# KHAGOL

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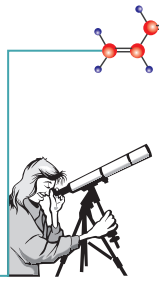
Contents...





# National Science Day Celebrations 2012

The National Science Day - 2012 was celebrated, as usual, with enthusiastic and efficient contributions from all the IUCAA members and visitors. As has been the tradition for more than a decade now, the occasion was celebrated on three different days.

On February 18, IUCAA conducted the Science Day celebrations for the rural students of the Ambegaon Taluka. Science quiz, Essay writing, Story writing and Drawing competitions were organised by the Public Outreach personnel with generous help from Nilesh Pokharkar amongst other IUCAA Girawali Observatory staff. Nineteen schools participated in the programme, hosted by the New English School, Landewadi. The winning students were invited to IUCAA to attend the programme on February 25 and to receive their prizes from the Director, IUCAA.

On February 25, about 400 students from 70 schools in Pune city responded to IUCAA's invitation and participated in another set of inter-school competitions. These students from class VIII and IX took part in the Drawing, Essay, Poetry and Science quiz competitions. The coordinators made sure of the good quality in the content and choice of the winners. Arvind Gupta conducted a session for teachers and students on making Science Toy experiments, while the other students were participating in the competitions. To add more to the educative value of the day's programme, Anirban Hazra and his colleagues from IISER, Pune, made an exciting and live demonstration called 'Colour and Chemistry' for all in the Chandrasekhar Auditorium.

The IUCAA, Pune campus was opened to the general public on February 28, the National Science Day, and there was a remarkable response with a final count of about 9000 attendees of various programmes. Volunteers from IUCAA staff and family made sure that they were welcomed and guided through the various displays while they discovered the wonders of the Universe.

As usual, the Open Day started at 10:30 a.m. Thirty students from Kendriya Vidyalaya, Ganeshkhind did a wonderful job of explaining various science experiments developed at the Muktangan Vidnyan Shodhika (MVS), IUCAA






to large crowds, who passed through the exhibition in the Chandrasekhar Auditorium foyer. Ashok Rupner and Vidula Mhaiskar were responsible for the thoughtful training of these student volunteers.

As part of the astronomy outreach, a special Telescope Information booth was set up in the Science Park with the help of Amateur Astronomers' groups, Akashmitra and Jyotirvidya Parisanstha, who also very enthusiastically showed Sunspots live and explained the many science models located outdoors in the Science Park. The scientific contributions of the four great scientists, whose statues are part of the IUCAA Kund, were showcased by the volunteers from Fergusson College. They also explained the working and the science behind the Foucault pendulum. Kadambari Bhujbal from IUCAA also actively participated in the latter. All volunteers were trained a week before the event by the Public Outreach staff.

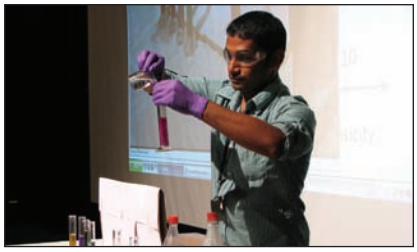
Continuous demonstrations of the WorldWide Telescope software were conducted in the Bhaskara 1 lecture hall by Aparna Joshi, Dipanjan Mukherjee and others from the VO team. In Bhaskara 2 lecture hall, R. Srianand with his team and the Instrumentation Laboratory group, displayed live spectra to explain the importance of Spectroscopy and its related instruments in Optical Astronomy. Similarly, the members of the Radio Astronomy Laboratory illustrated the scientific concepts on Radio Astronomy at the foyer outside Bhaskara 2 lecture hall. Alongside, a special poster about Cosmology using computers was displayed by Surajit Paul, who also showed a few simulations of the Universe.

Spectacular posters, introducing general Astronomy and the related work done at IUCAA, were put up by the Research Scholars and Post-doctoral Fellows of IUCAA. A series of related public talks, each of 30 minutes duration, were given in Bhaskara 3 lecture hall. These talks detailed some topics of the posters. The talk by Aditya Rotti, titled `Windows into the Universe', was in English, while that by Jayanti Prasad, titled `Bramhaand' was in Hindi. Sibasish Laha gave a talk on `The Mysteries of Active Galaxies' and Sanved Kolekar gave the last talk on `Black Holes' in the local language Marathi .

Thousands of people enjoyed the series of films on Astronomical topics in the Chandrasekhar Auditorium. This was coordinated by Santanu Das. Later, there was a special question and answer session in the Chandrasekhar Auditorium; J. V. Narlikar and T. Padmanabhan answered various Astronomy questions from the public. This session was coordinated by Samir Dhurde.

The day ended with a public talk by Swara Ravindranath, based on the Nobel Prize in Physics 2011. The evening sky-show was also conducted, with over 1000 people attending it. A talk about Great Observatories by Ajit Kembhavi, using multiple projectors was the special attraction of the outdoor event. The event ended at 11:00 p.m., wrapping up the National Science Day Celebraions of 2012.



# Results of various Competitions held on the occasion of the National Science Day at IUCAA on February 25, 2012.

**The prizes were distributed by Ajit Kembhavi, Director of IUCAA.**

| Science Quiz | |
|---|---|
| 1st prize | Chaitanya Mukund Tappu, Yash Amol Karwa, Saurav Sanjay Bhandare, from Bharatiya Vidya Bhavan Sulochana Natu Vidya Mandir. |
| 2nd prize | Sumit Milind Chavan, Aditya Raghavendra Karkhanis, Chaitanya Madan Desai, from Jnana Prabodhini Navanagar Vidyalay (English). |
| 3rd prize | Shomik Sanjay Adhicary, Aanak Abhimanu Sengupta, Pranav Ghorpade, from Loyola High School. |

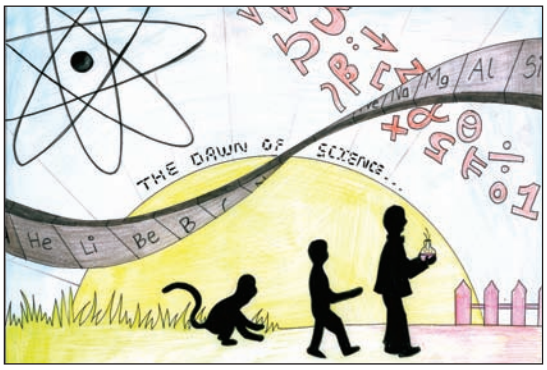
| Essay : Marathi | |
|---|---|
| 1st prize | Pranali Rajendra Tanpure, from Laxmanrao Apte Prashala. |
| 2nd prize | Madhura Prashant Vaze, from H.H.C.P. Huzurpaga, High School. |

| Essay : English |
|---|
| Only consolation prizes were given |
| Lisa Mishra, from Vikhe Patil Memorial School, and Ishan Joshi, from Vidya Valley School. |

| Drawing | |
|---|---|
| 1st prize | Shruti Gunda, from Vidya Valley School. |
| 2nd prize | Saurabh Marne, from Vikhe Patil Memorial School. |
| 3rd prize | Tanmai Mangesh Kanchan, from Bharatiya Vidya Bhavan Sulochana Natu Vidya Mandir. |

| Poetry : English | |
|---|---|
| 1st prize | Rohan Rajat Jain, from Bharatiya Vidya Bhavan Sulochana Natu Vidya Mandir. |
| 2nd prize | Shreya Mantri, from Vidya Valley School. |
| 3rd prize | Mansi Sachin Kate, from City Pride School. |

| Poetry : Marathi | |
|---|---|
| 1st prize | Trupti Ramesh Kohinkar, from Laxmanrao Apte Prashala. |
| 2nd prize | Tushar Parag Joglekar, from New English School, Ramanbaug. |
| 3rd prize | Mohika Pradeep Damle, from Sou. Vimalabai Garware Prashala. |




**1st prize** Shruti Gunda, from Vidya Valley School, on the theme, Dawn of Science.

**2nd prize** Saurabh Marne, from Vikhe Patil Memorial School, on the theme, Quarks to Cosmos.

**3rd prize** Tanmai Mangesh Kanchan, from Bharatiya Vidya Bhavan Sulochana Natu Vidya Mandir, on the theme Science in our Day to Day Life.

# Results of various competitions for Rural Schools of Ambegaon Taluka on February 18, 2012

| Science Quiz | |
|---|---|
| 1st prize | Shubham Devidas Hinge, Vishal Dattatraya Hinge, from Vidya Vikas Mandir, Awsari Budruk. |
| 2nd prize | Sahil Hamid Inamdar, Swamini Santosh Kale, Pallavi Deepak Sutar, from New English School, Landewadi. |
| 3rd prize | Gitanjali Mahadev Vharkute, Shubam Balasaheb Devkar, Akshay Shankar Kengale, from Bhimashankar Vidyamandir. |

| Essay : Marathi | |
|---|---|
| 1st prize | Priya Daulat Modhave, from Shivaji D. Adhalrao Patil Vidyalaya. |
| 2nd prize | Sudarshan Subhash Zagade, from J. M. High School. |

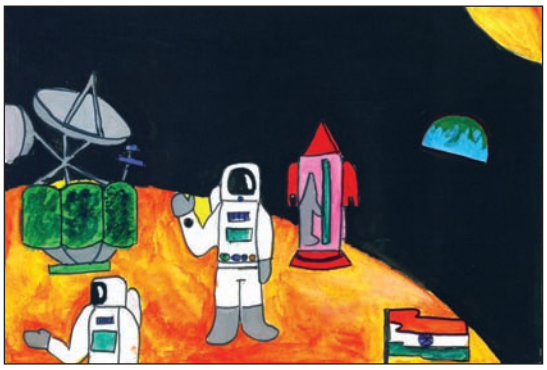
| Essay : English | |
|---|---|
| 1st prize | Saim Murtuja Momin, from New English School. |

| Drawing | |
|---|---|
| 1st prize | Amey Dattatray Jadhav, from Kamalaja Devi Vidyalaya |
| 2nd prize | Vivek Balasaheb Gavhale, from New English School. |
| 3rd prize | Hrishikesh Vishwas Dherange, from Bhimashankar Vidyamandir. |

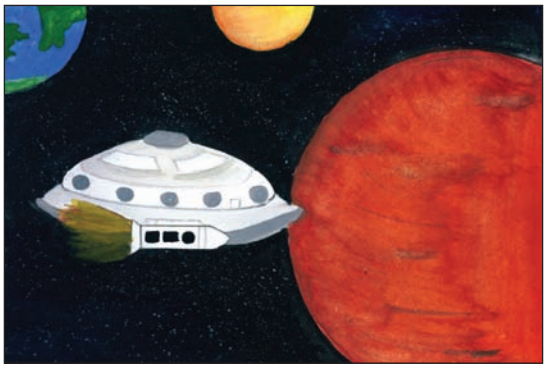
| Story Writing | |
|---|---|
| 1st prize | Kajal Jayram Phalke, from Lal Bahadur Shastri Vidyalaya. |
| 2nd prize | Shraddha Sharad Chikhale, from Shri Wakeshvar Vidyalaya. |
| 3rd prize | Pranjal Shankar Chikhale, from Sant Dnyaneshwar Vidyalaya. |

## Congratulations to ...

**Ashok Rupner** on being selected as a SCIFEST WINNER 2012 for best Workshop: Innovative (Toys from Trash) by South Africa's National Science Festival



**1st prize** Amey Dattatray Jadhav, from Kamalaja Devi Vidyalaya, on the theme Manglavaril Yan Mohim (Mission to Mars).



**2nd prize** Vivek Balasaheb Gavhale, from New English School, on the theme Mangal Yan (Mission to Mars).


**3rd prize** Hrishikesh Vishwas Dherange, from Bhimashankar Vidyamandir, on the theme Tumchya Kalpanetil Chandrayan (Imagine your own Chandrayan).

# Advanced Research Workshop on X-ray Timing

An Advanced Research Workshop and X-ray Timing was held at IUCAA during January 23 - 28, 2012. A total of 40 participants from India and abroad attended the workshop. The programme combined lectures on X-ray timing techniques and science, along with hands-on sessions for data analysis.

A new timing software package, called GHATS, was released during the workshop. This is an IDL-based data analysis software, particularly suited for high frequency aperiodic variability observed in accreting stellar mass black holes and neutron stars. The lead author of the package, Tomaso Belloni of INAF, Italy, was present at the workshop and provided instructions for its use. A number of research projects using archival data from the RXTE mission were then undertaken using this package. Group activities in these projects, organised under six different themes, are now being continued by the participants of the workshop.

One day of the workshop was devoted to the discussion of data analysis techniques for the Astrosat Cadmium Zinc Telluride (CZT) Imager payload. This is a hard X-ray coded mask imaging instrument to be launched aboard the Indian Astrosat satellite. The method of calibrating a CZT detector, the concept of coded mask imaging and the techniques of doing timing and spectroscopy using this instrument were illustrated. The first version of a software package for carrying out Astrosat CZTI data analysis was released and distributed during the workshop.

Dipankar Bhattacharya was the coordinator for this workshop.

# A Workshop on Photometer Fabrication

A Workshop on Photometer Fabrication was held at Muktangan Science Centre, IUCAA during January 9 - 13, 2012. Participants who fabricated the Night Sky Photometer were among the Amateur Astronomers from Mumbai, Pune and Bangalore, and Faculty from Sikkim Government College. Resource persons for this workshop were Vijay Mohan, Ranjan Gupta, Samir Dhurde and Vilas B. Mestry of IUCAA, and Arvind Paranjpye from Nehru Planetarium, Mumbai.

A total of 5 photometers were fabricated and IUCAA 9" telescope was used to calibrate them against standard stars, and night sky brightness measurements were carried out at IUCAA terrace. The participants will be carrying out similar follow up observations from their respective home locations and provide feedback to IUCAA in near future.

Ranjan Gupta was the coordinator for this workshop.

# IUCAA Workshop on Gravitational Wave Data Analysis

The Department of Mathematical Sciences, Tezpur University and IUCAA, co-sponsored and organized a national level workshop on Gravitational Wave Data Analysis during January 23-27, 2012. This workshop was the first of its kind in the north-east India in the field of Gravitational Waves.

The workshop was intended for highly motivated M.Sc. students/research students/college and University teachers of Physics and Mathematics to provide exposure to Gravitational Wave Astronomy, and familiarize with Data Analysis techniques, specific to this emerging and exciting area of research. A total of 40 participants, attended the workshop, and actively interacted with resource persons during the lecture sessions. The workshop was coordinated by Sanjit Mitra and Bhim P. Sarmah.

The workshop was inaugurated by N. Deka Baruah, Dean, School of Science and Technology, Tezpur University, who stressed on keeping up the long association of the Department of Mathematical Sciences, Tezpur University has with IUCAA, and to jointly organize more workshops, symposia, etc. in the University in the near future. IUCAA faculty members Sanjeev V. Dhurandhar, Sanjit Mitra, and Patrick Das Gupta from University of Delhi, Rajesh K. Nayak from IISER Kolkata, Archana Pai from IISER Thiruvananthapuram and Bhim P. Sarmah from Tezpur University delivered talks covering different aspects of the basics of GW Astronomy and Data Analysis techniques. The lectures were also accompanied by laboratory sessions, where participants were imparted hands-on training to handle and analyse gravitational wave mock data with the relevant application softwares. The main topics covered in the lecture sessions were the basics of General Theory of Relativity, Generation of Grativational Waves, Source Modelling, Fourier Transform and Seismometry, Gravitational Wave Detectors, basics of GW Data Analysis, Detector Network, apart from the general overview of the international scenario in the study of Gravitational Waves.

The outcome of the school was exciting. Many participants got excited about doing research in gravitational waves and data analysis. In particular, students were highly enthusiastic about the hands-on sessions, which often ran much longer than the scheduled time. Modern astronomy is largely dependent on massive use of computers and data analysis techniques. Getting students excited in this area is thus, a great success of the school.


## Seminars

Listed below are the seminars and colloquium given at IUCAA during January – March 2012.

| | |
|---|---|
| 03.01.2012 | Aditya Rotti on ***Cosmology with CMB weak lensing*** |
| 05.01.2012 | Poshak Gandhi on *New insights on activity in galactic nuclei from high spatial resolution mid-infrared observations* |
| 16.01.2012 | Steven Tomczyk on *Observation of Alfvén waves in the solar corona* |
| 07.02.2012 | Soma De on ***A few probes of cosmology*** |
| 23.02.2012 | Andrew *Hillier* on *Study of the magnetic Rayleigh-Taylor instability in solar quiescent prominences* |
| 27.02.2012 | Kalyan Dutta on *Modeling and simulation for adaptive optics systems* |
| 19.03.2012 | Nishant Singh on *Dynamo action in linear shear flows.* |

## Colloquium

05.03.2012 Binod Sreenivasan on *Understanding the structure of the earth's magnetic field.*

## Visitors Expected

### April 2012

Sandip Bhattacharya, Birla Planetarium, Jaipur; Mubashir Hamid, University of Kashmir, Srinagar; K. Indulekha, M.G. University, Kottayam; Jithesh V., University of Calicut, Kozhikode; Rishi Khatri, MPA, Munich, Germany; Nagendra Kumar, M.M.H. College, Ghaziabad; Bari Maqbool, University of Kashmir, Srinagar; Preeti Panjwani, Space Application Centre, Ahmedabad; K. Shanthi, University of Mumbai; Arvind Singh, Space Application Centre, Ahmedabad; Sanjay K. Singh, Space Application Centre, Ahmedabad; Jai Singla, Space Application Centre, Ahmedabad; Navita Thakkar, Space Application Centre, Ahmedabad; and Naveel Wani, University of Kashmir, Srinagar.

### May 2012

Subenoy Chakraborty, Jadavpur University, Kolkata; Sumanta Chakraborty, Calcutta University, Kolkata; Sarbari Guha, St. Xavier's College, Kolkata; K.P. Harikrishnan, The Cochin College, Kochi; Bhola Ishwar, BRA Bihar University, Muzaffarpur; S.N.A. Jaaffrey, M.L. Sukhadia University, Udaipur; Joe Jacob, Newman College, Thodupuzha; Kanti Jotania, The M.S. University of Baroda, Vadodara; Nikunj Maheswari, Indian Institute of Technology, Mumbai; Soma Mandal, Taki Government College; Sudeshna Mukerji, Jadavpur University, Kolkata; Sambit Panda, Ravenshaw College, Cuttack; K.D. Patil, B.D. College of Engineering, Sevagram, Wardha; B.C. Paul, North Bengal University, Siliguri; Farookh Rahaman, Jadavpur University, Kolkata; Shantanu Rastogi, DDU Gorakhpur University; Rajib Saha, IISER, Bhopal; P.K. Samal, Utkal University, Bhubaneswar; Sudipta Sarkar, Institute of Mathematical Sciences, Chennai; Sanjay Sarwe, S.F.S. College, Nagpur; and M.M. Verma, Lucknow University.

### June 2012

Sk. Saiyad Ali, Jadavpur University, Kolkata; Bidisha Bandopadhyay, University of Delhi; Bhuvanesh, G.B. Pant Engineering College, New Delhi; Sukanta Bose, Washington State University, USA; Ramesh Chandra, Kumaun University, Nainital; B.C. Chauhan, Government College, Karsog, Mandi; Rabin Chhetri, Sikkim Government College, Gangtok; Debi Prasad Choudhary, California State University, USA; Mamta Dahiya, SGTB Khalsa College, Delhi; Shaon Ghosh, Washington State University, USA; Sk. Monowar Hossein, Aliah University, Kolkata; N.G. Ibohal, Manipur University, Imphal; Deepak Jain, Deen Dayal Upadhyaya College, New Delhi; Rekha Jaiswal, Hindu Post-Graduate College, Ghazipur; Md. Mehedi Kalam, Aliah University, Kolkata; Atmjeet Kumar, University of Delhi; Nagendra Kumar, M.M.H. College, Ghaziabad; B.S. Kushvah, Indian School of Mines, Dhanbad; Nilanjana Mahata, Jadavpur University, Kolkata; Sanjay Kumar Pandey, L.B.S. College, Gonda; Anirudh Pradhan, Hindu Post-Graduate College, Ghazipur; Biplab Raychaudhuri, Visva Bharati, Santiniketan; Amartya Jyoti Saha, IISER, Bhopal; T.R. Seshadri, University of Delhi; Ranjan Sharma, P.D. Women's College, Jalpaiguri; H.D. Singh, Sikkim University, Parth Singh, St. Stephen's College, Delhi; Pranjal Trivedi, University of Delhi; P. Udayashankar, NIEIT, Mysore; and A.A. Usmani, Aligarh Muslim University.

### Long term visitors

Pushpa Khare (till January 2014)

Sanjeev Dhurandhar (till March 1, 2013)

## Visitors

### January - March 2012

Anvita Abbi, Marcela Acosta, P.C. Agrawal, Asif Iqbal Ahangar, Shah Alam, B.G. Anandarao, Rizwan Ul-Haq Ansari, K.G. Arun, Charanjit Singh Aulakh, Sudhanshu Barway, Shantanu Basu, Gesa Bertrang, Naseer Iqbal Bhat, Gour Bhattacharya, Samarpita Bhattacharya, K.G. Biju, M.S. Borkar, Robert Botet, Shuvendu Chakraborty, R.S. Chandramohan, Asis Chattopadhyay, Surajit Chattopadhyay, Tanuka Chattopadhyay, Rabin Chhetri, Steve Crawford, Ashok Das, Bipul Das, H.S. Das, Ujjal Debnath, Atul Deep, P.P. Divakaran, Kalyan Dutta, Rinku Dutta, Poshak Gandhi, Sharad Gaonkar, Rahul Ghosh, Ritesh Ghosh, Aruna Govada, Alok C. Gupta, Edith Hadamcik, M.K. Haris, Sk. Manowar Hossein, N.G. Ibohal, Bhola Ishwar, Bala Iyer, Sumit K. Jaiswal, Minu Joy, Anil Kakodkar, Md. Mehedi Kalam, Tejas Kale, Chandra Kant, S.D. Katore, G.S. Khadekar, M.L. Kurtadikar, Michael Little, Soma Mandal, Smita Mathur, Nairwita Mazumder, Biley Menon, Rajesh Nayak, Arvind Paranjpye, Shankar Dayal Pathak, Pramod Pawar, Ninan Sajeeth Philip, Anirudh Pradhan, Marina Prokopyeva, G. Rajalakshmi, C.P. Ranjith, Chayan Ranjith, Saibal Ray, Somak Raychaudhury, Krishna Reddy, Rupak Roy, Sonali Sachdeva, Rajib Saha, Sanjay Kumar Sahay, Sunder B. Sahayanathan, Tarun Saini, K.V. Santhilata, Subrato Sarkar, Asoke Kumar Sen, Anand Sengupta, T.R. Seshadri, Balveer Singh, Nishant Singh, Binod Sreenivasan, C.S. Stalin, Sauro Succi, Eric Tatulli, Michael Thompson, Peter Tino, Steve Tomczyk, Alexei Toporensky, Pranjal Trivedi, A.A. Usmani, D.B. Vaidya, and C.V. Vishveshwara.

## IUCAA Preprints

Listed below are the IUCAA preprints released during January - March 2012. 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.

M.B. Pandge, N.D. Vagshette, L.P. David, and M.K. Patil, *Systematic study of X-ray cavities in the brightest galaxy of the Draco Constellation NGC 6338,* IUCAA -1/2012; N.D. Vagshette, M.B. Pandge, S.K. Pandey, and M.K. Patil, *Dust extinction and X-ray emission from the star burst galaxy NGC 1482, IUCAA-2/2012;* N.V. Voshchinnikov, Th. Henning, M.S. Prokopjeva, and H.K. Das, *Interstellar polarization and grain alignment: the role of iron and silicon,* IUCAA- 3/2012.

## Know Thy Clouds - 9

**Arvind Paranjpye**
Director, Nehru Planetarium, Mumbai.

# Stratus : Low lying formless clouds

`Stratus' gets their name from Latin, which means 'layer'. These are low lying clouds that appear thin and sometimes fragmented. Most often we experience these as fog, but unlike fog these clouds do not rest on ground; these are above the ground fog (though these clouds can change to fog). These clouds develop under different weather conditions. The cloud mostly develop under the influence of wind streams, where moisture condenses in the lower layers or formed either through the lifting of morning fog or when cold air moves at low altitude.

These clouds are just about a kilometre thick but can spread up to 1000 kilometres. Stratus clouds can cause minor quick showers. This is when the clouds are patchy. But then these can develop into stratocumulus[1], leading to prolong gloomy weather with long drizzle or spells of rains.

These thin sheets lack contrast. These take complexion of varying shades of grey but never quite black and are, therefore, often difficult to photograph. These clouds do not develop vertically like cumulus[2] or stratocumulus[1]. As these clouds are very close to the ground they move rapidly and in different directions based on the local course of wind.

The wind changes during the summer months do lead to development of these clouds. Towards the end of May or beginning of June we may meet these clouds on the way to Ooty or Kodaikanal or other hill stations. It is an experience in itself of rowing through these clouds on the lakes of Nainital/Kodaikanal.

Quite often the Sun or the Moon can be seen through these clouds. They simply appear as if one is looking at them through a finely ground glass.

If the clouds are seen after the rains then it would clear out soon, and warm weather prevails but if stratus continues to stay on, then one may expect rains again.

[1] Know Thy Clouds - 6, July 2011, Khagol No. 87
[2] Know Thy Clouds - 2, July 2010, Khagol No. 83

Fog seen from a train along New Delhi-Gorakhpur route

| | | |
|---|---|---|
| Name | : | Stratus |
| Symbol | : | St |
| Height | : | 0 – below 2000 m |
| Symbol | : | —— |

## ...Farewell to

**Moumita Aich,** who has joined the University of Kwazulu Natal, South Africa, as a Post-doctoral Fellow.

**Tuhin Ghosh,** who has joined the Institut d' Astrophysique Spatiale (IAS), Orsay, France, as a Post-doctoral Fellow.

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

We welcome your responses at the following address:

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email : publ@iucaa.ernet.in Web page : http://www.iucaa.ernet.in/