

# KHAGOL

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Editor: Swara Ravindranath (swara@iucaa.ernet.in)  
Editorial Assistant: Manjiri Mahabal (mam@iucaa.ernet.in)

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## National Science Day Celebrations - 2010

The National Science Day celebrations - 2010 were extended this year beyond the campus of IUCAA, Pune. Samir Dhurde and Ashok Rupner carried out hands-on science and astronomy activities at Panditrao Agashe School, Pune on February 17. Science Lectures were given by Dipankar Bhattacharya (at Panditrao Agashe School on February 22) and by A. N. Ramaprakash (at Indian Institute for Aeronautical Engineering and Information Technology, Pune on February 26).

In IUCAA, Pune Campus, the school students competitions were conducted on February 27. About 250 students of class VIII and IX

participated in drawing, essay and quiz competitions. Amit Dhakulkar from Homi Bhabha Centre for Science Education, Mumbai interacted with the teachers about experiments with science teaching. Arvind Gupta talked with the students and teachers on doing simple science toys using discarded materials.

On February 28, general public started gathering outside IUCAA, Pune campus well before the scheduled start of 11:00 a.m. that prompted us to open the gates at 10:45 a.m.

Scientific Toys were demonstrated by the students from Loyola and Vidyapeeth High Schools, Pune in the science park area, out side the Chandrasekhar Auditorium.

Continuous demonstrations on Virtual Observatory, World Wide Telescope and Google sky were conducted by Tushar C. Agrawal and Sibasish Laha in IUCAA Lecture Hall Bhaskara 1.

Series of films on astronomical topics were screened in Bhaskara 3. It started with Vijay Mohan giving introduction to IUCAA Girawali Observatory, followed by series of video clips of the observatory.

In the foyer between Bhaskara 2, and Bhaskara 3, introduction to general astronomy, and specifically IUCAA related work was displayed with the help of eye-catching colourful posters. Faculty and students were present at the poster exhibition to answer queries of the visitors.

Three architect student volunteers explained IUCAA architecture with the help of scaled down model of IUCAA buildings. In and outside Bhaskara 2, Radio Astronomy related experiments and observations were set up. A simple DIY Lissajous figure was also shown by the Instrumentation Laboratory group.

Outside the Mukhtangan Vidnyan Shodhika (MVS), a poster exhibition of astronomical images was setup along with an astronomical telescope and water rocket demonstration.

A special workshop on making a simple spectroscope using CD or DVD was organized in the MVS. It was announced that those interested in participating in this workshop may bring one discarded CD or DVD. In all, 600 people made their own spectroscope.

All these exhibits and demonstrations were conducted throughout the day. In addition, there were following scheduled events.



Ajit Kembhavi, Moumita Aich and Sanil Unnikrishnan gave 30 minutes talk each on astronomical topics. Jayant Narlikar and T. Padmanabhan answered questions from visitors.

The day ended with lectures on science Nobel Prizes. A. N. Ramaprakash talked on 2009 Nobel Prize in Physics, and C. Suresh from National Chemical Laboratory, Pune, gave a talk on 2009 Nobel Prize in Chemistry.

Due to bright full moon light on the night of February 28, this year's night sky show was cancelled.

## National Science Day Programme at Girawali, Ambegaon Taluka

As a part of the on-going rural outreach programme, IUCAA also conducted competitions for the school students of Ambegaon Taluka.

Essay and Drawing competitions were conducted in the premises of the IUCAA Girawali Observatory (IGO) on March 6, 2010. After the competitions, the students and teachers visited IUCAA's state-of-art 2m telescope. The quiz competitions were held in the New English School, Landewadi, on March 15, 2010. While the quiz elimination round was conducted for the students, teachers solved a science crossword.

The Vidya Vikas Mandir, Awasari Budruk, has won prizes in all the three events and the results are given in page 3. These students would be given KSVS Narasimhan Prize. (Refer to Khagol No. 78, April 2009.)

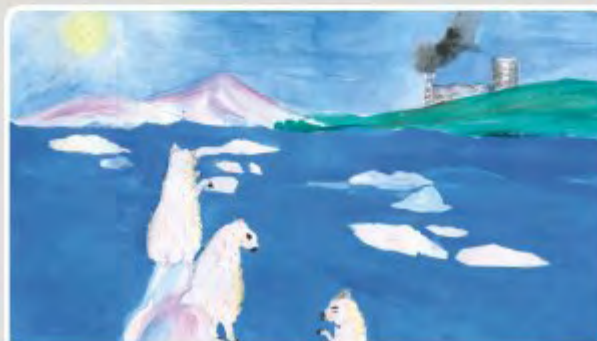
## National Science Day activities at IUCAA



## Prize-winning Drawings



Mayur Shinde  
(1st prize) Modern High School (Pune)



Karishma Deshpande  
(2nd prize) Jai Hind High School(Pune)



Nishigandha Shete  
(1st prize) Vidya Vikas Mandir (Girawali)



Pallavi Sutar  
(2nd prize) New English School (Girawali)



Results of competitions for school students held on February 27, 2010 at IUCAA.

As a part of the annual National Science Day celebrations, IUCAA conducted Essay, Drawing and Quiz competitions for the school students on Saturday, February 27, 2010. T. Padmanabhan, Dean, Core Academic Programmes, IUCAA gave away the prizes.

The list of the winners in various categories is given below.

#### Quiz competition :

**1<sup>st</sup> prize :** Abhinava Vidyalaya English Medium High School, represented by Yash Raghunandan Dixit, Devdutta Pradeep Phatak, and Tanmayan Prabodh Pande.

**2<sup>nd</sup> prize :** Bharatiya Vidya Bhavan Sulochana Natu Vidya Mandir, represented by Pinak Vidyasagar Ghate, Kedar Bhalchandra Chaudhari, and Adwait Vilas Pawgi.

**3<sup>rd</sup> prize :** D.A.V. Public School, represented by Sameer Suri, Sourabh Badane, and Gautam S. P.

#### Essay (English) :

**1<sup>st</sup> prize :** Ashay Navnath Ghogare, St. Vincent's High School.

**2<sup>nd</sup> prize :** not given.

**Honourable mention :** Somarth Kallurya, Abhinava Vidyalaya High School; Ashish Kumar Singh, Army School, B.E.G., Kirkee; Moumita Subhasis Pal, DSK School.

#### Essay (Marathi) :

**1<sup>st</sup> prize :** Kalyani Sunil Marathe, Jnana Pabodhini Prashala.

**2<sup>nd</sup> prize :** Rutuja Digamber Karanjkar, Mahilashram High School.

**Honourable mention :** Aditya Balwant Patil, New English School.

#### Drawing :

**1<sup>st</sup> prize :** Mayur Balasaheb Shinde, Modern High School.

**2<sup>nd</sup> prize :** Karishma Deshpande, Jai Hind High School.

**3<sup>rd</sup> prize :** Vaidehi Supalkar, Delhi Public School.

Results of various competitions held in the Girawali region

#### Quiz competition :

**1<sup>st</sup> prize :** Chinmay Mandale, Sahil Inamdar, and Rutwik Khandeshe from New English School, Landewadi.

**2<sup>nd</sup> prize :** Shubham Hinge, Aniket Chavan, and Triveni Shinde, from Vidya Vikas Mandir, Awasari Budruk.

**3<sup>rd</sup> prize :** Akash Khinvasara, Snehal Shete, and Rahul Kanawade, from Shivaji D. Adhalrao P. Vidyalaya, Landewadi.

#### Essay (Marathi) :

**1<sup>st</sup> prize :** Amruta Kokane, from Sant Dnyaneshwar Vidyalaya, Chas.

**2<sup>nd</sup> prize :** Shubham Hinge, from Vidya Vikas Mandir, Awasari Budruk.

**3<sup>rd</sup> prize :** Raviraj Mathe, from Jagdishchandra Mahindra High School, Chincholi, Khurd.

#### Drawing :

**1<sup>st</sup> prize :** Nishighandha Shete, from Vidya Vikas Mandir, Awasari Budruk.

**2<sup>nd</sup> prize :** Pallavi Sutar, from New English School, Landewadi .

**3<sup>rd</sup> prize :** Kameshwari Divekar, from Hutatma Babu Genu Vidyalaya, Mahalunge Padwal, and Swapnil Jaid, from Shri Navkund Madhyamik Vidyalaya, Pargaon Peth.

## National Science Day activities at Girawali







Geoffrey Burbidge  
(September 24, 1925 - January 26, 2010)

Professor Geoffrey Burbidge, one of the great astronomers of our time, and an Honorary Fellow of IUCAA, passed away on January 26, 2010, aged 84 years. He was a regular visitor to IUCAA since its inception, and was a close collaborator of Professor Jayant Narlikar, the founder Director.

Professor Burbidge was born in a small town in Oxfordshire in England, and studied physics at the University of Bristol, a subject that he chose in preference to history, because it offered him a scholarship. He obtained a Ph. D. in theoretical physics from the University of London, but then shifted his interest to theoretical astrophysics and cosmology, not least because of the influence of his wife Professor Margaret Burbidge, who is herself a renowned astrophysicist. He has worked in several important astronomy departments in Britain and the USA. He was a Professor at the University of California at San Diego (UCSD) from 1962, Director of the Kitt Peak National Observatory from 1978 until 1984, and was then again at UCSD. He formally retired in 2002, but continued to be actively associated with the department until the end.

Professor Burbidge was a Fellow of the Royal Astronomical Society, and won many awards and prizes, including the Warner Prize and also the gold medal of RAS, which he shared with Professor Margaret Burbidge. He was for many years the Editor-in-chief of the Annual Reviews of Astronomy and Astrophysics.

Professor Burbidge has made seminal contributions to many areas of modern astrophysics, and helped to give it the shape that we find it in today. What may be considered to be his best known work is on the synthesis of the elements in stars. In a collaboration with Professors Margaret Burbidge, William Fowler and Fred Hoyle which led to the massive paper, universally known as B<sup>2</sup>FH, he showed that stars in various stages of their lives lead to the formation of nearly all known

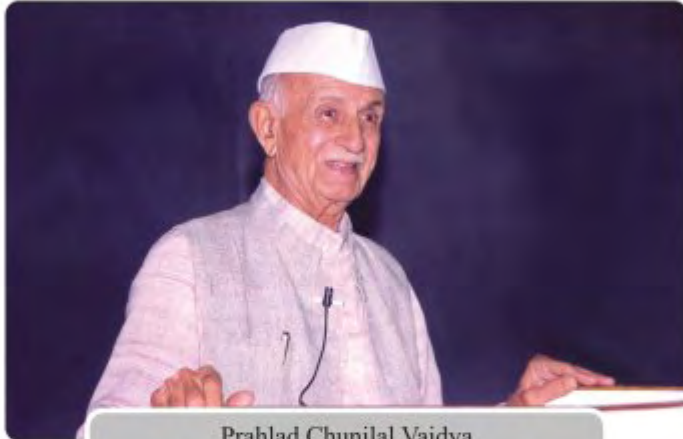
elements through nucleosynthesis. B<sup>2</sup>FH is considered to be a very important paper in astrophysics. Amongst Professor Burbidge's other important contributions are his work on accretion disks, energetics of extragalactic radio sources, and stellar contributions to the mass of galaxies.

Professor Burbidge contributed much to the early understanding of the nature of quasars, and his thoughts are insightfully summarized in a short monograph on quasars that he wrote with Professor Margaret Burbidge, which contains the seeds of many ideas which were later explored by astronomers. Soon Professor Burbidge became skeptical about some of the standard ideas about quasars, and he came to believe that the redshift of quasars, and other extragalactic objects, were not entirely due to the cosmological expansion of the Universe. He was encouraged in this belief by the observations by Professor Halton Arp of quasars with different redshift which were found very close together on the sky, and were therefore likely to be physically associated, and the association of several quasars with different redshift with the same galaxy. He believed that some part of a quasar's redshift could be intrinsic to the object, and could arise, for example, due to its Machian interaction with other particles in the Universe, as in the gravitation theory of Professors Fred Hoyle and Jayant Narlikar. Professors Burbidge, Hoyle, Narlikar and Arp wrote a series of research papers and monographs on these observations and ideas, and on a modified Steady State theory. The original Steady State theory envisaged a Universe which always remained in the same state even though it was expanding, because of the continuous creation of matter. Such a Universe cannot produce the cosmic microwave background radiation which has been observed, with a spectrum which is astonishingly close to a Planckian form. An explanation of the background arising from relic starlight of previous cycles is permitted by the modified Steady State theory, which envisages many explosions, and phases of expansion and contraction, but without the physical singularity, which is associated with the origin of the Universe in the standard Big Bang theory. Professor Burbidge had great belief in these ideas, and expounded them very articulately and forcefully. He and his colleagues were disappointed that mainstream cosmologists and astrophysicists ignored these ideas completely, in spite of all the evidence of inconsistencies in their interpretation of observations and theoretical ideas. But he remained convinced till the end that the ideas will one day prevail, and lead to a more enlightened discussion of the real Universe.

On a personal note, I remember Professor Geoff Burbidge walking round the foundations of the IUCAA buildings when they were being constructed, and when the buildings and the gardens got ready, sitting on a large granite slabs placed on the grass, matching the scale of the seat with his immense size, and bringing cheer to the landscape with his flaming red T-shirt and booming voice. I will miss him greatly, and I am sure so will Professor Jayant Narlikar and all my colleagues at IUCAA, who had the good fortune to meet him, and hear him speak.

Ajit Kembhavi  
Director, IUCAA





Prahlad Chunilal Vaidya  
(March 23, 1918 - March 12, 2010)

Professor P. C. Vaidya, a great relativist, and friend, mentor and Honorary Fellow of IUCAA, passed away on March 12, 2010, aged 92 years. With his demise, and that of Professor A. K. Raychaudhuri a few years ago, the Indian relativity community has lost two of its most outstanding and inspiring figures, who were admired as much for their achievements, as for their simplicity and humility. I reproduce below an obituary of Professor Vaidya written by Professor Pankaj Joshi of TIFR, who is the current President of the Indian Association for General Relativity and Gravitation.

**Ajit Kembhavi**  
Director, IUCAA

Eminent general relativist and gravitation theorist Professor P. C. Vaidya (Prahlad Chunilal Vaidya) passed away on March 12, 2010. He was 92.

In the passing away of PCV, IAGRG has lost one of its Founder Members and a father figure. The Indian and International gravitation and cosmology community has lost a renowned and acclaimed gravitation theorist.

PCV's research on general theory of relativity was started when he went to Banaras Hindu University in 1942, where he joined the school of relativity started by Professor V. V. Narlikar. It was only ten months that he spent at BHU at that time, during which the beautiful idea of developing a spacetime geometry was born, which would describe the gravitational potentials in the exterior of a radiating star. The well-known Schwarzschild solution describes the geometry around a spherical star, however, it necessarily assumes the exterior of the star to be empty. Vaidya generalized this case to incorporate the radiation from the star, and the metric has become famous now internationally as the Vaidya metric for a radiating star.

The Vaidya metric pioneered the key idea of using the light rays as a coordinate frame. In other words, the idea of a null coordinate was born, which has played extremely significant role in subsequent research in gravitation theory of next many decades, and helped

generate several significant results and insights. The Vaidya metric has by now found very many applications in gravitation theory and it is widely used and internationally cited to study many problems in gravitation and general relativity. For an excellent narration of how he arrived at the basic idea for deriving his key equations of this geometry, we refer to his own words and description in the movie given at the link : <http://www.imsc.res.in/~iagrg/>

From Banares, Vaidya then shifted to Mumbai to work with Dr. Homi Bhabha at the Tata Institute of Fundamental Research. However, after spending an year and a half there, the lack of accommodation in Mumbai made him to take up the position as a Professor of mathematics at Vallabh Vidyanagar. From there he moved as Principal of the Visnagar College, and finally to the professorship of mathematics at the Gujarat University.

This was the beginning of a glorious teaching career which he always enjoyed enormously, and he was always very proud to call himself a mathematics teacher. In addition to being an eminent scientist, PCV continued to be a teacher par excellence all his life. His lectures, always delivered using a chalk and black board, never failed to captivate the student and always created thrill and excitement to generate a lasting interest in the topic. He has written memoirs of his teaching and research, which he titled, Chalk and Duster. Even after he formally retired from his professorship position at the Gujarat University, he regularly visited the mathematics department for many years, continuing his research and educational activities. He would always insist on using a bicycle to go to the university, even when he became the Vice- Chancellor of the Gujarat University, and also later, till he was in his eighties.

He taught mathematics to several generations of students, for more than six decades. All his life, he worked continuously for the improvement of science education and research, and in particular for the development of mathematics education in Gujarat. At his suggestion, Vikram Sarabhai helped to create a mathematics laboratory in Ahmedabad, probably for the first time in India, which is known today as the Community Science Centre. He established the Gujarat Mathematical Society, and the Suganitam mathematics magazine, which he started in 1960s and ran for many decades, to popularize mathematics in the state. It goes today to numerous schools and colleges and has inspired generations of mathematics teachers and students.

PCV always exhibited a constant and abiding interest in education and society around him throughout his life. He was Vice- Chancellor of the Gujarat University, Chairman of the Gujarat Public Service Commission, and also a Member of the Union Public Service Commission for many terms, and rendered active and invaluable service through direct interaction and involvement. He was well-known as a Gandhian mathematician, and was always easy to spot with his Gandhian cap and a tall figure at the IAGRG and ICGC conferences, which he and his wife Vidya Gauri attended meticulously without fail.

PCV is survived by his four daughters, Kumud, Ila, Smita, and Hina, and their families.

Pankaj S. Joshi (President, IAGRG)



## The 6th Library and Information Services in Astronomy

### (LISA VI)



Participants of the LISA Conference

The 6th Library and Information Services in Astronomy (LISA VI) conference (<http://libibm.iucaa.ernet.in/conf/index.html>) was held during February 14-17, 2010 at IUCAA, Pune. LISA VI was organized jointly by the members of the Forum for Resource Sharing in Astronomy (FORSA) libraries, listed below, and hosted by IUCAA and NCRA, Pune.

- \* Aryabhata Research Institute of Observational Sciences (ARIES), Nainital.
- \* Bose Institute, Kolkata.
- \* Harish-Chandra Research Institute(HRI), Allahabad.
- \* Indian Institute of Astrophysics (IIA), Bangalore.
- \* Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune.
- \* National Centre for Radio Astrophysics (NCRA), Pune.
- \* Osmania University – Centre for Advanced studies in Astronomy (CASA), Hyderabad.

- \* Physical Research Laboratory (PRL), Ahmedabad.
- \* Raman Research Institute (RRI), Bangalore.
- \* Saha Institute of Nuclear Physics (SINP), Kolkata.
- \* S.N. Bose National Centre for Basic Sciences (SNBNCBS), Kolkata.
- \* Tata Institute of Fundamental Research (TIFR), Mumbai.

Critical financial support was received from Astronomical Society of India (ASI), some FORSA member institutes, in addition to the funds received from LISA V organizers.

The theme of the conference was "21st Century Astronomy Librarianship : From New Ideas to Action" and the conference discussed issues concerning the future of librarianship, Web 2.0/3.0, use, access and metrics, resource management and intellectual property, preservation and archiving, and the virtual observatory.

The keynote address was delivered by Jayant V. Narlikar, Emeritus Professor and Founder-Director, IUCAA on the topic "Role of a Virtual Library in the Coming Decades."





This was followed by a unique programme "Honouring our Mentors" to felicitate 17 retired astronomy library professionals from India and abroad in recognition of their contribution to the profession, at the hands of Rajaram Nityananda, Centre-Director, NCRA.

The scientific sessions scheduled on Tuesday, February 16, 2010 was held at GMRT-TIFR, Narayangaon. The participants were given a tour of the radio telescope after the scientific session, which was highly appreciated.

The invited talks were delivered by A.R.D. Prasad (D.R.T.C., Bangalore) in the session on 'Future of Libraries', Subbiah Arunachalam, (Information Consultant, Chennai) and Salvatore Mele (SCOAP, CERN, Switzerland) in the session on Open Access, and Ajit K. Kembhavi (Director, IUCAA) in the session on Virtual Communities.

A publisher roundtable session was organized on the concluding day of the conference with a participation of four publishers, viz. Astronomical Society of the Pacific (ASP), EDP Sciences, Institute of Physics (IOP), and John Wiley & Sons.

All the scientific sessions were video recorded using EyA (Enhance

your Audience), which is an innovative automated audio/video/slide recording system, developed by Science Dissemination Unit (SDU), ICTP, Italy, to archive and share scientific lectures and talks carried out using digital presentations (PPT, PDF, animations, etc.) and specially traditional chalk boards found in classrooms. The talks will be available at the conference website

(<http://libibm.iucaa.ernet.in/conf/index.php/LISA/conf>) shortly.

The efforts taken by the Friends of LISA (FOL) Committee, which has been set up to assist librarians from developing countries to attend LISA conferences, ensured over 100 participants, with more than 50 participants coming from abroad representing 18 countries.

The proceedings of LISA VI have been sponsored by the Astronomical Society of the Pacific (ASP), who will publish it as an ASP Conference Proceeding.



## Telescope Making Workshop at Thiruvananthapuram

IUCAA conducted a telescope making workshop for the students of the Indian Institute for Space Science Technology, (IIST), Thiruvananthapuram, during February 1 - 6, 2010. There were about 45 participants, who made 24 reflecting telescopes with 100 mm primary mirror on altazimuth mount.

A prototype of reflecting telescope with 100 mm diameter mirror was developed at IUCAA in October/November 2009. It takes about 20 man days to make a standard amateur telescope with 150 mm (6 inch) diameter. Such a telescope initially is used for observing planets and bright objects. Keeping this in mind, it was thought that a telescope with 100 mm mirror would ideally suit as beginner's



telescope, that would take less amount of time and proportionately less cost. Just as this project was coming close to its conclusion, IIST explored the possibility with IUCAA for conducting a telescope making workshop for their students. This workshop was conducted as part of Conscientia 2010, the annual TechFest of IIST.

The workshop started with Arvind Paranjpye giving a lecture and demonstration on astronomical telescope, and the telescope that the

students were going to make. During the workshop, the students ground the glass blanks to get sagitta sufficient for f ratios between 8



and 10. No stringent requirement was placed on exact focal length. Mirrors were then polished and figured. In parallel, telescope mounts were made. Finally, the mirrors were silvered by chemical precipitation. Using these telescopes on the night of February 5, students could see Orion nebula and Pleiades through their own telescope.

During the five days workshop, many interactive sessions were conducted to clear the doubts regarding the making and uses of the telescope.

The workshop coordinated by Anandmayee Tej, and conducted by Arvind Paranjpye. Tushar Purohit and Makarand Paranjpye supplied the materials and assistance.



### *Congratulations to...*

**J. V. Narlikar**, on being conferred with the **Maharashtrabhushan Award** by Maharashtra Times, Mumbai.

**P. N. Pandita**, Visiting Associate and Scientific Advisory Committee member of IUCAA, on being awarded the **J.C. Bose National Fellowship** by the Department of Science and Technology, Government of India, New Delhi.

**Ashok Rupner**, on being conferred with the **Award for Most Innovative Workshops** by Scifest Africa, 2010.

**K. Subramanian**, on being elected **Fellow of Indian Academy of Sciences, Bangalore.**



## Telescope Making Workshop



Telescope making activities at the Workshop

Listed below are the seminars and colloquia given at IUCAA during January – March 2010.

### Seminars

05.01.2010 Prateek Sharma on Dynamics and energetics of plasma in the cores of galaxy clusters; 07.01.2010 Philippe Prugniel on The star formation at  $z = 1$  in nearby galaxies; 15.01.2010 Norbert Werner on Feedback under the microscope: A close-up view of the AGN-ICM interaction in M87; 18.01.2010 Mudit Srivastava on Imaging characteristics of ultra violet imaging telescope (UVIT) through numerical simulations; 19.01.2010 Durgesh Tripathi on Dynamics of the solar corona; 20.01.2010 Aurora Simionescu on Large-scale motions in the ICM of galaxy clusters from an X-ray, numerical and radio perspective; 20.01.2010 Michal Ostrowski on A review of H. E. S. S. results; 04.02.2010 D. B. Vaidya on Composite interstellar grains; 23.02.2010 Atul Deep on Use of AO PSF models to study resolved stellar populations with MICADO; 26.02.2010 Danielle Alloin on Extremely massive and young star clusters at the LIR in barred galaxies: Formation process; 11.03.2010 Amit Roy on Renaissance in nuclear sciences; and 22.03.2010 Lokesh Tribedi on Highly charged ions to probe atoms, molecules and clusters: Present and future.

### Colloquia

19.01.2010 Devendra Lal on Direct measurements of solar activity in the past 35,000 years; 02.02.2010 Wei-Tou Ni on Gravitational wave detectors in space and the detectability of primordial inflationary gravitational waves; and 09.02.2010 Sanjay Puri on Pattern formation in the kinetics of phase transitions.

On the occasion of the International Year of Astronomy- 2009, the last workshop on telescope making was conducted at Raipur, during January 6 -7, 2010. The initiative was taken by S. K. Pandey, Vice-Chancellor of Pt. Ravishankar Shukla University, Raipur and coordinated by Alok Sharma of State Council of Educational Research and Training (SCERT), Raipur, Chhattisgarh.

S. K. Pandey inaugurated the workshop and gave the keynote address. In all, 20 telescopes were made by 20 pairs of students and their accompanying teachers. During these days, Jupiter was visible above the western horizon, and it was very exciting feeling for the students to recall that almost exactly 400 years ago, Galileo had pointed his telescope in the direction of Jupiter. All the students and participating teachers made cardboard spectroscopes with CD/DVD as dispersing element. Jyoti Chakaraborty of SCERT conducted the programme.

R. K. Thakur, former Vice-Chancellor of the same University took a lively one hour and a half session, in which he narrated stories about astronomers and physicists. Arvind Ranade of Vigyan Prasar, New Delhi, participated in the workshop and gave a popular talk, and conducted a quiz competition.

### Participants observing through the telescopes





## JRF Position under ISRO-RESPOND Project

Applications are invited on plain paper with details of educational qualifications for a JRF position under the ISRO-RESPOND sponsored project entitled :

Developing analytic formulas for extinction spectra of the major interstellar dust components.

The project will operate at IUCAA under the supervision of Ranjan Gupta (Principal Investigator) and has already started from March 15, 2010.

Candidates with M.Sc. degree in Physics with atleast 55% of marks (NET/GATE qualified candidates will be preferred), shall be eligible for consideration. Skills on mathematical abilities and computational experience (Linux) will be favourable. The position is purely temporary and for a period of three years (from the date of joining, subject to ISRO approval for no-cost extension if the fellowship tenure goes beyond the project completion date, which will be March 14, 2013). Selected candidate will get a monthly fellowship of Rs. 12,000/- (JRF) + 20% HRA for the first two years and subject to his/her performance, will get Rs. 14,000/- per month (SRF) + 20% HRA in the third year (if IUCAA accommodation is provided then there will be no HRA). The selected candidate shall have no automatic claim on any permanent position at IUCAA or ISRO by virtue of this selection. All other things being equal, preference shall be given to SC/ST candidates. Further, after successful completion of IUCAA-NCRA graduate school, the candidate may register for Ph.D. degree.

Completed applications (with their C.V.) should reach The Administrative Officer (Core Programmes), IUCAA, Post Bag 4, Ganeshkhind, Pune 411007 (e-mail: [snk@iucaa.ernet.in](mailto:snk@iucaa.ernet.in)) on or before May 20, 2010. Shortlisted candidates may be called for an interview at IUCAA for which TA/DA will be admissible (to/fro II nd class sleeper train fare by shortest distance to Pune).

## IGO Training School in Observational Astronomy at IUCAA, Pune (December 2nd week 2010 to January 2nd week 2011)

This school is aimed at training young researchers among Ph.D. Students, Post-doctoral Fellows, Faculty Members, from Indian Universities/Colleges/Research Institutes in Astronomical Observations and Data Reduction.

During the school, one week will be devoted for observations with IUCAA Girawali Observatory (IGO) 2 m. telescope under the guidance of experienced astronomers, followed by data reduction and presentation of scientific results. Rest of the time will be used to introduce the basic fundamentals of optical observations. The number of participants is restricted to five.

Applications (in plain paper) with complete curriculum vitae, current research plans/ topics, e-mail address, etc. are invited from Ph.D. Students, Post-Doctoral Fellows, and young Faculty Members of Indian Universities/Colleges/Research Institutes, who want to pursue Observational Astronomy as their career, and the same should reach The Administrative Officer, Core Programmes, IUCAA, Post Bag 4, Ganeshkhind, Pune 411007, by October 15, 2010 (e-mail: [snk@iucaa.ernet.in](mailto:snk@iucaa.ernet.in), fax: (020) 25604699). Ph.D. Student applicants should arrange to send a confidential reference letter from their Guide. The shortlisted candidates will be informed by the third week of October 2010, through e-mail.

All outstation participants will be provided travel support as per the norms, and free hospitality during the school.

Coordinators of the school are R. Srianand and Vijay Mohan.



Listed below are the IUCAA preprints released during January to March 2010. These can be obtained from the IUCAA library (library@iucaa.ernet.in). The preprints can also be freely downloaded from <http://www.iucaa.ernet.in/~library/main.html>

H.K. Das, N. V. Voshchinnikov, and V. B. Il'in, *Interstellar extinction and polarization - A spheroidal dust grain approach perspective*, IUCAA-01/10; S. V. Dhurandhar, K. Rajesh Nayak, and J-Y Vinet, *Time delay interferometry for LISA with one arm dysfunctional*, IUCAA-02/10; Vinu Vikram, Yogesh Wadadekar, Ajit Kembhavi, G. V. Vijayagovindan, *Quantitative measure of evolution of bright cluster galaxies at moderate redshifts*, IUCAA-03/10; R. Srianand, N. Gupta, P. Petitjean, P. Noterdaeme, and C. Ledoux, *Detection of 21-cm, H2 and deuterium absorption at  $z > 3$  along the line-of-sight to J1337+3152*, IUCAA-04/10; A.V. Ivanchik, P. Petitjean, S. A. Balashev, R. Srianand, D. A. Varshalovich, C. Ledoux, and P. Noterdaeme, *HD molecules at high redshift: The absorption system at  $z = 2.3377$  towards Q 1232+082*, IUCAA-05/10; Saumyadip Samui, Kandaswamy Subramanian, and Raghunathan Srianand, *Cosmic ray driven outflows from high redshift galaxies*, IUCAA-06/10; Ng. Ibohal, and L. Kapil, *Charged black holes in Vaidya backgrounds: Hawkings's radiation*, IUCAA-07/10; Moumita Aich, Tarun Souradeep, *Statistical isotropy violation of the CMB brightness fluctuations*, IUCAA- 08/10, and S. V. Dhurandhar, H. Mukhopadhyay, H. Tagoshi, and N. Kanda, *Coherent versus coincidence detection of gravitational wave signals from compact inspiraling binaries*, IUCAA-9/2010.

## Visitors

(January - March 2010)

Philippe Prugniel, P. N. Pandita, Ng. Ibohal, S. Chattopadhyay, Shuvendu Chakraborty, Haroon Rashid, Md. Imran, P. Vivekanand Rao, Sarbari Guha, G. C. Anupama, Joe Jacob, Prateek Sharma, T. K. Menon, V. Sravani, M. Zimmerman, S. N. Hasan, Priya Hasan, N. Werner, A. Simionescu, S. Beccari, T. Scherer, A. Khugaev, A. Abbi, D. Tripathi, Shruti Tripathi, Rizwan Shahid Khan, D. Lal, Wei-Tou Ni, Namrata Jain, N. Vagshette, M. Ostrowski, V. Vinu, Santanu Datta, S. Mukhopadhyay, Manzoor Malik, Raja Nisar, Tanuka Chattopadhyay, Ashish Mahabal, Ranjan Sharma, Garima Saraswat, Sharanya Sur, K. Maiti, B. Dasgupta, D. B. Vaidya, P. Sarpotdar, D. Raghavan, K. S. Singh, N. Ansari, G. Yadav, S. P. Yadav, S. D. Ghodke, V. Yadav, V. Jithesh, K. Jeena, Nawaf Nazir, S. Chandrasekharan, D. Ghoshal, B. Iyer, Sanjay Puri, Sanjit Mitra, D. Guha, Atul Deep, Sudipta Sarkar, S. Samui, Danielle Alloin, T. R. Seshadri, Minu Joy, S. Nandi, Rathin Sarma, S. Hasan, A. Kakodkar, P. Chaddah, P. C. Agrawal, Asis Kumar Chattopadhyay, Raj Bali, Laxmi Poonia, Meghna Kumawat, N. K. Chakradhari, S. Mukherjee, H. P. Singh, S. K. Pandey, R. C. Agrawal, A. Unghichanukit, S. N. A. Jaaffrey, V. C. Kuriakose, Arunava Bhadra, K. P. Singh, T. R. Kem, J. Arora, Amit Roy, H. A. Ranganath, Nidhi Joshi, T. Roychoudhury, Sushan Konar, Sumit Kumar, B. Ishwar, Shankaran Kumar, Farook Rahaman, Saibal Ray, Mehedi Kalam, Kaushik Chakraborty, Subhash Kaushik, Ashutosh Shrivastava, Balveer Singh Rathore, Sunil Kumar, G. Aswathi, M. R. Press, and Somak Raychaudhury. About 100 participants attended the LISA VI meeting held during February 14 - 17, 2010.

## Long term visitors :

P. P. Divakaran (till October, 2010), R. Tikekar (till May 2011), and N. Sajeeth Philip (till January, 2011).

## Visitors

Expected

April 2010 : Sandip Bhattacharya, Jaipur Birla Planetarium; K. Indulekha, M. G. University, Kottayam; Joe Jacob, The Newman College, Kerala; Devraj Pawar, Mumbai University; Sebastian Heinis, Laboratoire d'Astrophysique, France; Nitin Wadnerkar, SRTMU, Nanded; Mahadevappa Swami, SRTMU, Nanded; L. Sriramkumar, HRI, Allahabad; Dhiraj Hazra, HRI, Allahabad; B. C. Paul, North Bengal University, Siliguri; Jeena Samuel, M. G. University, Kottayam; and M. Sivakumar, University of Hyderabad.

May 2010 : Pranjal Trivedi, Delhi University; Ritabrita Biswas, Jadavpur University; Nairwita Mazumder, Jadavpur University; Kanti Jotania, M. S. University of Baroda; Ujjal Debnath, Bengal Engg. & Science University; K. P. Harikrishnan, The Cochin College; Onkar Dabeer, TIFR, Mumbai; Mita Brierley, University of Canterbury, New Zealand; Vasudha Bhatnagar, University of Delhi; S.N. Borah, D. K. D. College, Assam; Subenoy Chakraborty, Jadavpur University; Sarbari Guha, St. Xavier's College, Kolkata; Pushpa Khare, Utkal University, Bhubaneswar; K. D. Patil, B. D. College of Engineering, Wardha; Rachel Reena Philip, UC College, Alwaye; Pradeep Srivastava, DAV College, Kanpur; and V. Vinu, M.G. University, Kottayam.

June 2010 : T. R. Seshadri, University of Delhi; A. A. Usmani, Aligarh Muslim University; Tanuka Chattopadhyay, Calcutta University; Asis Kumar Chattopadhyay, Calcutta University; Paniveni Udayashankar, NIE Institute of Technology, Bangalore; Ratul Choudhury, Jadavpur University; Mamta, S. G. T. B. Khalsa College, New Delhi; Anjan Dutta, Delhi University; Joe Jacob, The Newman College, Kerala; Archana Pai, IISER, Thiruvananthapuram; S. Shankaranarayanan, IISER, Thiruvananthapuram; Sanjay Pandey, LBS PG College, Gonda; Devraj Pawar, Mumbai University; Shantanu Rastogi, DDU Gorakhpur; and Sk. Saiyad Ali, Jadavpur University.



**Luke Howard : Father of Modern Meteorology**

In this new series we will write about types of the clouds, their properties, and how to identify those.

As has happened, many a times in science, amateurs have made significant contribution, and science of weather is no exception and astronomy is full of these. The cloud classification is attributed to Luke Howard (1772-1864), an amateur meteorologist. By profession, Howard was manufacturing chemist, and was never trained as a scientist, but had broad interest in science.

Before Howard's time, it was generally believed that clouds were too transient, too changeable, too short-lived, to be classified or even analyzed. The first classification of clouds was proposed by Jean Baptiste Lamarck of France. The terms he used for his classification were in French, and thus, his work did not become very popular, even in France. Howard based his classification on Latin, then a universal language of scholars, and thus, became acceptable across the national borders. He also talked about mutability of clouds from one form to other, which was not thought of previously. He was elected to the Royal Society in 1821. He was also a friend of the German philosopher Goethe, who dedicated two poems to Howard.

Howard divided the clouds in three groups Cumulus (Latin for heap), Stratus (Latin for layer), and Cirrus (Latin for curl of hair). These groups were divided further into three sub-groups each. To indicate the cloud that might produce rain, hail or snow, he added a fourth category Nimbus (Latin for rain).



Luke Howard

"While any of the clouds, except the Nimbus, retain their primitive forms, no rain can take place; and it is by observing the changes and transitions of cloud form that weather may be predicted."

*Welcome to...*

Rizwan Ul Haq Ansari, who has joined as a Project Scientist. His areas of research are Cosmological Perturbation Theory, Dark Energy, and Braneworld Cosmology.

Santanu Das, who has joined as a Research Scholar.

*...Farewell to*

Manjari Bagchi, who has joined the West Virginia University, Morgantown, USA, as a Post-doctoral Fellow.

Pasquier Noterdaeme, who has joined the European Southern Observatory, Santiago, Chile, as a Scientific Visitor.

Susmita Chakravorty, who has joined the Harvard University, Cambridge, USA, as a Post-doctoral Fellow.

Khagol (the Celestial Sphere) is the quarterly bulletin of IUCAA

We welcome your responses at the following address :

IUCAA, Post Bag 4, Ganeshkhind,  
Pune 411 007, India

Phone	Fax
(020) 25691414; 25604100	(020) 25604699

email : [publ@iucaa.ernet.in](mailto:publ@iucaa.ernet.in)

Web page : <http://www.iucaa.ernet.in/>