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Visit of Maharashtra Chief Minister Shri Devendra Phadnavis to IUCAA

The Chief Minister of Maharashtra, Shri Devendra Fadnavis, visited the IUCAA campus on September 23, 2016. During his short stay, the Director, along with Tarun Souradeep and Ajit Kembhavi briefed him about IUCAA's involvement in LIGO-India, and the work being done in the selection of its site. The project was outlined to him with the help of a model of the LIGO-India interferometer (which has laser and mirrors that can function as a Michelson interferometer, when set up), built by members of Pune's enthusiastic society of amateur astronomers Jyotirvidya Parisanstha, and has been kept as a permanent display at IUCAA. He was also briefed about IUCAA's contribution to ISRO's Aditya-L1 mission, and of our outreach programmes with public, students and teachers all over the state and the country.

One Year of AstroSat

On September 28, 2016, India's first dedicated astronomical satellite, AstroSat, completed its first year of successful operation. To celebrate the occasion, a one

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day science meeting was organised at IUCAA on Thursday, September 29, 2016, to highlight the technical and scientific achievements of the Observatory.

In the morning, Kiran Kumar, Chairman, ISRO; Tapan Misha, Director, Physical Research Laboratory, Ahmedabad; and S. Seetha, AstroSat PI, visited the AstroSat Science Support Cell (ASSC), which has been hosted at IUCAA, where they were shown how the cell has been equipped to analyze the data from different AstroSat payloads, and the working of the AstroSat Proposal

Processing System (APPS). They also visited the IUCAA laboratory, and were shown the laboratory model for the Solar Ultraviolet Imaging Telescope (SUIT) instrument, which would be scheduled onboard the Aditya-1 mission.

The meeting started with welcome by the Director, IUCAA, and introduction by P. C. Agrawal. The Chairman, ISRO, delivered the keynote address, and dedicated the ASSC (http://astrosat-ssc.iucaa.in/) to the nation. This was followed by an official release of AstroSat outreach posters.The first scientific results and the future scope of the satellite were presented by the respective payload managers of the different instruments, and in the afternoon, there was a panel discussion on the future of Indian Space Astronomy.

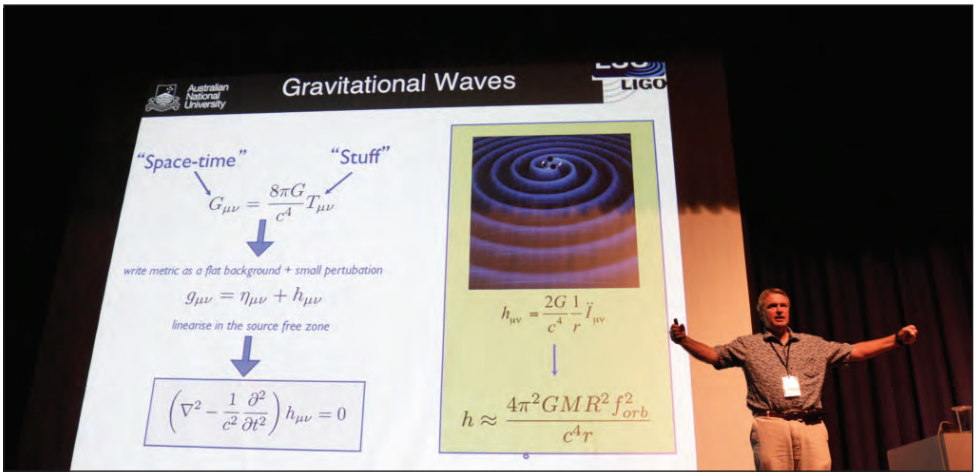
The meeting was attended by several dignitaries from ISRO and other institutes from all over the country, who have been involved with AstroSat. Ranjeev Misra was the coordinator of this meeting.

LIGO - India: The Road Ahead

This first LIGO-India specific meeting since it received its in-principle approval from the Government of India earlier this year, was held at IUCAA during August 16 - 18, 2016.

The primary purpose of this meeting was to discuss the various activities that Indian experimenters will need to undertake in order to build and commission LIGO-India. There were discussions on early plans on the next detectors beyond LIGO as well.

Invited speakers who delivered talks included Rana Adhikari (Caltech) on *Detector noise sources*, Giles Hammond (Glasgow) on *Suspensions*, Kawamu Izumi (LIGO-Hanford) on *Controls*, Brian Lantz (Stanford) on *Seismic noise*, David McClelland (ANU) on *Quantum optics / squeezing*, Benno Willke (AEI-Hannover) on *Lasers and optics.*



Other invited speakers included Anil Prabhakar (IIT Madras, Chennai), Sendhil Raja (RRCAT, Indore), A. N. Ramaprakrash (IUCAA, Pune), Umakant Rapol (IISER, Pune), C. S. Unnikrishnan (TIFR, Mumbai), and Anil Srivastava (DCSEM, Mumbai).

For further information on IUCAA and GW research, visit: http://www.iucaa.in and http://www.gw.iucaa.in.

Congratulations to...

Sanjeev Dhurandhar on being selected for ***H.K. Firodia Vigyan Bhushan Award.***

Short Term Course on Dynamical Systems: Theory and Applications

A short term course on Dynamical Systems: Theory and Applications, sponsored by IUCAA, was conducted at the Department of Applied Mathematics, Indian School of Mines, Dhanbad, during June 26 - 30, 2016. Aim of the course was to provide a basic training on the theory of dynamical systems, so that the participants can use the various tools to explore realistic models in many areas of science and engineering.

The topics covered were: Chaos, Fractals, Application of Tools of Non-linear Dynamics to Astrophysics, Applications in Scientific, Engineering, and other Real World Problems, Basics of Dynamical Systems, Periodic Orbits, Poincare Maps, Normalization, and Bifurcations. In addition, there were talks on Modelling of Dust using Light Scattering Tools, Story of our Universe, and Finite and Infinite Dimensional Spheres.

The resource persons were: M.R. Adhikari (Calcutta Univesity, Kolkata), Nandadulal Bairagi (Jadavpur University, Kolkata), Rumi De (IISER, Kolkata), Malay Banerjee (IIT, Kanpur), Nitu Kumari (IIT, Mandi), Bhola Ishwar (BRA Bihar University, Muzaffarpur), Brahma Deo (IIT, Bhubaneswar), Ranjan Gupta (IUCAA), H.P. Singh (Delhi University), Kanak Saha (IUCAA), Bijay Sharma (NIT, Patna), Javier James Raj (VSSC/ISRO, Thiruvananthapuram), and Mohammad Sajid (University Buraidah, Al-Qassim, Saudi Arabia).

There were 54 participants from throughout the country, and the coordinators were: Badam Singh Kushvah (ISM, Dhanbad), and Kanak Saha (IUCAA).

Introductory School on Astronomy

IUCAA sponsored Introductory School on Astronomy was held at Eliezer Joldan Memorial College, Leh, Ladakh, during September 13 - 14, 2016. The school was a first of its kind to be held at Ladakh region, and there were about 50 participants, who were mainly the B.Sc. (Physics) students and teachers of the college. The resource persons were Philippe Prugniel and Isabelle Vauglin (both from the Observatory of Lyon, France), Harinder Pal Singh (University of Delhi), and Ranjan Gupta (IUCAA). The topics covered were Gravity and Equilibrium, Heating in Stars, Basic Definitions in Astronomy, and Large Telescopes. The participants were very enthusiastic, and wanted more such schools/workshops at Leh in near future. This workshop was coordinated by Ranjan Gupta.

Research in Astronomy: Opportunities and Challenges - III

A conference on Research in Astronomy: Opportunities and Challenges - III was conducted at the Department of Physics, University of Calicut, Kozhikode, during July 18 - 19, 2016, under the auspices of the IUCAA Resource Centre (IRC) at the Cochin University of Science and Technology (CUSAT), Kochi.

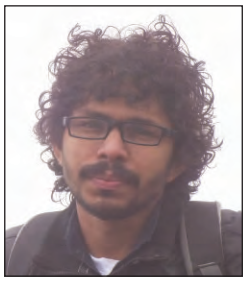
The inaugural session was chaired by Mohammed Musthafa, Head of the Department of Physics, A.M. Vinodkumar welcomed the gathering, and the conference was inaugurated by Mohammed Basheer, Vice-Chancellor, University of Calicut, at the Madhava Observatory. Ajit Kembhavi (IUCAA) offered words of felicitation, and Ravikumar C.D. (University of Calicut) expressed the vote of thanks.

The formal sessions were initiated, after the tea break, by A. Gopakumar (TIFR, Mumbai) and gave a talk on the recent developments in science and detection of gravitational waves. In the afternoon, a special meeting was held to commemorate the 17th year of activities of IRC, CUSAT, Kochi. Scientists from other institutions present at the conference lauded the culture of IUCAA, embracing everyone, right from elementary school students to acclaimed researchers of international repute, to spread awareness and strengthen research in Astronomy and Astrophysics in the country. Ajit Kembhavi remarked that though many of the objectives of setting up IRC became somewhat obsolete or irrelevant with the kind of information explosion available at college and university level, the role of IRC in providing human interaction is priceless.

Though the conference was mainly intended for young researchers in astronomy and related areas, there were talks by senior faculty like A.N. Ramaprakash (IUCAA) and Manoj Puravankara (TIFR, Mumbai). Overall, there were 22 presentations by Ph.D. students and post-doctoral fellows. The discussions were moderated by Ajit Kembhavi, P.P. Divakaran (Ex-TIFR, Mumbai), V.C. Kuriakose (CUSAT), Ranjeev Misra (IUCAA), K. Indulekha (Mahatma Gandhi University, Kottayam), Sajeeth Philip (St. Thomas College, Kozhencherri), and Joe Jacob (Newman College, Thodupuzha). There were 50 participants in the conference, and the feedback received from them suggested that the conference was greatly a success. Ravikumar C.D., V.C. Kuriakose and Ranjeev Misra were the coordinators.

Welcome to the IUCAA family

Md. Shah Alam, who has joined IUCAA as a Post-doctoral Fellow (AstroSat Project) in September 2016. He obtained his B.Sc. (2007), and M.Sc. (2009) degrees in Physics from Aligarh Muslim University, and did his Ph.D. research from the Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi. During Ph.D., he worked on observational study of black hole X-ray binary systems with space based X-ray astronomy satellites like XMM-Newton, RXTE, and Suzaku. He has studied the effect of strong gravity of stellar mass black hole on its surrounding structures like accretion disk and corona. Currently, he is working on to establish the relation between spectral and temporal properties of the black hole systems. He is also involved in the analysis of AstroSat data.



Jishnu Suresh, who has joined IUCAA as a Post-doctoral Fellow (LIGO-India Project) in August 2016. He obtained his Bachelor's degree in 2010 from the University of Calicut, Kozhikode, and Master's degree in 2012 and Ph.D., both from Cochin University of Science and Technology, Kochi, with his research focusing on modified theories of gravity. During Ph. D., he has worked on thermodynamics and thermodynamic geometry aspects of black holes. His current research interests are in gravitational waves, particularly on studies of stochastic background of gravitational radiation.

Isha Pahwa, who has joined IUCAA as a Post-doctoral Fellow (PDF) in August 2016. She has obtained her Bachelor's degree from Maharshi Dayanand University, Haryana (2007), and M.Sc. (Physics) (2009), and Ph.D. (2014), both from the University of Delhi. She had spent four months in IUCAA as a PDF, and then another post-doc from Leibniz-Institute for Astrophysics, Potsdam, Germany. During her Ph.D., she had worked on theoretical cosmology, basically model building of various cosmological phenomena. However, during her post-doc, she moved to the area of large scale structure. Her current research includes the halo modelling of galactic conformity, alignments of galaxies with the large scale structure, galaxy formation, evolution and dynamics, and triaxial shapes of halos.

Sourav Mitra, who has done Bachelor's (2006), and Master's (2008) degrees in Physics from Jadavpur University, Kolkata. He has obtained Ph.D. degree (Astrophysics) from Harish-Chandra Research Institute, Allahabad in 2013. After Ph.D., he joined the University of the Western Cape, Cape Town, South Africa as a post-doc researcher for 3 years, and then joined IUCAA as a Post-doctoral Fellow in September 2016. Areas of his research are: cosmology, structure formation in the Universe, intergalactic medium, galaxy formation and reionization, mainly, semi-analytic and analytic modelling of cosmological reionization and galaxy formation.

Shabnam Iyyani, who has joined IUCAA as a Vaidya - Raychaudhuri Post-doctoral Fellow in July 2016. She obtained her Bachelor's degree (2009) in Physics from the University of Calicut, Kozhikode, and Master's degree in Physics, specialising in nuclear physics, from the Indian Institute of Technology, Roorkee (2011). She obtained her Ph.D. degree from Stockholm University, Sweden (2015). Her research was focused on the study of photospheric emission in the prompt emission of gamma ray burst (GRB) observations by Fermi gamma ray space telescope. Her study involves identifying photospheric emission components and thereby, exploring the dynamics of the outflow by determining the jet Lorentz factor and position of the jet nozzle. Consequently, she has developed a physical scenario picture, explaining the observed radiation. Currently, her work involves further investigation of various photospheric emission models under their theoretical framework, and eventually to extend the study further into afterglows observed and thereby developing a global picture. Also, she is involved in the spectral analysis of the GRB detections done by CZTI instrument onboard AstroSat.

Welcome Continued...

Kamakshya Prasad Modak, who has joined IUCAA as a Post-doctoral Fellow in August 2016. He got his B.Sc. (Honours) degree in Physics (2008) from Hooghly Mohsin College under the University of Burdwan, and M.Sc. in Physics (2010) from I.I.T., Kharagpur. He completed his Ph.D. (2016) from Saha Institute of Nuclear Physics, Kolkata. His doctoral research is mainly focused on the phenomenology of dark matter, which includes the indirect search for dark matter by analysing the possible annihilation products in the astrophysical sites such as galactic centre, galaxy clusters, dwarf spheroidal galaxies, and also from other extragalactic sources, particle physics modelling for dark matter candidates and overall characteristics of dark matter in the Universe. Other than the physics of dark matter, Kamakshya has immense interests in exploring several aspects of cosmology, physics of neutron stars, neutrino physics, physics of early universe, inflationary scenarios and numerical relativity.

Anjali Rao, who has joined IUCAA as a Post-doctoral Fellow (AstroSat Science Support Cell Project) in August 2016. She obtained her B.Sc. and M.Sc. degrees from University of Lucknow, in 2007 and 2009 respectively. She joined Physical Research Laboratory, Ahmedabad in 2010 as a Junior Research Fellow, and completed her Ph.D. thesis work in 2015. Her research was focused on the study of black hole binaries and accretion processes in disks. She studied a peculiar behaviour exhibited by two of the black hole binaries, and put constraints on distance, inclination, mass and spin of a black hole candidate using phase resolved spectroscopy. Her work included the investigation of spectral components and parameters, which are linked with Quasi Periodic Oscillations, generally observed in black hole binaries during hard states.

Atreyee Sinha, who has obtained her B.Sc. (Physics) degree from St. Xavier's College, Kolkata in 2010, and thereafter joined the Tata Institute of Fundamental Research, Mumbai for her Ph.D. She has joined IUCAA as a Post-doctoral Fellow in September 2016. Her research focused on studying the highest energy photons in the universe, their sources and detection techniques. She studied the multi-wavelength emission from blazar jets, and used that to constrain the underlying particle distributions. She is looking forward to uncovering the mysteries behind the ubiquitous, but poorly understood, astrophysical jets, focusing on data from the AstroSat and other satellites. She had strongly involved in the outreach activities at TIFR, Mumbai, and would love to continue conveying the excitement of doing research among the general public.

Seminars

13.07.2016 Anjali Gupta on ***Missing metals and baryons in galaxies: Clues from our milky way;*** 20.07.2016 Sharanya Sur on ***Outflows from high surface density galaxies;*** 27.07.2016 Joe Philip Ninan on ***Constraining the episodic outflow mechanism and outburst period of young stellar objects***; 03.08.2016 Lata Kh Joshi on ***Backreaction effects of matter coupled higher derivative gravity.***

Neem Seminars

05.07.16 Ritubrata Biswas on ***Owards solutions of magnetohydrodynamic fluid flow onto a black hole;*** 05.07.16 Prasant Samantray on ***Aspects of particle creation in anti - de Sitter and de Sitter space times;*** 12.07.16 Anisul Ain Usmani on ***Volcanogenic dark matter and mass extinctions on earth;*** 12.07.16 Archana Bora on ***Analytical error estimate for the cross-correlation, phase and time lag between two light curves;*** 19.07.16 Anirban Saha on ***Quantum mechanics of matter interacting with gravitational waves: A possible probe of the non-commutative structure of (configuration/phase) space?;*** 13.09.16 Raj Bali on ***General relativity and its applications to cosmology with the role of cosmological constant.***

Colloquia

07.07.2016 S. Sridhar on ***Planets, stars and black holes: Dynamics and statistical mechanics of N-body gravitating systems;*** 04.08.2016 Sourendu Gupta on ***Hot stuff;*** 18.08.2016 Basudeb Dasgupta on ***What's the matter with dark matter?;*** 01.09.2016 R. Shankar on ***The physics of glacier dynamics.***

A true inspiring success story of Visitor Academic Programmes at IUCAA in his own words - **Shankar D. Pathak**

This write up gives my far ambitious journey from non-descript village in Uttar Pradesh, India, to Shandong University, China. I am Shankar Dayal Pathak, hailing from the small Pipra Pathak village of Deoria district in Uttar Pradesh. My father (Babuji) has remained a lifelong admirer of Shri Mahatma Gandhi, and had actively participated along with Shri Vinoba Bhave in the Bhoodan Movement. My Amma is a typical housewife and a loving, caring and enduring mother. It was probably our miserable financial status, which could not afford the education of my three elder sisters beyond primary school, and denied my younger brother a higher education, constraining him to paddy fields. Luckily for me, the improper schooling facilities in our village, and my endless passion for education, compelled Babuji to put me in schools in the vicinities he worked, far away from my home. However, his temporary assignments rallied me from school to school in different towns of eastern Uttar Pradesh, Making my school life difficult.

With tremendous hard work, God's grace, and blessings of parents, I passed the secondary school examination with a high score, and managed to obtain a National Merit Scholarship, which was partly helpful in my further studies. Helping other students in their studies had become my hobby. I continued to live with Babuji and enrolled for higher secondary education in Bapu Inter-College, Ghazipur, which was 16 km away from our station. As we could not afford daily travel fare, I arranged travel up and down the college by an old unfriendly bicycle. In 2001, I completed the higher secondary education.

In the same year, marriage of my second sister had pushed our family into a serious financial dilemma, and almost drawn us on to the roads. This also shattered my dream of getting into a professional degree, partly due to the financial inability and partly due to the lack of guidance. However, I moved on and enrolled into a B.Sc. (Physics) degree at the S.G.R.P.G. College of V.B.S. Purvanchal University, Jaunpur. With no hostel facility available, I was fortunate to find a suffocating abandoned room in a slum-like area, and rent it at Rs. 100/- per month, which was just 5 km away from my college. Again the same old bicycle was still alive to carry me through the slum to the college and back.

In 2002, the retirement of Babuji from his no-pension job at Gandhi Ashram literally snatched our tiny-but-only financial support. To cope between the needs of my family and my studies, it became compulsory to turn my hobby of helping students into my part-time profession of giving private tuition. Life was tough and emotional, because I had to visit my village once in every two weeks to collect essential requirements, such as ration for my home and leave some money with them for household expenses. Thanks to the parents

of my students who were generous and flexible enough to fulfill my occasional untimely demand for advance tuition fees.

Although I could manage a first division in B. Sc. in 2004, unexpected requirement of some additional medical expenses discouraged me to join M.Sc. in the same year. I managed the expenses through full time private teaching. During this period, I continued to keep a meticulous touch with my mainstream subjects along with some additional topics in Philosophy, History and Literature. The following year, I grabbed the privilege to get into M.Sc. (Physics with specialization in Electronics) at T.D. College, Jaunpur. I continued to be a private tutor throughout my M.Sc. to support me and my family. However, by the time I completed M.Sc. in 2007, more financial woes continued to haunt us.

My family desperately urged me to put full stop on studies and get some full time job.The period 2007-2008 witnessed my disheartened job search and taking up full time private tutor. My teachers arranged me access to the library facility of my college, where I enjoyed reading different subjects alongside Physics with no pressure of examinations. Here I met Professor Murali Manohar Verma from the University of Lucknow, who was deputed for conducting an examination. After many attempts with other professors, Professor Verma finally agreed to accept me as a Ph.D. candidate, and suggested me to take up a project in Cosmology.

Professor Verma recommended me the book, "An Introduction to Cosmology" by Professor Jayant V. Narlikar, the founder Director of IUCAA (Later, in 2012, I was thrilled to personally meet Professor Narlikar at Lucknow University during his visit). After reading the book, I felt that probably I have to start everything from the scratch, because I could not understand the technical stuff.

Gradually, I started to understand the basics of tensor, general relativity, and cosmology, which made me comfortable with my area of research. I had no funding or fellowship to support my maintenance. I again started offering private coaching and fortunately, took up a teaching profession at a degree college. Probably, I was satisfied with the money, but was still uncomfortable with my stint of full time job. I could gradually realize that it was my passion for the scientific research.

I made a tough decision to resign my job after two years, and return to pursue research. Professor Verma kept me engaged in various scientific discussions on and beyond my topic of research. Further, his wise decisions to arrange my repeated visits to IUCAA brought me the privilege to come across some eminent personalities, particularly Professor Varun Sahni (IUCAA), whose simple, selfless and down-to-earth manners would be undoubtedly amazing and inspiring for many students like me. I could learn many things from him, among which 'the art of living' stands out. My numerous visits to IUCAA enabled me to submit my Ph.D. thesis entitled, "A study of interacting dark energy in the Universe".

During March 2014 to September 2015, I utilized several facilities at IUCAA, and Centre for Theoretical Studies, IIT, Kharagpur. In September 2015, I joined the eminent research group of Professor Shiyuan Li at the School of Physics, Shandong University, Jinan, China, as a Post-doctoral Associate, where I am attempting to explore the astro-particle physics, scalar field dynamics and quantum effects of dark energy.

Many of Babuji's thoughts and words have taught me never to think in despair about 'where I would end up with' rather they have indicated me to look for the alternatives. Yes, it was a tough journey but there were people who rise from far worse situations. They are my inspiration. They show me 'life is lifeless without struggle', so I enjoy my struggle.

... Farewell

Pavan Kumar Aluri, who has joined University of Cape Town, South Africa, as a Claude Leon Post-doctoral Fellow.

Md. Wali Hossain, who has joined APCTP, Pohang, South Korea, as a Post-doctoral Fellow.

Kinjalk Lochan, who has joined IISER Thiruvananthapuram, as a Post-doctoral Fellow.

Remya Nair, who has joined Department of Physics, Kyoto University, Japan, as a JSPS Post-doctoral Fellow.The following Research Scholars have left IUCAA after defending their theses, on different assignments.

Vikram Khaire, has joined NCRA, Pune as a Post-doctoral Fellow.

Prantik Saha, has joined Tufts University, Boston to do graduate studies.

Krishna Mohan Parattu, is curently a Visiting Post-doctoral Fellow at Perimeter Institute, Canada (3 months from September - November 2016). From December 2016 he will join as an Institute Post-doctoral Fellow at IIT Madras, and

Santanu Das, is expected to take up IUCAA GWDC Post-doctoral position soon.

Additions to the IUCAA family

IUCAA extends a warm welcome to the new Visiting Associates of the twenty-seventh batch joining us for a tenure of three years, beginning August 2016.

New Visiting Associates

Manojendu Choudhury,
UM-DAE Centre for Excellence in Basic Sciences, Mumbai

Abhirup Datta,
Centre for Astronomy, Indian Institute of Technology, Indore

Kanan Kumar Datta,
Presidency University, Kolkata

Sukanta Deb,
Cotton College State University, Guwahati

Gurudatt Gaur,
University and Institute of Advanced Research, Gandhinagar

Sutapa Ghosh,
Barasat Government College, Kolkata

Umananda Dev Goswami,
Dibrugarh University

Shivappa Bharamappa Gudennavar,
Christ University, Bengaluru

Sanjeev Kalita,
Gauhati University, Guwahati

Ram Kishor,
Central University of Rajasthan, Ajmer

Jaswant Kumar,
Delhi University

Shiva Kumar Malapaka,
International Institute of Information Technology, Bengaluru

Bivudutta Mishra,
Birla Institute of Technology and Science-Pilani, Hyderabad Campus

Barun Kumar Pal,
Netaji Nagar College for Women, Kolkata

Devraj Damaji Pawar,
R.J. College, Mumbai

Tarun Deep Saini,
Indian Institute of Science, Bengaluru

Sudipta Sarkar,
Indian Institute of Technology, Gandhinagar

Surendra Nadh Somala,
Indian Institute of Technology, Hyderabad

Murli Manohar Verma,
University of Lucknow

Extension of term to the twenty-fourth batch of Visiting Associates

Farooq Ahmad,
Department of Physics, Central University of Kashmir, Srinagar

G. Ambika,
Department of Physics, IISER, Pune

Tanwi Bandyopadhyay,
Adani Institute of Infrastructure Engineering, Ahmedabad

Debbijoy Bhattacharya,
Manipal Centre for Natural Sciences, Manipal University, Udupi

Subenoy Chakraborty,
Department of Mathematics, Jadavpur University, Kolkata

Raghavendra Chaubey,
Faculty of Science, Banaras Hindu University, Varanasi

Bhag Chand Chauhan,
Department of Physics and Astronomical Sciences, Central Univ. of Himachal Pradesh, Dharamshala

Himadri Sekhar Das,
Department of Physics, Assam University, Silchar

Atri Deshamukhya,
Department of Physics, Assam University, Silchar

S. Dev,
Department of Physics, H.N. Bahuguna Garhwal Central University, Srinagar, Uttarakhand

Sukanta Dutta,
Department of Physics, Sri Guru Tegh Bahadur Khalsa College, Delhi

Sushant G. Ghosh,
Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi

Rupjyoti Gogoi,
Department of Physics, Tezpur University

Additions continued...

K. P. Harikrishnan,
Department of Physics, The Cochin College, Kochi

Sk Monowar Hossein,
Department of Mathematics, Aliah University, Kolkata

Ngangbam Ibohal,
Department of Mathematics, University of Manipur, Imphal

K. Indulekha,
School of Pure and Applied Physics, Mahatma Gandhi University, Kottayam

S. N. A. Jaaffrey,
Department of Physics, M. L. Sukhadia University, Udaipur

Sanjay Jhingan,
Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi

Kanti Jotania,
Department of Physics,
The M. S. University of Baroda, Vadodara

Md. Mehedi Kalam,
Department of Physics, Aliah University, Kolkata

L.N. Katkar,
Department of Physics, Shivaji University, Kolhapur

Nagendra Kumar,
Department of Mathematics, M.M.H. College, Ghaziabad

Badam Singh Kushvah,
Department of Applied Mathematics, Indian School of Mines, Dhanbad

P.N. Pandita,
Centre for High Energy Physics, Indian Institute of Science, Bengaluru

Madhav K. Patil,
School of Physical Sciences, Swami Ramanand Teerth Marathwada University, Nanded

Anirudh Pradhan,
Department of Mathematics, GLA University, Mathura

Rajesh S.R.,
Department of Physics, S.D. College Alappuzha, Kerala

Biplab Raychaudhuri,
Department of Physics, Visva-Bharati University, Santiniketan

Anirban Saha,
Department of Physics, West Bengal State University, Barasat, Kolkata

Pramoda Kumar Samal,
Post-Graduate Department of Physics, Utkal University, Bhubaneswar

Anjan Ananda Sen,
Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi

Harinder Pal Singh,
Department of Physics and Astrophysics, University of Delhi

Paniveni Udayashankar,
Department of Physics, NIE Institute of Technology, Mysore

Anisul Ain Usmani,
Department of Physics, Aligarh Muslim University

Aditya-L1: MoU with ISRO

The Director, Somak Raychaudhury, has signed a Memorandum of Understanding (MoU) with M. Annadurai, the Director of the ISRO Satellite Centre (ISAC) in Bengaluru, on September 15, 2016, undertaking that IUCAA will build one of the major instruments on ISRO's mission to the Sun, Aditya-L1. A team at IUCAA, led by A.N. Ramaprakash and Durgesh Tripathi, will build the Solar Ultraviolet Imaging Telescope (SUIT). It is being built in collaboration with scientists at IIA Bengaluru and IISER Kolkata. Aditya-L1 will be launched by ISRO in 2019-20, and will be placed in a halo orbit around the Lagrangian point L1, which is about 1.5 million km from the Earth. This will be the first Indian space mission to study the Sun. Only NASA and ESA have successfully placed satellites at the L1 point so far.This will be the first major Space instrument to be built at IUCAA. Before this, IUCAA has contributed in a major way to several instruments on board ISRO's AstroSat.

Public Outreach Activities at IUCAA

Hands-on Maths and Science Workshop

As part of public outreach programmes of IUCAA, the Tata Trust, Mumbai, invited 36 primary and secondary school teachers for a Hands-on Maths and Science Workshop conducted at MVS, IUCAA, during August 8 - 10, 2016. These teachers came from seven states of India and eleven organizations. They were the Tata Trust partners, engaged in educational work in tribal and rural areas. The workshop gave them an opportunity to learn scientific principles through hands-on activity, using toys and simple experiments. The participants also watched a few inspiring videos on science and education. They made over 40 models with their own hands, which included a Simple Motor, Generator, Levitating Pencil, Sprinkler, Newspaper Caps, and many more. They saw the possibilities of using very simple throwaway materials like cups, bottles, broomsticks, etc. for making interesting and joyous scientific toys. Several accomplished scientists and science popularizers also addressed the participants. They included Arvind Gupta, Sanjit Mitra, Ted Moallem, K. V. Potdar, Vijaya Ramachandran, and Somak Raychaudhury.

Each participant was gifted with two DVDs, and books on Maths, Science, and Education, which they could use and share with others. The photos of various activities of the workshop couldbe seen in the following site: http://www.arvindguptatoys.com/toys/Tatatrustpartnersworkshop.html.

Workshop on Basic Astronomy and Telescope Making

To inculcate interest in astronomy among students of IISER, Tirupati and IIT, Tirupati, a two-day workshop was held at the Department of Physics, IISER, Tirupati, during September 11 - 12, 2016. There were about 60 participants, and were given lectures and demonstrations on basic astronomical observations and making of telescopes. A 6 inch reflecting telescope was also assembled, and used by the participants. This will be further used in observations and outreach activities for the Astronomy Club at Tirupati, which has been started by the students. The resource persons included Samir Durde (IUCAA), Nirupam Roy (IISc, Bengaluru) and K. P. Yogendran (IISER, Tirupati). The workshop was coordinated by Sudipta Dutta and Bhas Bapat (both from IISER, Tirupati) and Samir Dhurde.

Workshop at the 3rd Universal Design Symposium in Astronomy Education

Samir Dhurde was invited to present a workshop and attend a special symposium hosted at the National Astronomical Observatory of Japan, Tokyo, during September 24 - 26, 2016.

The event has focussed on how to design outreach programmes to be of universal nature, i.e., to be inclusive for all those who are disadvantaged by various physical disabilities. He has highlighted a low-cost tactile dome made and tested by the IUCAA Scipop staff in collaboration with Lina Canas of the IAU Office of Astronomy Outreach. This can be used by normal as well as visually impaired learners to understand about the bright constellations and the apparent concave nature of the sky. Different ways of incorporating more details and using various materials were also discussed. Some other tools and activities that can be used for outreach, including visually impaired audience were demonstrated as well.

Other Regular Events

During July - September 2016, the MVS staff has conducted 20 Science Toys Workshops, 4 Basic Astronomy Workshops and 10 campus visits with an approximate reach to about 2,000 people.

2nd Saturday Lectures

July: Jayant V. Narlikar on Cosmic Illusions. **August:** Somak Raychaudhury on Our Place in Space. **September:** Kaustubh Waghmare/Bhooshan Gadre on Measuring Lengths.

The 2nd Saturday Lecture, given by Somak Raychaudhury, Director, IUCAA, could be viewed at https://youtu.be/VCGO8vnIv10, and IUCAA Channel: https://www.youtube.com/c/iucaascipop.

WhatsApp Outreach Updates

IUCAA Scipop regularly sends updates about Space and Astronomy events on Whatsapp. If you are interested to receive these, please email your details to <scipop@gmail.com> with a subject "Whatsapp Updates" to register your phone number.

Visitors

(July- September 2016)

Rana Adhikari, Chaitanya Afle, Satyam Agarwal, P.C. Agrawal, Gazi Ameen Ahmed, B. Rachith Aiyappa, Aslam Ali, Atma Anand, Vijayalakshmi Anand, Sioree Ansar, H. M. Antia, Jagdish Arora, N. M. Ashok, Praveer Asthana, Shrinivas Aundhkar, M. Ambarisha Babu, Rohit Baghal, Kalyani Bagri, Kishore Kumar Bairagi, Raj Bali, Ritwick Banerjee, Srikumar Banerjee, Disha Bapat, Monmoyuri Baruah, Jay Vishwas Bhambure, Priya Bharali, R. C. Bhatt, Sudipto Bhattacharjee, Sudip Bhattacharyya, Sunil Bhele, K. G. Biju, Mahasweta Biswas, Ritabrata Biswas, Archana Bora, Wrushali Bulle, Subenoy Chakraborty, Sunil Chandra, Philip Charles, Debjit Chatterjee, Ritaban Chatterjee, Anshu Chauhan, Jai Verdhan Chauhan, Dainy Choudhary, Rudrani Kar Chowdhury, Mahesh D., Abhishek Das, Indrani Das, Susmita Das, Basudeb Dasgupta, Bipash Dasgupta, Duggal Dayal, Tirna Deb, Shantanu Desai, Shankar Dhar, Payaswinee Dhoke, Mahipal Dhurwey, P. P. Divakaran, Mithun Dongare, Broja Gopal Dutta, Jayanta Dutta, Savithri Ezhikode, Devendra Fadnavis, Poshak Gandhi, Shashikiran Ganesh, Kavita Gangal, Anjasha Gangopadhyay, Abishek Garg, Prerak Garg, Gurudatt Gaur, Surya Prakash Ghanate, Joyee Ghosh, Shaon Ghosh, Sushant G. Ghosh, Tanuman Ghosh, Rupjyoti Gogoi, Kishore Gopalakrishnan, Manish Gore, G. K. Goswami, Pranjupriya Goswami, Arun Grover, Tamal K. Guha, Anjali Gupta, Anshu Gupta, Prateek Gupta, Sourendu Gupta, Rajalakshmi Gurumurthy, Giles Hammond, Tanvir Hussain, K. Indulekha, Nazma Islam, Bala Iyer, Kiwamu Izumi, Joe Jacob, Rinku Jacob, Shreejit Prafulla Jadhav, Andreas Jaeger, Dhairyashil Jagadale,Sandhya Jagannathan, Jayant Jain, Karan Jani, Anjali Rao Jassal, Sharda Keshav Jogadand, Reju Sam John, H. Josh, Lata Joshi, Rajas Joshi, Vishal Joshi, Kanti Jotania, Vishwanath K., Anusree K.G., Paul K.T., Sanjeev Kalita, Dinakar Kanjilal, Kapil Kannogiya, Bhaskar Kanseri, Disha Kapasi, Parvesh Kazi, O.P. Khajuria, Rakesh Khanna, Rukaiya Khatoon, Shivan Khullar, A. S. Kiran Kumar, Anil Kumar, Kamesh Kumar, Nagendra Kumar, Pravir Kumar, Ramesh Kumar, Sanjay Kumar, Richa Kundu, Kiran Lakhchaura, Ram Lal, B. Sankar Madaswamy, Anita Madavi, Abhijit Mandal, Soma Mandal, Bari Maqbool, Sujay Vivek Mate, David Ernest Mcclelland, Ranjana Mehrotra, Gabrielle Mehta, Tapan Misra, Joy Mitra, Theodore Moallem, Abhisek Mohapatra, Aditya Sow Mondal, Kallol Mukerjee, Pramod G. Musrif, Sowgat Muzahid, T. Nagamani, Sachindra Naik, K. Rajagopalan Nair, Rajesh Kumar Namdev, Nilam Navale, Rajesh Kumble Nayak, Mithun Neelakandan, Rahul Nigam, Joe Philip Ninan, Tarun Oberoi, Varun Oberoi, Mahesh P.K., Shamin Padalkar, Prajwal Padmanabh, Archana Pai, Siddhesh Pai, Partha Sarathi Pal, Sanjay Pandey, Shivam Pandey, Mahadev Pandge, Mahadev Pandge, P. N. Pandita, R. Pandiyan, Kashi Pandre, Deepak Panzade, Shubhonkar Paramanick, Viral Parekh, Prashant Parsai, Paste, Rohankumar Maheshbhai Patel, K. D. Patil, M. K. Patil, B. C. Paul, Biswajit Paul, Debdutta Paul, Nupur Paul, Surajit Paul, Devraj Pawar, Pramod Pawar, Anant Shivaji Pawara, Sambhaji Thoba Pawara, Bryan Penprase, Ninan Sajeeth Philip, Khun Sang Phukon, Santosh Pingale, Anil Prabhakar, Ananta Charan Pradhan, Anirudh Pradhan, Dinesh Ranjan Pradhan, Rajkumr Pradhniya, Prachi Prajapati, T.V.S.R.K. Prasad, Subha Priyadarshini, Sangeeta Pujari, Frederick J. Raab, Ashok Kumar Rai, Deepak Raj R., M. C. Ramadevi, A. R. Rao, N. Kameswara Rao,Vivekananda P. Rao, Hemant Rathi, C. D. Ravikumar, Katherine Rawlins, R. Rayappa, Jayashree Roy, Sayani Maity Roy, P.C. Sachin, Margarita Safonova, Anirban Saha, Pameli Saha, Sourita Saha, Sunder B. Sahayanathan, Dipen Sahu, Narad Kumar Sahu, Gautam Saikia, Prasant Kumar Samantray, Shishir Sankhyayan, Iftikar H. Sardar, K. Suryanarayana Sarma, Pranjal Sarmah, Sanjay Sarwe, Steni Sebastian, S. Seetha, Sanjana Sekhar, T. R. Seshadri, Zahir Ahmad Shah, Ishrat Shaikh, Nigar Shaji, M. Udaya Shankar, Ramachandran Shankar, K. N. Shanti, Aishawnnya Sharma, Ashok Kumar Sharma, Dilip Kumar Sharma, Naresh Kumar Sharma, Parag Sharma, Ramkishor Sharma, Swarnim Shashank, Aarran Shaw, Gargi Shaw, Mitali Shetty, N. C. Shivaprakash, H. S. Sunil Simha, Arvind Singh, Balendra Pratap Singh, Dharm Veer Singh, K. P. Singh, Krishna Pratap Singh, Neha Singh, R. P. Singh, Akshat Singhal, Ajit Kumar Sinha, Atreyee Sinha, Balamurugan Sivaraman, Surendranath Nadh Somala, Anupama Sreevalsan, S. Sridhar, K. Sriram, Amit Srivastava, Arun Srivastava, C. S. Stalin, Vivishek Sudhir, Sharanya Sur, Avinash Surendran, Hareram Swain, Devika T., Amit Tamrakar, Navita Thakkar, Buddhi Vallabh Tripathi, Jitendra Kumar Tripathi, Shruti Tripathi, Kruti Trivedi, Pranjal Trivedi, Paniveni Udayashankar, C. S. Unnikrishnan, Sanil Unnikrishnan, Pooja Upadhyay, Anisul Ain Usmani, Santosh Vadawale, Siddharth Vadnerkar, Aditya Vidhate, Shubham Vidyant, Aditya Vijaykumar, Pratam Sing Vishwakarma, M. Vivek, Benno Willke, J. S. Yadav, Lavkush Yadav and Mahesh Kumar Yadav.

Visitors Expected

October 2016

Koushik Chakraborty, Government Training College, Hooghly; Savithri Ezhikode, St. Thomas College, Kerala; Rupjyoti Gogoi, Tezpur University, Assam; Reju Sam John, University of Pondicherry; S. Rathna Kumar, Physical Research Laboratory, Ahmedabad; Pradip Mukherjee, Barasat Govt. College, West Bengal; Pramod Pawar, SRTM University, Nanded; Sunder B. Sahayanathan, BARC, Mumbai; Aveek Sarkar, Physical Research Laboratory, Ahmedabad and Naveel Wani, University of Kashmir, Srinagar.

November 2016

S. W. Anwane, Shri Shivaji Science College, Nagpur; Nigel Bishop, Rhodes University, South Africa; Guillermo Blanc, Chilean Astronomical Society, Chile; Jeandrew Brink, Rhodes University, South Africa; Suresh Chandra, Amity University, Noida; Subhamoy Chatterjee, IIA, Bengaluru; Atri Deshamukhya, Assam University, Silchar; Shreejit Jadhav, IIT, Mumbai; Helen Mason, University of Cambridge, UK; Akhil Mittal, Gujarat Arts and Science College, Ahmedabad; Sreejith Padinhatteeri, Manipal University, Udupi; K. D. Patil, B. D. College of Engineering, Wardha; Denis Pollney, Rhodes University, South Africa and Shishir Sankhyayan, IISER, Pune.

December 2016

Ayan Banerjee, Jadavpur University, Kolkata; Sumita Banerjee, Budge Institute of Technology, Kolkata; Ritabrata Biswas, Bankura University, West Bengal; Sourav Chatterjee, CIERA Northwestern University, USA; Surajit Chattopadhyay, Pailan College of Management & Technology, Kolkata; Goutami Chattopadhyay, University of Calcutta, Kolkata; Amit Das, Indian Institute of Engg. Science & Technology, Shibpur; Debabrata Deb, City College, West Bengal; Ujjal Debnath, Indian Institute of Engineering Science & Technology, Howrah; Sutapa Ghosh, Barasat Govt. College, West Bengal; Shounak Ghosh, Indian Institute of Engg. Science & Technology, Shibpur; U. C. Joshi, Ex- Physical Research Laboratory, Ahmedabad; Ram Kishor, Central University of Rajastan; Abhijit Mandal, Jadavpur University, Kolkata; Sajahan Molla, Aliah University, Kolkata; Saibal Ray, Govt. College of Engineering and Ceramic Technology, West Bengal; Sourav Roychaudhury, Seth Anandram Jaipuria College, West Bengal; Iftikar Sardar, Jadavpur University, Kolkata; Amit Seta, University of Newcastle, U.K.; Parita Shah, IISER, Bhopal; D. B. Vaidya, Ex-Gujarat College, Ahmedabad and Gopal Vishwakarma, Universidad Autonoma de Zacatecas, Mexico.

Long Term Visitor

Shamin Padalkar, Tata Institute of Social Sciences, Mumbai.

Know Thy Birds 15

Tailorbird

- Chaitanya Rajarshi

▲ **Common Tailorbird**
Photo Courtesy : Umesh Vaghela

Hello friends,

Every day, I wake up early with a loud and repetitive call *chewbik chewbik*, which comes from the cluster fig tree outside the window of my house. The source of the sound is a little songbird *Common Tailorbird*.

Tailorbird is a passerine bird. About 10 - 15 cm in size, a long upright tail, olive green upper body, creamy under parts, and rufous head are the features to identify this bird. It has a sharp bill with slight curve, which is used to sew the edges of large leaves together with plant fibre to build the nest and hence the name "Tailorbird". Males and females are alike, and juvenile birds are duller.

Tailorbirds are well distributed in South Asia and South East Asia, with number of sub-species. They are *Least Concerned* in IUCN list.

Tailorbirds are unique artist in nest building. They build deep cup nest by sewing the leaves in thick foliage, difficult to spot, and form excellent camouflage. They breed mainly during June - August in India, which is the monsoon season. They lay usually 2 - 3 eggs, which incubate in about two weeks. Both male and female feed the young. Cuckoo family birds sometimes parasitize the nests of Tailorbird.

▲ **Juvenile of Tailorbird**
Photo Courtesy : Chaitanya Rajarshi

These birds are common residents in urban gardens, and usually seen on trees looking for insects, feeding nectar of flowers. Their presence is detected by their familiar loud calls.

Call for a Bird Photo: I am delighted to inform that I got the first response from Paniveni Udyashankar, a Visiting Associate of IUCAA. She has shared a photograph of *Budgerigar*, commonly known as common pet parakeet or lovebird or budgie. Its scientific name is *Melopsittacus undulatus* . It has a lifespan of 5 - 10 years.

Readers of Know Thy Birds are invited to share photographs of birds taken by them. Selected photos will be published in this article with due credit. Please mail your photos to cvr@iucaa.in (Mention "Photos for KTY" in the subject).

Wish You A Very
Happy Birding

Khagol (the Celestial Sphere) is the quarterly bulletin of

IUCAA

We welcome your responses at the following address:

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