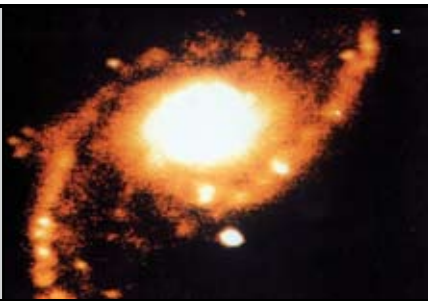


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Editor: T. Padmanabhan (e-mail: nabhan@iucaa.ernet.in)

Editorial Assistance: V. Chellathurai (e-mail: vch@iucaa.ernet.in) and Manjiri Mahabal (e-mail: mam@iucaa.ernet.in)

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The IUCAA-MPA Workshop on Astrophysics and Cosmology



Participants of the IUCAA-MPA Workshop

The IUCAA-MPA workshop on Astrophysics and Cosmology was held at IUCAA during March 5-9, 2007. The aim was mainly to foster closer ties between the Max Planck Institute for Astrophysics at Garching, Germany, and IUCAA. About 40 people participated in the workshop, including Simon White (the MPA Director), Torsten Ensslin, Antonella Maselli, and Volker Springel from MPA, IUCAA academics and several astronomers from other Indian institutes. The format of the workshop consisted of 16 one hour talks, spread over four days, with extensive discussions during the talks. Mostly topics related to structure formation in the universe were covered. Overall, the workshop resulted in closer contacts being established between many of the participants.

Congratulations to...

T. Padmanabhan, on being honoured with the *Padma Shri* (awarded by the President of India) on January 26, 2007.



Students receiving trophies at the hands of IUCAA Director

IUCAA celebrated the National Science Day on two days. Essay, Drawing and Quiz competitions for the secondary school students were organized on Saturday February 24, 2007. (The results are given below.) The Open Day was celebrated on the February 28, 2007. This year we had unprecedented response, especially from the schools. More than 6000 people visited IUCAA between 11 a.m. and 5:30 p.m., and about 1000 visited between 7:30 p.m. and 11:00 p.m. for the sky show. Do-it-yourself (DIY) experiments, poster exhibition on the current research trends in astronomy, optics experiments, short lectures (by A.N. Ramaprakash, A.K. Dawood,), screening of films (in particular Cosmic Collisions, Narrated by Robert Redford), question answer session by (Jayant Narlikar and Ajit Kembhavi), and a talk on Nobel prize in Physics by (T. Padmanabhan) were the various activities conducted to celebrate the occasion.

We thank the students and teachers of Bhojwani School and students of Aksharnandan School for participating in the demonstration of DIY experiments, members of Akashmitra (amateur astronomers association) for volunteering in science park demonstrations and for conducting the night sky show and Uday Patil, (freelance science hobbyist) for setting up domino effect machine. The N.C. Rana Trophy for overall good performance was awarded to Vidya Bhavan High School.

Winners of Various Competitions held on the occasion of the National Science Day

Essay Competition (Marathi Medium)

1st Prize: No prize was given

2nd Prize: Prachi Vinaya Kshirsagar, Sadhana Girls High School.

Essay Competition (English Medium)

1st Prize: No prize was given

2nd Prize: Darshita Rajesh Raval, Vidya Bhavan High School.

Honorable Mention: Vishakha R. Damle, Dr. Kalmadi Shamrao High School.

Drawing Competition

1st Prize (shared by): Priyanka D. Joshi, H.H.C.P. High School, and Gayatri S. Wavhal, Mukhtangan English School.

2nd Prize: Nilambari Pravin Tupe, Sadhana English Medium School.

Quiz Competition

1st Prize:

Vidya Bhavan High School
(Rohit Sant, Mugdha Todkar, Jaideep Pathak)

2nd Prize:

Vikhe Patil Memorial School
(Piyush Kulkarni, Ameysa Deshpande, Rohan Biwalkar)

3rd Prize:

Army Public School
(Pranjal Mittal, Ashish Pande, Rohan S. Vangal)

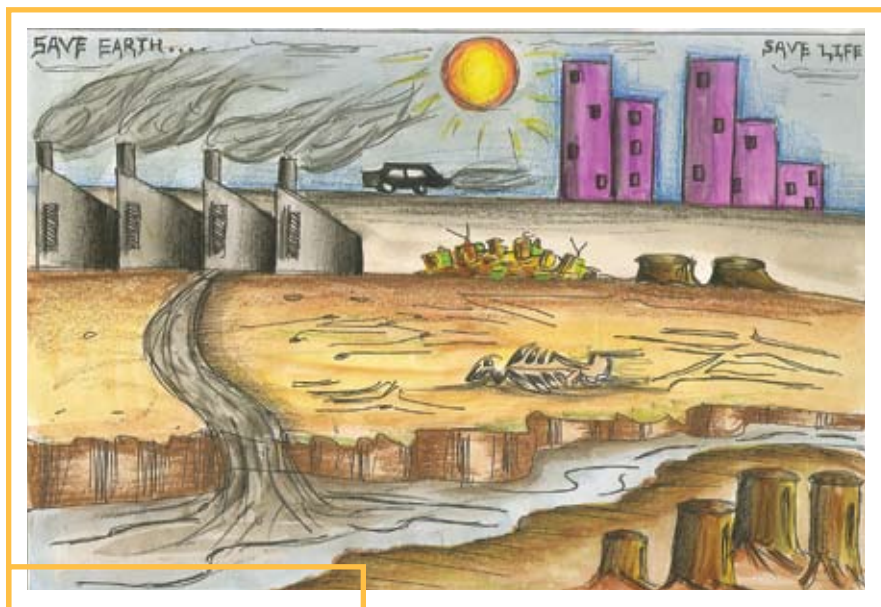
(Army School, Kirkee and D.E.S. Secondary School were the other two schools which qualified for the grand finale)

The prize-winning drawings are printed on page 4.



IUCAA Open Day, attracted a crowd of more than six thousand people from in and around Pune

National Science Day Prize-Winning Drawings



Man made Climate change



A cosmic voyage

Workshop on Introduction to Astronomy



Rita Sinha at one of the lecture sessions



Students of Nashik at a question-answer session

A workshop on Introduction to Astronomy was conducted by IUCAA at K.T.H.M. College, Nashik during January 17-18, 2007. In all, about 100 students and teachers from host and nearby colleges in Nashik district participated in the workshop. Lectures covered the topics on Imaging the sky, Measuring the light from the stars, Virtual observatories for the 21st century, Science from Hubble Space Telescope, Sun: our own star and Careers in Astronomy. Each lecture was followed by question and answer session. In addition to these topics, there were demonstration sessions, devoted to practical training. Resource persons included A.K. Kembhavi, Santosh Joshi, Arvind Paranjpye, Rita Sinha, and Abhishek Rawat all from IUCAA. A.K. Kembhavi from IUCAA and A.S. Mandlik, Department of Physics, K.T.H.M. College were the coordinators of this workshop.

Indo-French Training School in Optical Astronomical Observations



Participants of the Indo-French Training School in Optical Astronomical Observations

An Indo-French Training School in Optical Astronomical Observations was organised at IUCAA during February 12-26, 2007. The school was funded by the Indo-French Centre for Promotion of Advanced Research, New Delhi. The school was aimed at to provide efficient training to research scholars, and young faculty members in optical astronomical observations and data reduction directly at the telescope. In all, there were 16 participants, 13 from India and 3 from France. There were 4 lecturers from France and 7 from India.

The school consisted of a few basic lectures required for doing observational astronomy. These lectures were held for the first four days during morning sessions. During these four days, in the afternoon sessions, hands on practice of data reduction was imparted using the archival data taken at IUCAA Girawali Observatory (IGO).

The 16 participants were divided into 4 groups and each group was given an observational project, supervised by an astronomer. Each group observed at 2-metre telescope of IGO, for one night. The complete data reduction of these observations was carried out by each group. On the last day of the school, every participant presented the results obtained by him/her.

During the last week of the school, evening talks were arranged on current observational facilities. The topics were: GMRT by J. Chengalur (NCRA, Pune), From Galileo to ELTs

by Michel Dennefeld (IAP, France), Astrosat and UVIT by S.N. Tandon (IUCAA, Pune), FUSE mission by Jean-Michel Desert (IAP, France) and Virtual Observatory by Rita Sinha (IUCAA, Pune).

The lectures included: Telescopes by S.N. Tandon (IUCAA, Pune), Detectors and their calibrations by A.N. Ramprakash (IUCAA, Pune), Atmospheric effects on observations by T.P. Prabhu (IIA, Bangalore), Astronomical observations by Vijay Mohan (IUCAA, Pune), Astronomical spectroscopy by Michel Dennefeld (IAP, France), Astronomical photometry by N.M. Ashok (PRL, Ahmedabad), Surface photometry by Prof. S.K. Pandey (Pt. Ravi Shankar University, Raipur), Archival data by A.K. Kembhavi (IUCAA, Pune), Image analysis by Emmunel Bertin (IAP, France), and Polarimetry by A.N. Ramprakash (IUCAA, Pune).

The observational projects were: Active galaxies and deep fields by Henry-McCracken (IAP, France), Spectroscopy of planetary nebulae by Jean-Michel Desert (IAP, France), Surface photometry of elliptical galaxies by S.K. Pandey (Pt. Ravi Shankar University, Raipur) and Abhishek Rawat (IUCAA, Pune), and Polarimetry of T-Tauri stars by A.N. Ramprakash (IUCAA, Pune).

Michel Dennefeld of IAP, France was the French coordinator of the school. Vijay Mohan of IUCAA and S.K. Pandey of Pt. Ravi Shankar Shukla University, Raipur were the Indian coordinators of the school.

IUCAA Preprints

Listed below are the IUCAA preprints released during January-March 2007. These can be obtained from the IUCAA Library (library@iucaa.ernet.in).

Ajit Kembhavi, *Virtual observatories and developing countries*, IUCAA-01/07; Ray Norris, Heinz Andernach, Guenther Eichhorn, Francoise Genova, Elizabeth Griffin, Robert Hanisch, Ajit Kembhavi, Robert Kennicutt, and Anita Richards, *Astronomical data management*, IUCAA-02/07; Andrew J. Fox, Patrick Petitjean, Cedric Ledoux, and Raghunathan Srianand, *Hot halos around high redshift protogalaxies: Observations of O VI and N V absorption in damped Lyman alpha systems*, IUCAA-03/07; Arnab K. Ray, and Jayanta K. Bhattacharjee, *Evolution of transonicity in an accretion disc*, IUCAA-04/07; Hideyuki Tagoshi, Himan Mukhopadhyay, Sanjeev Dhurandhar (et al.), *Detecting gravitational waves from inspiraling binaries with a network of detectors: coherent strategies by correlated detectors*, IUCAA-05/07; Sanjit Mitra, Anand S. Sengupta, Subharthi Ray, Rajib Saha, and Tarun Souradeep, *CMB power spectrum estimation with non-circular beam and incomplete sky coverage*, IUCAA-06/07; Rodney Nascimento Guimaraes, Patrick Petitjean, Emmanuel Beaumont Rollinde, Reinaldo Ramos De Carvalho, George Djorgovski, R. Srianand, Ali Aghaee, and Sandra Castro, *Evidence for overdensity around $z_{em} > 4$ quasars from the proximity effect*, IUCAA-07/07; Saumyadip Samui, R. Srianand, and Kanadaswamy Subramanian, *Probing the star formation history using the redshift evolution of luminosity functions*, IUCAA-08/07; P. Noterdaeme, P. Petitjean, R. Srianand, C. Ledoux, and F. Le Petit, *Physical conditions in the neutral interstellar medium at $z = 2.43$ toward Q2348-011*, IUCAA-09/07; Sharanya Sur, Kandaswamy Subramanian, and Axel Brandenburg, *Kinetic and magnetic alpha effects in nonlinear dynamo theory*, IUCAA-10/07; Sharanya Sur, Anvar Shukurov, and Kandaswamy Subramanian, *Galactic dynamos supported by magnetic helicity fluxes*, IUCAA-11/2007; Sudhanshu Barway, Ajit Kembhavi, Yogesh Wadadekar, C.D. Ravikumar, and Y.D. Mayya, *Lenticular galaxy formation – possible luminosity dependence*, IUCAA-12/2007.

Seminars

04.01.2007 Aparna Venkatesan on The first stars in the universe: Formation, feedback effects and detections;
05.01.2007 Varsha Kulkarni on Tracing galaxy evolution with quasar absorption lines;
23.01.2007 Gulab Chand Dewangan on X-Ray investigations of active galactic nuclei and ultraluminous X-ray sources;
25.01.2007 Achamveedu Gopakumar on Inspiral dynamics of compact binaries: Its applications and implications;
29.01.2007 Simi Ghassemi on Generalized Friedmann equations for a finite thick brane;
15.02.2007 Pankaj Jain on Direct determination of astronomical distances and proper motions by interferometric parallax;
22.02.2007 K. Shivanandan on Astronomy after retirement.

Colloquia

15.01.2007 Jurgen Ehlers on Mass in general relativity;
22.01.2007 Kishore Marathe on Gravity and topology;
12.02.2007 Francois Bouchet on Cosmological anisotropies: Status and perspective with Planck

Making Khagol Electronic!

From July 2007 onwards, we plan to make Khagol, an electronic journal. The full version of the Khagol will be made electronically available in the IUCAA homepage and we will discontinue mailing of the hard copies. You will receive an e-mail notification of Khagol's availability at IUCAA website.

Kindly email to us your e-mail address to which we can send the notification regarding the availability of future Khagol issues. The address may be sent to us at publ@iucaa.ernet.in.

– Editor

Visitors

(January–March 2007)

J. Ehlers, L. Dorendro, P. Prugniel, Sanjit Das, M. Koleva, W. Sharma, S. Bhattacharya, A. Mitra, A. Jayakumar, A. Keshwarjit Singh, S. Roy Chowdhury, S. Khedekar, S. Bhattacharya, C. Boily, T. Bandyopadhyay, A.H. Siddiqi, P. Manchanda, S. Chakrabarti, A. Venkatesan, A.A. Usmani, S.K. Pandey, D. Bhattacharya, Rabin Chhetri, Sima Ghassemi, P.S. Goraya, S.D. Maharaj, M. Sami, A. Raychaudhury, T.R. Kem, A. Nautiyal, A.K. Sood, U. Alam, T.R. Seshadri, Jotin Singh, A. Starobinski, G. Ferland, G. Dewangan, N. Bandyopadhyay, G. Bhattacharya, H. Ganai, A. Sagar, R. Bhattacharjee, S. Ganguly, S. Chakraborty, H. Das, D. Mukhopadhyay, I. Chakraborty, C. Banerjee, A. Moulik, S. Bhattacharjee, P. Roy, A. Gopakumar, A. Mukherjee, S. Das, Asoke Sen, A. Maselli, K. Sahu, N. Wadnerkar, F. Bouchet, K. Benabed, M.A. Malik, S. Prunet, S.S. Hasan, S.M. Chitre, Nardeep Kumar, Ruta Kale, Prasun Dutta, A. Pathak, M. Dennefeld, H. Atek, P. Guillard, J.M. Desert, H. McCracken, F. Riquebourg, M. Sudhakar, Shiva Prasad, Sukanta Deb, V. Vinu, T. Nadarajan, R. Murali, S. Majumdar, T.P. Prabhu, U. Dodia, N. Vagashette, Priya Hasan, S. Ashtamkar, M. Patil, K. Kadam, P.K. Samal, V. Rawoot, G. Shinde, G. Wagle, V. Pawade, V. Salgaonkar, S. Kadam, V. Wadwalkar, S. Sethi, R. Pitchiah, G.C. Anupama, P. Jain, N.M. Ashok, E. Bertin, S. Bhattacharya, K. Shivanandan, Rajesh Nayak, J.S. Bagla, H.K. Jassal, S. White, T. Ensslin, V. Springel, T. Saini, P.P. Divakaran, Asoke Sen, A.K. Goswami, Mukulika Jana, Taparati Ganguly, and M. Sami.

Welcome to ...

Supratik Pal, who has joined as a Post-doctoral Fellow. His areas of research are classical and quantum gravity, low energy effective theory and phenomenology, observable signatures, braneworld cosmology, dark matter, and dark energy in braneworlds.

... Farewell to

Sanjit Mitra, who has joined as a Post-doctoral Fellow at Observatoire de la Cote d'Azur, Nice, France.

Visitors expected

(April–June 2007)

April: S. Prajapati, Benares Hindu University; D.B. Vaidya, Gujarat College, Ahmedabad; A. Fabian, University of Cambridge, UK; R. Cannon, Anglo-Australian Observatory, Australia; D. Lynden-Bell, University of Cambridge, UK; K. P. Harikrishnan, The Cochin College, Kerala; P. Sudheesh, Mahatma Gandhi University, Kerala; Syju, Mahatma Gandhi University, Kerala; C. Craford, University of Cambridge, UK; T. Biswas, Pennstate University, USA; M. Marov, Keldysh Institute, Moscow; Nagendra Kumar, KGK PG College, Moradabad; Anil Kumar, KGK P.G. College, Moradabad; O.B. Dluzhnevskaya, Russia; Kavilan Moodley, University of Kwazulu Natal, S. Africa; G.K. Panicker, N.S.S. College, Changanacherry; and Suparna Roychoudhury, St. Xavier's College, Kolkata.

May: B.R.S. Babu, University of Calicut; T. Bandopadhyay, Jadavpur University; C.D. Ravikumar, University of Calicut; Pavan Chakraborty, Assam University, Silchar; Subenoy Chakraborty, Jadavpur University; D.B. Vaidya, Gujarat College; Writambhara Chakraborty, New Alipore College, W. Bengal; Deepak Chandra, SGTB Khalsa College, Delhi; Suresh Chandra, Swami Ramanand Teerth Marathwada University, Nanded; Ujjal Debnath, Bengal Engineering and Science University, W. Bengal; Sarbari Guha, St. Xaviers College, Kolkata; S.S.R. Inbanathan, The American College, Madurai; Joe Jacob, Newman College, Kerala; K. Jotania, The M.S. University of Baroda; Vinod Joshi, M.B. Govt. P.G. College, Haldwani; R.S. Kaushal, Ramjas College, Delhi; Pushpa Khare, Utkal University, Bhubaneswar; Ashok Kumbharkhane, Swami Ramanand Teerth Marathwada University, Nanded; Manish Pandey, M.B. Govt. P. G. College, Haldwani; M.K. Patil, Swami Ramanand Teerth Marathwada University, Nanded; A. Pradhan, Hindu Degree College, Ghazipur; Lalan Prasad, M.B. Govt. P.G. College, Haldwani; Nagalakshmi Rao, Government Science College, Bangalore; B.K. Sinha, V.B.S. Purvanchal University, Jaunpur; P.K. Shrivastava, Govt. Model College, Rewa; A.A. Usmani, Aligarh Muslim University; Santanu Das, IIT, Kharagpur; Rishabh Mehrotra, City Montessori School, Lucknow; Adil Moin, City Montessori School, Lucknow; and Ninan Sajeeth Philip, St. Thomas College, Kozencherri.

June: A.S. Chattopadhyay, Calcutta University; Deepak Jain, Deen Dayal Upadhyay College, Delhi; K.D. Patil, B.D. College of Engineering, Wardha; B.C. Paul, North Bengal University, Siliguri; S.K. Sahay, BITS, Pilani-Goa Campus; E. Saikia, Inderprastha Engineering College, Delhi; G.P. Singh, Visveswaraya National Institute of Technology, Nagpur; P.N. Pandita, North Eastern Hill University; Saptarshi Mondal, Calcutta University, Kolkata; and Sanjiv Zade, Jankidevi Bajaj College of Science, Wardha.

This is an old chestnut, which appears in different forms and the most dramatic version is the following: "What is the probability that the breath you just inhaled contains at least one molecule that was in the Julius Caesar's last breath?" [Assume air molecules from Caesar's last breath had sufficient time to mix evenly in the atmosphere, no molecules are lost or created, etc. and make reasonable numerical estimates.]

Solution to For the Younger Minds - 19

Let the radius of earth's orbit be a , and the distance of closest approach of the comet to sun be p . The time spent by the comet inside earth's orbit is twice the time it takes to go from a to p . Since the comet is on a parabolic orbit, its energy E is zero. Evaluating E at $r = p$, it is easy to determine the angular momentum to be $l = (2mCp)^{1/2}$ where $C = GM_{\odot}m$. The standard text book equation for the orbit $(dr/dt)^2 = (2/m)[(C/r) - (l^2/2mr^2)]$ can now be integrated to give the time inside earth's orbit to be

$$t = \left(\frac{2m}{C}\right)^{1/2} \int_p^a \frac{rdr}{\sqrt{r-p}} = \left[\frac{\sqrt{2T}}{3\pi}\right] \left[1 + \frac{2p}{a}\right] \left[1 - \frac{p}{a}\right]^{1/2},$$

where $T = 2\pi(ma^3/C)^{1/2}$ is earth's orbital period. This function reaches a maximum for $p = a/2$ with the maximum value being $2T/3\pi \approx 77$ days.

Jacaranda

Know Thy Trees - 5

Arvind Gupta and
Arvind Paranjpye



Five trees blooming with blue mauve colour flowers, in the Kund, herald approaching summer. These are Jacaranda.

Jacaranda is a native of Brazil, but because of its outstanding beauty, it has been introduced in many tropical and sub-tropical countries. It is a handsome tree of medium height 18 m. at the most with leaves divided into tiny segments such that the whole leaf has the cut appearance of a fern. Each little leaflet is oblong and at the end of each pinna is a leaflet slightly larger than the others.

Jacaranda mimosifolia has leaves which can be easily mistaken for those of the Gulmohur Tree, but its flowers are quite different. They are tubular in structure and blue mauve in colour. The flowering is short lived lasting from March to May. But odd trees can be found blooming out of season. An avenue of Jacarandas in bloom is an unforgettable sight. Every tree is swathed in blue. This gives the tree its popular Hindi name "Neeli Gulmohur". The fruits are flat discs 5 cm. across. They burst open to reveal winged seeds.

The Green Finger(s)

Saplings of five Jacarandas were planted on the December 29, 1992 by Professors S. Chandrasekhar, Yash Pal, P.C. Vaidya, Russell Cannon and Donald Lynden-Bell.

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: (020) 25691414, 25604100

Fax: (020) 25604699

Email: publ@iucaa.ernet.in

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