

Khagol

THE IUCAA BULLETIN



July 1990

To Our Readers

We are happy to announce the appointment of Senior Associates and Associates of IUCAA for the period July 1990 - June 1993. We would have perhaps liked to appoint twice as many if the logistic and infra-structural facilities were available. It is unfortunate that many of the competent colleagues could not be accommodated. We hope that we shall be able to accommodate more of them next year.

Senior Associates

- S.M. Alladin, Osmania University
- S.M.R. Ansari, Aligarh Muslim University
- S. Banerji, University of Burdwan
- K.B. Bhatnagar, Zakir Hussain College, Delhi
- H.L. Duorah, Gauhati University
- A.N. Maheshwari, Reg. Coll. of Education, Mysore
- S. Mukherjee, North Bengal University
- N. Panchapakesan, University of Delhi
- L.K. Patel, Gujarat University
- V.R. Venugopal, Madurai Kamaraj University
- S.D. Verma, Gujarat University

Associates

- G.M. Ballabh, Osmania University
- S. Chandra, Gorakhpur University
- B.N. Dwivedi, Banaras Hindu University
- K.N. Iyer, Saurashtra University
- P. Khare, Utkal University
- S. Mahajan, St. Stephen's Coll., Delhi
- S.K. Pandey, Ravishankar University
- L.M. Saha, Zakir Hussain College, Delhi
- R.S. Tilkekar, Sardar Patel University

Academic Events at IUCAA

Summer School

The Introductory Summer School on Astronomy and Astrophysics (A & A) was jointly organised by IUCAA and TIFR, Pune Campus during June 4-29, 1990. The school was aimed at introducing B.Sc. (III year), M.Sc. (I year) and B.E./B.Tech. (III year) students to exciting areas of research in A & A and to the facilities available in the country for doing advanced work in these fields. There was a tremendous response and we were flooded with over 550 applications. It was a very difficult task to select only 40 from that many.



Since IUCAA does not as yet have its own hostel and lecture hall facilities, the school was entirely held on the campus of Spicer Memorial College, which is about 15 minutes walk from the IUCAA Campus. The academic programme consisted of 50 lectures on various topics such as Stellar Structures Supernovae and Pulsars, Interstellar medium, Molecular Clouds, Gravitation theory, Radio, Optical, X-ray, γ -ray and Infrared Astronomies and Cosmology. Partici-

pants in groups of 2-3 did a project study of a specialized topic and there were presentations of project reports in the concluding week. Besides the inhouse faculty of the host institutions, we had guest lecturers from other institutes and they included Rajaram Nityananda, K.R. Anantharamaya, T. Prabhu, Vijay Mohan, P.C. Agarwal, Alak Ray, B.V. Sreekantan and S.D. Verma.

We thank all these colleagues for their cooperation in making the school successful and are grateful to Dr. M.E. Cherian, President of the Spicer Memorial College for his very cordial hospitality.

A Model M.Sc. Syllabus For A & A

IUCAA conducted a meeting of experts to decide the format of a syllabus for A & A specialization in the M.Sc. Physics course of a university. Bearing in mind the diversity of academic schedules in our university system, it was decided to divide the course content in modules of 15 lectures each. The general distribution recommended allows for equal weightage to lectures, experiments and projects. Details can be had from Professor A.K. Kembhavi at IUCAA.

The expert committee also recommended introductory and refresher courses in A & A for college and university teachers and vacation project programmes at IUCAA for M.Sc. students.

Seminars

- K.B. Bhatnagar, April 11, **Chaos in Astronomy**
- Marc Van der Valk, May 21, **Cells and Quasars**
- N.C. Mathur, June 27, **Radio Astronomy at millimetre wave**

Summer Visitors to IUCAA

L.K. Patel, Gujarat University, 18.5 - 8.6
R.S. Tikekar, Sardar Patel University, 18.5 - 8.6
D.K. Chakraborty, Ravishankar University, 28.5 - 14.6
S.K. Pandey, Ravishankar University, 28.5 - 21.6
P. Khare, Utkal University, 28.5 - 23.6

Colloquia

Professor Yash Pal, May 14, *Ways of Seeing and Relating*

In the past 25 years there has been an explosion in our knowledge and it is becoming more and more difficult to relate it to concepts and things we understand and know well. This is causing a big gap between the information and its relationship to wider scientific, social and cultural issues and perceptions. We ought to zoom out at regular intervals to relate what we normally see in the narrow window of our daily existence to the global structure of phenomena, events and concepts. Thus spoke Yash Pal on 14th May, 1990.



Future Visitors to IUCAA

- Professor N. C. Wickramasinghe of the University of Wales, Cardiff will visit IUCAA from 29th July to 12th August 1990. He will give a series of three lectures on *Theory of Cosmic Grains* and one lecture on *Panspermia and its applications*.
- Professor Tanmay Vachaspati of Tufis University (USA) will visit IUCAA for a fortnight in August 1990 (The exact dates of his lectures will be announced shortly). He will give a series of about ten lectures on *Cosmic Strings*.
- Professor K. Shivanandan of Naval Research Laboratory, Washington will be conducting a mini school on Infrared

Astrophysics in December 1990 under the auspices of IUCAA. The dates and location will be announced in due course.

Interested persons should write to Professor N. Dadhich for attending any one of the above programmes.

Future Mini Workshops Of IUCAA

- Relativistic Astrophysics, November 5-11, 1990, Physical Research Laboratory, Ahmedabad 380 009. (Coordinator : Professor A.R. Prasanna)
- Gravitation and Gravitational Radiation, October 8-12, 1990, the HNB Garhwal University, Srinagar, Garhwal 246 174. (Coordinator : Dr. K.D. Purohit)
- N-Body Simulations in Stellar Dynamics, in February 1991, Centre for Advanced Study in Astronomy, Osmania University, Hyderabad 500 007. (Coordinator : Professor M.B.K. Sarma)

Interested persons should apply to the coordinators for attending any one of the above mini-workshops.

Regional Discussion Meetings

IIT KANPUR : A regional discussion meeting (RDM) for the Uttar Pradesh universities was held at IIT, Kanpur during April 20-22, 1990. Besides the faculty members of Physics, Electrical and Communication Engineering of the host institute, there were representatives from Uttar Pradesh State Observatory, Aligarh Muslim University, Banaras Hindu University, Universities of Lucknow, Allahabad, Gorakhpur, Garhwal and Roorkee. In a discussion lasting over two days there were useful exchanges of views on the present infrastructural problems at the universities and how IUCAA could usefully interact with the university faculty and students. The topics included (i) the teaching of A & A special courses as parts of the M.Sc. Physics and Mathematics programmes as well as parts of engineering courses, (ii) introductory and refresher courses for teachers, (iii) library and documentation service in A & A, (iv) collaborative inter-university research programmes, (v)

the participation by IUCAA faculty as guest lecturers in various universities and (vi) participation of university students and teachers in the GMRT project.

As part of the meeting, Professor J.V. Narlikar and Professor V.K. Kapahi gave public lectures on *Exciting Problems in A & A* and *The Radio View of the Universe* respectively. Professors N. Dadhich, A.K. Kembhavi and V.K. Kapahi gave seminars on current research in gravitation, high energy astrophysics and radio astronomy.

CALCUTTA : Another RDM was held at the Institute of Radio Physics, Calcutta University on May 26, 1990. It was attended by representatives of Calcutta, Jadavpur, Burdwan, North Bengal, Utkal, Raipur, Guwahati, Manipur and Tripura universities as well as IIT Kharagpur, Saha Institute of Nuclear Physics, S.N. Bose Institute of Basic Sciences, Indian Statistical Institute and Birla Planetarium.

1993 will be the birth centenary year of Professor Megh Nad Saha. Understandably the discussions centred around the objective of setting up facilities in optical and radio astronomies as a fitting tribute to the great astrophysicist. There is a great enthusiasm amongst the universities and the institutes listed above for doing something special and big in astronomy in the eastern region to mark the important event. Certain action points were agreed upon in the hope that the various funding agencies will provide adequate grants for these projects.

Recent "Acquisitions"

IUCAA is happy to welcome Professor S.N. Tandon from TIFR who joined recently as a Visiting Professor and Dr. Ranjan Gupta from the Indian Institute of Geomagnetism who joined in April. With their joining IUCAA's instrumentation programme will now be underway.

There was also general discussion as at the Kanpur meeting. It was preceded by talks by Professor J.C. Bhattacharyya on Optical Astronomy, by Professor A.K. Kembhavi on Role of CCD in optical observations and by Professors K.D. Abhyankar and N. Dadhich on Teaching of Astronomy in universities. On the previous day, May 25, Professor J.V. Narlikar delivered the S.K. Mitra centenary lecture.

Facilities at IUCAA

INSTRUMENTATION LABORATORY

The instrumentation activity is aimed at serving two functions : (a) to provide a core for experimental programmes at the centre, and (b) to provide resources to the astronomers from the universities to develop the instruments for their programmes.

In order to give a concrete shape to the laboratory facilities, two projects have been identified for development work. These are : (i) small automatic telescopes and (ii) CCD-Controller.

OBSERVING PROGRAMMES AND IMAGE PROCESSING

IUCAA is developing observing programmes for its faculty and students, as well as the university astronomical community, in collaboration with various observatories in the country and abroad. To facilitate the analysis of data obtained from this programme, various image processing packages have been installed on the SUN computers at IUCAA. These include *IRAF*, *VISTA* and *SUPERMONGO*. All these packages run in a variety of hardware and software environments and appropriate versions may be obtained at a very nominal cost, or even completely free, from appropriate sources. The season for optical observations in India extends from October to April. Anyone from the university community interested in submitting observing proposals for the coming season, or simply using the facilities at IUCAA for astronomical computation or image processing may contact Professor Ajit Kembhavi at IUCAA.

Research News

Singularity Free Universe

Recently, Jose Senorilla (Phys. Rev. Lett. 64, 2219 (1990)) has presented a class of exact solutions to Einstein equations which are free from 'big-bang' like singularities while maintaining positivity of the energy density. These solutions correspond to an inhomogeneous universe (inhomogeneity along a single spatial direction) consisting of a perfect fluid with pressure equal to one-third the energy density. The curvature and matter invariants are regular and smooth everywhere. The author also provides another interpretation to these solutions by altering the topology of the spatial coordinates and obtaining thereby a globally regular cylindrically symmetric spacetime.

We are happy to congratulate Professor S.K. Khanna on his appointment as Vice-Chairman, UGC.

On Lions And The Early Universe

At a conference devoted to the early universe and its relics de Rajula told the following story after presenting a paper on the esoteric superheavy nuclei :

A rabbit was accosted by a wolf who threatened to eat him. "Please spare me, I am doing fundamental research" pleaded the rabbit. "I don't believe you", said the wolf, whereupon the rabbit offered to take him to his lab and introduce him to his collaborator. The wolf accepted the invitation and followed the rabbit to his lab in a cave. The wolf never came out.

Similar incident was repeated with a bear a few days later and again with a tiger. Neither of them were seen again. The rest of the animals in the forest got curious and at last picked up courage to peep into the cave that was the rabbit's laboratory. They saw a heap of bones and sitting amongst them was a big lion.

Moral : For fundamental research in speculative areas it helps to have a powerful collaborator.

Incidentally, de Rajula's collaborator happened to be the Nobel Laureate Sheldon Glashow.

It however remains to be seen whether, as indicated by the singularity theorems, this model contains incomplete non-spacelike geodesics and, if so, what is the nature of such geodesics. Furthermore, since the equation of state corresponds to that of the radiation, it will be interesting to study the evolution of the thermodynamic properties of relativistic particles in such a spacetime and their observational consequences.

How To Communicate With IUCAA?

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note : to contact some specific person in IUCAA by e-mail, replace the word root by the person's first name.