KHAGOL

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The Refresher Course in Astronomy and Astrophysics for College and University Teachers

Participants and Lecturers of the Refresher Course in Astronomy and Astrophysics

The Refresher Course in Astronomy and Astrophysics for college and university teachers was held during the period May 9 to June 10, 2011 at IUCAA. Participants were selected from all over India and sixteen highly interested participants attended the course. The course introduced astronomy and astrophysics in the first week and covered more advanced topics in the following weeks. An important aspect of the programme was the data analysis sessions, where the participants were exposed to astronomical data archives and virtual libraries. They also analysed photometric and spectroscopic data obtained through the 2 metre optical telescope at IUCAA Girawali Observatory (IGO). The faculty members, visiting associates and students of IUCAA delivered lectures and conducted lab sessions with great enthusiasm. A few faculty members and visitors outside IUCAA also delivered lectures. The scientific and the administrative staff were of vital help in ensuring that the course ran smoothly. T. Padmanabhan and R. Srianand were the faculty coordinators of the Refresher Course. Santosh Khadilkar took special interest in conducting the course smoothly. The participants also visited IGO and the Giant Metrewave Radio Telescope (GMRT). At the end of the course, it was clear from the participants' feedback that they benefitted substantially, and were inspired to take up research and teaching in astronomy and astrophysics at their home institutions.

Contents

School Students' Summer Programme - 2011

School students engaged in various activities

The annual School Students' Summer Programme was held from April 11 to May 20, 2011. One hundred and fifty students of class VIII /IX/ X participated in this programme with nominations from their schools. Most of the participants were high scorers in the National Science Day quiz contest, which was organised on February 28, 2011 and got to do a week long project with an IUCAA scientist.

During the above period, starting every Monday, 30 students in teams of 3, were guided on scientific projects by volunteering scientists at IUCAA. This year the students carried out projects under the supervision of V. Chellathurai, D. Bhattacharya, N. Katyal, S. Laha, J. V. Narlikar and Pushpa Khare. The projects covered a wide-range of topics including Polarization of Light, Use of Foucault Pendulum to Measure the Latitude of IUCAA, etc. The students were given access to the main IUCAA library, and the facilities at the Muktangan Vidnayan 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, and submitted a report.

For the last four weeks of this programme, special sessions were conducted for 120 students in an astronomy 'summer camp' format. The programme was overseen by A. Paranjpye and S. Dhurde. Expert advice and considerable teaching help were provided by A. Dhakulkar, research student at HBCSE-TIFR, Mumbai. Through various lectures and experiments, effort was taken to clarify misconceptions and give a better understanding of motives of Science. Hands-on Astronomy training was done with sky-maps. Astronomy as a career option was also discussed by K. Waghmare, research student and P. Trivedi, associate of IUCAA. A. Rupner conducted sessions to make science-toys. We have observed a marked increase in the confidence level of students due to interactions amongst peers of various schools and backgrounds, and IUCAA scientists.

The Vacation Students' Programme

Participants and Lecturers of the Vacation Students' Programme

The Vacation Students' Programme (VSP), for students in their penultimate year of M.Sc. (Physics) or engineering degree course was held during May 9 - June 24, 2011. Exceptionally motivated final year B.Sc. and second year engineering students were also invited. This year, five 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, and faculty membes of NCRA . They also did a project with one of the faculty members of IUCAA during this period. K. Subramanian was the faculty coordinator of this programme.

IUCAA Preprints

Listed below are the IUCAA preprints released during April - June 2011. 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

Sibasish Laha , Gulab C. Dewangan, and Ajit K. Kembhavi, ***X-ray warm absorption and emission in the polar scattered Seyfert 1 galaxy MRK 704, IUCAA-07/2011;*** Tarun Souradeep, **'Standard' cosmological model and beyond with CMB, IUCAA –08/2011;** Tarun Souradeep, ***Early universe with CMB polarization, IUCAA-09/2011;*** S. Paul, L. Iapichino, F. Miniati, J. Bagchi, and K. Mannheim, ***Evolution of shocks and turbulence in the formation of galaxy clusters embedded in megaparsec-scale filaments, IUCAA-10/2011;*** Rizwan Ul Haq Ansari, and Sanil Unnikrishnan, ***Perturbations in dark energy models with evolving speed of sound, IUCAA-11/2011;*** Sanjeev Dhurandhar, Hideyuki Tagoshi, Yuta Okada, Nobuyuki Kanda, and Hirotaka Takahashi, ***The cross-correlation search for a hot spot of gravitational waves, IUCAA-12/2011;*** Tarun Souradeep, ***Beyond the standard cosmological model with CMB, IUCAA-13/2011;*** Moumita Aich, Dhiraj Kumar Hazra, L. Sriramkumar, and Tarun Souradeep, ***Oscillation in the inflaton potential: Exact numerical analysis and comparison with the recent and forthcoming CMB datasets, IUCAA-14/2011.***

Welcome...

Ruta Kale, *who has joined as a Post-doctoral Fellow. Her areas of research are Galaxy Clusters, Radiation Mechanisms, etc.*

Congratulations to . . .

Arvind Gupta, on being conferred with the Outstanding Science Teacher Award by C.N.R. Rao Education Foundation, Bangalore.

Announcements

EGO-IndIGO Meet on Gravitational Waves November 1- 2, 2011, IUCAA, Pune

The Embassy of Italy in New Delhi, and IUCAA will hold a focused two days meeting between the European Gravitational Observatory (EGO) and the Indian Initiative in Gravitational Wave Observations (IndIGO) at IUCAA. The main aim of this meeting is to explore possible areas of collaboration in the technology and science of second generation gravitational wave detectors between Europe and India. T. Ramasami, Secretary, DST, has accepted to grace the meeting as the chief patron. The scientific organization is coordinated by Federico Ferrini (EGO), and Bala Iyer and Tarun Souradeep (IndIGO). The local and logistical organization is led by Tarun Souradeep (IUCAA) and Lidia Szpyrkowicz (Italian Embassy, New Delhi).

Participation in the meeting is strictly by invitation only. For more details of the programme, please visit the 'meetings' page in the IndIGO website: www.gw-indigo.org.

ICTS School on Cosmology and Gravitational Waves December 1 - 11, 2011, IUCAA, Pune

As part of the ICTS programme on Frontiers of Cosmology and Gravitation, IUCAA will organize a school on Cosmology and Gravitational Waves. The school will feature lecture courses on current research frontiers in the subject by international experts. The school targets international young researchers interested in these research areas. The call for application and programme details will be posted on the site http://www.icts.res.in/program/details/211. The school is being co-organized by Subha Majumdar (TIFR) and Tarun Souradeep (IUCAA).

ICTS Workshop on Gravitational Wave Astronomy, December 20-22, 2011, IUCAA, Pune.

In continuation of the above school, IUCAA will be hosting a Workshop on Gravitational Wave Astronomy. The workshop is expected to be attended by leading international experts from the GW groups around the globe, including, Kip Thorne (Caltech, USA), Abhay Ashtekar (Penn State University, USA), Bernard Schutz (AEI), Stan Whitcomb (LIGO, USA), and Ed Seidel (NSF, USA). The workshop is aimed at highlighting the scientific need for international cooperation in launching the new field of GW astronomy and the exciting possibility of initiating a major India initiative in this field at this time. B. S. Sathyaprakash (Cardiff, UK) leads the scientific coordination together with Tarun Souradeep (IUCAA). The participation in this meeting is strictly by invitation only. Please visit http://www.icts.res.in/program/details/211 for details closer to the date.

Workshop on Galaxies: Normal and Active

School of Physical Sciences of SRTM University, Nanded will be hosting an IUCAA sponsored workshop on Galaxies: Normal and Active during November 14-17, 2011. This workshop is intended for research scholars, post-docs and young teachers, who are working in the area of observational astronomy and wish to use astronomical data from the 2 m IUCAA Girawali Observatory (IGO) and archival X-ray data from Chandra/XMM-Newton for their research work. A few M.Sc. final year students with Astrophysics background and strong desire in pursuing research in Astronomy will also be considered. The total number of participants will be restricted to 40.

There will be a series of lectures on basic and advanced topics in galaxies and active galaxies with an emphasis on their optical and X-ray properties, delivered by eminent scientists from different institutes. In addition to the lectures, half of the time of the workshop will be devoted to give hands-on experience on analysis of optical and X-ray data on some selected targets, using image processing software like IRAF, CIAO, SAS, etc. Participants should have some experience in using Linux OS and knowledge of using computers for astronomical data processing is highly desirable.

To participate in this workshop, please send your resume by post or e-mail along with a covering letter to the address given below before September 15, 2011. Ph.D. students, post-docs and young faculty members interested in starting their research career in observational astronomy are particularly encouraged to apply. They should arrange to send a recommendation letter from their guide or head of the department along with their application. Participants will be provided free hospitality (boarding and lodging) during this workshop. Limited travel support will be provided to needy applicants. Those who need travel support should mention clearly in their applications.

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JES-IUCAA Workshop on Teaching and Research Using Small Telescopes

During past two decades, about 25-30 small optical telescopes of diameter 8'' to 16'', with PC interfacing facility, have been installed in various universities, colleges, institutes and organizations in the country and the number is increasing every year. In order to provide an opportunity to small telescope users to interact with the experts working in the leading Astronomy institutes like IUCAA (Pune), PRL (Ahmedabad), Delhi University, JES College (Jalna), etc., a three days workshop on "Teaching and Research Using Small Telescopes" is scheduled to be conducted at J.E.S.College, Jalna (Maharashtra) during October 17 – 19, 2011, with the support of Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune.

The workshop is aimed at co-ordinating the participation of small telescope users for significant observational programmes in the form of Observing Campaigns, in collaboration with international organizations working in this field. This activity would provide a boost to small telescope users in the form of serious astronomical observations.

College and university teachers, researchers, amateur astronomers using small telescopes can participate in the workshop. Interested candidates should send their application on plain paper, duly recommended by their Head of the Department/Organization, giving details of their background and observational interest. The applications should be sent to the following address, latest by August 30, 2011. Selected candidates will be informed by September 5, 2011.

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Seminars

Listed below are the seminars given at IUCAA during April - June 2011.

19.04.2011 Garima Singh on ***Focus tracking of the laser guide star at Subaru telescope;*** 26.04.2011 Josep Pons on ***A fresh look at the Einstein-Palatini formalism for general relativity;*** 02.05.2011 Arunav Kundu on ***The globular cluster - Low mass x-ray binary connection and its implications;*** 03.05.2011 Partha Ghose on ***Measurement as spontaneous symmetry breaking;*** 05.05.2011 Anvar Shukurov on ***Dynamo action with reconnecting magnetic flux ropes;*** 03.06.2011 Bhaswati Bhattacharyya on ***Searching for millisecond pulsars at positions of Fermi LAT unassociated sources: Discovery of three;*** 20.06.2011 Hari Om Vats on ***Multi-wavelength studies of solar differential rotation;*** 20.06.2011 Hadi Rahmani Bayegi on ***Studying the properties of high redshift damped Lyman Alpha absorbers;*** 20.06.2011 Charles Jose on ***Weighing neutrinos using high redshift galaxy luminosity functions;*** 20.06.2011 Sibasish Laha on ***An investigation of warm absorber properties in Seyfert galaxies;*** 20.06.2011 Dipanjan Mukherjee on ***Phase dependant view of cyclotron lines from accretion mounds on neutron stars;*** 20.06.2011 Sowgat Muzahid on ***A high resolution survey of O VI absorber;*** 21.06.2011 Mahendra K.Verma on ***Dynamo transition and reversals;*** 22.06.2011 Ashutosh Kotwal on ***Testing particle physics through precision measurements;*** 23.06.2011 Adil Amin on ***Plasma diagnostics in solar active regions;*** 23.06.2011 Jyoti Aneja on ***Time dependent evolution of accretion disc;*** 23.06.2011 Kaustubh Deshpande on ***Observational tests of cosmological models;*** 23.06.2011 Rajeshwari Dutta on ***Infrared emission properties of circumstellar dust;*** 23.06.2011 Shubhajyoti Mohapatra on ***Dark matter and modified Newtonian dynamics (MOND);*** 30.06.2011 Rizwan Ansari on ***Effect of dark energy sound speed on CDM power spectrum;*** 30.06.2011 Surajit Paul on ***Probing phases of major galaxy cluster mergers;*** 30.06.2011 Jayanti Prasad on ***Cosmological Parameter estimation using particle swarm optimization;*** 30.06.2011 Prakash Sarkar on ***The scale of homogeneity of the galaxy distribution in luminous red galaxies;*** and 30.06.2011 Sanil Unnikrishnan on ***Dark energy versus modified gravity.***

Colloquia

25.04.2011 Raghu Murtugudde on ***Earth, life and sustainability***; and 12.05.20 11 P.P. Divakaran on ***Reading Aryabhata's mind***.

Forthcoming Events of Public Outreach Programme

Second Saturday Lecture/Demonstration Programme for School Students

July 9, 2011
Cosmic Illusion by Jayant Narlikar

August 13, 2011
Sky in X-ray by Gulab Dewangan

September 10, 2011
Understanding Mathematics by Ujjwala Tirkey, NCSTC, Dehli

Regular weekly events

Tuesdays and Thursdays
Scientific Toys Workshop
10:00 a.m. to 13:00 p.m.

Wednesdays
Astronomy Workshops
10:00 a.m to 13:00 p.m.

Thursdays
Public Visit to IUCAA
16:00 p.m. to 17:30 p.m.

Fridays
Public Sky Shows
18:30 p.m. to 20:00 p.m.

For details please visit

http://www.iucaa.ernet.in/~scipop

Lunar Eclipse; June 15, 2011

The images were taken with a 6" optical telescope, belonging to the IUCAA Resource Centre at the Cochin, University of Science and Technology, Kochi, by Nijo Varghese, Vivek M., Tharanath R., Saneesh Sebastian, Bhavya B., and Prasia P., who were research students of V. C. Kuriakose.

Visitors Expected

July :

Vasudha Bhatnagar, University of Delhi; Sulagna Chakrabarti, Techno India, Kolkata; Shuvendu Chakraborty, Seacom Engg. College, Howrah; Nabajit Chakravarty, Positional Astronomy Centre, Kolkata; Ritaban Chatterjee, Yale University, USA; Suchetana Chatterjee, Yale University, USA; Mamta Dahiya, S.G.T.B. Khalsa College, Delhi; Jishnu Dey, Presidency College, Kolkata; Mira Dey, Presidency College, Kolkata; Motiram Dugair, M.L. Sukhadia University, Udaipur; Pooja Gupta, Meerut College; Sushant Gupta, BBA Central University, Lucknow; Trasha Gupta, University of Delhi; Naseer Iqbal, Kashmir University, Srinagar; Joe Jacob, Newman College, Thodupuzha; Jithesh V, University of Calicut, Kozhikode; Imran Mohammad, Aligarh Muslim University; Nidhi Joshi, Jamia Millia Islamia, Delhi; Mohd. Shafi Khan, Kashmir University, Srinagar; Shahid Khan, M.L. Sukhadia University, Udaipur; Amitabha Lahiri, S.N. Bose National Centre for Basic Sciences, Kolkata; Ritam Mallick, IISc., Bangalore; Bari Maqbool, Kashmir University, Srinagar; Tabasum Masood, Kashmir University, Srinagar; Nishant Mittal, Meerut College; Udit Narain, Meerut College; Sanjay Pandey, L.B.S.P.G. College, Gonda; P. Pandita, North Eastern Hill University, Shillong; Sajeeth Philip, St. Thomas College, Kozhancherry; Chayan Ranjit, Seacom Engg. College, Howrah; Somak Raychaudhury, University of Birmingham, UK; Sonali Sachdeva, University of Delhi; Kanak Saha, Max-Planck Institute for Extraterrestrial Physics, Germany; B.P. Sarmah, Tezpur University; Joginder Sharma, Meerut College; Ramesh Sharma, University of New Haven, USA; Sapna Sharma, M.L. Sukhadia University, Udaipur; Satya Pal Singh, M.M.M. Engg. College, Gorakhpur; and Donald J. Thielman, University of Wisconsin, USA.

August :

Marcela J.M. Acosta, St. Petersburg State University, Russia; B.G. Anandrao, Ex-PRL, Ahmedabad; Kinjal Banerjee, University of Petroleum and Energy Studies, Dehradun; Samarpita Bhattacharya, Bengal Engg. and Science University, Howrah; Sukanta Bose, Washington State University, USA; Asis Chattopadhyay, Calcutta University; Tanuka Chattopadhyay, Calcutta University; Tirthankar Roy Choudhury, Harish Chandra Research Institute, Allahabad; Apratim Ghosh, St. Xavier's College, Kolkata; Priya S. Horo, Tata Trust, Mumbai; Bhola Ishwar, B.R.A. Bihar University, Muzaffarpur; Dhanya Joseph, University of Calicut, Kozhikode; Kanti Jotania, M.S. University of Baroda, Vadodara; Imran Khan, Tata Trust, Mumbai; S. Kumar, Tata Trust, Mumbai; S. Kundu, Tata Trust, Mumbai; V.C. Kuriakose, CUSAT, Kochi; Soma Mandal, Taki Govt. College, West Bengal; Nikesh M., University of Calicut, Kozhikode; R.S. Pandey, Tata Trust, Mumbai; Preetha V., University of Calicut, Kozhikode; C.D. Ravikumar, University of Calicut, Kozhikode; Shruti Tripathi, DDU Gorakhpur University; and D.B. Vaidya, ICCSIR, Ahmedabad.

September :

K.S.V.S. Narasimhan, Ex-New College, Chennai; L. Sriramkumar, HRI, Allahabad.

Visitors

(April - June 2011)

Pawan Agarwal, Bobomurat Ahmedov, Jyoti Aneja, Snehadeep Ata, Saji Augustine, S.K. Banerjee, K.G. Biju, Atreyee Biswas, Ritabrata Biswas, Charusita Chakrabarti, Subenoy Chakraborty, Koushik Chakraborty, Sunil Chandra, Rabin Chhetri, Jampa Chophel, Pratik Dabhade, Ujjal Debnath, Jyoti Prasad Deka, Amit Dhakulkar, P.P. Divakaran, Ravi Dutt, Anjan Dutta, Rajeshwari Dutta, K.F. Fency, Madhuri Gaikwad, N.S. Gajbhiye, Partha Ghose, Aruna Goswami, Sarbari Guha, R.K. Gupta, Mubashir Hamid, Aly Haroon, Bhola Ishwar, Bala Iyer, Joe Jacob, Suyog Jadhav, Dhairyashil Jagadale, Deepak Jain, Rekha Jaiswal, K. Jeena, Govind Kumar Jha, Sarita Jha, V. Jithesh, Kanti Jotania, Minu Joy, Anil Kakodkar, Md. Mehedi Kalam, Prem Kalra, Piyali Bagchi Khatua, Ram Kishor, Anil Kumar, Nagendra Kumar, Mohan Kumar, Amaresh M.V. Kumar, Prashant Kumar, Arunav Kundu, B.S. Kushvah, Nestor Lasso, Partha Majumdar, Soma Mandal, Reena Mathur, Bari Maqbool, Nairwita Mazumder, K.M. Minu, S. Mukherjee, Usha Mukunda, Anand Narayanan, Kamalika Nath, Prashant Pathak, M.K. Patil, Srikar Paavan, Devraj Pawar, Anirudh Pradhan, Sanjay Puri, V.S. Ramamurthy, S. Ramaswamy, Shantanu Rastogi, K. Chenna Reddy, L. Resmi, Amit Roy, Rajib Saha, Anirban Saha, Sheetal Kumar Sahu, Sk Saiyad Ali, Pramoda Samal, B.P. Sarmah, Somasri Sen, Anjan Ananda Sen, Anand Sengupta, T.R. Seshadri, Ranjan Sharma, Tejaswita Sharma, Sanjar Shaymatov, Satish Shetye, S.V. Shinde, Anvar Shukurov, H.P. Singh, Ashmeet Singh, R.P. Singh, Garima Singh, Firoza Sutaria, Mahadevappa Swami, Sanish Thomas, Reji Mathew Thomas, Shruti Tripathi, Pranjal Trivedi, A.A. Usmani, Hum Chand Varma, Hari Om Vats, Raj Verma, Gunjan Verma, M.N. Vinoj, Anand P. Vivek, and M. Vivek.

Long term visitors :

Pushpa Khare (till January 2014), P.C. Agrawal (till 2013)

Know Thy Clouds - 6
Stratocumulus: clouds in groups, lines and waves

The dark clouds in globule, in groups, in lines or in waves, are stratocumulus clouds. Stratocumulus is from the Latin words stratus = flattened layer or spread out and cumulus = mass or heap.

These clouds are created by convective currents, like cumulus, but the currents are weak. The clouds do not rise because of drier and stable air above this level, which prevents the vertical development. These clouds do not reach high altitudes. These clouds start at about 300 metre above the ground level and reach up to 2000 metres.

These clouds have very similar appearance to altocumulus but are much larger. The individual masses of altocumulus subtend an angle of about half a degree, whereas stratocumulus is about few degrees across. You can block altocumulus by thumb of your hand extended at arm length, whereas you would have to clinch your fist to block stratocumulus.

These clouds bring in dull gloomy weather. They cover large area of the sky. Stratocumulus could be widespread reducing the sunlight reaching the ground. These clouds do not bring rains, that is to say, they produce very little precipitation, and when it does it is only drizzle, light shower or snowfall. However, these clouds may herald incoming stormy weather or seen soon after one, indicating the possible end of bad weather.

Though these clouds bring gloomy weather, they play a very interesting role; in summer they reduce the general heat, whereas their presence in the nights in winter will keep the weather warm.

These clouds can develop to other types of clouds. More commonly these clouds would look like nimbostratus (to be discussed later), but unlike nimbostratus, these clouds produce very little rain. The stratocumulus clouds can develop into cumulus clouds if the air over land is moist and hot.

Arvind Paranjpye

Name	**Stratocumulus**
Short form	Sc
Height	300 m – 2000 m
Symbol (Graphical Representation)	
Stratocumulus - spreading from Cumulus	
Stratocumulus - not from Cumulus	
Cumulus and Stratocumulus	

Stratocumulus Clouds

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