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Editor :
Swara Ravindranath
(swara@iucaa.ernet.in)

Editorial Assistant :
Manjiri Mahabal
(mam@iucaa.ernet.in)

Three day INAAD workshop on Science with *Optical Spectra*

Contents...

A three day workshop on 'Science with Optical Spectra' was conducted at Mar Athanasios College for Advanced Studies (MACFAST, http://macfast.org/), Tiruvalla (Kerala) during September 6 - 8, 2012. It was a follow-up of the workshop on 'Optical Astronomy Projects using IRAF', that was held at Newman College, Thodupuzha (Kerala) in January 2012. In addition to 15 undergraduate students from the previous workshop, 15 research scholars from different universities also participated in this workshop. A pre-workshop session was held on 5th at Newman College for students to refresh them on the spectral reduction procedures that were taught in the January workshop.

The workshop started with a class on "Physics of emission and absorption lines" by Pushpa Khare. This was followed by a class on "Science with optical spectra" by R. Srianand. The theory lectures were backed with hands-on sessions in the afternoon, conducted by local resource persons Vivek, Biju, Sheelu and Arunkumar. The programmes continued late into the evenings and the lab that was powered by a 30KW solar power plant was open overnight to the participants. Participants used SDSS spectra of about a dozen galaxies to estimate star formation rates, black hole mass, galaxy rotational velocities, and mass of galaxy clusters .

A parallel session for school students on 7th September, titled, "A day with an astronomer" witnessed the enthusiasm of the youth to astronomy. Over 500 students overflowed the auditorium and the talk on "Understanding the universe" by Pushpa Khare was followed by an unconstrained flow of questions.

A public lecture by Ajit Kembhavi to about 300 elite participants, which included leading medical doctors, researchers and teachers marked the ceremonial climax of the workshop. The talk highlighted the major Indian Astronomy research projects and collaborations such as the TMT, SALT, LIGO, etc. with special emphasis to the importance of the "LIGO- India" project.

Tiji Thomas, Head of the Department of Computer Applications was the local organiser of the programme from the MACFAST side. The workshop was conducted under the auspices of the IUCAA Resource Centre, Kochi, and the INAAD at Newman College, Thodupuzha with R. Srianand, V.C. Kuriakose, and Joe Jacob as coordinators.

Welcome to the IUCAA Family

IUCAA is happy to announce the selection of the Twenty-third Batch (2012) of Visiting Associates. The Visiting Associateship is for a tenure of three years, beginning August 2012.

Extension of term to the Twentieth Batch of Visiting Associates

Sk. Saiyad Ali, Jadavpur University, Kolkata
Shyamal Kumar Banerjee, University of Petroleum and Energy Studies, Dehradun
Anjan Dutta, University of Delhi
Sarbari Guha, St. Xavier's College, Kolkata
Joe Jacob, Newman College, Thodupuzha
Deepak Jain, Deen Dayal Upadhyaya College, Delhi
Minu Joy, Alphonsa College, Pala
Mamta, S.G.T.B. Khlasa College, Delhi
Bikash Chandra Paul, North Bengal University, Siliguri
Farook Rahaman, Jadavpur University, Kolkata
C.D. Ravikumar, University of Calicut, Kozhikode
Sandeep Sahijpal,Panjab University, Chandigarh
Asoke Kumar Sen, Assam University, Silchar
K. Shanthi, University of Mumbai
Ranjan Sharma, P.D. Women's College, Jalpaiguri
Pranjal Trivedi, Sri Venkateswara College, Delhi

New Visiting Associates

Gazi Ameen Ahmed, Tezpur University
Prasad Basu, National Institute of Technology, Sikkim
Koushik Chakraborty, Government Training College, Hooghly
Partha Chowdhury, University of Calcutta, Kolkata
Broja Gopal Dutta, Y.S. Palpara College, West Bengal
Supriyo Mitra, IISER, Kolkata
Soumen Mondal, R.M.R. College, Kolkata
Hemwati Nandan, Gurukula Kangri Vishwavidyalaya, Hardwar
Rajesh Kumble Nayak, IISER, Kolkata
Amit Pathak, Tezpur University
Somak Raychaudhury, Presidency University, Kolkata
Sanjay Kumar Sahay, BITS Pilani, Goa
Somasri Sen, Jamia Millia Islamia, New Delhi
K. Yugindro Singh, Manipur University, Imphal
Parijat Thakur, Guru Ghasidas Vishwavidyalaya, Bilaspur

Congratulations to ...

Jayant Narlikar on being selected for the 2012 Third World Academy of Science Regional Prize, which is earmarked this year for `***Building Scientific Institutions***' and the ***Telesio-Galilei Academy of Science Award*** by Telesio-Galilei Academy of Science, UK.

T. Padmanabhan on being elected ***Fellow of the Third World Academy of Sciences (TWAS)*** and on being conferred with ***Thomson Reuters Research Excellence India Citation Award 2012.***

Varun Sahni on being conferred with ***Thomson Reuters Research Excellence India Citation Award 2012.***

Tarun Souradeep on being conferred with the ***Hari Om Ashram Prerit Dr. Vikram Sarabhai Research Award for the year 2011,*** by Physical Research Laboratory, Ahmedabad.

Welcome to...

Satadru Bag, Prasanta Bera, Rajeshwari Dutta, Bhooshan Gadre, and Hamsa Padmanabhan, who have joined as Research Scholars.

Varun Bhalerao, who has joined as Vaidya-Raychaudhuri Post-doctoral Fellow. His areas of research are Compact Objects (Neutron Stars, White Dwarfs) in X-rays, Optical and IR, and Astronomical Instrumentation.

Arunava Mukherjee, who has joined as a Post-doctoral Fellow. His areas of research are Timing and Spectral Properties in Low-mass X-ray Binaries, Physics of Accretion Processes, and High Energy Astrophysics.

Srividya Subramanian, who has joined as a Post-doctoral Fellow. Her area of research is Solar Spectroscopy.

Shruti Tripathi, who has joined as a Project Scientist. Her area of research is X-ray Variability of AGN : Timing and Spectral Studies.

Surajit Paul, and **Shalima Puthiyaveettil,** who have joined as DST-SERB Fast Track Young Scientists.

...Farewell to

Debbijoy Bhattacharya, who has joined the Manipal Centre for Natural Sciences, as an Assistant Professor.

Sanil Unnikrishnan, who has joined the IISER, Thiruvananthapuram as a Post-doctoral Fellow.

Vaidya – Raychaudhuri Post-doctoral Fellow

Varun Bhalerao has joined IUCAA in August this year as the first Vaidya-Raychaudhuri post-doctoral fellow. This prestigious fellowship named after the two great relativists, has been instituted to attract talented young persons to IUCAA. Varun did his Ph.D. at Caltech, working with Fiona Harrison and Shri Kulkarni. His primary research interests are in astronomical instrumentation, and compact astrophysical objects. He worked on detector development for NuSTAR hard X-ray telescope, which was recently launched into space, and is now using his expertise in the calibration of the CZTI instrument on ASTROSAT. His interests in Astronomy cover neutron stars, white dwarfs and various classes of binaries.

Varun will be contributing to the instrumentation programme at IUCAA.

IIST-IUCAA Introductory Workshop on Solar Physics

Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram and the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune are jointly organizing an introductory workshop on Solar Physics, during November 29 - December 01, 2012. The workshop will be hosted at IIST campus.

Solar physics is a branch of astrophysics that specializes in exploiting and explaining the detailed measurements that are possible only for the Sun, our nearest star. The Sun provides us with unique opportunities to study the different dynamic processes taking place in late-type stars and other astrophysical objects. In addition, the Sun plays a pivotal role in shaping the climate patterns on Earth. Study of the Sun and its atmospheric dynamics has been at the forefront internationally as demonstrated by a number of launched space missions dedicated to solar studies, and various others in planning and preparation phases by different international space agencies such as the National Aeronautics and Space Administration (NASA), European Space Agency (ESA), Japan Aerospace Exploration Agency (JAXA), etc. Considering the importance of solar studies, Indian Space Research Organization (ISRO) will be launching a dedicated mission to study solar physics, named ADITYA-1 in 2014, which will be the only coronagraph observing the Sun's corona - the outermost atmosphere of the Sun - in that time frame and therefore, carries a lot of international importance. In addition, the ground based observing facilities in India such as Multi-Application Solar Telescope (MAST) at Udaipur Solar Observatory and planned National Large Solar Telescope (NLST) will play important role in the studies of dynamics of solar magnetic fields. Given that there are so many existing space missions already providing unprecedented observations of the Sun and various upcoming space missions along with ground based observing facilities both nationally and internationally, this is a golden era for solar physicist.

Topics to be covered

The participants will be introduced to the physics of the Sun, its internal structure, atmosphere and dynamics, in addition to energy transport within different layers of Sun's atmosphere and Sun-Earth connection.

Eligibility

Students pursuing their M.Sc. (Physics, first year or final year) and B.Tech. (Any branch, final year) with strong motivation to pursue further studies in Solar Physics are encouraged to apply for this workshop. We will admit at most 10 students.

How to apply

Interested candidates should send their CV by e-mail to Administrative Officer (Core Programmes) (e-mail: aocp@iucaa.ernet.in) on or before October 30, 2012 along with a covering letter briefly mentioning their motivation to attend the workshop and a recommendation letter from the Head of the Department /Institute. While submitting the application please mention 'Solar Physics Workshop' in the subject of the e-mail. Selected candidates will be provided with free hospitality during the workshop and to-and-fro train fare.

For any queries related to this workshop, contact Anandmayee Tej (anandmayee.tej@gmail.com) and/or Durgesh Tripathi (durgesh@iucaa.ernet.in).

Workshop on Mathematical Methods and Astronomy (WMMA 2013)

Indian School of Mines, Dhanbad will be hosting an IUCAA sponsored Workshop on Mathematical Methods and Astronomy during February 07 - 09, 2013. The aim of the workshop is to motivate young minds towards the mathematical methods in Astronomy and related areas. First two days of the workshop will be on Astronomy and the emphasis will be on Astronomical Instrumentation. The last day will be devoted to lectures on Mathematical Methods.

Interested participants may send their request (by email), along with their CV and a recommendation from the Head of the Department /Institution to the Coordinator latest by November 15, 2012. The selected participants will be informed by email.

Participants will be provided with free hospitality, including accommodation during this workshop. Limited travel support will be available. Those who require travel support should mention that in their applications.

Coordinator:

Badam Singh Kushvah

Assistant Professor

Department of Applied Mathematics, Indian School of Mines,
Dhanbad-826004, Jharkhand (India)
Phone and Fax: +91-326-223-5765
Mobile: 9471191119
Email: bskush@gmail.com

Astronomy Outreach by IUCAA

More than 6000 students, in places as far as Sangamner, in Ahmednagar District of Maharashtra, have been exposed to the wonders of the night sky through Mobile Planetarium Programmes of IUCAA astronomy outreach. From July 2012, over 200 shows have been very successfully run by many enthusiastic school teachers and volunteers trained at IUCAA.

Students at IUCAA's celebration of the
International Observe the Moon Night - 22nd Sept. 2012.

A special evening course for amateur Astronomers is being run at the Muktangan Vidnyan Shodhika by Samir Dhurde. This aims to give some experienced amateurs an exposure to advanced methods like photoelectric photometry and CCD imaging. Ten amateurs from the city are participating in this course planned to run from August to December 2012.

2nd IUCAA X-ray Astronomy School

IUCAA will organize a one-month long school on X-ray Astronomy, during February 4 - March 1, 2013. The school will be similar to the first X-ray astronomy school organized at IUCAA during February -March 2009. The main purpose of the school is to gain hands-on understanding of X-ray astronomy, so that the X-ray observations made with the upcoming Indian astronomy satellite ASTROSAT can be utilized fruitfully. The school will introduce X-ray astronomy and provide necessary theoretical background and hands-on experience on the analysis and interpretation of X-ray data obtained from X-ray observatories such as XMM-Newton, Chandra and Suzaku. The participants of the school will work on research projects under the guidance of experienced scientists and will have a chance to continue their work in collaboration after the school. Ph.D. students, postdocs and young faculties having interest in X-ray astronomy should apply with their curriculum vitae and one page write-up on their current or planned work and their interest in X-ray Astronomy. Ph.D. Students should arrange for a recommendation letter from their advisers, and the letter should be sent directly by the advisors to the address given below. Local hospitality and travel support will be provided by IUCAA. Applications in the pdf format should be emailed or hardcopies should be sent to the address given below by November 30, 2012. The candidates will be informed of their selection for the school by December 15, 2012.

The Administrative Officer (Core Programmes)
IUCAA, Post Bag 4, Ganeshkhind, Pune - 411 007 (e-mail: aocp@iucaa.ernet.in)

Introductory Workshop on Solar Physics

The Ramakrishna Mission Vivekananda University (RMVU), Belur and the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune are jointly organizing an introductory workshop on Solar Physics during February 05 - 07, 2013. The workshop will be hosted at RMVU campus, Belur, West Bengal.

Solar physics is a branch of astrophysics that specializes in exploiting and explaining the detailed measurements that are possible only for the Sun, our nearest star. The Sun provides us with unique opportunities to study the different dynamic processes taking place in late-type stars and other astrophysical objects. In addition, the Sun plays a pivotal role in shaping the climate patterns on Earth. Study of the Sun and its atmospheric dynamics has been at the forefront internationally as demonstrated by a number of launched space missions dedicated to solar studies and various others in planning and preparation phases by different international space agencies such as the National Aeronautics and Space Administration (NASA), European Space Agency (ESA), Japan Aerospace Exploration Agency (JAXA) etc. Considering the importance of solar studies, Indian Space Research Organization (ISRO) will be launching a dedicated mission to study solar physics named ADITYA-1 in 2014, which will be the only coronagraph observing the Sun's corona - the outermost atmosphere of the Sun - in that time frame and therefore, carries a lot of international importance. In addition, the ground based observing facilities in India such as Multi-Application Solar Telescope (MAST) at Udaipur Solar Observatory and planned National Large Solar Telescope (NLST) will play important role in the studies of dynamics of solar magnetic fields. Given that there are so many existing space missions already providing unprecedented observations of the Sun and various upcoming space missions along with ground based observing facilities both nationally and internationally, this is a golden era for solar physicist.

Topics to be covered

The participants will be introduced to the physics of the Sun, its internal structure, atmosphere and dynamics in addition to energy transport within different layers of Sun's atmosphere and Sun-Earth connection.

Eligibility

Students pursuing their M.Sc.(Physics, first year or final year), B.Sc.(Physics, final year) and B.Tech. (Any branch, final year) with strong motivation to pursue further studies in Solar Physics are encouraged to apply for this workshop.

How to apply

Interested candidates should send their CV by e-mail to Partha Choudhuri (partha240@yahoo.co.in) on or before November 30, 2012 along with a covering letter briefly mentioning their motivation to attend the workshop and a recommendation letter from the Head of the Department/Institute. While submitting the application please mention 'Solar Physics Workshop' in the subject of the e-mail.

IUCAA Preprints

Listed below are the IUCAA preprints released during July - September 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/preprints.html

Ruta Kale, K.S Dwarakanath, Joydeep Bagchi, and Surjit Paul, *Spectral and polarization study of the double relics in Abell 3376 using the GMRT and the VLA,* IUCAA-9/2012.

Abhik Ghosh, Jayanti Prasad, Somnath Bharadwaj, Sk. Saiyad Ali, and Jayaram N. Chengalur, *Characterizing foreground for redshifted 21-cm radiation: 150 MHz GMRT observations,* IUCAA-10/2012.

S.V. Dhurandhar, W.-T. Ni, and G. Wang, *Numerical simulation of time delay interferometry for LISA with the simplification or having only one interferometer,* IUCAA-11/2012.

Seminars

Listed below are the seminars given at IUCAA during April-June 2012.

02.07.2012	Santanu Das on *Effects of variation of dark energy on the CMBR angular power spectra.*
03.07.2012	Luke Chamandy on *Galactic spiral patterns and dynamo action: A new twist on magnetic arms.*
10.07.2012	F.A. Gent on *The supernova-regulated ISM: Multi-phase structure, the magnetic field and dynamo.*
24.07.2012	Shantanu Desai on *Optical follow-up program of south pole telescope galaxy clusters.*
09.08.2012	Pasham R. Dheeraj on *A study of the long x-ray periods of ultraluminous x-ray sources: Clues on accretion geometry.*
16.08.2012	R. I. Vilaplana Cerda, on *Absorption and scattering of light by small particles: An application to cometary dust particles.*
21.08.2012	Srividya Subramanian on *Small scale EUV and X-ray transient brightenings in the solar atmosphere.*
23.08.2012	Vithal Tilvi on *Discovering galaxies during the reionization epoch.*
29.08. 2012	Peeyush Prasad on *AARTFAAC and the search for radio transients using LOFAR.*
04.09.2012	Christopher Tout on *The origin of the strongest magnetic fields in white dwarfs.*
11.09.2012	T.K. Ramkumar on *Medium (2 mhz) and very high (53 mhz) frequency radar observations of atmospheric dynamics and ionospheric electrodynamics.*

Colloquium

16.07.2012 Sarah Gibson on *Magnetism and the invisible man: The mysteries of coronal cavities.*

Obituary

Susan Kuriakose

Susan Kuriakose, who was on the administrative staff at IUCAA for close to twenty years, passed away in a tragic accident on September 15, 2012. She worked as Secretary, first in the office of the Dean, Visitor Academic Programmes for many years, and later in the Director's office.

Susan was known for her hard work, organizational abilities, sincerity and patience. Her work brought her in contact with many people in India and abroad, who often became her friends. Susan contributed much to the many activities at IUCAA, and her passing away has been a great loss.

Susan leaves behind, her husband, young daughter, parents, brothers, her larger family and a host of people - from IUCAA, from many other places and from her church, who greatly benefitted from her many acts of kindness.

Visitors Expected

October 2012

Shah Alam, Jamia Millia Islamia, Delhi; Tanwi Bandyopadhyay, Shri Shikshayatan College, Kolkata; Gour Bhattacharya, Presidency University, Kolkata; Broja Gopal Dutta, Y.S. Palpara College, West Bengal; Archisman Ghosh, International Centre for Theoretical Sciences, Bangalore; Ritesh Ghosh, Visva Bharati University, Santiniketan; Matteo Guainazzi, European Space Astronomy Centre, Spain; Joe Jacob, The Newman College, Kerala; Aditya S. Mondal, Visva Bharati University, Santiniketan; Soumen Mondol, Ramakrishna Mission Residential College, Kolkata; Pradip Mukherjee, Barasat Government College, Kolkata; K.S.V.S. Narasimhan, New College, Chennai; S.K. Pandey, Pandit Ravishankar Shukla University, Raipur; P.N. Pandita, North Eastern Hill University, Shillong; B.C. Paul, North Bengal University, Siliguri; Saibal Ray, Government College of Engineering and Ceramic Technology, Kolkata; Anirban Saha, West Bengal State University, Barasat; Kanak Saha, MPE, Germany; Tarun Deep Saini, Indian Institute of Science, Bangalore; Subrato Sarkar, Visva Bharati University, Santiniketan; Sudipta Sarkar, Institute of Mathematical Sciences, Chennai; Rathin Sarma, Hojai College, Assam; Ranjan Sharma, P.D. Women's College, West Bengal; Yuri Shtanov, Bogolyubov Institute for Theoretical Physics, Ukraine; and Douglas Singleton, California State University, USA.

November 2012

Tomaso Belloni, INAF, Italy; Arindwam Chakraborty, Assam University, Silchar; Koushik Chakraborty, Government Training College, West Bengal, Asis Chattopadhyay, Calcutta University, Kolkata; Surajit Chatopadhyay, Pailan College of Management and Technology, Kolkata; Tanuka Chattopadhyay, Calcutta University, Kolkata; Himadri S. Das, Assam University, Silchar; Sumit Jaiswal, ARIES, Nainital; Kanti Jotania, The M.S. University of Baroda, Vadodara; Soma Mandal, Taki Government College, West Bengal; Helen Mason, University of Cambridge, United Kingdom; S.K. Pandey, Pandit Ravishankar Shukla University, Raipur; M.K. Patil, Swami Ramanand Teerth Marathwada University, Nanded; Farook Rahaman, Jadavpur University, Kolkata; Parijat Deb Roy, Assam University, Silchar; Priya Shanti D., Osmania University, Hyderabad; and Matteo Smerlak, Max-Planck Institute for Gravitational Physics, Germany.

December 2012

Dharms Baboolal, University of Kwazulu-Natal, South Africa; Samarpita Bhattacharya, Bengal Engineering and Science University, Howrah; K.S. Bindra, Panjab University, Chandigarh; Ritabrata Biswas, Indian Institute of Science, Bangalore; Shuvendu Chakraborty, Jadavpur University, Kolkata; Suresh Chandra, Lovely Professional University, Punjab; Surajit Chattopadhyay, Pailan College of Management and Technology, Kolkata; Rumi Deb, Sikkim Manipal Institute of Technology, Sikkim; Ujjal Debnath, Bengal Engineering and Science University, Howrah; Nur Farhad, Aliah University, Kolkata; Rahul Ghosh, Bhairab Ganguly College, Kolkata; Gabriel Govender, University of Kwazulu-Natal, South Africa; Ashoke Sen, Harish Chandra Research Institute, Allahabad; Mohit Kumar Sharma, Jiwaji University, Gwalior; Pedro Mafa Takisa, University of Kwazulu-Natal, South Africa; Paniveni Udayashankar, NIE Institute of Technology, Mysore; and M.M. Verma, Lucknow University, Lucknow.

Long term visitors

P.C. Agrawal

Hauen Chung

Sanjeev Dhurandhar

Pushpa Khare

M. Parthasarathy

Visitors

July - September 2012

Ahmadjon Abdujabbarov, Gazi Ameen Ahmed, Ishtiaq Ahmed, Bobomurat Ahmedov, Shah Alam, Syed Moosa Ali, S. Saiyad Ali, Pavan Kumar Aluri, B.G. Anandarao, G.C. Anupama, K.G. Arun, Ashish Asgekar, Abhay Ashtekar, Jasjeet Bagla, Raj Bali, Naseer Iqbal Bhat, Bidisha Bandyopadhyay, Sougata Basu, Debbijoy Bhattacharya, Anupam Biswas, Atreyee Biswas, David Buckley, Sukanta Bose, Praveen Chaddah, Sandip Chadha, Subenoy Chakraborty, Trina Chakraborty, Soumya Chakravarty, Sumanta Chakraborty, S. Chandrasekharan, Phil Charles, Swati Chatterjee, Dipayan Chattopadhyay, Chanchal Chawla, Rabin Chhetri, Sayantan Choudhury, Manisha Chourasia, Haeun Chung, Pratik Dabhade, James Dacey, Mamta Dahiya, Prathamesh Dalvi, Sudipta Das, Ghanshyam Date, Shantanu Desai, Jishnu Dey, Mira Dey, Pasham Dheeraj, Dinesh Dixit, A.K. Dogra, Gourab Dutta, Reda El-Bendary, Andreas Finke, Prakash Suryakant Gaikwad, Madhuri Gaikwad, Sunandan Gangopadhyay, Sharad Gaonkar, Fred Gent, Shaon Ghosh, Suparna Ghosh, Sushant Ghosh, Tuhin Ghosh, Sarah Gibson, Rupjyoti Gogoi, J.N. Goswami, Sushant Gupta, Debdyuti Halder, M.K. Haris, Mubashir Hamid, K.P. Harikrishnan, Ananda Hota, Bhola Ishwar, Deepak Jain, Rekha Jaiswal, Harvinder Kaur Jassal, Jithesh V., Reju Sam John, Nidhi Joshi, Kanti Jotania, Anil Kakodkar, Atish Kamble, Niloufer Kazmi, T.R. Kem, Kenda Knowles, Enrico Kotze, Marissa Kotze, Shailesh Kulkarni, Atmjeet Kumar, Gulshan Kumar, Rajiv Kumar, Suresh Kumar, Debojoti Kuzur, Deepshika Lahiri, Rakesh Lakshman, S.B. Sruthil Lal, Naval Kishor Lohani, Nilanjana Mahata, Nikunj Maheswari, Sankar Mandal, Soma Mandal, Bari Maqbool, Tabasum Masood, Filbert Minz, Arabind Mitra, Gour Mohan, Anupam Mukherjee, Pradip Mukherjee, S. Mukherjee, Anand Narayanan, Dipanjan Nag, Rajesh Nayak, Devendra Ojha, Barun Kumar Pal, Supriya Pan, Sambit Kumar Panda, Mahadev Pandge, S.K. Pandey, P.N. Pandita, Changbom Park, Devraj Pawar, Pramod Pawar, Alok Prabhakar, Anirudh Pradhan, Souvik Pramanik, Tanusree Raha, Andry Rajoelimanana, Anusha Ramachandran, Fidy Ramamonjisoa, T.K. Ramkumar, A.R. Rao, C.D. Ravikumar, Biplab Raychaudhury, Resmi L., Jethro Ridl, Isabel Rosario, Amit Roy, Munni Roy, Amartya Jyoti Saha, Anirban Saha, Subhajit Saha, Sunder Sahayanathan, Payaswini Saikia, Inder Sain, Anuradha Samajdar, Ratna Sanyal, Rathin Sarma, Bhim Prasad Sarmah, Seema Satin, Anand Sengupta, T.R. Seshadri, Shiv Sethi, Pankaj Sheoren, Dipak Singh, H.P. Singh, Nishant Singh, Parth Narayana Singh, Sharanya Sur, Abhishek Sutradhar, Lijo Thomas, Vithal Tilvi, Christopher Tout, Pranjal Trivedi, Sanil Unnikrishnan, Santosh Vadawale, D.B. Vaidya, Vivek Anand P., Naveel Wani, Mahesh Kumar Yadav, and Andrzej Antoni Zdziarski.

Arvind Paranjpye
Director, Nehru Planetarium, Mumbai.

Altostratus : Cloud sheets with different shapes

Altostratus clouds can be confused with other status clouds. Altostratus, as the name suggests are clouds in sheet form. These clouds often appear as smooth sheets of gray or dark gray in colour. These clouds are darker than cirrostratus, which are at the same height or above and lighter than nimbostratus nearly at the same height. In fact, these clouds are not just one layer but many layers, one over the other. These clouds can also look similar to stratus at lower level. As the thickness of altostratus increases, they would develop into nimbostratus. Nimbostratus is the rain bearing clouds as we have seen in the last article.

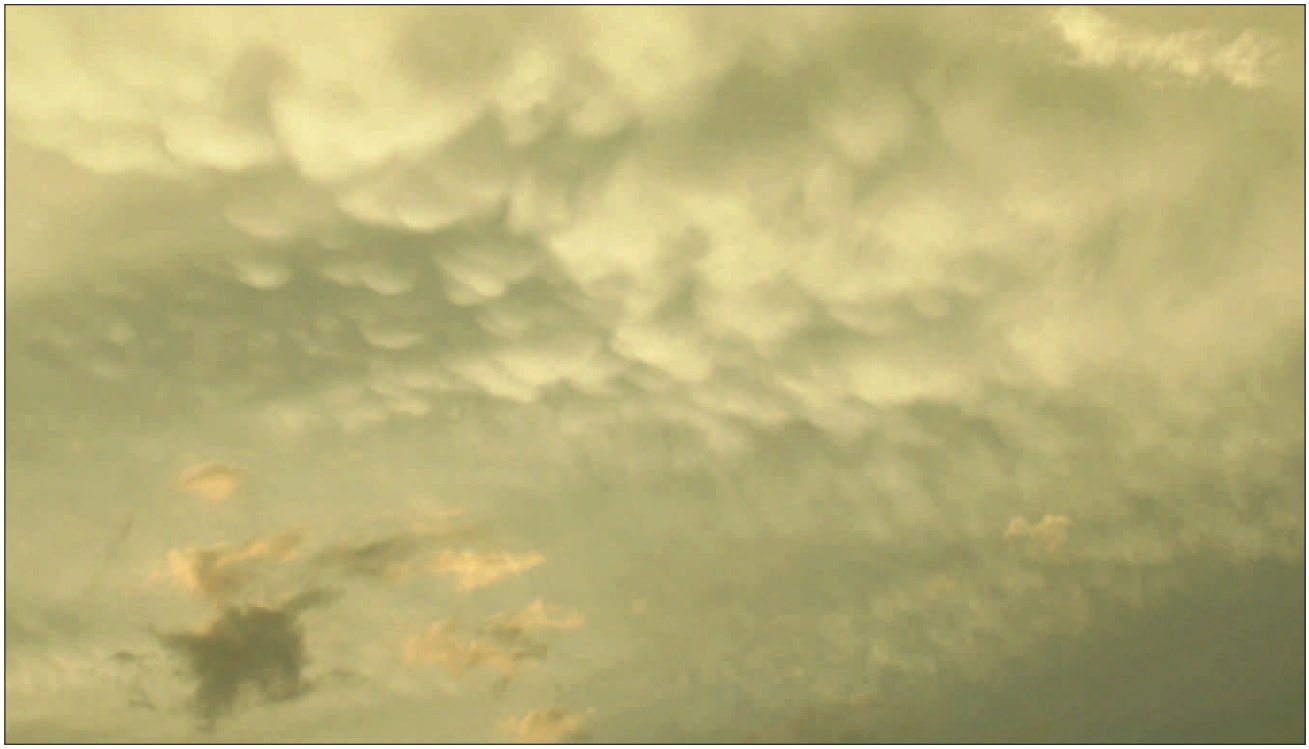
The sun and the moon can be seen through Altostratus clouds, as if one is looking through finely grounded glass. These clouds can cover a very large part of the sky.

Altostratus come in different forms, such as wavy form, called altostratus undulates, as a result of strong wind breaking them. Or in a fragmented form (fibratus). When sun is seen weakly through these, the cloud is Altostratus translucidus or Altostratus opacus when sun cannot be seen at all. Altostratus mammas have spherical lumps hanging below. Mamma in Latin means "udder" or "breast".

The clouds have either water droplets or ice crystals, and one can see beautiful display of colours, due to iridescence. From air, one can catch circular corona. This is due to diffraction of light by the crystals in the cloud.

This is the last type of clouds in this series. There are other types too, for e.g., Noctilucent clouds at the height of about 80 km, but what has been presented here is the common cloud classification.

Name	:	Altostratus
Symbol	:	As
Height	:	2400 - 6100 m
Symbol	:	



Altostratus mammas

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/