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The Introductory Summer School on Astronomy and Astrophysics was conducted at IUCAA, during May 5 - June 6, 2014. Twenty-three students from across the country, who were in their final year of B.Sc., or first year of M.Sc., as well as second/third year of engineering participated in the school. The programme consisted of a series of basic lectures on a wide range of topics in theoretical and observational astronomy, data analysis, and problem solving sessions. Facilities like library, internet access and computing, etc. were provided to all the students during their stay. The school started with the welcome address by the Director, Ajit Kembhavi followed by an introductory lecture on Astronomy and Astrophysics. The main areas on which the lectures were given include,

## Introductory Summer School on Astronomy and Astrophysics (for College/University Students)

stars and their evolution leading to compact objects like white dwarfs, neutron stars and black holes, astrophysical fluids and plasmas, solar physics, spectroscopy, radiative process, UV and X-ray astronomy, accretion disks, galaxy formation and evolution, gravitation and cosmology, early universe, dark matter and dark

energy, telescopes and instrumentation and data analysis. In addition to these, there were special lectures arranged on more advanced research topics including various national and international projects in which India is an active partner. Almost all the primary lectures were given by faculty members and visiting associates of IUCAA. Special lectures were given by faculty members, senior students, post-doctoral fellows of IUCAA. Jayaram Chengalur from NCRA gave a lecture on GMRT. The lectures were followed by hands on demonstration sessions. The participants were taken for a visit to the IUCAA Girawali Observatory to see the functioning of the 2 m. optical and infrared



telescope. They also visited the GMRT, operated by NCRA.

The students in groups of 3-4 were assigned to do a project. The aim of these short-term projects was to give them a feel of working with real astronomical problems, analyzing observational data and learning scientific techniques and research. At the end of the school, a poster presentation session was arranged, in which the participants interacted directly with the IUCAA faculty members, research scholars, post-doctoral fellows and visiting associates

of IUCAA, which allowed them to exchange scientific ideas and thoughts on their respective projects.

A separate interactive session was arranged between IUCAA research scholars, post-doctoral fellows and the summer school students, to give them an opportunity to ask questions related to life as a researcher. The school ended with a briefing by Ranjeev Misra on career and opportunities in Astronomy.

The faculty coordinators for the summer school were Kanak Saha and Ajit Kembhavi.



## Vacation Students' Programme

The Vacation Students' Programme (VSP), for students in their penultimate year of M.Sc. (Physics) or engineering degree course was held during May-July 2014. Exceptionally motivated final year B.Sc., and second year engineering students were also invited. This year, nine students participated in this programme. The participants attended about 50 lectures, dealing with a wide variety of

topics in Astronomy and Astrophysics, given by the academic members of IUCAA. They also did a project with one of the faculty members of IUCAA, and at the end of the programme, the students presented their work in individual seminar, attended by faculty members and others. R. Srikanth was the faculty coordinator of this programme.



### ...Farewell to

**Haritama Gaur**, who has joined the Shanghai Astronomical Observatory, Shanghai, China, as a Post-doctoral Fellow.

**Sibasish Laha**, who has joined the Queen's University, Belfast, Northern Ireland, U.K., as a Post-doctoral Fellow.

**Swara Ravindranath**, who resigned from IUCAA to join the Space Telescope Science Institute, Baltimore, U.S.A., as the JWST Mission Scientist.

**Srividya Subramanian**, who has left IUCAA after completing her term.

## Welcome to ...



**Neeraj Gupta**, who joined as a Faculty Member on July 15, 2013.

Neeraj Gupta works on interstellar medium of galaxies. He is involved in various observational projects with current and upcoming radio telescopes to trace the evolution of cold atomic and molecular gas content of galaxies using absorption lines. He is a co-PI of the MeerKAT Absorption Line Survey (MALS), and interested in observational techniques relevant to large blind searches of absorption lines at radio wavelengths.

Before joining IUCAA, Neeraj worked as a post-doctoral fellow at the Australia Telescope National Facility (ATNF) in Sydney (2007-2010) and the Netherlands Institute for Radio Astronomy in Dwingeloo (2010-2013). At ATNF, he has designed the telescope array configuration for the Australian Square Kilometre Array Pathfinder (ASKAP). The construction of all the 36 antennas based on this configuration is now complete, and is expected to return excellent science outcomes in coming years.



**Barun Kumar Pal**, who joined as a Post-doctoral Fellow on April 24, 2014.

He did Ph.D. from the Indian Statistical Institute, Kolkata, under the joint supervisions of Supratik Pal and Banasri Basu.

His research is mostly on inflationary model building. He has also studied theoretical and observational aspects of inflationary cosmological perturbations, and derived a cosmological analogue of the Berry phase for inflationary perturbations and established a link between the Berry phase and the cosmological observables. He has also proposed a new method to reconstruct the unlensed CMB power spectra from the lensed ones in ideal conditions.

Presently, he is engaged in reconstruction of the intrinsic CMB power spectra for realistic data and also trying to reconstruct the lensing potential from the CMB polarization data.



**Kanak Saha**, who joined as a Faculty Member on December 4, 2013.

Prior to joining IUCAA, Kanak Saha was a Humboldt post-doctoral fellow at the Max-Planck-Institut für Extraterrestrische Physik, Garching, Germany.

His primary research interest is in the dynamics and evolution of galaxies, and in particular, the formation and evolution of galactic bars, bulges, spiral structures and their interplay with the dark matter haloes.

His current focus is to investigate why some galaxies are NOT barred while a majority are in the local universe including our Milky Way, which is now widely accepted as a barred spiral galaxy. There are several outstanding issues in the Milky Way, for instance, the structure and the origin of its bulge, metallicity distribution, origin of the spiral structures (long-lived or transient?), etc., which he is currently investigating primarily using gravitational N-body simulation. Apart from the Milky Way, he is also investigating the evolution of low surface brightness (LSB) galaxies. He also plans to create a large simulated galaxy catalogues, with various moment maps, e.g., surface density, velocity, which can be used to compare and model galaxies observed through high resolution telescope having IFS facility.

## Congratulations to ...

**Varun Sahni** on being conferred with the *Homi Jehangir Bhabha Medal (2014)* by the Indian National Science Academy (INSA), New Delhi.

# School Students' Summer Programme

April 22 - 25, 2014

Fifteen students of classes from VIII to X were selected to work on a project at IUCAA under this programme. Teams of 2-4 students were guided on scientific projects by volunteering scientists. In the spirit of true research, the students and guides worked together on projects like the properties of light, Foucault pendulum, galaxies rotation, etc., and were under the supervision of J. V. Narlikar, Aditya Rotti, Prasanta Bera, Bhooshan Gadre,

Satadru Bag, Krishnamohan Parattu, and Samir Dhurde.

The students were given access to the IUCAA library and the facilities of IUCAA's Science Exploratorium - the Mukhtangan Vidnayan Shodhika, like the library, computer section and workshop. The student teams made presentations about the work they did during the week and submitted a report.



## Summer Astronomy Camp

The new format “Astro Camp” was conducted during April 29 - May 23 2014, with 120 school students in total, who got to work at the IUCAA Muktagan Vidyan Shodhika. The aim was to give an overview of an Astronomer’s tools to school students via the recently developed structured content and experiments. These were very popular with the students. Topics covered ranged from simple geometry and statistics to optics and spectroscopy. The students found out the difficulty in measuring something as dimunitive as a mustard seed. They used the Samrat Yantra for studying trigonometry as well as the celestial motions of the Sun. They were able to understand the scales of the solar system by finding the ratio of the

Star maps were distributed and sky watching practice sessions were held for all the students on Friday evenings. During the camp, effort was taken to clarify misconceptions and give a better understanding on motives of Science. The days were interspersed with watching fun videos and science toy making.

The programme was coordinated by Samir Dhurde with experimental devices prepared by Maharudra Mate. Considerable teaching help was provided by Sonal Thorve and outreach interns Ziad Modak and Rethika Deshmukh. Varun Bhalerao and Dipanjan Mukherjee interacted with the students, representing Astronomers from IUCAA.



## Announcements of Forthcoming Schools and Workshops

### School on Recent Trends in Astrophysics and Cosmology

September 4 - 6, 2014

The Manipal Centre for Natural Sciences, Manipal University will be hosting a three-day school aimed at under-graduate and post-graduate students in physics and engineering. Co-sponsored by IUCAA, the school will cover modern trends in these subjects as well as place in this context the importance of the large space missions in India, such as the Indian multi-wavelength satellite ASTROSAT and India’s participation in the International Thirty Metre Telescope (TMT) project. Contemporary research will be presented through a dual focus on theoretical cosmology and a phenomenological approach to observational high energy astrophysics through data analysis. The Sky Theatre at the Dr. T. M. A. Pai

Planetarium at MCNS will provide a unique digital laboratory to acquaint budding researchers with the mysteries of the night sky and the instruments used to probe the Cosmos.

The aim is to provide an exciting overview of some of the most challenging questions in modern science and motivate the brightest young minds to be attracted to higher studies and research in the fascinating fields of Astrophysics and Cosmology.

Accommodation will be available in Manipal University guest house or hostels. Limited support for travel by train or bus will be provided to young researchers, which will be reimbursed on production of train/bus tickets as per the university rules.

Those who are interested, should apply by e-mail to :

rtac2014@manipal.edu with the following mandatory information:

Name, Photo, Gender, Contact e-mail, Affiliation, Year and program enrolled (e.g. 1st year, M.Sc. / Ph.D. / M.Tech., etc); Whether guest house/hostel accomodation required, if applying for the travel support, the approximate amount required.

Applications reaching before July 28, 2014 will be given full consideration. Selected candidates will be informed by August 11, 2014 via the Manipal University website [www.manipal.edu](http://www.manipal.edu)

## Introductory Workshop in Relativistic Astrophysics: Commemorating the 50 Years

Department of Physics, Gauhati University, Guwahati will be hosting a workshop during August 21 - 23, 2014 in relativistic astrophysics sponsored by IUCAA. This workshop is planned for post-graduate students, who have been motivated in astrophysics and cosmology, research scholars, motivated undergraduate students and interested college/university teachers, who want to take astrophysics as a future career. In 2013, relativistic

astrophysics has completed 50 years since the discovery of quasars, the remotest and the most enigmatic objects in the Universe. The proposed topics for the workshop will cover stars, black holes, galaxies, quasars, X-ray astronomy, galaxy clusters and cosmology.

Interested participants are requested to send their resume by e-mail to IWRAP2014@gmail.com. Selected participants will be provided with free

hospitality and accommodation during the workshop. Only limited funds are available for travel. Participants requiring travel support may mention that in the applications.

Contact :

**S. Kalita**

Department of Physics  
Gauhati University,  
Guwahati – 781014, Assam  
E-mail: IWRAP2014@gmail.com  
Phone: 09864087304

## Workshop on Current Trends in Near Infrared Astronomy in India

In the past three years or so, there have been a large number of Near Infrared Focal Plane instruments commissioned on the various telescopes in India. This has led to large amount of observing time in the Near Infrared band (1.0 – 2.5 microns) being made available to the Indian astronomers. A workshop to familiarise faculty, post-docs and Ph.D. students of astronomy in the various research institutes and universities in India, on these new instruments and the techniques for analysis of Near Infrared Spectroscopic and Photometric data is planned to be held at TIFR Balloon Facility, Hyderabad

during November 25 - 27, 2014 by TIFR in collaboration with IUCAA and IIA. This has become necessary to train future astronomers to use these facilities to do science and also to develop scientific manpower for the forthcoming large astronomy projects like Thirty Metre Telescope. It has also become imperative to form working groups to bring together astronomers from different institutes working on common science goals to efficiently utilise the near infrared facilities available in the country. The workshop will have presentations and discussions on star formation, supernovae and novae, galactic

structure, extra-galactic and cosmology, near infrared instrumentation, data reduction techniques as well as the possible science using these instruments. There will also be a half day demonstration session on Near Infrared Spectroscopic Data Reduction techniques. It is proposed to invite around 20 faculty and post-docs, 15 active research students and 15 fresh research students from various institutes and universities. Participation in the workshop will be by invitation only. Interested persons can apply latest by August 31, 2014 to aocp@iucaa.ernet.in.

## International Conference on Interstellar Dust, Molecules and Chemistry (IDMC-2014)

IUCAA and Tezpur University will organize an International Conference on Interstellar Dust, Molecules and Chemistry during December 15 -18, 2014 at Tezpur. The interstellar medium is a treasure trove for the study of a wide variety of physical phenomenon. It also plays a crucial role in star and planet formation. Recent advances in observational, laboratory, theoretical studies have opened up several avenues of work, made attractive by the possibilities of diverse interdisciplinary interactions. The conference intends to provide a platform for expert discussions and presentations with ample opportunities for young and motivated students and researchers to interact and to take up challenging problems in this field. During the conference, there will be several invited review lectures, contributed talks and a poster session. Intention to participate and topic of contribution may be communicated by **October 1, 2014**.

Conference e-mail: [2014.idmc@gmail.com](mailto:2014.idmc@gmail.com)

Conference Web Site: <http://www.iucaa.ernet.in/~idmc2014>

Contact Persons: **Shantanu Rastogi**, Department of Physics, DDU Gorakhpur University, Gorakhpur ([shantanu@iucaa.ernet.in](mailto:shantanu@iucaa.ernet.in)),  
**Gazi Ameen Ahmed**, Department of Physics, Tezpur University, Tezpur ([gaziaahmed@yahoo.com](mailto:gaziaahmed@yahoo.com)),  
**Amit Pathak**, Department of Physics, Tezpur University, Tezpur ([amitpah@gmail.com](mailto:amitpah@gmail.com)).

## Workshop on Active Galaxies: An X-ray and Radio View

School of Physical Sciences of Swamy Ramanand Teerth Marathwada (SRTM) University, Nanded, will be hosting the IUCAA sponsored workshop on Active Galaxies: An X-ray and Radio View during November 25-28, 2014. The scientific rationale of the workshop is to bring young researchers together and provide training on the X-ray and radio data analysis acquired using the Chandra, XMM-Newton, Suzaku and GMRT observatories. This workshop will mainly focus on the study of the X-ray and radio emission properties of AGNs and their impact on the surrounding medium, and is intended for young researchers, teachers and post-docs willing to work on AGNs. As this workshop is planned for the serious researchers, it is desired that the participants be acquainted with the astronomical data formats, preliminary data analysis strategies and well versed with the Linux operating system. A few highly

motivated M.Sc. final-year students with Astrophysics background and strong desire to pursue research in Observational Astronomy may also be considered. Total number of outstation participants in either case will be restricted to 30.

A series of lectures on basic and advanced topics in AGNs by eminent scientists from IUCAA and other institutes will be arranged in the morning sessions, while afternoon sessions will be devoted for the hands-on training on the X-ray and radio data analysis. Every participant will be required to complete a project during the workshop. Resource material including the data analysis help documents will be provided to the participants before hand, so that they can come prepared for the workshop.

Interested candidates may apply by e-mail to [mkpatil@srtmun.ac.in](mailto:mkpatil@srtmun.ac.in) or [patil@iucaa.ernet.in](mailto:patil@iucaa.ernet.in) with the following details: Name, Affiliation,

Educational details, Contact details, E-mail, Present status, Requirement of accommodation and travel support, etc. on or before October 1, 2014. M.Sc. and Ph.D. students should arrange to send a recommendation letter from their guide or head of the department in support of their application. Free hospitality and accommodation will be provided to all the participants. Limited travel support for needy participants will be made available on request. Selected candidates will be informed by October 10, 2014 by e-mails.

Contact address:

**M. K. Patil**

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[patil@iucaa.ernet.in](mailto:patil@iucaa.ernet.in)  
08308298063,  
09405938449

## International Conference on Coupling and Dynamics of the Solar Atmosphere

IUCAA will organize an International Conference on Coupling and Dynamics of the Solar Atmosphere during November 10-14, 2014. It is now believed that the dynamics in the chromosphere, transition region and corona are governed by the magnetic fields, which are rooted in the photosphere, and created at the base of the convection zone. Therefore, in order to understand the physics of the upper layers of the solar atmosphere, it is of utmost importance to study the dynamics coupling among all the relevant layers.

Over the past few years, space missions, such as the Solar Dynamics Observatory (SDO), Hinode, the Solar Terrestrial Relations Observatory (STEREO), various ground based observatories and balloon-borne experiments, e.g., Sunrise have provided a wealth of observational data that have revealed some of the strong dynamics displayed and caused by the solar magnetic field, which are prime candidates for coupling the

different layers of the solar atmosphere. In addition, the ever increasing computational power has provided opportunities to set-up more and more realistic numerical experiments, the results of which are being compared directly with those obtained from observations.

The key goal of the workshop is to further strengthen our understanding of coupling among different layers of the solar atmosphere by confronting the simulation results with observations.

The list of topics, which will be covered are:

- 1) Generation and transport of magnetic field: From deep interior to the atmosphere.
- 2) Photospheric, chromospheric and coronal magnetic field: Measurements and limitations.
- 3) Waves in the solar atmosphere.
- 4) Active region heating and dynamics.

- 5) Eruptive processes in solar atmosphere: Ellerman bomb, jets, spicules type II, and coronal mass ejections.

The conference intends to provide a platform for expert discussions and presentations with ample opportunities for young and motivated students and researchers to interact and to take up challenging problems in this field. During the conference, there will be several invited review lectures, contributed talks and a poster session.

Conference e-mail:  
[solar@iucaa.ernet.in](mailto:solar@iucaa.ernet.in)

Conference Web Site:  
<http://www.iucaa.ernet.in/~solar>

For registration and abstract submission, interested persons may visit the above web site, and the last date is August 15, 2014.

Contact Person :  
**Durgesh Tripathi**, IUCAA, Pune  
(e-mail: [durgesh@iucaa.ernet.in](mailto:durgesh@iucaa.ernet.in)).

## Seminars

03.04.2014	Nilmani Mathur on <i>Quarks, gluons and computers.</i>
10.04.2014	Frederick Gent on <i>Flux tubes in a stratified solar atmosphere: Magnetohydrostatic equilibrium.</i>
16.04.2014	Partha Ghose on <i>The strong equivalence principle for electrodynamics and the unification of gravity and electromagnetism.</i>
03.06.2014	Jean Surdej on <i>Observing multiply imaged quasars with the 4m International Liquid Mirror Telescope.</i>
11.06.2014	Arunava Mukherjee on <i>Astrophysical compact objects in galactic LMXB systems.</i>
11.06.2014	Pavan Kumar Aluri on <i>Estimation local velocity boost from CMB maps.</i>
16.06.2014	Vikram Khaire on <i>Extragalactic background light.</i>
16.06.2014	Krishna Mohan Parattu on <i>Null surfaces in GR: Characterisation, boundary conditions and thermodynamics.</i>
23.06.2014	Girjesh Gupta on <i>Observations of Damping of slow magneto-acoustic waves and plasma diagnostics in the solar corona.</i>
23.06.2014	Haritma Gaur on <i>X-ray and optical Studies of blazars.</i>
23.06.2014	Mandar Patil on <i>Investigations in general relativity.</i>
23.06.2014	Vivek M. on <i>Variability in quasar outflows.</i>
23.06.2014	Sabyasachi Chattopadhyay on <i>IFU deployment algorithm.</i>
23.06.2014	Anirban Ain on <i>Stochastic gravitational wave background from exoplanets.</i>
23.06.2014	Suvodip Mukherjee on <i>Anomalies in cosmic microwave background.</i>
24.06.2014	Kinjalk Lochan on <i>Spontaneous evolution to classicality in interacting quantum system.</i>
24.06.2014	Varun Bhalerao on <i>NuStar measurement of magnetic fields in the Supergiant fast X-ray transient IGRJ17544-2619.</i>
24.06.2014	Nilkanth Vagshette Part 1 on <i>Cooling and heating mechanism in cluster galaxies, Part-2 on Calibration of CdZnTe detector.</i>
24.06.2014	Nidhi Pant on <i>Characterizing systematic effects with BipoSH measures of statistical isotropy in CMB maps.</i>
24.06.2014	Barun Kumar Pal on <i>A method to delense the lensed CMB power spectra.</i>
24.06.2014	Jayanti Prasad on <i>Mapping stochastic gravitational wave background with particle swarm optimization.</i>
02.07.2014	Pallavi Bhat on <i>Resilience of helical magnetic fields to turbulent diffusion.</i>
02.07.2014	Santanu Das on <i>Developing one of the most efficient cosmological parameter estimation codes.</i>
03.07.2014	Mohammad Sami on <i>Quintessential inflation or unifying inflation with dark energy.</i>
04.07.2014	Urjit Yajnik on <i>Cosmology and unification.</i>
23.07.2014	Ravi Kumar Kopparapu on <i>Habitable zones and the occurrence of potential habitable planets in extrasolar planetary systems.</i>

## IUCAA Preprints

IUCAA preprints released during April - June 2014 can be obtained from the IUCAA library ([library@iucaa.ernet.in](mailto:library@iucaa.ernet.in)). The preprints can also be freely downloaded from <http://www.iucaa.ernet.in/~library/main.html>.

## The Universe – A Touching Experience

Of the approximately 40 million blind people in the world, 20 percent are in India, thus, emphasizing the need to promote and provide inclusion activities for the VI students. The Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, has started an effort to produce tactile astronomy resources under its scientific public outreach programme (SciPop). It is now part of the few outreach groups and individuals worldwide, who have taken up the cudgels in order to share at least the basics of Astronomy with our VI friends.

The initial effort was to make a small scale tactile planetarium, which could be touched from the inside to reveal the apparent curvature of the sky as well as the position and intensity of stars with the imaginary constellations put in. Various prototypes were designed by Samir Durde and a 1-metre diameter shape was finally found to be the right size for students of all ages to be able to reach in and enjoy comfortably. As SciPop always aims to make low cost, quality



resources, while promoting recycling, the first few domes were fabricated with corrugated cardboard packing boxes. The design has been released as open source and is being developed further so that it is possible for interested teachers to build it for themselves at a very low cost. Work is also on to make it into a kit to reduce the teacher efforts further.

Scipop has also been in touch with the “Meet our Neighbours” team (supported by Europlanet, NUCLIO, Galileo Teacher Training Programme), which is based in Portugal, and has produced a set of tactile images of the main objects of the Solar system. As an addition, SciPop has created tactile images of different types of galaxies. These were displayed on the National Science Day on February 28, 2014 in IUCCA. In a recent exhibition for the

students of the Blind Student Learning Centre (University of Pune), on March 12, 2014, the tactile planetarium was displayed along with the “Meet our Neighbours” resources.

The resource was also tried out with students of four VI schools in Mumbai. Kalpana Kharade from K.J. Somaiya College, Mumbai was a collaborator and she herself is unable to see but is working on a project to make Astronomy concepts accessible to visually impaired children at upper primary level.

### Some reactions:

*“Let me tell you that the children enjoyed the dome very much. They were again and again going and touching the sky and getting the feel of touching the sky in literal as well as in a figurative sense.”* – Kalpana Kharade, K.J. Somaiya College, Mumbai.

*“My dream of ‘seeing’ the stars has come true!”* – Dhananjay Bhole, Head of Blind Student Learning Centre University of Pune.



# CCSU Astronomy and Astrophysics Summer School



Cotton College State University (CCSU), Guwahati with support from IUCAA and "Friends of Cotton" organised a summer school on Astronomy and Astrophysics for undergraduate students during June 16 - July 5, 2014. Over 40 students from various states of the North Eastern region of India participated in the school. Twenty one resource persons from within as well as outside the country interacted with the students during the three weeks of the school.

Dhruba J. Saikia (CCSU and NCRA, TIFR), Santabrata Das (IITG), Wasim Raja (RRI and CCSU), Archana Bora and Eeshankur Saikia (Gauhati University), Amit Pathak and Tanvir Hussain (Tezpur University), Sangita Baruah, Sangeeta Barthakur and Debojit Sarma (Cotton College), Somak Raychaudhury (Presidency University), A. Gopakumar (TIFR, Mumbai), Prasun Dutta (IISER, Bhopal), Ajit Kembhavi (IUCAA) and Sailo Mukherjee (North Bengal University) introduced the students to

a wide variety of topics in Astronomy and Astrophysics.

Harsha Raichur and Nishant Singh (NORDITA, Stockholm), Nirupam Roy (MPIfR, Germany), Katherine Blundell (University of Oxford) and Chris Salter and Tapasi Ghosh (Arecibo Observatory, Puerto Rico) interacted with the students using video conferencing through Skype.

On July 4, students had a thrilling experience of remote observations using the world's largest single-dish radio telescope located at Arecibo in the Island of Puerto Rico, USA. Sitting in their classroom at CCSU, the students made observations of neutral atomic hydrogen emission from several galaxies including the Milky Way. Chris Salter and Tapasi Ghosh supervised these observations from the control room at Arecibo.

The topics covered in the school included basic radiation processes, stars and stellar evolution, the Sun and planetary systems, ISM, galaxies, active galaxies, clusters of galaxies,



binary stellar systems, accretion disks, X-ray emission, introduction to general relativity, pulsars, gravitational waves, statistics and mathematical techniques in astronomy, particle physics, cosmology, and large scale structure formation. On the last two days of the school, Ajit Kembhavi, Director, IUCAA, delivered a public lecture on each day on two major upcoming projects: LIGO - India and the TMT. The school was organised in the Computer Science and IT Department of CCSU, and was coordinated by Wasim Raja.



## VISITORS

(April - June 2014)

Anamika Aggarwal, Avinash Aher, Farooq Ahmad, Gazi Ameen Ahmed, P Ajith, Sk. Saiyad Ali, M. Amanathulla, K. Amrutha, S. Anagha, Aiswarya Andavan, K.G. Anusree, K. Aravind, C. Arunan, Blessy Baby, Jasjeet Bagla, Bidisha Bandyopadhyay, Srikumar Banerjee, Arkadip Basak, Prasad Basu, Aroonkumar Beesham, Jayashree Behera, Mohit Bharadwaj, Karri Bhargavi, Naseer Iqbal Bhat, Ravinder S. Bhatia, Sandip K. Bhattacharya, Souradeep Bhattacharya, Tara Shankar Bhattacharya, Atreyee Biswas, H.B. Bohidar, Mridusmita Buragohain, P. Chakraborty, Subenoy Chakraborty, Ramesh Chandra, Sunil Chandra, Subhamoy Chatterjee, Asis Kumar Chattopadhyay, Tanuka Chattopadhyay, Raghavendra Chaubey, Aman Sudhir Chaudhari, Garima Chauhan, Bhakti Kanulal Chitroda, Haeun Chung, Raka Dabhade, Mamta Dahiya, Aritra De, Sukanya De, Jishnu Dey, Mira Dey, J.S. Dhanya, Broja Gopal Dutta, Sourav Dutta, Sukanta Dutta, Savithri Ezhikode, Tanim Firdoshi, Sai Kirthiga Ganesan, Sharad Gaonkar, Prerak Garg, Fred Gent, Partha Ghose, Archisman Ghosh, Avyarthana Ghosh, Ritesh Ghosh, Kim Gillies, V. Girish, Rupiyoti Gogoi, A. Gopakumar, Arun Grover, Sarbari Guha, A. Gupta, Anuradha Gupta, Rohit Gupta, M. Haney, K.P. Harikrishnan, Nikhil Hatwar, Souvanik Hui, Tanvir Hussain, K. Indulekha, Asif Iqbal, Bala Iyer, S.N.A. Jaaffrey, Joe Jacob, Deepak Jain, R.S. Jain, V. Javad, K. Jeena, V. Jithesh, Reju Sam John, Kanti Jotania, Minu Joy, Anil Kakodkar, Dinesh Kale, Prem Kumar Kalra, Shalmalee Lalit Kapse, Sanjay Kapur, L.N. Katkar, Ziauddin Khan, Rakesh Khanna, Shreya Prashant Khedkar, Dawood Kothawala, Ramesh Koul, Amit Kumar, Atmjeet Kumar, Nagendra Kumar, Saurabh Kumar, Uday Kumar, Arpan Kundu, V.C. Kuriakose, Kshama Sara Kurian, Nithin K. Kurian, M.L. Kurtadikar, Debojoti Kuzur, Siddharth Maharana, Chandreyee Maitra, Manzoor A. Malik, Sumit Mamoria, Pranshu Mandal, Soma Mandal, Bari Maqbool, Sujay Vivek

Mate, Nilmani Mathur, Nairwita Mazumder, Chandrakant Mishra, Saugata Mitra, Rekhesh Mohan, Priyanka Mondal, Soumen Mondal, S. Mukherjee, Sargam Mulay, C. Bala Murugan, Pramod G. Musrif, Hemwati Nandan, Dillip Nandy, Anand Narayanan, Nilam Navale, Rajesh Nayak, Subas Gegindra Prasad Nepal, Uvanjelin Nithya, Peddireddy Nymisha, Archana Pai, S.K. Pandey, Sanjay Pandey, Vihan Pandey, Rajan Panikar, Changbom Park, Pooja Passi, Megha Homeshkumar Patel, Amit Pathak, D.B. Patil, M.K. Patil, Surajit Paul, Pramod Pawar, Sushant Pawar, D.R. Phadatar, Ninan Sajeeth Philip, Khun Sang Phukon, Nihan Pol, Shailendra Nandkishor Potdar, Anirudh Pradhan, Lalatendu Pradhan, P.M. Premjith, Khushboo Punia, Mussadiq Qureshi, K.K. Rahul, Karthik Rajeev, S.R. Rajesh, Gayathri Raman, A.R. Rao, Yashwanta Rao, Shantanu Rastogi, C.D. Ravikumar, Swara Ravindranath, Bharti Rawat, Somak Raychaudhury, Sunita Rewale, Satyajit Roy, Prantik Saha, Subhajit Saha, Sanjay Kumar Sahay, Sunder B. Sahayanathan, Prasant Kumar Samantray, Saumyadip Samui, Shishir Sankhyayan, Prakash Sarkar, Subrato Sarkar, Shanmugapriya Sathyanarayanan, Seema Satin, Somasri Sen, T.R. Seshadri, Phalguni Shah, P. Shalima, Anushrut Sharma, Ashu Sharma, Ranjan Sharma, Tarun Sharma, Umang Sharma, Abinash Kumar Shaw, Gargi Shaw, Jane S. Sikha, H.P. Singh, K.P. Singh, Shradhanand Singh, Atreyee Sinha, Mark Sirota, Vikram Soni, Radha Srinivasan, Navita Srivastava, S. Sudhagar, T.P. Sudheesh, Jean Surdej, Avinash Surendran, Rishabh Mookesh Thakkar, Jinu M. Thomas, Ajay Kumar Tiwari, Shrishti Tiwari, Buddhi Vallabh Tripathi, Jitendra Kumar Tripathi, Pranjal Trivedi, Anurag Tyagi, Umopathy, C.S. Unnikrishnan, Muneer Urothody, A.A. Usmani, Santosh Vadawale, D.B. Vaidya, P. Vaishak, Brijesh Varghese, George Varghese, Nischal Varma, Vasundhara, Heena Vyas, and Akash Yadav.

## VISITORS EXPECTED

### July (2014)

G.C. Anupama, Indian Institute of Astrophysics, Bangalore; Priya Bharali, Gauhati University, Assam; Debasish Borah, Tezpur University, Assam; B.C. Chauhan, Central University of Himachal Pradesh ; S. Dev, H.N. Bahuguna Garhwal Central University, Uttarakhand; Taparati Gangopadhyay, Presidency University, Kolkata; Michelle George, Manipal University, Udupi, Abdolhosein Hashemizadeh, Institute for Advanced Studies in Basic Sciences, Tehran, Iran; Bivudutta Mishra, BITS-Pilani, Hyderabad; Nishant Mittal, Meerut College; Abhishek Parida, Jamia Millia Islamia, Delhi; S.D. Pathak, University of Lucknow; Saibal Ray, Government College of Engineering and Ceramic Technology, Kolkata; Biplab Raychaudhuri, Visva-Bharati University, Santiniketan; Sonali Sachdeva, University of Delhi; Anirban Saha, West Bengal State University; Sunder B. Sahayanathan, BARC, Mumbai; M. Sami, Jamia Millia Islamia, Delhi; Amit Seta, University of Mumbai; Joginder Sharma, Meerut College; Ram Sharma, University of Delhi, Delhi; Parampreet Singh, Louisiana State University, USA; Sanam Thakur, University of Pune; S.K.

Tripathi, Government College of Engineering, Odisha; P. Udayashankar, NIE Institute of Technology, Mysore; S.R. Valluri, University of Western Ontario, Canada; and Urjit Yajnik, IIT, Mumbai.

### August (2014)

Partha Chowdhury, University of Calcutta, Kolkata; Devendra Ojha, TIFR, Mumbai; Subodh Patil, CERN Theory Division, Switzerland; Vivekananda P. Rao, Osmania University, Hyderabad; and Ayanda Zunga, University of Kwazulu-Natal, South Africa.

### September (2014)

Nithaya Chetty, South Africa; Bernie Fanaroff, South Africa; K.S.V.S. Narasimhan, New College, Chennai; Yuri Shtanov, Bogolyubov Institute for Theoretical Physics, Ukraine; and Ted Williams, South Africa.

### Long Term Visitors :

P. C. Agrawal, Sanjeev Dhurandhar, Pushpa Khare, and Gopal Krishna.

# Know Thy Birds - 6

— Chaitanya Rajarshi

Hello friends,

We have many misbeliefs about the birds, and this article tells you about one such bird, which is believed to sleep on its back and support the heaven with its legs.

Famous Hindi metaphor *Tithiri se asman thama jayega* (can the pee-wit support the heavens?) Actually, it refers to persons undertaking tasks beyond their ability. Here we are talking about the bird Lapwing.

This bird's call is believed to be misfortune. Actually, it has a characteristic sharp alarm call, which is rendered as *did he do it*.



Red-wattled Lapwing (*Vanellus indicus*)  
(Photo: Umesh Vaghela)

**Red-wattled Lapwing** : size: ~ 32-35 cm light brown wings and back; head, chest and front part of neck are black. A red fleshy wattle is in front of the eyes, black-tipped red bill and yellow long legs.



Yellow-wattled Lapwing (*Vanellus malabaricus*)

## Lapwing

These birds are mainly found on dry lands of India. Their nests are very difficult to find as they are flawlessly camouflaged with the ground pattern. Mostly, 4 eggs are laid and the incubation period is 27–30 days. They mainly feed on insects and grains.

**Yellow-wattled Lapwing** : size: ~ 25-30 cm, dull grey brown with a black cap, yellow legs and a triangular wattle at the base of the beak.

In the summer of 2009, I found 22 nests of red and yellow Lapwings on the dry plains of Pimple Nilakh, Pune.

When the nests are approached, the incubating bird attempts to move away from the nest without drawing attention to it. They even act like that their wing is broken and take the predator away from the nest. The young are also well camouflaged. In the situation of danger, parents emit alarm call and chicks squat flat on the ground and freeze.

This behaviour is very interesting to watch and I enjoyed every moment of it. Here is a short photo tour for you.



Red-wattled Lapwing hatching the eggs



The nest on the land, very difficult to spot



The nest



The Chick



Catch me if you can

(All Photos: Chaitanya Rajarshi)

So, go out this monsoon with binocular and play hide and seek with The Lapwings...

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