



## IUCAA Associates Fest

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The Visiting Associates Programme of IUCAA is an integral part of its efforts to spread astronomy and astrophysics in universities and colleges in the country. A number of associates visit during the summer vacation period. The team associated with the Visitor Academic Programmes made special efforts this year to increase the number of associates coming in the summer and to foster interaction between them and the faculty at IUCAA. As a part of these overall efforts, the very first Associates Fest was organized during June 25-29, this year. This gave an opportunity for the Visiting Associates and a few former associates to highlight their own work, through presentations and discussions over the period of the Fest. There were also presentations by faculty from IUCAA, NCRA and IISER, Pune on present and upcoming facilities including the instrumentation programme at IUCAA and two mega projects, Thirty Metre Telescope (TMT) India and LIGO-India in which IUCAA will be a nodal institution. The talks were delivered by Sk. Saiyad Ali, Dipankar Bhattacharya, Mamta Dahiya, Sushant Ghosh, Yashwant Gupta, S.N.A. Jaaffrey, Joe Jacob, Md. Mehedi Kalam, Ajit Kembhavi, Pushpa Khare, V.C. Kuriakose, Vijay Mohan, Sailo Mukherjee, S.K. Pandey, Sajeeth Philip, Anirudh Pradhan, A.N. Ramaprakash, C.D. Ravikumar, Saibal Ray, T.R. Seshadri, H.P. Singh,





Tarun Souradeep, R. Srianand, Kandaswamy Subramanian, Prasad Subramanian, and Pranjal Trivedi. The talks were followed by a panel discussion, in which Dr. Anil Kakodkar, Chairman, Governing Board of IUCAA participated. The discussion focused on the ways in which the associates, students and other interested persons from the university could systematically participate in the exciting new projects.

A detailed report on the discussion will be provided in due course. About 20 associates, some former associates and the IUCAA faculty members participated in the Fest. It was agreed at the end of the event that such a Fest should be organized every year and associates should be encouraged to participate in large numbers.



## Welcome...

**Sujoy Kumar Modak**, who has joined as a Post-Doctoral Fellow. His areas of research are Gravitation, Cosmology, Black Hole Physics, and Gauge / Gravity Duality.

**Angel Ruiz**, who has joined as a Post-Doctoral Fellow. His areas of research are Extragalactic Astronomy, AGN, the Co-evolution of Supermassive Black Holes, and Galaxy Formation.

## Introductory Summer School on Astronomy and Astrophysics (for College/University Students) and Vacation Students' Programme



The Introductory Summer School on Astronomy and Astrophysics, was conducted at IUCAA, during May 7 - June 8, 2012. Twenty-four students from across the country, who were in their final year of B.Sc., or first year of M.Sc., as well as second/third year of engineering participated in the school. The programme consisted of a series of lectures on a wide range of topics in theoretical and observational astronomy, data analysis, and problem solving sessions. Facilities like library, internet access and computing, etc. were provided to the students during their stay. The main areas on which the lectures were given include, Astrophysical Processes, Stars and Stellar Systems, The Sun, Gravitation and Cosmology, Telescopes and Instruments, and Data Analysis. Almost all the lectures were given by faculty members and visiting associates of IUCAA. Prasad Subramanian from IISER-Pune gave a couple of lectures on introduction to the Sun. The lectures were followed by hands on demonstration sessions.

The participants were taken for a visit to the IUCAA Girawali Observatory to see the 2-m optical and infrared telescope. They also visited the GMRT, operated by NCRA. The students were assigned to do a project in groups consisting of three students. The aim of these short-term projects was to give the students a feel of working with real scientific data and analysis methods. At the end of the school, the students made posters as well as oral presentations which were very well appreciated by the IUCAA faculty members.

An interactive session was arranged between IUCAA research scholars and post-doctoral fellows, and the summer school students, to give the summer school students an opportunity to ask questions related to life



as a researcher and regarding the research career in Astronomy.

The faculty coordinators for the Summer School were Durgesh Tripathi and Ajit Kembhavi.

### The Vacation Students' Programme (VSP)

The Vacation Students' Programme (VSP), for students in their penultimate year of M.Sc. (Physics) or engineering degree course was held during May 7 - June 22, 2012. Exceptionally motivated final year B.Sc. and second year engineering students were also invited. This year, twelve students participated in this programme. The participants attended about 50 lectures, dealing with a wide variety of topics in Astronomy and Astrophysics, given by the academic members of IUCAA. They also did a project with one of the faculty members of IUCAA during this period. R. Srianand was the faculty coordinator of this programme.

### E-Books...



The IUCAA library has recently acquired 183 e-books in physics and astronomy published by Cambridge University Press (CUP) and 78 e-books from the Oxford Scholarship Online, which can be accessed at <http://www.iucaa.ernet.in/~library/eBooks.html>. These e-books can be accessed by the users within IUCAA. At present, certain IUCAA Resource Centres can access these books and it is planned to extend the facility to all the IRCs in the near future.

## School Students' Summer Programme and Astronomy Camp



IUCAA Public Outreach group conducted the regular School Students' Summer Programme as well as an Astronomy Camp from April 11 to May 20, 2012. One hundred and sixty students of class VIII/IX/X participated in this programme, who were nominated by their schools.

The highlight of the Camp was the newly developed content to give an overview of Astronomer's tools to school students, while getting them to try out what they study in school. Topics covered ranged from simple geometry and statistics to optics and spectroscopy. The students used the Samrat Yantra to study Trigonometry, as well as the Celestial Motions of the Sun. They were able to understand the scales of the solar system by finding the ratio of the distances of the Planets to the Sun. They were also introduced to the basics of aeromodelling and flight. Star maps were distributed, and sky watching practice sessions were held for all the students on Friday evenings. Throughout the duration, effort was taken to clarify misconceptions and to give a better understanding of motives of Science.

The programme was coordinated by Samir Dhurde. The experimental devices used were designed by Arvind Paranjpye (Director, Nehru Planetarium, Mumbai), who also gave four talks. They were constructed by Maharudra Mate. Considerable teaching help was

provided by summer interns, Chaitanya Thakur and Sujay Mate, both first year B.Sc. students from Fergusson College, Pune, and IISER, Pune respectively. The ability of the students of that age to put data into a graphical form is being assessed, in collaboration with Amit Dhakulkar, a research student at HBCSE-TIFR, Mumbai.

The regular, School Students' Summer Programme continued in parallel, in which about 21 students did projects with six academics from IUCAA, namely, J. V. Narlikar, Krishna Parattu, Pushpa Khare, Ranjan Gupta, Shalima P. and Suprit Singh. The students were given access to the main IUCAA library, and the facilities at the Mukhtangan Vidyanayn Shodhika, including the library, computers and workshops. On completion of their work, on the last working day, the student teams made presentations on the work done by them during that week.

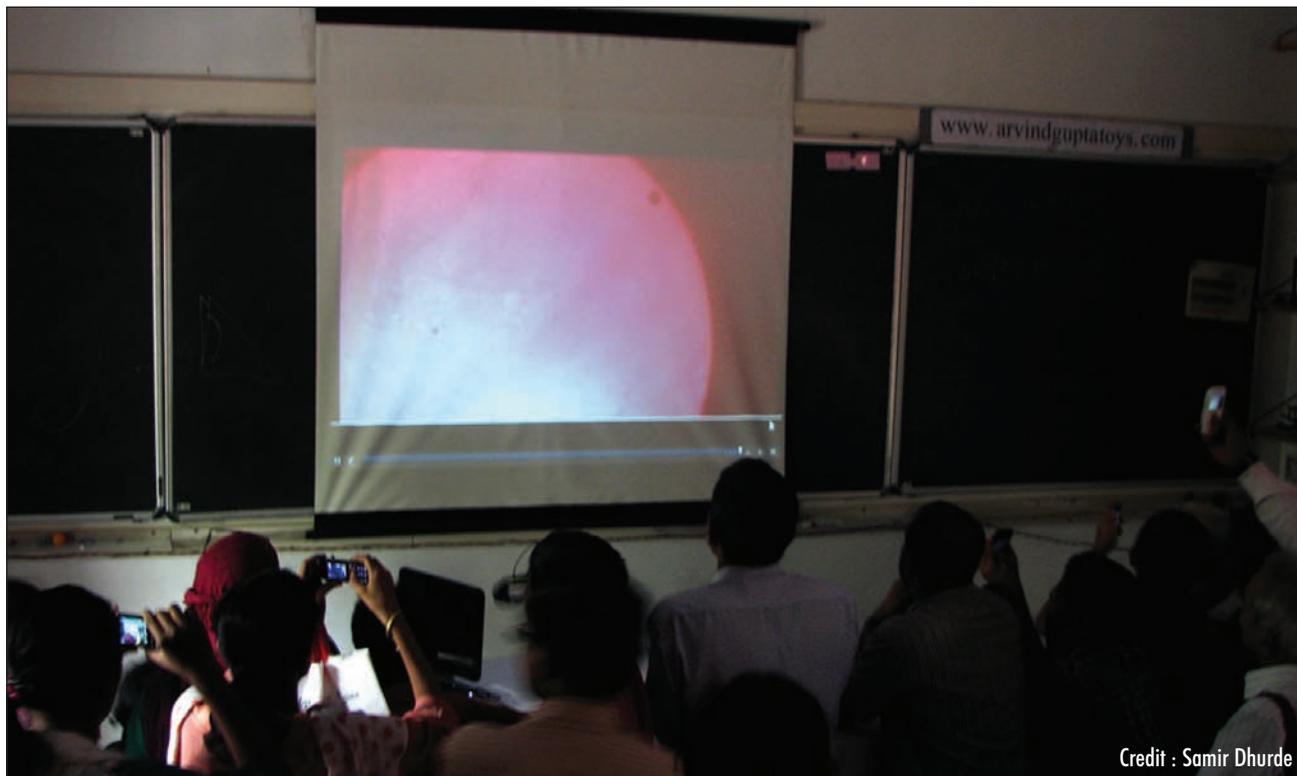
### Educational Campus Visit

Over 3 weeks in May 2012, IUCAA conducted educational campus visits for ~1500 high school students from many districts of Maharashtra in collaboration with the INSPIRE programme conducted by IIT, Pune. During the visit, the students spent time in the Science Park aided by IUCAA trained volunteers, and attended a talk discussing astronomy and its scope for Indian students.



# Transit of Venus

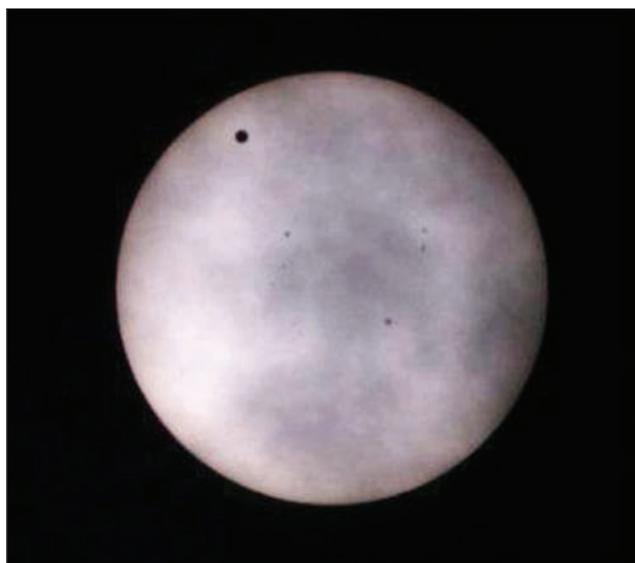
June 6, 2012



Credit : Samir Dhurde

On June 6, 2012 more than 700 people gathered at the IUCAA Science Centre to see the Transit of Venus. Despite a cloud cover, many woke up early to see the event, which had already started before the Sun rose at 6.00 a.m. The enthusiasm for this rare event that happens twice in a century separated by eight years, was not dampened by the drizzle. The clouds played spoilsport while live telecasts from other Indian cities could be seen on TV. A webcast from the Keck Observatory was shown to the public in the Science Centre.

The Public Outreach team, with the help of Akashmitra volunteers, had prepared six telescopes and many solar image projection units. Hundreds of solar eclipse goggles had also been distributed. This year's summer school students had been trained to make solar projectors to share the event with those around them. However, the clouds continued till 9:15 a.m., and when the Sun peeked out, all the patient viewers got to see live the round beauty spot on the face of the Sun. This was for the second time, after 2004, that IUCAA was successful in sharing this event with so many people. The picture shows the event, as seen from Pune by an amateur astronomer, Kshitija Kelkar, an ex-project student at IUCAA. It also shows some sunspots that were actually on the Sun's surface on that day.



Credit : Kshitija Kelkar



Credit : V.C. Kuriakose, Visiting Associate of IUCAA, and his students at CUSAT, Kochi (Using 6" IUCAA telescope)

## Seminars

12.04.2012	Rishi Khatri on <i>Bose-Einstein condensation of CMB and damping of sound waves in the early universe</i>
04.05.2012	Dipanjan Mukherjee on <i>MHD of accretion columns on neutron star poles and cyclotron spectra</i>
09.05.2012	Hadi Rahmani Bayegi on <i>Constraining the variation of fundamental constants at <math>z \sim 1.3</math> using 21-cm absorbers</i>
15.05.2012	Sanved Kolekar on <i>Some issues in horizon thermodynamics</i>
17.05.2012	Suprit Singh on <i>Complex effective path: A semi-classical probe of quantum effects</i>
25.05.2012	Vikram Rana on <i>The nuclear spectroscopic telescope array (NuSTAR)</i>
29.05.2012	Bhaswati Bhattacharyya on <i>Discovery of interesting millisecond pulsars at the positions of Fermi LAT unassociated sources and results from followup study</i>
30.05.2012	Aditya Rotti on <i>Weak lensing probes of cosmology</i>
31.05.2012	P. Shalima on <i>Dust properties of extragalactic sources</i>
01.06.2012	Bibhas Majhi on <i>Noether current, Virasoro algebra and entropy</i>
04.06.2012	Sibasish Laha on <i>A study of warm absorbers in Seyfert galaxies in X-rays</i>
06.06.2012	Kaustubh Vaghmare on <i>The ones in the middle</i>
11.06.2012	Charles Jose on <i>Spatial clustering of high redshift LBGS</i>
12.06.2012	Ramesh Chandra on <i>Multiple surges/jets and associated flares from NOAA Ar10484 on 23 and 25 October, 2003</i>
12.06.2012	Badam Singh Kushvah on <i>Stability and chaos in dynamical systems</i>
12.06.2012	Debbijoy Bhattacharya on <i>Blazar: Long term variability and their luminosity function</i>
13.06.2012	Pramod Kumar Samal on <i>Question of isotropy of universe</i>
13.06.2012	Sanil Unnikrishnan on <i>Non-canonical scalars and their application in cosmology</i>
14.06.2012	Gaurav Goswami on <i>Uncovering cosmic inflation</i>
15.06.2012	Jayanti Prasad on <i>Optimization problems in cosmology</i>
18.06.2012	Prakash Sarkar on <i>Exploring the cosmic web in the galaxy redshift survey</i>
20.06.2012	Sowgat Muzahid on <i>QSO absorption line systems : Intervening and associated</i>
22.06.2012	Surajit Paul on <i>Effect of galaxy cluster mergers on cluster medium and void</i>



## Announcements

### Workshop on Cosmology (November 8 - 10, 2012)

Bangalore University will be hosting an IUCAA sponsored Workshop on Cosmology during November 8 - 10, 2012. The workshop is intended for research scholars and college/ university teachers. Topics proposed to be covered include large scale structures of the universe, cosmological models, early universe, primordial nucleosynthesis, microwave background radiation, dark matter and dark energy. To participate in this workshop please send your resume by email to B.A. Kagali before September 15, 2012. Participants will be provided with free hospitality and accommodation during this workshop. Limited travel support will be available. Those who require travel support should mention that in their applications.

Contact:

Professor B. A. Kagali,  
Department of Physics, Bangalore University, Bangalore - 560 056.  
Ph. : 080-22961475, Email : bakagali@gmail.com

### BITS-IUCAA workshop on Gravitational Waves Data Analysis (December 17 - 21, 2012)

Birla Institute of Technology and Science (BITS), Pilani, K.K. Birla Goa Campus and the Inter-University Centre for Astronomy and Astrophysics (IUCAA) are jointly organising a Workshop on Gravitational Wave Data Analysis at the BITS, Pilani, K.K. Birla Goa Campus during December 17-21, 2012. Students and young researchers with strong motivation to pursue future studies in Gravitational Waves are specially encouraged to participate in this workshop.

The participants will be introduced to the basic concepts of Gravitational Waves, their sources and detection, and techniques of data analysis. Interested candidates may send their CV to S. K. Sahay before September 30, 2012, along with a covering letter briefly mentioning their motivation to attend the workshop. Selected participants will be provided with free hospitality during the workshop. Limited travel support, as admissible, may be available for participants on advance request.

Contact :

Professor S. K. Sahay  
Department of Computer Science and Informations Systems  
BITS, Pilani - K.K. Birla Goa Campus, NH-17B, By Pass Road,  
Zuarinagar, Goa - 403726.  
Ph. : 0832-2580-243, Fax : +91-832-2557-033,  
Email : ssahay@bits-go.a.ac.in

### Introductory School in Astronomy and Astrophysics (January 29 - 31, 2013)

Srikishansarda College, Hailakandi, Assam, will be hosting an IUCAA sponsored Introductory School in Astronomy and Astrophysics. This workshop is intended for young researchers (final year postgraduate students, research scholars, and college / university teachers) who are working in this area or plan to do so in future. To participate in this workshop please send your resume by email to A. K. Das before October 31, 2012. Participants will be provided with free hospitality and accommodation during this school. Limited travel support will be available. Those who require travel support should mention that in their applications.

Contact :

Dr. Ashok Das  
Srikishansarda College, Hailakandi - 788151, Assam.  
Ph. / Fax : 03844-222409, Email : ashok.dashok.das93@gmail.com

## Visitors Expected

### July 2012

A. Abdujabbarov, Nuclear Institute of Physics, Uzbekistan; Bobomurat Ahmedov, Nuclear Institute of Physics, Uzbekistan; B.G. Anandarao, Physical Research Laboratory, Ahmedabad; KG. Arun, Chennai Mathematical Institute ; Abhay Ashtekar, University of Pennsylvania, USA; Jasjeet Bagla, IISER, Mohali; Raj Bali, University of Rajasthan, Jaipur; S.K. Banerjee, University of Petroleum and Energy Studies, Dehradun; Rupal Basak, TIFR, Mumbai; David Buckley, SAAO, South Africa; Soumya Chakravarti, Presidency University, Kolkata; Phil Charles, SAAO, South Africa; Hauen Chung, Korea Institute of Advanced Study, Korea; Prathamesh Dalvi, BITS, Goa; Sudipta Das, ISI, Kolkata; Jishnu Dey, Presidency University, Kolkata; Mira Dey, Presidency University, Kolkata; P.S. Gaikwad, University of Pune; Sunandan Gangopadhyay, West Bengal State University, Kolkata; Fred Gent, University of Newcastle, United Kingdom; Sushant Ghosh, Jamia Millia Islamia, Delhi; Sarah Gibson, High Altitude Observatory, USA; Mubashir Hamid, University of Kashmir, Srinagar; K.P. Harikrishnan, The Cochin College, Kochi; Reju Sam John, Pondicherry University; Amritaksha Kar, Assam University, Silchar; Enrico Kotze, SAAO, South Africa; Marissa Kotze, SAAO, South Africa; Shailesh Kulkarni, Sogang University, South Korea; Saurabh Kumar, Hindalco Industries Ltd., Uttar Pradesh; Suresh Kumar, Delhi Technological University; Debojoti Kuzur, IISER, Kolkata; Naval Kishor Lohani, Govt. P.G. College, Uttarakhand; Bari Maqbool, University of Kashmir, Srinagar; Anand Narayanan, IISST, Thiruvananthapuram; Ravikumar R. Panchal, B.H. Gardi College of Engineering and Technology, Rajkot; P.N. Pandita, North Eastern Hill University, Shillong; A. Rajoelimanana, SAAO, South Africa; Fidy Ramamonjisoa, University of Kwazulu-Natal, South Africa; L. Resmi, IISST, Thiruvananthapuram; Anirban Saha, West Bengal State University, Kolkata; Rathin Sarma, Hojai College, Assam; Asoke Sen, Assam University, Silchar; Anand Sengupta, IIT, Gandhinagar; Kiran Shanker, University of Allahabad, Allahabad; Pankaj Sheoren, Jamia Millia Islamia, Delhi; Dipak Singh, ERNET, Delhi; Nishant Singh, Raman Research Institute, Bangalore; Srividya Subramanian, USA; Lijo Thomas, Christ University, Bangalore; Pranjal Trivedi, University of Delhi; Jithesh V., University of Calicut, Kerala; Naveel Wani, University of Kashmir, Srinagar; Mahesh Kumar Yadav, Sant Ganinath Govt. P.G. College, Uttar Pradesh; and A.A. Zdziarski, N. Copernicus Astronomical Centre, Poland.

### August 2012

Gazi Ameen Ahmed, Tezpur University, Assam; Asoke Kumar Sen, Silchar, Assam University; Trina Chakraborty, ISI, Kolkata; Chanchal Chawla, Sant Longowal Institute of Engineering and Technology, Sangrur; Sayantan Choudhury, ISI, Kolkata; Sudipta Das, ISI, Kolkata; Reda El-Bendary, NRIAG, Egypt; Sushant Gupta, BBA Central University, Lucknow; Rekha Jaiswal, Hindu Post-Graduate College, Uttar Pradesh; Kanti Jotania, The M.S. University of Baroda, Vadodara; Barun Kumar Pal, ISI, Kolkata; Anirudh Pradhan, Hindu Post-Graduate College, Uttar Pradesh; Souvik Pramanik, ISI, Kolkata; Isabel V. Rosario, University of Valencia, Spain; and Christopher Tout, University of Cambridge, United Kingdom.

### September 2012

Andreas Finke, University of Heidelberg, Germany; and Bhola Ishwar, BRA Bihar University, Muzaffarpur.

### Long term visitors

Pushpa Khare, and Sanjeev Dhurandhar.

## Visitors

### April - June 2012

Marcela Morillo Acosta, Rupali Ahire, Syed Moosa Ali, Sk. Saiyad Ali, Pavan Kumar Aluri, Rizwan Ul-Haq Ansari, Bidisha Bandyopadhyay, Sudhanshu Barway, Sandip Bhattacharya, N. Bijoy, Sukanta Bose, Shuvendu Chakraborty, Rabin Chhetri, Steve Crawford, Pratik Dabhade, Mamta Dahiya, Drisya K., Madhuri Gaikwad, Ritesh Ghosh, Shaon Ghosh, Sushant Ghosh, M.K. Haris, Ananda Hota, Bala Iyer, Deepak Jain, S.N.A. Jaaffrey, Joe Jacob, Kanti Jotania, Minu Joy, V. Jithesh, Md. Mehedi Kalam, Tejas Kale, Atish Kamble, Rishi Khatri, Gopala B. Krishna, Atmjeet Kumar, V.C. Kuriakose, Rakesh Lakshman, Sruthil S.B. Lal, Michael Little, Nikunj Maheswari, Nairwita Mazumder, Sneha More, Arunava Mukherjee, Sailo Mukherjee, Rajesh Nayak, Mayukh Pahari, Sambit Kumar Panda, S.K. Pandey, Preeti Panjwani, Shankar Dayal Pathak, Arvind Paranjpye, Devraj Pawar, Pramod Pawar, Kedar Phadke, Sajeeth Philip, Alok Prabhakar, Anirudh Pradhan, C.P. Ranjith, C.D. Ravikumar, Saibal Ray, Rupak Roy, Amartya Jyoti Saha, Anuradha Samajdar, Subroto Sarkar, Bhim Prasad Sarmah, T.R. Seshadri, Marsha Shams, K. Shanthi, Arvind K. Singh, Balveer Singh, Dipal Singh, H.P. Singh, Nishant Singh, Parth Singh, Jay Singla, Radha Srinivasan, T.P. Srinivasan, Firoza Sutaria, Eric Tatulli, Navita Thakkar, Peter Tino, Pranjal Trivedi, Nilkanth Dattatray Vagshette, and M. Vivek.

Also there were about 35 students attending the Introductory Summer School on Astronomy and Astrophysics, and the Vacation Students' Programme.

## IUCAA Preprints

Listed below are the IUCAA preprints released during April - June 2012. These can be obtained from the IUCAA library ([library@iucaa.ernet.in](mailto:library@iucaa.ernet.in)). The preprints can also be freely downloaded from <http://www.iucaa.ernet.in/~library/main.html>.

Durgesh Tripathi, Helen E. Mason and James A. Klimchuk, *Active region moss: Doppler shifts from Hinode/EIS observations*, IUCAA-04/2012; Rakesh K. Rai and Shantanu Rastogi, *Modeling anomalous/non-CCM extinction using nanodiamonds*, IUCAA-05/2012; Naseer Iqbal, Naveel Ahmed, Mubashir Hamid and Tabasum Masood, *Correlation functions for extended mass galaxy clusters*, IUCAA-06/2012; Pranjal Trivedi, T. R. Seshadri and Kandaswamy Subramanian, *Cosmic microwave background trispectrum and primordial magnetic field limits*, IUCAA-07/2012; Anju Maurya, Shantanu Rastogi and Gael Rouille, Friedrich Huisken and Thomas Henning, *Experimental and theoretical study on the infrared spectroscopy of astrophysically relevant PAH derivatives 2- and 9-vinylnanthracene*, IUCAA-08/2012.

### Nimbostratus : Brings continuous rains

As we have said in the last article, Stratus<sup>1</sup> gets their name from Latin, which means 'layer' and nimbo is associated with Latin word "nimbus" for rain. Nimbostrati are layered clouds, which bring rains, as would be expected during the monsoon. Unlike Cumulonimbus<sup>2</sup>, these clouds bring long continuous spell of rains. These clouds are seen across the world, but are more common at the latitudes close to the equator.

These clouds are formed when altostratus (to be discussed in the next issue) descend to lower altitudes. These clouds do not have much of vertical development but the layer can be as thick as 2000 metres. Nimbostratus is somewhat similar to Altocumulus<sup>3</sup> and Stratocumulus<sup>4</sup>, but these clouds show patterns and they have well-defined base.

Nimbostrati are rather difficult clouds to photograph, as can be seen in the photographs that were taken on Mumbai-Pune highway at Lonavala ghat. These clouds have generally grey base and lack contrast. The cloud blocks the sun entirely behind it and create generally a wet, gloomy and dull rainy weather that can last for days together.

At times, the cloud breaks and one can see small blobs of clouds right below the main nimbus clouds. These are called scuds. The scuds are produced due to re-condensation of water saturated air.

Due to its featureless appearance and lack of contrast, it is difficult to estimate the speed and the direction in which the cloud is traveling. This is where scuds have been found useful.

Like scuds, another interesting feature often associated with nimbostratus is virga. It is streak or shaft of cloud that appears to hang from the cloud. Virga never reaches the ground. It evaporates well above the ground level.

Name : Nimbostratus

Symbol : Ns

Height : upto 2000 m

Symbol : 



Virga



Nimbostrati

<sup>1</sup> **Stratus** : Know Thy Clouds - 9, April 2012, Khagol No. 90  
<sup>2</sup> **Cumulonimbus** : Know Thy Clouds - 3, October 2011, Khagol No. 84  
<sup>3</sup> **Altocumulus** : Know Thy Clouds - 5, April 2011, Khagol No. 86  
<sup>4</sup> **Stratocumulus** : Know Thy Clouds - 6, July 2011, Khagol No. 87