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A Quarterly bulletin of the Inter-University Center for Astronomy and Astrophysics (An Autonomous Institution of the University Grants Commission)

Contents...

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

Welcome to ...

Anil Kakodkar, Chairman, Atomic Energy Commission, who has taken over as the Chairman, Governing Board of IUCAA.

... Farewell to

N. Mukunda, Indian Academy of Sciences, Bangalore, whose tenure as Chairman, Governing Board of IUCAA came to an end on June 18, 2006.

Congratulations to ...

Hum Chand on being conferred with the R.K. Bhalla Award (2006) by Indian Physics Association (Pune Chapter).

A.K. Kembhavi on being conferred with the UGC-National Hari Om Ashram Trust Award (2004).

Dawood A. Kothawala on being awarded the CSIR's Shyama Prasad Mukherjee Fellowship for the year 2006.

Welcome to ...

Rajesh Gopal, who has joined as a Post-doctoral Fellow. His areas of research interests are magnetic fields, large scale structure in the universe, magnetized CMBR scalar mode, and cosmological perturbation theory.

Arnab Kumar Ray, who has also joined as a Post-doctoral Fellow. His areas of research interests are astrophysical accretion, dynamical systems, and fluid dynamics.

Moumita Aich, Saugata Chatterjee, and Sandeep Kumar, who have joined as Research Scholars.

... Farewell to

Hum Chand, who has joined as a Post-doctoral Fellow at Institut d'Astrophysique de Paris (IAP), France.

Priya Hassan, who left at the conclusion of the project.

Suryadeep Ray, who has joined at CGG India Pvt. Ltd., Mumbai.

Workshop on Stars and Galaxies: Observational Techniques and Data Analysis

A workshop on "Stars and galaxies: observational techniques and data analysis" was conducted by IUCAA at North Bengal University, Siliguri during September 12 - 15, 2006. In all about 50 students and lecturers from nearby colleges and universities participated in the workshop. The lectures covered the topics on stars, galaxies, compact objects, telescopes, detectors, celestial co-ordinates, photometry, polarimetry and projects with small telescopes. In addition to these, practical sessions were held to impart training on LINUX, IRAF and image processing. Lectures were held in the morning session and afternoon sessions were devoted to practical training. Resource persons included A.K. Kembhavi, S.N. Tandon, R. Srianand, Vijay Mohan, Sudhashu Berve, Abhishek Rawat (all from IUCAA), Asoke Sen (Assam University), S. Chakraborty (Visva Bharati University) and Rabin Chhetri (Sikkim Govt. College, Gangtok). Vijay Mohan was the coordinator of the workshop from IUCAA, and S. Mukherjee was the coordinator from North Bengal University, Siliguri.



Participants and lecturers at the Workshop on Stars and Galaxies: Observational Technique and Data analysis

Workshop on Astronomy for Engineers

The IUCAA and IUCAA Reference Centre, North Bengal University (NBU), organised a two-day workshop on "Astronomy for Engineers" at Siliguri Institute of Technology (SIT), Sukna, on September 10-12, 2006. About 100 undergraduate engineering students and faculty members attended the workshop. The local arrangements were made by SIT in their scenic campus at the foothills of the Himalayas. The lecturers included S. N. Tandon, A. K. Kembhavi, A. Bandyopadhyay, R. Srianand, Vijay Mohan, Abhishek Rawat and S. Mukherjee. There were two interaction sessions, where the participants held long and animated discussions with the speakers.

An interesting event during the workshop was the distribution of prizes to the winners of the essay competition organised by IRC, NBU in 2005, the Year of Physics. The first three winners, Malini Ghosal, Dipanjan Hore and Alokparna Roy, were given cash awards and certificates and the next 12 participants were awarded certificates of merit and special prizes. There was a popular talk on the "Mysteries of the Universe" by A. Bandyopadhyay, M.P. Birla Planetarium, Kolkata.

Welcome to the IUCAA Family

IUCAA is happy to announce the selection of the Seventeenth Batch of Visiting Associates. The Visiting Associateship is for a tenure of three years beginning August 1, 2007.

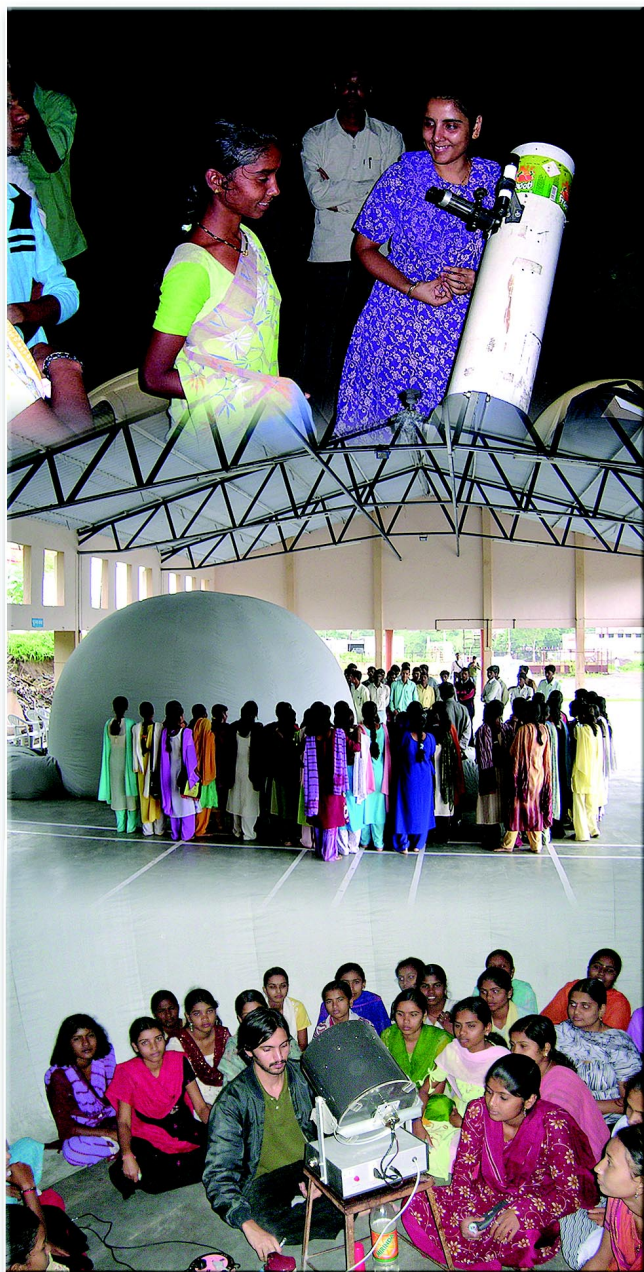
Extension to the Fourteenth Batch of Visiting Associates :

1. Shyamal Kumar Banerjee, Amity School of Engineering, Noida, Uttar Pradesh.
2. Dhananjay V. Gadre, Netaji Subhas Institute of Technology, New Delhi.
3. Ngangbam Ibohal, Manipur University, Imphal.
4. Deepak Jain, Deen Dayal Upadhyaya College, New Delhi.
5. Moncy V. John, St. Thomas College, Kozhencherri, Kerala.
6. Bikash Chandra Paul, North Bengal University, Siliguri, West Bengal.
7. Sandeep Sahijpal, Panjab University, Chandigarh.
8. Asoke Kumar Sen, Assam University, Silchar.
9. K. Shanthi, UGC Academic Staff College, University of Mumbai.
10. Gyan Prakash Singh, Visvesvaraya National Institute of Technology, Nagpur.

New Visiting Associates :

1. B.R.S. Babu, University of Calicut, Kerala.
2. Sukanta Dutta, Sri Guru Tegh Bahadur Khalsa College, Delhi.
3. Sarbari Guha, St. Xavier's College, Kolkata.
4. Joe Jacob, Newman College, Thodupuzha, Kerala.
5. Avinash Khare, University of Delhi.
6. C.D. Ravikumar, University of Calicut, Kerala.
7. Sanjay Kumar Sahay, Birla Institute of Technology, Pilani, Goa Campus.
8. M. Sami, Jamia Millia Islamia, New Delhi.
9. M. Sivakumar, University of Hyderabad.

Science Reaching Ghodegaon and the regions around



The various Science Popularisation activities

A. N. Ramaprakash, Ranjeev Misra and Arvind Paranjpye decided to initiate science popularization activities of IUCAA in the region around Ghodegagon village, which is at the base of Girawali mountain, now proudly hosting IUCAA's 2 meter telescope.

A group of science teachers and the school principals were invited to the observatory for a meeting. It was decided to start sky observation sessions in the secondary schools in the region. Five sky shows were carried out on Tuesdays in April and May, 2006.

After the schools reopened in June, a one day workshop on astronomy and science toy making was conducted at Ghodegaon for school teachers. This workshop was addressed by Muktangan Vidnyan Shodhika team - Vidula Mhaiskar, Arvind Gupta, Samir Dhurde, Arvind Paranjpye and Ashok Rupner.

At the end of the workshop, a schedule was drawn for science demonstration and mobile planetarium (which was acquired in June) show. These programmes were carried out on Tuesdays. Students in batches of 35 were given general introduction to the sky, and parallel sessions on making science toys or screening of educational films were carried out.

These programmes were conducted by Samir Dhurde and Ashok Rupner and coordinated by Arvind Paranjpye. Indrajit Jadhav, The Principal, College of Arts & Commerce, Ghodegaon has actively carried out local coordination. IUCAA students and amateur astronomers have volunteered to participate in this programme.

In addition to the above programme, an evening dialogue meeting with Jayant Narlikar and Naresh Dadhich was organized at Ghodegaon on April 21, 2006. Local support to these activities was highly encouraging.

Seminars

06.07.2006 Naresh Dadhich on *New black hole solution: Matter without matter?*; 03.08.2006 Jogesh Babu on *Linear regression issues in astronomy*; 11.08.2006 Dawood A. Kothawala on *A study of the Painleve-Gullstrand type metrics*; 06.09.2006 Gianluca Calcagni on *Ghost conditions for Gauss-Bonnet cosmologies*; 07.09.2006 Sudip Bhattacharyya on *What thermonuclear X-ray bursts can tell us about neutron stars*; 14.09.2006 Sanjit Mitra on *Gravitational waves from inspiralling binaries and cosmological ramifications*; and 26.09.2006 Resmi L. on *On the presence of hard electron energy spectrum in GRB afterglow*.

Colloquium

11.09.2006 Ravindra E. Amritkar on *Spatial synchronization and extinction of species*.

IUCAA-NCRA Graduate School Courses

The IUCAA-NCRA Graduate School (conducted jointly with the National Centre for Radio Astrophysics (NCRA), Pune) is divided into two semesters (four terms) spread over one year. Each term is of roughly eight weeks duration. During the Graduate School, the Ph.D. students (Research Scholars) are taught relevant advanced courses in Physics and are also introduced to courses in Astronomy and Astrophysics (A & A). The Graduate School structure is given below. The number of teaching hours is shown in brackets after each course.

Semester I, Term I, From August second week to October first week.

01. Methods of Mathematical Physics I (21)
02. Introduction to Astronomy and Astrophysics I (14)
03. Electrodynamics and Radiative Processes I (14)
04. Quantum and Statistical Mechanics I (14)

Semester I, Term II, From October third week to December second week.

05. Methods of Mathematical Physics II (14)
06. Introduction to Astronomy and Astrophysics II (14)
07. Electrodynamics and Radiative Processes II (14)
08. Quantum and Statistical Mechanics II (14)

Semester II, Term I, From January first week to February fourth week.

09. Astronomical Techniques I (14)
10. Galaxies : Structure, Dynamics and Evolution (21)
11. Extragalactic Astronomy I (21)

Semester II, Term II, From March third week to May second week.

12. Astronomical Techniques II (14)
13. Interstellar Medium (14)
14. Extragalactic Astronomy II (14)
15. Project Work (During May - July).
16. Topical Course (for earlier batch of students) (< 21)

1. The courses are designed, emphasizing the aspects which are directly relevant to A & A. It is assumed that unnecessary repetition of material which is already taught at M.Sc. is avoided.
2. The syllabus provides enough avenues for topics which are of “local interest” to be included in the graduate school. This is necessary so that graduate students coming out of IUCAA/NCRA, not only have a comprehensive grasp of the A & A but are also aware of the key research areas in which these two institutions are concentrating at present. Detailed syllabus may be found in the website: <http://www.iucaa.ernet.in/>.

If any of the Research Scholars from Indian universities/colleges are interested in attending any of these courses, they may contact: The Coordinator, Core Programmes, IUCAA, e-mail: vch@iucaa.ernet.in.

IUCAA Postdoctoral Positions

Applications are invited for post-doctoral fellowships at IUCAA, for durations which are flexible within a range of one to five years. The fellowship includes a remuneration, contingency grant, accommodation on the campus and medical benefits. Facilities required for research are provided through the general IUCAA budget. Post-doctoral fellows with excellent performance can be considered for a tenured position.

The Inter-University Centre for Astronomy and Astrophysics (IUCAA) is an autonomous institution under the University Grants Commission. It was set up in December 1988 amidst the picturesque surroundings of the University of Pune. IUCAA has an integrated campus which includes the academic facilities as well as residential and recreational areas. IUCAA is a centre of excellence within the university sector for teaching, research and development in astronomy and astrophysics. The centre at present consists of about 40 academic members, including core faculty, post-doctoral fellows and graduate students, with potential for growth in the numbers. IUCAA has a vigorous visitor programme, involving short and long term visits of scientists from India and abroad. The centre has about 90 visiting associates from universities and colleges, who visit periodically and participate in all its activities. Further information can be obtained from the IUCAA website at www.iucaa.ernet.in.

Applicants should send a curriculum vitae and list of publications, and arrange for three confidential references to be sent independently. All the relevant material should reach IUCAA by November 25, 2006. Candidates will be informed of the result by January 16, 2007. Successful candidates are normally expected to commence their fellowship during 2007.

Facilities at IUCAA include a network of state-of-the-art computers, high speed internet connections, mirror sites of important databases like ADS and VIZIER, a very well equipped instrumentation laboratory and a library with exhaustive collections of books and periodicals.

A 2m optical telescope has been installed at a site which is about 80 kms from IUCAA campus and there will be special opportunities for optical astronomy and related instrumentation.

Research Areas covered by faculty members at IUCAA include:

- Classical and quantum gravity
- Cosmic magnetic fields
- Cosmology and large scale structure
- Galactic and extragalactic astronomy
- Gravitational waves
- High energy astrophysics
- Instrumentation for astronomy
- Interstellar medium
- Optical astronomy
- Radio astronomy
- Solar system and stellar physics
- Virtual observatory

IUCAA has a vigorous observational programme in several areas. Support is available for guest observing from international facilities.

Other academic activities include a graduate school for Ph.D. students, teaching at the Master's level for students from the University of Pune and other universities, schools and workshops, refresher courses for university and college teachers, and a vigorous public outreach programme.

Applications and enquiries should be sent by post or e-mail to:

The Coordinator, Core Programmes,
IUCAA, Post Bag 4, Ganeshkhind Pune 411 007, India.
email: vch@iucaa.ernet.in

Introductory Workshop on Astrophysics

An Introductory Workshop on Astrophysics has been arranged at Mohanlal Sukhadia University, Udaipur, Rajasthan, during December 20 - 24, 2006. Ph.D./M.Sc./B.E./B.Tech./M.E./M.Tech. students with Physics and Engineering background and young faculty members of universities and colleges, interested in Astronomy and Astrophysics, are specially encouraged to apply. Student applicants should arrange to send a recommendation letter from the guide or university/college teacher along with the application. Limited travel support will be available. All applications should reach : S.N.A. Jaaffrey, Organizing Coordinator, Department of Physics, University College of Science, Mohanlal Sukhadia University, Udaipur 313 001, Rajasthan, India (e-mail : sna_jaaffrey@yahoo.co.in), by October 24, 2006. For more details, please visit : <http://www.mlsu.org/>, link to Conferences, and then link to Introductory Workshop on Astrophysics.

IUCAA Preprints

Tarun Souradeep, *Cosmology with CMB anisotropy*, IUCAA-30/06; Patrick Petitjean, C. Ledoux, P. Noterdaeme, and R. Srianand, *Metallicity as a criterion to select H2 bearing damped Lyman-alpha systems*, IUCAA-31/06; Tarun Souradeep, Amir Hajian and Soumen Basak, *Measuring statistical isotropy of CMB anisotropy*, IUCAA-32/06; S. G. Ghosh, and D. W. Deshkar, *Exact non-spherical radiating collapse*, IUCAA-33/06; S. G. Ghosh, D. W. Deshkar, and N. N. Saste, *Five dimensional dust collapse with cosmological constant*, IUCAA-34/06; M. Sami, Parampreet Singh and Shinji Tsujikawa, *Avoidance of future singularities in loop quantum cosmology*, IUCAA-35/06; Anirudh Pradhan and Saeed Otarod, *Universe with time dependent deceleration parameter and Λ term in general relativity*, IUCAA-36/06; Tarun Souradeep, Rajib Saha and Pankaj Jain, *Angular power spectrum of CMB anisotropy from WMAP*, IUCAA-37/06; Shin'ichi Nojiri, Sergi D. Odintsov and M. Sami, *Dark energy cosmology from higher-order, string-inspired gravity, and its reconstruction*, IUCAA-38/06; Gaurang Mahajan, Sudipta Sarkar, and T. Padmanabhan, *Casimir effect confronts cosmological constant*, IUCAA-39/06; Himan Mukhopadhyay, Norichika Sago, Hideyuki Tagoshi, Sanjeev Dhurandhar, Hirotaka Takahashi and Nobuyuki Kanda, *Detecting gravitational waves from inspiraling binaries with a network of detectors: coherent versus coincident strategies*, IUCAA-40/06; Tarun Souradeep, Sanjit Mitra, Anand Sengupta, Subharthi Ray, and Rajib Saha, *Non-circular beam correction to the CMB power spectrum*, IUCAA-41/2006; Shinji Tsujikawa and M. Sami, *String-inspired cosmology: Late time transition from scaling matter era to dark energy universe caused by a Gauss-Bonnet coupling*, IUCAA-42/06; Tarun Souradeep, *Spectroscopy of cosmic topology*, IUCAA-43/06; Soumini Chaudhury, Arnab K. Ray, and Tapas K. Das, *Critical properties and stability of stationary solutions in multi-transonic pseudo-Schwarzschild accretion*, IUCAA-44/06

Visitors during July to September 2006

Shashank Araokar, P.N. Pandita, Aseem Paranjape, Viktoriya Morozova, Ekaterina Dergunova, S.K. Shevade, S.K. Pandey, K.S.V.S. Narasimhan, Partha Sarathy Pal, Jotin Singh, Anirudh Pradhan, J.S. Bagla, H.K. Jassal, S.G. Ghosh, Ram Sagar, Ranjan De, Dipankar Bhattacharya, T.P. Prabhu, Ashok Pati, S.R. Kulkarni, D.W. Deshkar, G.Jogesh Babu, Purnima Pandey, Rajib Saha, Qingzhen Wang, S.C. Kaushik, Ninan Sajeeth Philip, G. Calcagni, V. Vinu, H.P. Singh, V. Priya, Kanti Jotania, M.K. Yadav, Santosh Kumar Pandey, K.D. Thengane, J.K. Jumale, Laxmikant Chaware, J.P. Chaturvedi, Subir Bhattacharyya, T. Ramesh Babu, Joe Jacob, Sudip Bhattacharyya, S.N. Biswas, R.E. Amritkar, Malay Maiti, Vivek Agarwal, Anoop Kumar Srivastava, B.S. Kushvah, S.M. Chitre, S. Mukherjee, Asit Banerjee, B. Ishwar, Somak Raychaudhury, Avdheesh Kumar, Jayant Murthy, A. Pimpale, G. Rajasekaran, C.V. Visveshwara, Pushpa Khare, A. Kakodkar, T.R. Kem, A.K. Parate, Ramamurthy Naidu, and S.K. Singh.

Visitors expected

October

Suresh Chandra, SRTMU, Nanded; S. Tavassoli, IASBS, Iran; H. Rahmani, IASBS, Iran; A. Takey, NRIAD, Egypt; Ranabir Dutt, Visva Bharati, W.Bengal; B.C.Paul, North Bengal University, Siliguri; Pushpa Khare, Utkal University, Bhubaneswar; Aphisit Ungkitchan, Chulalongkorn University, Thailand; Sarbeswar Chaudhuri, Gushkara Mahavidyalaya, West Bengal; Dilip Paul, Khoribari High School, Darjeeling; Yuri Shtanov, Bogolyubov Institute for Theoretical Physics, Ukraine; Alexander Viznyuk, Bogolyubov Institute for Theoretical Physics, Ukraine; J. Dey, Presidency College, Kolkata; M. Dey, Presidency College, Kolkata; M. Bagchi, Presidency College, Kolkata; Taparati Ganguly, Presidency College, Kolkata; V. Gaur, Indian Institute of Astrophysics, Bangalore; Tanuka Chattopadhyay, Shibpur D.B. College, West Bengal; K. Jotania, M.S. University of Baroda; R. Tikekar, Sardar Patel University, Vallabh Vidyanagar; K.P. Harikrishnan, The Cochin College, Kochi; Yasuo Tanaka, Ibaraki University, Japan; L. M. Saha, Zakir Husain College, Delhi; M.K. Das, Sri Venkateswara College, Delhi; A.A. Usmani, Aligarh Muslim University; G. Muni Raj, Bishop Cottons Women's Christian College, Bangalore; Anju Rai, V. B.S. Purvanchal University, Jaunpur; and A. Pradhan, Hindu Degree College, Ghazipur.

November

A.A.Zdziarski, Nicolas Copernicus Institute, Poland; W. H. Kegel, Zentrum fuer Astronomie und Astrophysik der Technischen Universitaet Berlin, Germany; Suresh Chandra, SRTMU, Nanded; P.G. Musrif, SRTMU, Nanded; S.V. Shinde, SRTMU, Nanded; Alfred Molina, University of Barcelona, Spain; Monika Sharma, SRTMU, Nanded; L.P. Verma, M.B. Govt. P.G. College, Haldwani; Vinodkumar Joshi, M.B. Govt. P.G. College, Haldwani; and N. Kanda, Osaka City University, Japan.

December

A.A. Shukurov, University of Newcastle, UK; J. Ehlers, Max-Planck Institute for Gravitational Physics, Golm, Germany; Sarbari Guha, St. Xavier's College, Kolkata; T.K. Menon, USA; Sukanta Bose, Washington State University, USA; and U.R. Ananthamurthy, Bangalore.

Consider a large rectangular vessel with glass walls containing water, e.g., a large fish tank. Near the edge, the water surface will have a meniscus. Estimate the typical height of the meniscus.

Solution to For the Younger Minds - 17

Sound will propagate even at a low pressure as long as the mean free path of the molecules is small compared to the wavelength of the sound. A quick calculation shows that even at the pressure of 1 cm of mercury, the mean free path is about 4×10^{-4} cm and so sound can propagate perfectly well. Hence the conventional interpretation is incorrect. The correct explanation, as usual, is lot more complicated. It essentially has to do with the impedance mismatch between the glass and air because of which the fraction of the sound energy transmitted to the outside drops as the air-pressure is reduced. A qualitative way of modeling this will be to treat it like a system of two masses [the bell and the surrounding glass] connected by a weak spring which represents the air that is contained. The spring constant will then be proportional to the air pressure. If the amplitude of the vibration of the bell is constant then the amplitude of the vibration of the glass jar will scale in proportion to the pressure 'p'. Thus, the intensity of sound radiated will fall as p^2 as the pressure is lowered.

Know Thy Trees - 3

Arvind Gupta and Arvind Paranjpye

Fountain or Squirt Tree (*Spathodea campanulata*)

As you enter the Kund, from the Foucault pendulum side, a tall magnificent tree with profuse orange flowers greets you on the left. This is the Fountain Tree. There are several grand specimens of this tree in the IUCAA campus.

This ornamental tree comes from tropical Africa and belongs to Bignoniaceae family. The wood of this fast-growing species is light, soft, and of little use. It is popularly known as the African Tulip tree, Fountain tree or Squirt Tree.

Spathodea comes from Greek *Spatha* referring to the ladle like shape of the calyx (sepals of a flower considered as a group), and *campanulata* describes the bell shape of the flowers (blossoming in August – October). The asymmetrical bell-shaped yellow-rimmed scarlet or blood red flowers of the tree are 2-4 inches long. The flowers are fragrant and attract birds, bees and animals. Bulbuls love nesting on this tree.

It is moderately branched, leafy tree with opposite pinnate leaves. The leaves are ovate, leathery and deep green in colour. The tree grows up to 20 meters tall.

Its soft brown, curved flower buds often contain a quantity of liquid and children squirt it out as a jet after puncturing the pointed ends of the bud. Hence, the name Fountain Tree, or Squirt tree. The dry pods make exquisite and streamlined toy boats.

The green finger for this tree: Planted by Professor N. V. G. Sharma, on December 29, 1992.



Khagol (the Celestial Sphere) is the quarterly bulletin of IUCAA. We welcome your responses at the following address:

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