researchers, and academicians a platform to explore the foundational principles and advancements in General Relativity (GR) and its applications in astrophysics and cosmology. The inaugural session of the workshop was graced by eminent resource persons, including Manas Kumar Baidya, Principal, Malda College; Ankur Sensharma, University of Gour Banga; Saibal Ray, CCASS, GLA University, Mathura (online); Farook Rahaman, Jadavpur University, Kolkata; Ranjan Sharma, CBPBU, Cooch Behar; senior faculty members Ujjwal Saha; Uttam K Sarkar, Tapan Kumar Mandal, Amal Ch Mandal, Aritra Sanyal, IASES, Kolkata (online), Shyam Das, Coordinator, GR-COBS, Moumita Das, HOD, Dept. of Physics, Malda College. Siddarth Rai, Co-coordinator, GR-COBS, invited the dignitaries to the dais, who were felicitated by the students of the Department. A symbolic gesture of nurturing knowledge and growth was portrayed through the watering of a plant by all the guests, symbolising the nurturing of new ideas and collaboration in Astrophysics and Cosmology. Moumita Das, HOD, Department of Physics, Malda College, extended a warm welcome through her opening speech, expressing gratitude for the esteemed gathering and highlighting the significance of scientific research in fundamental sciences. Manas Kumar Baidya, Principal, Malda College, gave the inaugural speech, emphasising the pivotal role of such a conference. Concluding the inauguration session, the Convenor of the conference, Shyam Das, expressed

heartfelt gratitude to IUCAA for sponsoring the conference and also thanked the distinguished guests, invited speakers, particularly Surhud More, for his presence and everyone involved in organising the conference. Their collective efforts were instrumental in making the conference a resounding success, setting the stage for insightful discussions and fruitful collaborations in General Relativity.

The workshop featured a diverse mix of theoretical lectures, interactive discussions, and hands-on sessions, covering the following topics:

1. The evolution of General Relativity and its fundamental principles.
2. Applications of GR in black holes, wormholes, gravitational lensing, and cosmology.
3. Practical exposure to astrophysical data analysis techniques.

The first day focused on the historical perspectives and mathematical foundations of GR, with insightful lectures by Saibal Ray, Farook Rahaman, and Ranjan Sharma. The second day focused on deeper theoretical aspects and applications. Farook Rahaman began with a comprehensive discussion of the theoretical and mathematical approaches in GR. Ranjan Sharma highlighted the physics of "dead stars", including neutron stars and white dwarfs. Surhud More introduced participants to gravitational lensing and its applications. The post-lunch session commenced with a lecture by Farook Rahaman on black holes and wormholes: Implications of general relativity. The day ended with an introductory session by Aritra Sanyal on data analysis techniques. In the evening at the end of the second day's workshop, the participants, along with the speakers and organisers, took part in the cultural program in a homely environment.

The final day emphasised practical learning, with Surhud More conducting an extensive hands-on session on weak gravitational lensing. The workshop concluded with an open discussion and a valedictory session. The valedictory session was graced by the Principal, Malda College, and the invited speakers of the conference. The participants expressed their heartfelt gratitude and appreciation to the conference organisers. Surhud More and Shyam Das, the workshop conveners, expressed sincere gratitude to IUCAA, speakers, participants, students, and others for their support from the commencement to the workshop's conclusion. The workshop provided participants with an understanding of general relativity and its applications, exposure to advanced data analysis techniques for astrophysical research, and networking opportunities with leading experts in the field. The workshop was coordinated by Shyam Das (Malda College) and Surhud More (IUCAA).

Empowering Teachers to Foster Scientific Curiosity in Students - A Joint Initiative of STEM & Space and ARIES

A unique Teacher Training Program titled 'Empowering Teachers to Foster Scientific Curiosity in Students' was jointly organised by STEM & Space, New Delhi, Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital, with the support from the Office of Astronomy Education (OAE), India on November 25-27, 2024. The program was designed for primary and middle school science teachers in North India. The program aimed to equip the participants with the knowledge and methodologies needed to effectively introduce astronomy education in their classrooms. The participants engaged in lectures, demonstrations, and hands-on activities over three days and gained valuable insight into the subject and practical experience with the tools to make astronomy more accessible and engaging for their students.

Brief background to the program:

Before organising the Teacher Training Program, the OAE Center India conducted a nationwide astronomy education survey in collaboration with ARIES in Uttarakhand. A common feedback received from the teachers was regarding the lack of suitable astronomy education resources in India, which posed a challenge for the students to visualise the concepts taught in the class, hampering the ability of the teachers to impart astronomy education successfully. The workshop aimed to bridge this gap by demonstrating how the available astronomy resources can enable teachers to successfully undergo training to achieve astronomy education in the classroom. Astronomy and space connect easily to STEM subjects like physics, geography, engineering, and math, making them engaging and relevant for students. Their interdisciplinary nature helps deepen understanding and sparks curiosity in the classroom. The project aims to train and support astronomy educators, empowering them to inspire the next generation toward a career in space. By expanding the network of educators, it is possible to nurture future explorers and scientists while making space education accessible to all, regardless of location or background.

ARIES is one of the premier astronomy research institutes in India and is located in a small mountainous state, Uttarakhand, in northern India. Uttarakhand and nearby regions have many urban, semi-urban and rural schools, which do not have easy access to educational resources like affluent schools in urban regions. The Devasthal Observatory of ARIES hosts two of India's largest optical telescopes. Conducting the workshop at ARIES provided a unique opportunity for the participants to visit world-class telescopes and interact with scientists working in diverse fields of astronomy.

Twenty participants representing the North Zone of India were selected for the program. The participants were an equal mix of primary and middle-grade teachers who, over three days, engaged in a comprehensive introduction to astronomy education, briefly described below:

Lectures and Demonstrations:

The participants were exposed to lectures and demonstrations by experts from the Homi Bhabha Centre for Science Education - TIFR, who conducted lecture demonstrations on foundational topics such as eclipses and the phases of the Moon. The sessions clarified core concepts, empowering teachers to better communicate these ideas to students.

Spacetopia: A Ready-Made Teaching Resource:

STEM & Space presented Spacetopia, an astronomy education portal offering grade-specific lessons, engaging videos, and hands-on activities. Designed for minimal teacher preparation, this resource streamlines the integration of astronomy into classrooms. Experts demonstrated the portal's use through interactive sessions covering various topics in primary and middle grades. Teachers engaged in hands-on activities, finding them effective for keeping students actively involved. Demonstrating a giant Moon map added an engaging element, helping teachers understand the lunar features.

Activities at the observatory:

ARIES provided participants with unique astronomy experiences to enhance their fascination and experience, which included:

- Star gazing sessions: Identifying planets, constellations and stars during the star gazing sessions and viewing through a telescope.
- Solar observation: Features of the Sun were explained while viewing through a telescope.
- Facility tours: Participants visited the Stratosphere Troposphere (ST) Radar facility, the 1.04m Sampurnanand Telescope, the 1.3m Devasthal Fast Optical Telescope, the 3.6m Devasthal Optical Telescope and the 4m International Liquid Mirror Telescope at ARIES and Devasthal. They saw the telescope operations and data acquisition by astronomers for scientific research.

Panel discussion on Challenges and Opportunities:

Panel discussions led by ARIES encouraged teachers to share their experiences and discuss challenges related to astronomy education, particularly given its absence from most school curricula. The key topics included:

- Discussing survey results gathered from interviews with teachers about astronomy education in schools to get an idea about how astronomy education is perceived across states, led by HBCSE-TIFR.
- The feasibility of introducing astronomy as a subject in Indian schools.
- Overcoming barriers faced by teachers eager to teach astronomy.
- Identifying reliable astronomy teaching materials and videos.
- Addressing gender bias in fostering girls' participation in astronomy

In the concluding session, the participants were privileged to meet and interact with Jean Surdej (University of Liege, Belgium). The program was highly successful, with all participants appreciating the content and discussions. The telescope visits and observations provided invaluable hands-on experience, made possible by the unique location of the workshop at ARIES. Panel discussions created a space for teachers to share insights and learn from experts and peers, which they found essential for implementing astronomy education in their schools. Expert-led lectures and demonstrations from ARIES, HBCSE-TIFR, and STEM & Space covered key astronomy concepts. Additionally, the Spacetopia portal by STEM & Space gave teachers the confidence to incorporate astronomy into their schools, either as a STEM extracurricular activity or as part of the curriculum. Teachers left the workshop feeling motivated and empowered to introduce astronomy education.

The workshop coordinators Kuntal Misra (kuntal@aries.res.in), ARIES, Nainital, Virendra Yadav (virendra@aries.res.in), ARIES, Nainital, Mila Mitra (mila@stemandspace.com), STEM & Space, New Delhi, Gautam Agawari (gautam@stemandspace.com), STEM & Space, New Delhi Office will follow up with the participants in the near future to assess their progress.

The Teacher Training Program was coordinated by Surhud More (IUCAA).

(Based on the press report submitted by. Kuntal Mishra, ARIES, Nainital)

High Energy Astrophysics Workshop

A workshop on High Energy Astrophysics jointly organised by the Department of Physics, Banaras Hindu University and IUCAA was held in the Department of Physics from November 25-27, 2024. The workshop aimed to motivate B.Sc., M.Sc. and early Ph.D. students to pursue research in High Energy Astrophysics and included hands-on sessions along with the theoretical lectures. The workshop was attended by over seventy participants all over the country.

The workshop included a broad range of topics from compact objects on smaller masses to active galactic nuclei. Five resource persons from IUCAA, Pune, ARIES, Nainital, and the Central University of Kashmir were invited, and they delivered insightful lectures during the workshop. The workshop commenced with a lecture on active galactic nuclei and their emission processes, as well as how these objects are detected across the wavebands from optical to very high-energy gamma-rays from ground and space-based observatories.

As a part of the workshop, the organisers arranged a public talk by Gulab Dewangan titled 'India's X-ray Missions: Past and Future', which provided an engaging overview of India's contributions to X-ray astronomy. He highlighted the success of past missions like ASTROSAT and their significant findings, including the study of black holes and neutron stars. Looking ahead, Gulab Dewangan discussed the current mission, such as XpoSat and upcoming missions and their potential to further advance our understanding of High-Energy Astrophysics.

The workshop was coordinated by Raj Prince (Banaras Hindu University) and Vaidehi Paliya (IUCAA).

Introductory Workshop on Solar Astronomy

A two-day introductory workshop on Solar Astronomy was organised by the Department of Physics, Patna University, in collaboration with IUCAA on November 29-30, 2024. The workshop venue was the Seminal Hall in the Physics Department, Patna University. The workshop aimed at familiarising undergraduate and postgraduate students with the captivating domain of solar astronomy, fostering an interest in the Sun, our closest star, and its significant impact on our lives and technology. The workshop was coordinated by Sumita Singh, Sanjay Kumar from Patna University, and Durgesh Tripathi from IUCAA. Fifty students from across the country were selected to participate, with 46 ultimately attending the workshop.

The inaugural session of the workshop was presided over by Ajay Kumar Singh (Vice Chancellor, Patna University), The chief guest for the occasion was D. K. Mahato (Head, Department of Physics, National Institute of Technology, Patna). Durgesh Tripathi (IUCAA, Pune) was the guest of honour. The event was graced by the distinguished presence of Birendra Prasad (IQAC Director, Patna University), and Nishant K Singh (IUCAA). The session commenced with the lighting of the lamp by the dignitaries, followed by a welcome song. Sumita Singh (Head, Department of Physics) warmly welcomed the guests and introduced the workshop's theme. Santosh Prasad Gupta was the master of ceremonies of the inaugural session.

Lectures on various aspects of solar astronomy were delivered by eminent speakers, including Durgesh Tripathi (IUCAA) and Nishant Singh (IUCAA), Upendra Kumar Singh Kushwaha (Univ. of Allahabad), Alok Ranjan Tiwary (J.P. University) and Priti Mishra (Patna University) which helped in integration of theoretical knowledge with practical demonstrations.

The workshop was coordinated by Sumita Singh (Patna University), Sanjay Kumar (Patna University) and Durgesh Tripathi (IUCAA).

Workshop on Teaching Astronomy in State Board Schools in and around Mumbai: Train the Trainer

A workshop on Teaching Astronomy in State Board schools in and around Mumbai: Train the Trainer was organised by the Sky Explorers, in collaboration with the Nehru Planetarium, Worli, Mumbai, on December 06-07, 2024, at the Nehru Planetarium. The IUCAA-funded workshop was specifically designed for science, environmental studies, geography, and mathematics teachers affiliated with Maharashtra State Board schools. Among the 65 applications received, 35 teachers were selected to participate.

The two-day workshop focused on student-centred learning and hands-on teaching methodologies, utilising low-cost resources easily accessible in classrooms and homes. The sessions were designed to enhance the teaching of astronomy in primary and middle school classrooms by promoting collaborative efforts among teachers. The sessions were held on the following themes:

Myth-Busting
These sessions addressed common misconceptions surrounding eclipses and incorporated storytelling as a powerful teaching tool.

Classroom Design & Learning Styles
The teachers were introduced to classroom design methods that cater to diverse learning styles.

Astronomy Education Simplified
The workshop aimed to demystify astronomy concepts for teachers and students, making the subject more accessible and engaging. The key topics included:

- The role of the Sun at the center of the solar system.
- The Moon and its effect on Earth.
- The science behind Eclipses and the myths surrounding them.

Engagement Strategies:
Teachers were provided with strategies to actively involve students and encourage them to pursue research early on.
The workshop aimed to inspire teachers to enjoy teaching astronomy with clarity and simplicity. By empowering educators with effective methods, it is hoped that they will foster curiosity and interest in their students about celestial bodies and the wonders of the universe. The feedback from the participants—both verbal and written—indicated that the sessions were highly appreciated and well-received.

The workshop was coordinated by Surhud More (IUCAA).

IAU - Astronomy for Education Teacher Training Program 2025

The Tamil Nadu Astronomy & Science Society (TASS) and the Indian Institute of Astrophysics (IIA), Bengaluru organised an OAE-Center India supported Teacher Training Program on Astronomy on December 6-8, 2024 at the Bishop Herber College, Tiruchirappalli, Tamil Nadu, to support school teachers and resource personnel dedicated to teaching science, geography, mathematics, and environmental studies and desired to impart astronomy concepts to their students directly or indirectly. The workshop was attended by 35 participants, and the program addressed pedagogical aspects of the teaching-learning process concerning concepts in astronomy and included hands-on activities, simple calculations, and a sky watch session.

The workshop primarily aimed to improve astronomy education for primary and high school students through teachers. The workshop included concepts covered in school textbooks, such as the effects of the tilt of the Earth's axis, the phases of the moon, eclipses, tides, in addition to basics of the solar system, astronomy in daily life and the various missions of the Indian Space Research Organisation (ISRO). The teachers were also introduced to scales in the Universe, constellations and stars, pre-telescopic observational astronomy, galaxies, and cosmology.

The workshop is expected to help teachers introduce astronomy engagingly and interactively, which will kindle the students' curiosity to learn about astronomy. One of the workshop's themes was introducing teachers to different teaching techniques. The resource persons for the workshop were drawn from reputed national astronomy institutes in India, along with staff from the TASS and IIA. Through visual and study aids, worksheets and demonstrations, as well as hands-on activities and role plays, some of the complex concepts were broken into smaller bits which would be easier for school children to digest.

The workshop was well received by the participants based on their feedback and is expected to enhance the quality of astronomy education in schools, especially to make both astronomy and science education more fruitful for students and learners. The workshop was coordinated by Surhud More (IUCAA).

(*Based on the report submitted by organisers, along with Niruj Mohan Ramanujam and Surhud More*
https://astro4edu.org/news/oT131XO/) .

Manipal-IUCAA Astrostatistics School-2024

The Manipal Astrostatistics School 2024 (MAS 2024) was organised at the Manipal Centre for Natural Sciences (MCNS), Manipal Academy of Higher Education (MAHE) from December 10-15, 2024, in collaboration with Pennsylvania State University, IUCAA, Harvard Smithsonian, SINP, and BARC. 170 applications were received from various parts of India, and a few from outside India, such as South Africa, France, and the UK. Applications came from more than 20 different states of India. Over 23 eminent institutes such as various IITs, IISERs, NITs, IUCAA, 35 universities across India, spanning from Srinagar in the North to Trivandrum in the south, including many North-eastern parts like Assam, Manipur. The total number of participants, including MAHE and nearby regions, was close to 100.
The School was coordinated by Debbijoy Bhattacharya (MAHE) and Ranjeev Misra (IUCAA).

Gravity@2024

A national-level conference 'Gravity@2024' was held at the IUCAA Centre for Astronomy Research and Development (ICARD), Department of Physics, Cooch Behar Panchanan Barma University (CBPBU) during December 18-20, 2024. The scientific programme covered a broad range of topics in astronomy, astrophysics and cosmology. The conference aimed to discuss and promote recent advances in specific areas of gravity, namely, the theory of compact stars, tests of general relativity, modified theories of gravity, galaxy formation and evolution, observational astronomy and cosmology. Although several registered participants could not attend the conference due to logistical challenges, the conference witnessed the participation of more than sixty participants, including eight invited speakers, namely Naresh Dadhich (IUCAA), Kanak Saha (IUCAA), Bikash Ch. Paul (North Bengal University), Aditya Sow Mondal (Visva-Bharati University), Arunava Bhadra (North Bengal University), Tamal Sarkar (North Bengal University), Soma Mondal (Government Girls' General Degree College, Kolkata) and Farook Rahaman (Jadavpur University), who delivered invited talks at the conference.

The conference aimed to provide young researchers a platform to present their recent works. The Scientific Organising Committee (SOC) reviewed and selected the abstracts that aligned with the theme of the conference and shortlisted candidates accordingly. The conference enabled participants to share new research findings among physicists with different backgrounds and expertise and gain insights into gravitation and cosmology. Participants also learned about astrophysical data handling from Aditya Saw Mondal, Tamal Sarkar and Soma Mondal. The workshop was coordinated by Ranjan Sharma (Coordinator, ICARD, Cooch Behar Panchanan Barma University) and Kanak Saha (IUCAA).

Introductory Workshop on Astronomy and Astrophysics

An introductory workshop on Astronomy and Astrophysics, sponsored by the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, was held from December 18-20, 2024, at the Dolphin PG Institute of Biomedical and Natural Sciences (DIBNS), Dehradun. This highly anticipated event, organised in collaboration with the Department of Physics, DIBNS, provided an enriching platform for students, researchers, and educators to delve into the fascinating realms of astronomy and astrophysics.

The workshop commenced with a warm

welcome address by Shailja Pant (Principal, DIBNS), setting an inspiring tone for the three-day journey of cosmic exploration. The inaugural session was graced by S.P.S. Rawat (Scientist G and Former ADG of ICFRE), who chaired the event, along with Anupam Bhardwaj (Coordinator, IUCAA) and Aasheesh, Coordinator (DIBNS). The opening talk by Anupam Bhardwaj on the Fundamentals of Astronomy set the stage for an immersive learning experience. The first day, based on the theme 'Unravelling the Mysteries of the Cosmos', introduced the participants to the fundamentals of astronomy and observational techniques. Anupam Bhardwaj provided insights into celestial structures, astronomical measurements, and the evolving universe. Bhuwan Joshi (Udaipur Solar Observatory) captivated the audience with his talk on solar physics, focusing on solar flares, sunspots, and the dynamic nature of the Sun. Kaushal Sharma discussed astronomical techniques, including photometry and spectroscopy, which are crucial for studying stars, galaxies, and celestial bodies. The day concluded with an engaging hands-on session in observational astronomy, where participants learned to operate telescopes and track celestial objects under the guidance of Kaushal Sharma, Nitesh Kumar, and Anupam Bhardwaj. The second day focused on the life cycle of stars and stellar explosions. Neelam Panwar (ARIES-Nainital) took the participants on 'A Stellar Journey: From Gas Clouds to Fiery Balls', explaining the birth, evolution, and eventual fate of stars. Brijesh Kumar (ARIES-Nainital) gave a compelling talk on supernovae explosions, emphasising their role in enriching the universe with heavy elements. Another highlight was the talk by Susmita Das (IUCAA), who discussed variable stars, demonstrating how their brightness variations help us understand stellar interiors and dynamics. A stellar modeling and data visualisation session led by Nitesh Kumar, Susmita Das, and R.K. Kundu equipped participants with skills to analyse astronomical data and interpret cosmic phenomena. The final day introduced the participants to cutting-edge topics in modern astrophysics, namely 'Black Holes, Globular Clusters and Data Analysis'. Neelam Panwar presented a session on multiwavelength astronomy, explaining the importance of observing celestial objects across radio, infrared, optical, and X-ray wavelengths to understand the universe comprehensively. Balendra Pratap Singh (UPES Dehradun) delved into the enigmatic world of black holes, unravelling their mysteries, properties, and role in astrophysical processes. Richa Kundu (Miranda House, University of Delhi) shared insights on the extra-tidal regions of globular clusters, and Nitesh Kumar led a hands-on session on astronomical data analysis, guiding the participants through advanced research techniques and data interpretation.

The workshop concluded with an interactive feedback session, where participants shared their experiences and learnings. Certificates were awarded to all attendees, marking their successful completion of this intellectually stimulating event. Experts and organisers reflected on the workshop's success in inspiring young minds and fostering a deeper interest in astronomical research. The workshop was coordinated by Aasheesh Raturi (DIBNS) and Anupam Bhardwaj (IUCAA).

Welcome to...

Susmita Das, Sudeb Ranjan Datta, Balpreet Kaur and **Rahul Sharma**, who have joined IUCAA as Post-Doctoral Fellows.

Farewell to...

Sourav Bhadra and **Atrideb Chatterjee**, Post-Doctoral Fellows, who left IUCAA at the end of their tenure or to take up a new assignment.

Piyali Ganguly, Suprovo Ghosh, Kavita Kumari and **Ankush Mandal**, Senior Research Fellows, who left IUCAA at the end of their tenure.

Colloquium

03.10.2024	Sonjoy Majumder on ***Skyrmion engineering in spin-orbit coupled spinor BEC.***
24.10.2024	Paolo Creminelli on ***Primordial Non-Gaussianity: the f_NL ~1 threshold.***

Seminars

08.10.2024	Bhaskar Biswas on ***Probing the Dense Matter Equation of State: Neutron Stars in General Relativity and Beyond.***
10.10.2024	Ashwin Devaraj on ***Probing accretion regimes and non-dipolar magnetic fields in HMXBs using Cyclotron lines ina neutron star spectra.***
22.10.2024	Abhishek Rajhans on ***Energy partition and acceleration of ions and electrons during magnetotail reconnection.***
28.10.2024	Hamsa Padmanabhan on ***Modelling the baryonic Universe: a multi-messenger view into the first supermassive black holes.***
06.11.2024	Deepak Pandey on ***Precision measurements, Gravitational wave detection and Quantum technology with Optical resonators.***
08.11.2024	Khyati Malhan on ***Shiva & Shakti: The earliest building blocks of the Milky Way?***
12.11.2024	Gunjan Tomar on ***High-Energy Observations of Low-Luminosity Active Galactic Nuclei.***
13.11.2024	Andrzej Zdziarski on ***The puzzles of the soft state of accreting black-hole binaries.***
14.11.2024	Bhupal Dev on ***New Physics from Multi-messenger Merger Studies.***
19.11.2024	Yogesh Chandola on ***Cold neutral atomic hydrogen (HI) in radio active galactic nuclei (AGNs) host galaxies and nearby young starburst dwarf galaxies.***
21.11.2024	Bhooshan Gadre on ***Unraveling the cosmic symphony of merging compact binaries.***
28.11.2024	Jyotirmay Paul on ***Advancements in High Angular Resolution Astronomy: Insights from SALTO, SCExAO VAMPIRE, and BIFROST/Asgard Suite.***
19.12.2024	Nikhil Mukund on ***Tackling Challenges in Gravitational-Wave Interferometer Sensing and Control.***
26.12.2024	Suvendu Rakshit on ***The Monster in the Heart: the sub-pc region of AGN.***

Office of Astronomy for Education (OAE) Center - India

The OAE Center India funded three teacher training workshops from October to December 2024, at Tiruchirappalli, Tamil Nadu, Nainital, Uttarakhand, and Nehru Planetarium, Mumbai, Maharashtra. The workshops benefited a number of teachers, and all of them included pedagogical as well as practical aspects of teaching astronomy in schools.

The office printed several sets of three astronomy books for school students: '*Big Ideas in Astronomy*'(in English and Hindi), 'Khagol Goshti' (Astronomy Tales - in Marathi), and 'Jantar Mantar' (Historic Indian Observatory - in English, Hindi, and Marathi). These books, together with user guides for teachers on how to use these books in their classes effectively, have been distributed in about four hundred schools. The office also completed an English translation of the book '*Khagol Goshti*', which is now at the vetting stage.

Our team performed a secondary analysis of the baseline survey on Astronomy education in order to assess state-to-state differences and similarities within India. We observed substantial disparities in performance across states. The insights gained offer important implications for comparing state-level teaching standards and guiding the development of a more effective national astronomy curriculum. These results were presented at the epiSTEME-10 conference held at HBCSE, Mumbai, and the summary of this work will be published in the conference proceedings.

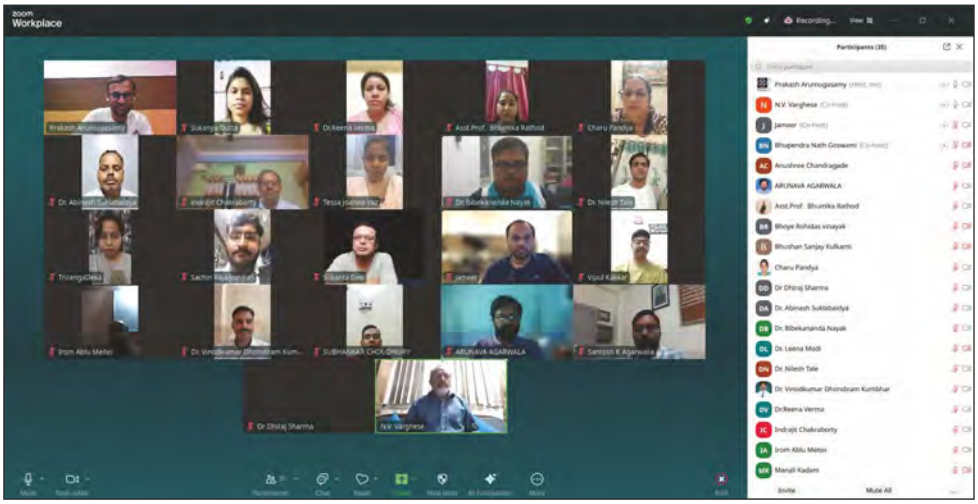
Finally, the OAE center India also helped in the organisation of the annual SHAW IAU workshop this year, with members acting to be part of the SOC of the Astronomy Education Research part as well as in the technical organisation of the workshop.

Astronomy Centre for Educators

Malaviya Mission Teacher Training Centre

National Education Policy – 2020: Orientation and Sensitisation

The Malaviya Mission Teacher Training Centre (MMTTC) of the Astronomy Centre for Educators (ACE) conducted a two-week online capacity-building programme on the National Education Policy – 2020: Orientation and Sensitisation. The programme was scheduled from November 15 to November 30, 2024. It was open to faculty members, research scholars, research associates, post-doctoral fellows, demonstrators, and tutors from all higher educational institutions. About 30–35 participants attended the sessions every day. The programme comprised two sessions each on eight NEP themes, by prominent speakers with vast experience in their respective fields. The themes and the speakers were as follows:



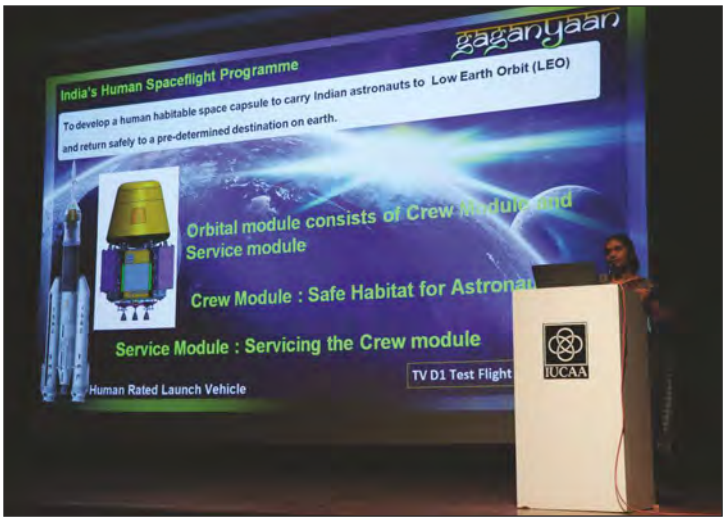
- **Skill Development** - The speakers were N V Varghese (NIEPA) and Narayan Sharma (Cotton University).
- **Indian Knowledge Systems** - The speaker was Malhar A Kulkarni (IIT Bombay).
- **Research and Development** - The speakers were Bhupendra N Goswami (Cotton University) and Narayan Rangaraj (IIT Bombay).
- **Higher Education and Society** - The speakers were Dhruba J Saikia (IUCAA) and Nilratan Shende (EAGL Livelihood Foundation).
- **Holistic and Multidisciplinary**

Education - The speakers were Narayan Sharma (Cotton University) and Aniket Sule (Homi Bhabha Centre for Science Education).

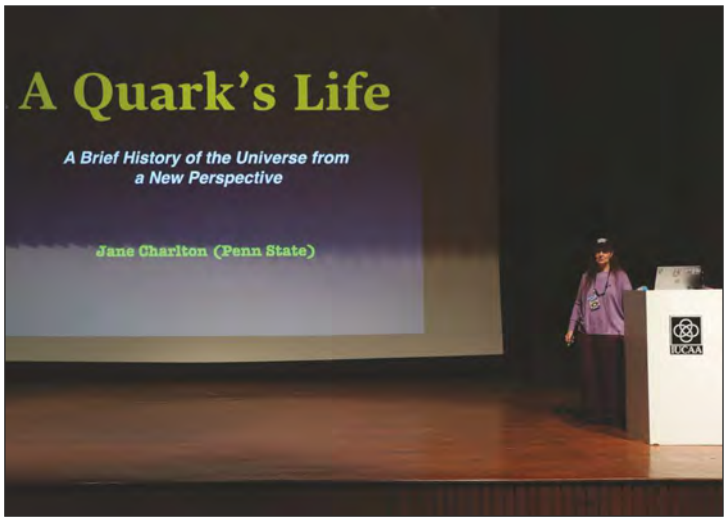
- **Student Diversity and Inclusive Education** - The speakers were Ajailiu Niumai (University of Hyderabad) and Ayush Gupta (Homi Bhabha Centre for Science Education).
- **Information and Communication Technology** - The speakers were Hiten Choudhury (Cotton University) and Prakash Arumugasamy (IUCAA).
- **Academic Leadership, Governance, and Management** - The speakers were Garima Malik (NIEPA) and Abdul Shaban (Tata Institute of Social Sciences).

Public Outreach Activities

The Public Talk series at IUCAA has been renamed 'Chandra Public Lectures' to honor Prof. Subrahmanyan Chandrasekhar, whose name is also given to the venue, the Chandrasekhar Auditorium. The following talks were conducted.



November 21, 2024 - Talk by Nigar Shaji (ISRO, Bengaluru) titled '*A vision for future Indian Space Missions*'.



December 03, 2024 - Talk by Jane Charlton (Penn State University, USA) titled 'The Life of a Quark'.

December 05, 2024 - Talk by Lutz Wisotzki (Leibniz-Institut für Astrophysik Potsdam (AIP)) titled 'The cosmic time machine – What the light from distant galaxies can tell us'.

The talk was organised in collaboration with Jyotirvidya Parisanstha.

(Photo credits: JVP, Pune)

2nd Saturday Lecture / Demos

'Studying the Universe from Space' by Varun Bhalerao (IIT Bombay)

'A Quarks Life: A brief history of the universe from a new perspective' by Samir Dhurde & Scipop Team

Regular Workshops, Visits and Other Outreach Events

1. **Astronomy & Telescope Making Workshop at St. Xavier's College, Ahmedabad** (07-08 October)
   200 students and 20 teachers participated in the workshop.

2. **Astronomy workshop at IUCAA** for **Modern College of Engineering, Pune** (10 October)
   50 students participated in the workshop.

3. **Science Toys Workshop for The Kalyani School, Pune** (15 October)
   60 students and teachers attended the workshop.

4. **Telescope Making Workshop for the Indian Association of Physics Teachers, Dharamshala** (15-17 October)
   30 students and 5 teachers participated in the workshop.

5. **Astronomy, Telescope Making and Science Toys Workshop at Sainik School, Goalpara, Assam** (21-24 October)
   700 students and 20 teachers participated in the workshop.

6. **Astronomy workshop** for **Bhaktivedanta Model School** (19 November)
   40 students participated in the workshop.

7. **Astronomy & Telescope Making Workshop at IUCAA in collaboration with Ashoka University** (22 November)
   70 teachers from the city participated in the workshop.

8. **Astronomy workshop** for **Mahilashram Junior College** (26 November)
   50 students participated in the workshop.

9. **Sky Observation session at MIT Gurukul World School, Loni** (27 November)
   350 students and teachers enjoyed looking through a telescope and learned how to handle one.

10. **Astronomy & Science Toys Workshop for Sondara School, Domari, Beed** (28 November)
    45 students and 5 teachers attended the workshop.

11. **Astronomy & Telescope Making Workshop for KBT College of Engineering, Nashik** (10 December)
35 teachers participated in the workshop.

12. **Astronomy workshop** for **Vibgyor School** (17 December)
33 Students participated in this Workshop

13. **Astronomy & Science Toys Workshop for Dnyandeep Vidyamandir, Dapoli** (19 December)
80 students and 5 teachers attended the workshop.

14. **Science Toys Workshop & Sky observation session** (26-27 December)
450 students and teachers participated in the workshop.

(The above sessions had various members of the IUCAA Scipop Team as organisers or resource persons.)

IAU-related outreach

Samir Dhurde participated in and delivered workshops in two events supported by the IAU Office of Astronomy for Education

- IAU OAE FRESCO Residency Meeting during October 13–15, 2024, in Istanbul, Turkey, where two new Astronomy board games were developed. These are being tested by IUCAA Scipop with various school audiences in India.
- The Mediterranean Regional SHAW-IAU Workshop on ASTronomy for EDucation [MASTED] was held from October 16-20, 2024, in Istanbul, Turkey.
- The 1st Asian Regional Shaw-IAU Workshop on Astronomy for Education 2024 was held from December 19-21, 2024, in Kathmandu, Nepal.

Visitors

[October – December 2024]

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