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Introductory Summer School in Astronomy and Astrophysics



The biennial Introductory Summer School in Astronomy and Astrophysics (for College and University Students) was conducted during May 14 - June 15, 2018, at IUCAA. Forty students from different parts of India participated in this school, which introduced the students to astronomy and astrophysics through a series of lectures delivered by IUCAA faculty members, including some of our visiting associates and a few faculty members from other institutions, with topics ranging from basic concepts to cutting-edge research. The school also included hands-on sessions managed by the students and post-doctoral fellows of IUCAA, where different computing and astronomical data analysis techniques were demonstrated. The participants were also taken on a tour to the Giant Metrewave Radio Telescope (GMRT) operated by NCRA, Pune, and the IUCAA Girawali Observatory (IGO). The students were very enthusiastic throughout the school and actively participated in the lectures and hands-on sessions by engaging in lively discussions with the lecturers. The school was concluded by a lecture on 'Career Opportunities in Astronomy' by a Senior Professor at IUCAA followed by a high tea. The scientific, technical and administrative staff of IUCAA played a vital role in ensuring that the school ran smoothly. Santosh Khadilkar and Manjiri Mahabal/Nirupama Bawdekar, in particular, managed a significant part of the administrative work. The faculty coordinator for the school was Kanak Saha.

Vacation Students' Programme



The annual Vacation Students' Programme (VSP) was held during May 14 - June 29, 2018 at IUCAA. There were 17 students from various colleges / universities / institutes. The selectors had a tough task to select the participants from a large number of online applications. Along with lectures on basic and advanced astronomy (held in common with the Introductory Summer School in Astronomy and Astrophysics), the students worked on individual projects with faculty members and post-doctoral fellows of IUCAA, with topics covering a broad range



of subjects across observational, instrumental and theoretical aspects of astronomy and astrophysics. The students were also taken a tour to the GMRT facility operated by the NCRA, and IUCAA Girawali Observatory. The students enthusiastically participated in the programme, and presented their project work in seminars held at the end of the session. Gulab C. Dewangan was the faculty coordinator of this programme.

Congratulations to...

Aseem Paranjape, on being awarded INSA Medal for Young Scientist (2018)



Introductory Workshop on Astronomy and Astrophysics

An Introductory Workshop on Astronomy and Astrophysics was held at the Kohima Science College, Jotsoma (KSCJ), Nagaland, during April 5 - 6, 2018. The objective of the workshop was to present selected introductory topics on Astronomy and Astrophysics. Ranjan Gupta (IUCAA) and Harinder P. Singh (University of Delhi) were the resource persons, and Chetan Kachhara (KSCJ) was the local coordinator. About 8 college teachers from various parts of Nagaland, and 45 M.Sc. and B.Sc. students of Physics and Mathematics participated in the workshop, which began with a brief inaugural session, chaired by M. Devrani (Department of Physics, KSCJ); Lily Sema (Principal, KSCJ) delivered the welcome address, and R. C. Gupta (Pro Vice-Chancellor, Nagaland University) was the chief guest.

The lectures were on Telescopes and Techniques, and Physical Parameters of Stars through Observations. The participants were introduced to the concepts in general astronomy, astronomical measurements, magnitude systems, distance modulus, mass and luminosity, distance measurement of stars, H-R diagram, stellar evolution, solar system, star and galaxies, basic optics, and telescope and space observations. The school generated a considerable interest among the participants and faculty, as confirmed by their feed-back. The workshop was sponsored by IUCAA and coordinated by Ranjan Gupta.

Farewell to . . .

Sayantana Choudhury, who has joined the Max Planck Institute for Gravitational Physics, Albert Einstein Institute, Postdam, Germany, as a Post-Doctoral Fellow.

Priyanka Singh, who has joined the INAF, Trieste, Italy, as a Post-Doctoral Fellow.

Workshop on Developing Astronomy Themed Experiments



IUCAA, in collaboration with the Public Outreach and Education Committee (POEC) of the Astronomical Society of India (ASI), hosted a Workshop on Developing Astronomy Themed Experiments (for Colleges/Universities at UG/PG Levels), during June 18 - 20, 2018, aimed at developing experiments with an astronomy flavour, which would be useful to get the subject into physics laboratories at under-graduate and post-graduate levels. This was the first activity under the IUCAA Astronomy Centre for Educators (ACE). There were around 50 astronomers and college/university teachers from various parts of the country, actively participating in discussion sessions based on specific themes chosen such that they relate to both to astronomy research and higher level physics syllabi. The themes were: (i) Properties of Electromagnetic Radiation, (ii) Optics in Astronomy/Telescopes, (iii) High Energy/Gravitational Waves Astronomy, (iv) Positional Astronomy and Orbital Mechanics, and (v) Spectroscopy and Spectral Analysis. Additional themes are planned to be discussed in follow up workshops of a similar format. There were also sessions, discussing specific use of the Michelson's Interferometer, Radio Antennae and Astronomical Data Analysis in Physics labs. The interest among the participants was very high, and some of the night sessions went on till midnight, with the participants brainstorming on various ideas. The results for each theme will be collected with the help of the ACE and collated in a document. The coordination was done by Samir Dhurde (IUCAA), Priya Hasan (Maulana Azad National Urdu University, Hyderabad), and Joe Jacob (Newman College, Thodupuzha), with valuable inputs from a working group of several astronomers, ASI POEC members, and executive committee of the IUCAA ACE.

Public Outreach Activities

Global Astronomy Month

On the occasion of the Global Astronomy Month (GAM) - April 2018, IUCAA SciPOP organised a themed public sky-gazing event on April 28, 2018. The theme of GAM - 2018 was 'The Moon'. Around 300 enthusiastic adults and children attended the evening events, which were coordinated by Sonal Thorve (IUCAA). Prior to the sky-watch, a short talk about the importance of the Moon was delivered by Shivom Gupta (IUCAA).



Workshop on Teaching and Learning with Science Toys

A Workshop on Teaching and Learning with Science Toys for volunteers was held at IUCAA on April 12, 2018. All the volunteers were given material kits to make 15 science toys, on sound, optics, electricity, motion, force, work and energy.

Demonstrations of 30 to 35 toys were given with a brief idea of how to use these toys in teaching textbook science and even more. The selected toys were connected with the existing science curriculum of classes 8, 9, and 10, which would be helpful for the teachers and the volunteers in the classroom teaching. The workshop was coordinated by Shivani Pethe (IUCAA) and Rupesh Labade (IUCAA).



School Students' Summer Programme and Astronomy Camp

The annual School Students' Summer Programme and Astronomy Camp were held at IUCAA, during April 23 - June 1, 2018. Altogether, one hundred eighty students of classes 8, 9 and 10, were selected and invited to the six-week event at IUCAA's Muktagan Vidnyan Shodhika (MVS). These students were grouped into six different batches, each batch started on Monday and continued till Friday. The aim was to introduce the basics of astronomy, and demonstrate hands-on experiments. One of the key objectives was to make students learn how to think scientifically, instead of blindly following the textbooks or other resources.

In the basic astronomy sessions, students learned interesting lessons, like, different scales of the universe, details about the solar system, reading sky-maps, etc. Role-plays for the Earth-Moon system made the students to understand the phases of the Moon, and solar and lunar eclipses. The demonstrations on optics made the students to experience and realize the behaviour of light when it interacts with different media. Working principle of different telescopes was one of the most enjoyed sessions by students.

Hands-on astronomy sessions included making of an angle measurer, a CD spectroscope, a solar camera using pin-hole principle, etc. There were three experiments designed to improve the experimental skills of the students. These were: (i) measuring the diameter of a mustard seed, (ii) finding the height of the Samrat Yantra at IUCAA using trigonometry, and (iii) determining the ratio of Sun's distance from the Earth to the diameter of the Sun using a solar camera made by the students. Apart from the standard methods, each student was allowed to come up and perform their own method to solve the given problem. This encouraged the students to think about the different ways to carry out an experiment. Students also learned about the limitations of different methods, and error factors.



IUCAA Research Scholars, namely, Pratik Dabhade, Bhaskar Biswas, Sunil Choudhary, Kaushal Sharma, Swagat Mishra, and Debabrata Adak provided able guidance and valuable time, and volunteered to guide batches of 3 - 6 students, on focussed scientific projects. The students worked with their guides throughout the week on their projects, ranging from the study of nature of

light to the working of radio telescopes. There were also some exciting goal oriented projects, like, investigating the time period of a bar pendulum, moment of inertia and principle of conservation of momentum using a modified form of the ballistic pendulum, and experimenting with the Lissajous patterns.

Astronomy Camp were coordinated by Samir Dhurde and Sonal Thorve, with the help of other MVS personnel.



During the event, the students also got an opportunity to interact with IUCAA faculty. Kaustubh Vaghmare, Somak Raychaudhuri, A. N. Ramaprakash and Aseem Paranjape (all from IUCAA) spent some time at the MVS to answer the questions of the students in a friendly manner, and gave some career advice. The IUCAA main library and the facilities of the MVS, like, the library, computer section, and workshop were made available to the students, who themselves built the equipments using tools from the workshop under the guidance of Maharudra Mate (IUCAA). At the end of every week, sky-watching sessions were organized for the participants and their parents. In these sessions, the students practically used their sky-map reading knowledge gained during the week to locate the stars and constellations. On the last working day of every batch, the students submitted reports of the experimental work done by them, and concluded their week with well designed presentations, attended by other students and IUCAA academics. On May 14, 2018, the Zero Shadow Day for Pune was also celebrated. The School Students' Summer Programme and

IUCAA Visit and Sky Watch for Rural Teachers

A group of 100 teachers from different rural parts of Maharashtra visited IUCAA on June 7, 2018 under a Teachers' Training Programme, organised by Sakal NIE and IISER - Pune. Somak Raychaudhuri (Director, IUCAA) interacted with these teachers, sharing information about IUCAA and the mega-projects in progress. Sonal Thorve talked about the astronomy included in school textbooks and conducted a sky-watching session.



Public Lectures



April 17, 2018: Matthew Colless on It's Not Aliens!



June 8, 2018: Arvind Gupta on A Journey in Education.

All these lectures are available at IUCAA youtube channel:

<https://www.youtube.com/user/IUCAASciPOP/>.

Felicitation to Arvind Gupta

The IUCAA Public Outreach Programme is proud to host Arvind Gupta, who has been awarded the Padma Shri, the fourth highest civilian award, by

the Hon'ble President of India, in February 2018. This award has been given to Gupta in recognition of his contribution to science education through scientific toys. To mark this achievement, a felicitation programme was organised at IUCAA on June 8, 2018. Various people, who have been associated with Gupta, spoke about him, and the impact of his work in shaping the public outreach programme of IUCAA. In his response, he appreciated the new programme launched by IUCAA SciPOP, namely, "Vigyan Tarang" lab. He also delivered a public lecture, titled, "A Journey in Education", and at the end, he met a few members of the press.



Astronomy Lecture

As a part of summer camps organised by Mukangan Exploratory, Pune, an interactive session on reading sky-maps was conducted at IUCAA, on April 16, 2018, by Samir Dhurde. About 50 school students attended and enjoyed the session.

International Astronomy Olympiad (Jr.) Students' Visit

The students selected for the Orientation-cum-Selection Camp of the International Astronomy Olympiad (Jr.) attended an inspiring lecture at IUCAA, by Somak Raychaudhury on May 8, 2018. The students were taken for a short tour around the IUCAA campus.

Astronomy Lectures at JVP

IUCAA SciPOP supported a summer programme in Basic Course in Practical Astronomy, organised by the Jyotirvidya Parisanstha (JVP), Pune, on May 17, 20 and 21, 2018. Lectures on Astronomy topics were delivered by IUCAA personnel: Samir Dhurde on Multi-wavelength Astronomy, Shivom Gupta on Exoplanets, and Akanksha Tiwary on Gravitational Wave Astronomy. About 30 astronomy enthusiasts participated in and benefited from the course.

Regional Workshop on Zero Shadow Day

The Central and Northern Regional Workshops on Zero Shadow Day were organised by ASI POEC at Mumbai and Raipur on April 21 and 22, 2018, respectively. These workshops were aimed to make formal and informal science educators aware of the very exciting astronomical phenomenon - the Zero Shadow Day - that occurs twice a year within the tropical latitudes.

Samir Dhurde was the resource person at the workshop hosted at the Pt. Ravishankar Shukla University, Raipur, organised by the V + Chhatisgarh Vigyan Sabha. Sonal Thorve attended the workshop hosted at Homi Bhabha Centre for Science Education, Mumbai. They conducted sessions, introducing to teach astronomy using role-plays and hands-on activities with participants, who were mostly school teachers. The latter enjoyed getting to know this novel event and also the teaching methods that can be used to engage students in learning astronomy concepts. The hands-on activities included tracing the apparent motion of the Sun using shadow of a gnomon, and were well appreciated. All

participants later went on to conduct these activities with their students and arranged public programmes on the Zero Shadow Day at their own respective places.



Teachers' Training

IUCAA SciPOP personnel with the help of Rayat Shikshan Sanstha, Satara Region, organised a Teachers' Training Programme at Satara, during June 25 - 26, 2018, for science teachers from Zilla Parishad schools. About one hundred teachers from 13 Talukas of Satara District participated enthusiastically. These teachers discovered how basic concepts of Physics and Astronomy can be taught using simple hands-on activities. Sonal Thorve coordinated and conducted the training with the help of Maharudra Mate.



Colloquia

- 03.04.2018 Oliver Hahn on *Collisionless dynamics of dark matter and the first haloes.*
- 05.04.2018 Aniruddha Kembhavi on *May I have your "attention" please? (said one neuron to another).*
- 03.05.2018 Jayaram N. Chengalur on *Angular momentum of dwarf galaxies.*
- 07.05.2018 Rajesh Gopakumar on *Down-to-earth string theory.*
- 17.05.2018 Durgesh Tripathi on *It's hot, magnetic and happening: The solar corona.*
- 24.05.2018 Prayush Kumar on *Numerical simulations of binary black holes and gravitational-wave science.*

Seminars

- 04.04.2018 Vaibhav Tiwari on *Constraining black hole spins with gravitational-wave observations.*
- 02.05.2018 Jnanadeva Maharana on *The S-Matrix proposal.*
- 09.05.2018 Parampreet Singh on *Resolution of cosmological and black hole singularities using loop quantum gravity: An overview and recent progress.*
- 23.05.2018 Sayantani Bera on *Gravitational radiation from binary pulsars in a Fourth Order Gravity model.*
- 05.06.2018 Sumanta Chakraborty on *Some novel features of spacetime torsion and its astrophysical implications.*
- 13.06.2018 Barun Dhar on *New insights into structure of galaxies.*
- 20.06.2018 David Hilditch on *Hyperbolicity of relativistic fluids.*

- 26.06.2018 Dhiraj Hazra on *The standard model of cosmology and beyond: Constraints and forecasts.*

Neem Seminars

- 05.06.2018 Ananta C. Pradhan on *A stellar population synthesis model for the study of ultraviolet star counts of the Galaxy.*
- 05.06.2018 Broja Gopal Duta on *Variability properties in galactic black hole sources.*
- 12.06.2018 Deepak Vaid on *Connecting loop quantum gravity and string theory via quantum geometry.*
- 12.06.2018 Shantanu Rastogi on *First ring molecule detection in Taurus Molecular Cloud.*
- 19.06.2018 Sushant G. Ghosh on *Black hole shadow.*
- 19.06.2018 Ram Kishor on *Higher order Lyapunov characteristic exponents.*
- 26.06.2018 Prasant Samantray on *Hot anti-de-Sitter space.*
- 26.06.2018 Sarbari Guha on *Dissipative collapse in modified theories of gravity.*

Other Regular events

The Public Outreach group has conducted 2 basic astronomy workshops, 2 science toys workshops, 10 campus visits, and one sky-watching programme with an approximate reach to about 700 people.

Visitors (April - June 2018)

Gazi Ameen Ahmed, Shreya Anand, Rizwan Ul-Haq Ansari, Shrey Ansh, G. C. Anupama, K. G. Anusree, Archana Aravindan, Raghav Arora, Saji Augustine, Kalyani Bagri, Tanwi Bandyopadhyay, Agnibha Banerjee, Arunima Banerjee, Smaranika Banerjee, Sarmistha Banik, Karabee Batta, Sayantani Bera, Anupam Bhardwaj, Anwesh Bhattacharya, Parag Bhattacharya, Rajorshi Bhattacharya, Maitraya Kanta Bhattacharyya, Sudip Bhattacharyya, Yashpal Bhulla, K.G. Biju, Ritabrata Biswas, Anjana C., Hritam Chakraborty, Koushik Chakraborty, Manoneeta Chakraborty, Sudip Chakraborty, Sumanta Chakraborty, Ankita Chakravarty, Susmita Chakravorty, Luke Chamandy, Jyothis Chandran, Philip Charles, Ritaban Chatterjee, Subhamoy Chatterjee, Suchetana Chatterjee, Indranil Chattopadhyay, Shalmali Umakant Chaudhari, Sundeep Chopra, Sankalp Satyananda Choudhuri, Manojendu Choudhury, Sourav Roy Chowdhury, Mamta Dahiya, Parimal Dilip Darne, Abhishek Das, Kaustav Kashyap Das, Sudipta Das, Prathamesh Dash, Debabrata Deb, Jishnu Dey, Mira Dey, Amit Dhakulkar, Barun Kumar Dhar, Saeed Mahesh Dhawalikar, Payaswinee Dhoke, Adithiya Dinesh, Arunima Dutta, Broja Gopal Dutta, Deepali Gaba, Akash Garg, Mathew George, Joyee Ghosh, Sushant G. Ghosh, Sutapa Ghosh, Tuhin Ghosh, Gourab Giri, Rupjyoti Gogoi, Rajesh Gopakumar, Gaurav Goswami, Pranjupriya Goswami, Milind Gowardhan, Shivappa B. Gudennavar, Sarbari Guha, Ajesh Gulati, Alok C. Gupta, Pawan Kumar Gupta, Oliver Hahn, Gajanan D. Harale, K.P. Harikrishnan, Priya Hasan, Syed Najamul Hasan, Dhiraj Hazra, Michelle Heurs, David Hilditch, Nikhil Hulke, K. Indulekha, Md. Sayeedul Islam, Kishore Narayanan Iyer, Joe Jacob, Dhairyashil Jagadale, Ayush Jain, Chetana Jain, Deepak Jain, P. S. Jayakumar, Reju Sam John, Kanti Jotania, Minu Joy, Jeena K., Y. C. Kamala, Jayatee Kanwar,

Yasha Kaushal, Yatish Kaushik, Aniruddha Kembhavi, Rukaiya Khatoon, Ram Kishor, Kenda Knowles, Madhurima Kumar, Nagendra Kumar, Phani Kumar, Pravir Kumar, Prayush Kumar, Ravinder Kumar, Suresh Kumar, Ioannis Kypriotakis, Kinjalk Lochan, Sreelakshmi M., Madhu, Smriti Mahajan, Jnanadeva Maharana, Abdulla Al Mamon, Abhijit Mandal, Amit Kumar Mandal, Soma Mandal, Suvadip Mandal, Bari Maqbool, Urvish Markad, Rahul Maroju, Titus Mathew, Irom Ablu Meitei, Ashish Mhaske, Ashish Mishra, Tanmaya Mishra, Anupama Mohanan, Abhishek Mohapatra, Saptarshi Mondal, Soumen Mondal, Anupreeta More, Mona Mostafa, Sneha Prakash Mudambi, Sajal Mukherjee, Jayant Murthy, Sarath N., Vidhya N., Sachindra Naik, K. Rajagopalan Nair, Vishnu Namboothiri, Jay Shankar Nanda, Hemwati Nandan, Wrishik Naskar, Pingal Pratyush Nath, Rajesh Nayak, Tathagata Pal, Sambit Kumar Panda, Anil K. Pandey, Divya Pandey, Sanjay Pandey, Mahadev Pandge, P. N. Pandita, Uma Papnoi, Rutu Parekh, Abhishek Parida, Ashish Patel, Amit Pathak, Shirish Pathare, K.D. Patil, M.K. Patil, Pranav Govind Patil, Geetha Paul, Nupur Paul, Devraj Pawar, D. M. Phase, Ninan Sajeeth Philip, Anil Prabhakar, Ananta Charan Pradhan, Marina Prokopenko, Akhil Punia, Arun Kumar R. M., Farook Rahaman, Binay Rai, Kunal Rai, M. Xavier James Raj, M.C. Ramadevi, Pritesh Ranadive, Chayan Ranjit, Sujata Kundu Ranjit, Shantanu Rastogi, Divya Rawat, Saibal Ray, Tirumalasetty Rayvalesh, Surojit Kumar Roy, Prabir Rudra, K.S. Sreekara Sabarish, P.C. Sachin, Onkar Ravindra Sadekar, Margarita Safonova, Sanjay Kumar Sahay, Sunder B. Sahayanathan, Gautam Saikia, Prasant Kumar Samantray, Shishir Sankhyayan, Varun Saraswat, Nayan Sarkar, Sudipta Sarkar, Susmita Sarkar, Abhilash Sarwade, Saurabh, Prasad Prakash Sawant, Somasri Sen, T.R. Seshadri, Vishwangi Shah, Isha Shailesh, Nigar Shaji, Akriti Sharma, Saurabh Shukla, Suhail Ahmad Siddiqui, Sinenhlanhla Sikhosana, Aditya Singh,

Alkendra Singh, Anand Kumar Singh, Gyan Prakash Singh, H.P. Singh, Jyoti Singh, K. P. Singh, Manvinder Pal Singh, Parampreet Singh, Shalika Singh, Monika Sinha, Bhalamurugan Sivaraman, Praveen Solanki, Kanchan Soni, P. Sreekumar, Arun Srivastava, Gaurav Srivastava, Annapurni Subramaniam, Aniket Sule, Anitta Sunny, Jean Surdej, Avinash Surendran, Prayas Sutar, Radhika T. P., Amit Tamrakar, Amira Ahmed Tawfeek, Arun Thampan, Sivarani Thirupathi, Neal Thomas, Vaibhav Tiwari, Anurag Tyagi, Janmesh Ukey, Malavika Unni, Amrita Unnikrishnan, Anisul Ain Usmani, Nived V.N., Deepak Vaid, Manoj Varma, Hari Om Vats, Ramasamy Venugopal, Aditya M. Vora, Rahul Kumar Walia, Jaswant Kumar Yadav, and Reena Yadav.

Visitors (Expected)

July 2018

Akash Agnihotri, University of Denver, USA; Arunima Banerjee, IISER, Tirupati; Naseer Iqbal Bhat, University of Kashmir, Srinagar; Mahasweta Biswas, IEST, Shibpur; Promila Biswas, Jadavpur University; Dmitry Blinov, University of Crete, Greece; Debi Prasad Choudhary, California State University of Northridge, USA; Debaiudh Das, NISER, Bhubaneswar; Kabita Deka, Tezpur University; Prasanna Deshmukh, IIA, Bengaluru; Sandip Dutta, The University of Burdwan; Akash Garg, Jamia Millia Islamia, New Delhi; Gurudatt Gaur, Institute of Advanced Research, Gandhinagar; Tuhin Ghosh, NISER, Bhubaneswar; Shounak Ghosh, IEST, Shibpur; Kishore Gopalkrishnan, BITS-Pilani, Goa; Umananda Dev Goswami, Dibrugarh University; Pawan Kumar Gupta, CBS, Mumbai; Kishore Iyer, IISER, Thiruvananthapuram; Anusree K. G., M. G. University, Kottayam; Nishikanta Khandai, NISER, Bhubaneswar; Lalit Kumar, IIA, Bengaluru; Ankita Limbachiya, Mumbai; Tanmaya Mishra, NISER, Bhubaneswar; Bivudutta Mishra, BITS-Pilani, Hyderabad; Ambuj Kumar Misra,

GLA University, Mathura; Sambit Kumar Panda, BITS-Pilani, Rajasthan; Kumud Pandey, Lovely Professional University, Phagwara; Gina Panopoulou, Caltech, USA; Pradeep Paryane, Mumbai; Nupur Paul, Jadavpur University; Anirudh Pradhan, GLA University, Mathura; Rahul R. T., CUSAT, Kochi; Surojit Kumar Roy, IIA, Bengaluru; Shivani Sharma, BITS-Pilani, Rajasthan; S. K. Sharma, Mumbai; Prateek Sharma, IISc, Bengaluru; Umesh Kumar Sharma, GLA University, Mathura; Sherehan Shehata, NRIAG, Egypt; S. K. Tripathy, Indira Gandhi Institute of Technology, Sarang; Paniveni Udayashankar, NIE Institute of Technology, Mysore; Sanil Unnikrishnan, St. Stephen's College, Delhi; Jeevan Vedamurthy, IIA, Bengaluru; and Chetan Verma, Institute of Advanced Research, Gandhinagar.

August 2018

Aiswarya Andavan, Alphonsa College, Pala; Kavitha Arur, Texas Tech University, USA; Shreya Banerjee, TIFR, Mumbai; Samuzal Barua, Hojai College, Assam; Pritikana Bhandari, Jadavpur University; Anshuman Borgohain, Tezpur University; Debabrata Deb, IEST, Shibpur; Suhani Gupta, IISER, Mohali; Ayush Jain, BITS-Pilani, Hyderabad; Kanti Jotania, The M.S. University of Baroda, Vadodara; Ramasami Krishna, BITS-Pilani, Hyderabad; Abhijit Mandal, The University of Burdwan; Divya Rawat, IIT, Kanpur; Sanjar Shaymatov, Institute of Nuclear Physics, Uzbekistan; Atreyee Sinha, APC, Paris; Murli Manohar Verma, University of Lucknow; and Marcus Christian Werner, Kyoto University, Japan.

September 2018

Bobomurat Ahmedov, Ulugh Beg Astronomical Institute, Tashkent.

Long Term Visitors

Ajesh Gulati, TMT Project Office, USA; and Dhruba J. Saikia.