



IUCAA
ISSN 0972-7647

KHAGOL

खगोल

A Quarterly Bulletin of the Inter-University Centre for Astronomy and Astrophysics
(An Autonomous Institute of the University Grants Commission)

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

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

No. 71 | July 2007

Contents...

Report of the	Preprints	Visitors.....
Past events	Colloquia, Seminars	For the Younger Minds.....
Welcome and Farewell	Announcements	Know Thy Trees.....
1,3,4,5	6	7
2	6	8
	7	8

Vacation Student's Programme



The participants of the Vacation Students' Programme

The Vacation Students Programme (VSP), for students in their penultimate year of their M.Sc. (Physics) or Engineering degree course, was held during May 14 - June 29, 2007. This year two exceptionally bright B.Sc. students were also selected. Eight students participated in this programme. The participants attended about 50 lectures dealing with wide variety of topics in Astronomy and Astrophysics, given by the members of IUCAA and IUCAA Associates. They also did a project with one of the faculty members of IUCAA during this period. One of the students has been pre-selected for research scholarship. K. Subramanian was the faculty coordinator of this programme.

Welcome to ...

Dipankar Bhattacharya, who has joined as a Faculty Member in June 2007. His research areas of interest are high energy astrophysics, neutron stars, gamma ray bursts, and x-ray astronomy.

Maulik Parikh, who has joined as a Faculty Member in November 2006. His research areas of interest are theoretical high energy physics, especially black holes, cosmology, quantum gravity, and string theory.

... Farewell to

Atul Deep, who has joined the Leiden Observatory, Netherlands, as a Post-doctoral Fellow.

Santosh Joshi, and **Arnab Kumar Ray**, who has joined a Geophysics company at Mumbai, as a Scientific Application Developer.

Welcome to the IUCAA Family

IUCAA is happy to announce the selection of the Eighteenth Batch of Visiting Associates. The Visiting Associateship is for a tenure of three years beginning August 1, 2008.

Extension to the fifteenth batch of Visiting Associates

1. G. Ambika, Indian Institute of Science Education and Research, Pune.
2. Narayan Banerjee, Jadavpur University, Kolkata.
3. Pavan Chakraborty, Indian Institute of Information Technology, Allahabad.
4. Subenoy Chakraborty, Jadavpur University, Kolkata.
5. Ranabir Dutt, Visva Bharati University, Santiniketan.
6. Sushant G. Ghosh, Birla Institute of Technology and Science, Pilani, Dubai Campus.
7. K.P. Harikrishnan, The Cochin College, Kochi.
8. Chanda J. Jog, Indian Institute of Science, Bangalore.
9. Kanti R. Jotania, The M.S. University of Baroda, Vadodara.
10. Nagendra Kumar, K.G.K. (P.G.) College, Moradabad.
11. Pran Nath Pandita, North Eastern Hill University, Shillong.
12. Madhav K. Patil, Swamy Ramanand Teerth Marathwada University, Nanded.
13. Harinder P. Singh, University of Delhi.
14. Pradeep Kumar Srivastava, D.A.V. (P.G.) College, Kanpur.
15. Anisul Ain Usmani, Aligarh Muslim University.

New Visiting Associates

1. Ashish Asgekar, Birla Institute of Technology and Science, Pilani, Goa Campus.
2. Himadri Sekhar Das, Kokrajhar Government College, Assam.
3. S.N.A. Jaaffrey, M.L. Sukhadia University, Udaipur.
4. Sanjay Jhingan, Jamia Millia Islamia, New Delhi.
5. Biplab Raychaudhuri, Surya Sen Mahavidyalaya, Siliguri.
6. Anirban Saha, Sovarani Memorial College, Howrah.
7. Anjan Ananda Sen, Jamia Millia Islamia, New Delhi.
8. Paniveni Udayashankar, B.H.S. First Grade College, Bangalore.

School Students Summer Programme

The School Students Summer Programme was conducted during April 23 -May 18, 2007. Invitation to participate in the programme was sent to all the students scoring good points in the elimination round of quiz programme in the school students competitions held in February on the occasion of the National Science Day. These were three students from each school. In addition, winners of essay and drawing competitions were also invited to participate. About 80 students participated in the programme.

Each week a batch of about 15 to 18 students participated in the programme. Over a period of four days, the students were challenged to solve a particular problem that was assigned to him/her by a member of academic staff. In addition, question/answer sessions, visits to the science park and screening of scientific films were included in the programme. On the last day, the students were asked to give an 'academic' seminar on the problem they worked.



Students in various activities of the MVS



Sunitabai Deshpande pays visit to Mukhtangan Vidnyan Shodhika



On June 18, 2007, Sunitabai Deshpande paid a visit to Mukhtangan Vidnyan Shodhika (MVS), to which P. L. Deshpande (Pu La), has given a handsome donation. She participated in scientific toy making session for children as an observer and later acquainted herself with the working of the mobile planetarium. She also planted two apple trees next to the "Pulastya" building.



Planting of an Apple tree by Smt. Sunitabai Deshpande

Mobile Planetarium

In June 2006, the public outreach programme of IUCAA acquired a new and a very valuable asset – Taramandal which is an igloo shaped inflatable and portable planetarium. It is developed by the National Council for Science Museums, Kolkata. It requires about 8m x 8m of clear ground space and 3.7 metres of clear unobstructed height, normally available in any school. The complete mobile planetarium packs into two small boxes for the projector, one bag for the inflatable dome, and one box for the blower fan. It can be inflated to its full capacity in less than 10 minutes. The planetarium has a novel tunnel like entry to the dome, which serves as light trap, but children (and also the elders) do enjoy crawling in and out of the planetarium. The seating arrangement is on the floor and about 35 children or 25 adults watch the planetarium programme at a time. Generally a programme consists of 4 to 6 shows of about half an hour each for half a day session. A full day programme would have 4 more shows with a break for lunch. These programmes are essentially carried out by the members of the MVS but some amateur astronomers and volunteer science educators have been trained to run these programmes.

The planetarium projector is capable of simulating night sky at any place on earth for any moment of time. The most important feature of this system is that it is interactive and gives the science educator the possibility of directly communicate with the audience, and can modify the programme as and when required. It is a good tool to explain the basic concept of observations.

Since its acquisition, IUCAA has carried out a large number of programmes in Pune and in Girawali region, where IUCAA's 2 m telescope is located. In addition, a few programmes at other cities, such as Kolhapur, Walchandnagar, etc. were conducted but these are exceptions. After a good success of running the mobile planetarium show by amateur astronomers and volunteer science educators, IUCAA has placed an order for one more unit.



Taramandal, an igloo shaped inflatable and portable planetarium

Refresher Course in Astronomy and Astrophysics for College and University Teachers



The lecturers and participants of the Refresher Course in Astronomy and Astrophysics for College and University Teachers

The Refresher Course in Astronomy and Astrophysics for college and university teachers was held during the period May 14 to June 15, 2007. Participants were selected from all over India and thirteen highly interested participants took part in the course. The faculty, post-doctoral fellows, and students joined in the programme with great enthusiasm. The scientific and the administrative staff were of vital help in ensuring that the course ran smoothly. The lecture courses were designed by Ajit Kembhavi and Kandaswamy Subramanian, who were the coordinators of the Refresher Course, and the Vacation Students Programme (VSP) respectively. The course consisted of introductory and advanced lectures, which covered the basics of astronomy and astrophysics. The participants were given assignments based on these lectures and tutorial classes were conducted to explain the solutions. An important aspect of the programme was the data analysis sessions, where the participants were given hands on experience on the use of computers and virtual libraries. They also extracted and analysed data from astrophysical data archives. A scientific visit to the IUCAA's 2 metre optical telescope at Girawali was arranged. Finally, lectures and useful reference material were copied on CDs, which were distributed to each of the participants. It was clear that at the end of the course, the participants benefited substantially and were inspired to take up research and teaching in astronomy and astrophysics at their home institutions. R. Misra assisted in the coordination of this course.

Congratulations to

Tarun Souradeep, on being conferred with the Buti Foundation Award (2006) by the Indian Physics Association, Mumbai.

IUCAA Preprints

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

K.D. Patil, S.S. Zade, A.N. Mohod, *Non-spherical gravitational collapse of strange quark matter*, IUCAA-13/2007; Sanghamitra Goswami, Saba Nashreen Khan, Arnab K. Ray, Tapas Kumar Das, *Axisymmetric black hole accretion in the Kerr metric as an autonomous dynamical system*, IUCAA-14/2007; Ipsita Mandal, Arnab K. Ray, Tapas K. Das, *Critical properties of spherically symmetric black hole accretion in Schwarzschild geometry*, IUCAA-15/2007; A. Rawat, A.K. Kembhavi, F. Hammer, H. Flores, and S. Barway, *Unravelling the morphologies of luminous compact galaxies using the HST/ACS GOODS survey*, IUCAA-16/2007; Gopal-Krishna, Pronoy Sircar and Samir Dhurde, *Kinematical diagrams for conical relativistic jets*, IUCAA-17/2007; Gopal-Krishna, Samir Dhurde, Pronoy Sircar and Paul J. Wiita, *Influence of the jet opening angle on the derived kinematical parameters of blazar jets having uniform and stratified bulk motion*, IUCAA-18/2007; D.B. Vaidya, Ranjan Gupta, T.P. Snow, *Composite interstellar grains*, IUCAA-19/2007; Sudhanshu Barway, Ajit Kembhavi, *A super massive black hole fundamental plane for ellipticals*, IUCAA-20/2007; Jayanta K. Bhattacharjee, Arnab K. Ray, *Secular instability in quasi-viscous disc accretion*, IUCAA-21/2007; Joydeep Bagchi, Florence Durret, Gastao B. Lima Neto, Surajit Paul, *Giant ring like radio structures around galaxy cluster Abell 3376*, IUCAA-22/2007; Amit Pathak and Shantanu Rastogi, *Theoretical infrared spectra of large polycyclic aromatic hydrocarbons*, IUCAA-23/2007; K.D. Patil, S.S. Zade and A.N. Mohod, *Gravitational collapse of radiating Dyon solution and cosmic censorship hypothesis*, IUCAA-24/2007; S.V. Dhurandhar, *Physical and algebraical models of LISA*, IUCAA-25/2007; Rajib Saha, Simon Prunet, Pankaj Jain and T. Souradeep, *CMB anisotropy power spectrum using linear combinations of WMAP maps*, IUCAA-26/2007; and Nirupam Roy and Arnab K. Ray, *Critical properties of spherically symmetric accretion in a fractal medium*, IUCAA-27/2007.

Seminars

10.04.2007 Tirthabir Biswas on Non-perturbative and non-singular (?) gravity; 11.04.2007 Andy Fabian on The X-ray background; 12.04.2007 Mikhail Marov on Modeling of protoplanetary gas-dust disk evolution; 13.04.2007 Carolin Crawford on The origin of the emission-line nebulae around central cluster galaxies; 18.04.2007 Sharmila Kamat on Hunting for WIMPs - The search for dark matter in the universe; 30.04.2007 J. Maharana on Novel symmetries of string theory; 09.05.2007 Jean Pierre Petit on Geometrization of Sakharov model through group theory; 17.05.2007 Sayan Kar on Quantum mechanics in volcano potentials; 08.06.2007 S. Guha on A brief review of the work on embedding problems; 08.06.2007 R.S. Kaushal on Role of metaphor and simile in mathematical sciences; 08.06.2007 S.K. Pandey on The lighter side of observational astronomy; 11.06.2007 Mudit K. Srivastava on Design and development of an optical fibre based integral field unit (IFU) for 2-D spectroscopy; 14.06.2007 Lalan Prasad on SOLar coronal heating; and 14.06.2007 Himadri Sekhar Das on Light scattering properties of cometary dust.

Colloquia

02.04.2007 P.P. Divakaran on Calculus under the coconut trees; and 09.04.2007 Andy Fabian on Probing strong gravity with broad iron lines.

Erratum

We regret that the colloquium given by Kailsah C. Sahu was inadvertently missed out in the April 2007 issue of *Khagol*, and also his name was missed out in the visitors' list.

The title of his colloquium was *Spinning close to the stars*, and it was given on February 2, 2007.

Visitors

(April - June 2007)

A. Fabian, D.B. Vaidya, T. Biswas, R. Cannon, K. Jotania, G. Date, M. Marov, K.P. Singh, D. Lynden-Bell, E.S. Gopalakrishna Panicker, D.K. Ojha, S. Kamat, K.P. Hari Krishnan, P. Sudheesh, Syju Thomas, H.K. Jassal, J.S. Bagla, Nagendra Kumar, Anil Kumar, K. Moodley, S. Ashtamkar, M. Patil, V. Wadwalkar, G. Ambika, J. Maharana, Jean Pierre Petit, C.D. Ravikumar, B.R.S. Babu, J. Hutchings, Santanu Das, P. Sreekumar, Joe Jacob, G. Stewart, P. Khare, A.K. Sen, V. Koteswara Rao, P.C. Agrawal, R.K. Manchanda, J.S. Yadav, S.K. Ghosh, S. Vadawale, K. Mukherjee, J. Murthy, P. Shastri, A.K. Pati, H.S. Das, R. Bhattacharjee, A.P. Radhakrishna, D. Mandal, S. Mondal, P. Puri, B.K. Sinha, S. Kar, N. Sandeep, P. Arun, Saptarshi Mondal, J. Belapure, C. Kachhara, A. Deshpande, D. Pawar, L. Madharia, Laxmi Prasad Subedi, S. Deshmukh, S.S. Selvaraj, A.C. Kumbharkhane, K.T. Paul, A. Moin, R. Mehrotra, Lalan Prasad, S. Chakdar, B. Vaidya, P. Hasan, S.N. Hasan, S.S.R. Inbanathan, P. Srivastava, M.K. Patil, N. Vagshette, L. Chaware, D. Chandra, Pankaj K. Shrivastava, J.K. Singh, A.A. Usmani, Z. Hasan, Manish Pandey, Vinod Kumar Joshi, Ninan Sajeeth Philip, Neeraj Gupta, S.K. Pandey, T. Bandyopadhyay, U. Debnath, W. Chakraborty, S. Chandra, S. Guha, S. Chakraborty, N.A. Rao, R.S. Kaushal, S. Rastogi, T.V. Raziman, Rakesh Rai, S. Srivastava, B.K. Kumthekar, K. Shanthi, K.D. Patil, Arnab Ray, B.C. Paul, B.K. Yerra, S. Ramya, M. Maiti, A.C. Pradhan, Asis Chattopadhyay, P.M. Kokne, R.S. Yannawar, D.C. Srivastava, K. Joshi, E. Saikia, S.S. Zade, S. Jhingan, Hum Chand, R. Bali, N. Chandnani, S. Ghose, S. Karmakar, S.K. Banerjee, S. Vashishtha, D. Jain, A. Kar, S. Padmavathi, A. Sirmoney, Partha Pal, P. Padmanabhan, V. Vinu and A. Thakar

Visitors expected

(July - September 2007)

July: S.K. Sahay, BITS, Pilani-Goa Campus; Sudipta Das, Jadavpur University; U.S. Pandey, D.D.U. Gorakhpur University; S.S. Prasad, UNPG College, Padrauna; Jogesh Babu, Penn State University, USA; Eric Feigelson, Penn State University; Asis Kumar Chattopadhyay, Calcutta University; N. Banerjee, Jadavpur University; Anoop Kumar Srivastava, D.D.U. Gorakhpur University; Ali Takey, NRIAG, Egypt; Mohammed Hassan Ali, NRIAG, Egypt; C.P. Singh, Delhi College of Engineering; P. Sreekumar, ISAC, Bangalore; B. Paul, RRI, Bangalore; J. Murthy, IIA, Bangalore; K. Mukherjee; J.S. Yadav, TIFR, Mumbai; H.P. Singh, Delhi University; S.N.A. Jaaffrey; M.K. Yadav, Sobhasaria Engineering College, Rajasthan; A. Pradhan, Hindu Govt PG College, Ghazipur; Sanjeev Tiwari, Udaipur Solar Observatory; S.R. Valluri, University of Western Ontario, Canada; and S.G. Ghosh, BITS, Pilani, Dubai campus; V. Girish, TIFR, Mumbai; Eshwar Prakash, ISAC, Bangalore, R. Pandiyan, ISAC, Bangalore, H.P. Singh, Delhi University; S. K. Ghosh, TIFR, Mumbai; N. Hasan, Osmania University; J.N. Goswami, PRL; G.C. Anupama, IIA, Bangalore; S. Annapurni, IIA, Bangalore; R.C. Kapoor, IIA and Dipak Munshi, University of Cambridge, UK,

Participants of the Indo-Brazil Workshop and members of FC, GB and Council.

August: Alexander Abraham, Punalur, Kerala; Taparati Ganguly, Presidency College, Kolkata; A. Abdujabbarov, Institute of Nuclear Physics, Tashkent; Anju Rai, Hindu Govt. PG College, Ghazipur; Vandana Rai, Hindu Govt. PG College, Ghazipur; K. Jotania, M.S. University of Baroda; K.S.V.S. Narasimhan, Chennai; and Sukanta Bose, USA.

The 6th International Conference Gravitation and Cosmology (ICGC-07)

December 17-21, 2007 IUCAA, Pune, India.

The 6th meeting in the series of International Conference on Gravitation and Cosmology, will be hosted by the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, during December 17 - 21, 2007. This series of international meetings, held under the auspices of the Indian Association for General Relativity and Gravitation (IAGRG), has spanned nearly two decades,.

This meeting aims at bringing together active scientists from all over the globe to take stock of the state of the art in Gravitation and Cosmology, chart out promising future directions and exchange ideas, as well as offering younger researchers from Indian academia an opportunity for interaction with experts from within India and abroad. To this end, the programme will have a series of plenary lectures by senior scientists/experts, with parallel workshops and poster sessions that will, among other things, serve to provide a platform for upcoming researchers and graduate students.

Applications for workshop talks and posters are invited from Indian as well as foreign nationals. Please check out the tentative schedule for our line-up of invited speakers.

Some details like participants, registration information, important dates, abstract submission can be viewed at <http://meghnad.iucaa.ernet.in/~icgc07>

The standard, one dimensional, harmonic oscillator has the potential $V(x) \propto x^2$ and we know that the period of oscillation of a particle in this potential is independent of the amplitude. Are there other potentials with this property or is this unique to harmonic oscillator?

Solution to For the Younger Minds - 20

Let us suppose, there are about N molecules in the atmosphere and a typical human breath (Caesar's or yours!) involves n molecules. Based on the assumptions in the question, the chance that any one of the molecules in a given breath you take came from Caesar's last breath is (n/N) , so the chance that none of the molecules came from Caesar's last breath is $[1 - (n/N)]^n$. Assuming $n \approx 2 \times 10^{22}$, $N \approx 10^{44}$ and using the fact that $n/N \ll 1$, this probability is about $\exp[-(n^2/N)] \approx e^{-4} \approx 0.018$. So there is nearly 98.2% chance that at least one molecule in your breath came from Caesar's last breath!

KRISHNA **(*Ficus krishnae*)**

Know Thy Trees - 6
Arvind Gupta and
Arvind Paranjpye



A casual visitor is likely to ignore this tree thinking it is a small Banyan tree. But, *Ficus krishnae* is an unusual variant of the Banyan. On looking carefully, you will find a pocket-like pouch at the base above every leaf stalk. In other words, every leaf is bent into a little cup or scoop. It is believed that Lord Krishna used the leaves to scoop out butter. Because of the butter-cup legend, the tree has been immortalized as *Ficus krishnae*.

In today's scenario of water scarcity certain terms have

become common. Water harvesting, micro-catchments have entered the popular lexicon. Perhaps, nature has been at it for a long-long time. These leaf pouches could be nature's way of catching little bits of water and releasing them slowly. This drip irrigation would certainly have helped the plant in its struggle to survive.

The *Ficus krishnae* is not a common tree. There is one lone specimen in the Director's bungalow in the Akashganga Housing Colony of IUCAA. As one walk from the 1, Akashganga towards the type VE quarters, on left one finds a small service entry gate. The tree is 10 to 12 steps from this gate, behind the wall. Propagation of the tree by grafting process is underway.

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/>