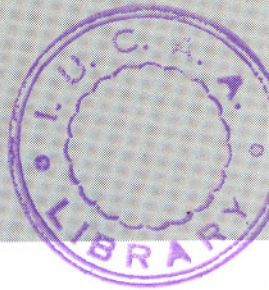


# Khagol

Inter-University Centre for Astronomy and Astrophysics  
An Autonomous Institution of the UGC



No. 8

THE IUCAA BULLETIN October 1991

## Welcome

We welcome G. Rama Reddy, Chairman, UGC and look forward to his guidance and support as Chairman of IUCAA's Governing Body.

## SAC MEETING

The Scientific Advisory Committee of IUCAA had its second meeting during September 16-17, 1991 at IUCAA. The meeting included closed sessions with the Director as well as open sessions at which the academic members of IUCAA described their present research and developmental activities and future programmes.

The SAC was very appreciative of the overall growth in IUCAA activities and offered critical constructive comments on the areas where improvements can be made. We hope that during the next SAC meeting some of our Associates and Senior Associates will also be present to describe their work and to interact with the SAC members.

The SAC members who attended the meeting were Geoffrey Burbidge, V. Radhakrishnan and N.V.G. Sarma. Jean Audouze and Martin Rees were unable to attend.

## Congratulations to

**A.K. Raychaudhuri**, who has been awarded the prestigious **Vainu Bappu Award** for this year.

**J.V. Narlikar**, who has been elected as the **Vice President of the IAU Commission 47 on Cosmology** and has also been invited to give the **Second Vaidya-Raychaudhuri Endowment Fund Lecture** at the **XVI IAGRG meeting**.



## Evening Lecture

September 16, 1991 : **V. Radhakrishnan**, Raman Research Institute, Bangalore

**Of Wind and Water - About Sailboats**

## Colloquia

July 12, 1991 : **P.C. Vaidya**, Gujarat University, Ahmedabad

**A Model Universe with a Conical Singularity**

July 15, 1991 : **S. Ramani**, National Centre for Software Technology, Bombay  
**Computer Networking for Research Institutions**

July 29, 1991 : **Aditi Pant**, National Chemical Laboratory, Pune

**Indian Expeditions to Antarctica:  
A Personal Experience**

August 19, 1991 : **S. Rangarajan**, INSAT, Hassan

**Indian Satellite Programme**



### Seminars

September 19, 1991 : *N.V.G. Sarma*, Raman Research Institute, Bangalore

#### Millimetre and Sub-millimetre Receivers for Radio Astronomy

September 19, 1991 : *G. Burbidge*, University of California, San Diego

#### BL Lac Objects

### VISITORS EXPECTED

- R. Ramakrishna Reddy, Sri Krishnadevaraya University, October 5-21, 1991.
- P. Khare, Utkal University, October 7-21, 1991.
- A.W. Wolfendale, University of Durham, October 9, 1991.
- N. Panchapakesan, University of Delhi, October 13 - November 12, 1991
- R. Tikekar, Sardar Patel University, October 17 - November 3, 1991.
- K.N. Iyer, Saurashtra University, October 21 - November 16, 1991.
- T.P. Singh, TIFR, October 27-30, 1991.
- B.K. Pal, Himachal Pradesh University, November 3, 1991 - February 20, 1992
- Joanna Anosova, Leningrad State University, November 25, 1991 - May 25, 1992.
- Ljudmila Kiseleva, Leningrad State University, November 25, 1991 - May 25, 1992.
- S.R. Kulkarni, Caltech, December 1-31, 1991.
- S.G. Tagare, University of Hyderabad, December 1-31, 1991.
- Cecilia Iwanizweska, Nicolaus Copernicus University, Torun, December 5-12, 1991.
- Robert Brandenberger, Brown University, Rhode Island, December 19-25, 1991.
- Salman Habib, Los Alamos Scientific Laboratory, December 19, 1991 - January 1, 1992.
- Henry Kandrup, University of Florida, December 19, 1991 - January 3, 1992.
- Ian Moss, University of Newcastle upon Tyne, December 19-30, 1991.
- Abhay Ashtekar, Syracuse University, December 20, 1991 - January 5, 1992.

- L.K. Patel, Gujarat University, December 1991 - April 1992.
- Yvonne Choquet-Bruhat, University of Paris, December 1991.
- John Stachel, Boston University, December 1991.

### POST-DOCTORAL POSITIONS

IUCAA invites applications for post-doctoral fellowships in astronomy and astrophysics. The duration of a fellowship is flexible within the range of one to five years, with the possibility of conversion to a tenured position. As a newly set up institution, IUCAA offers challenging opportunities to experts in theory, observation as well as in astronomical instrumentation. IUCAA will be especially looking for observers and experimentalists willing to contribute to its long term programmes including the establishment of an astronomical instrumentation centre equipped with the most modern facilities. Candidates should apply to **Professor J.V. Narlikar, Director, IUCAA** with curriculum vitae and list of publications. They should also arrange to send three confidential references. All relevant material should reach IUCAA by December 25, 1991. Candidates will be informed of the results of their application by January 30, 1992. The fellowship will normally commence in the second half of 1992.

### VISITS BY IUCAA MEMBERS

**Ranjan Gupta** was deputed by IUCAA (partially financed by DST) to attend the 103rd Annual Meeting of the Astronomical Society of Pacific, held during June 22-28, 1991 at University of Wyoming, USA. He presented a paper entitled 'Automated Photoelectric Telescopes (APTs) for Indian Universities' in the 'Robotics Telescopes in the 1990's' symposium held during this meeting. Other presentations included the results from existing APTs, new projects like possibility for detection of planetary systems, Brown dwarf study, stellar radial velocity measurements and new techniques like fibre fed spectroscopes, spatial interferometry etc. Possibility of global networking of APTs and placing Robotic telescopes on Moon were proposed. Detailed publications of this symposium will be brought out as a regular ASP Conference Series.

There were presentations on HST image processing, CFHT image improvements, speckle interferometric observations in optical and IR, adaptive optics, several new instruments proposed/ongoing using IR rays from ground and space borne platforms.



He also had brief stop-overs at CRESS, York University, Toronto; Institute of Astronomy, Cambridge, UK and CNRS, Orsay, France.

**Jayant Narlikar** visited Buenos Aires (Argentina) for the General Assembly of the International Astronomical Union. The IAU had several interesting joint discussion meetings and joint commission meetings apart from the usual official business. The progress of IUCAA was described in the session on Worldwide Development of Astronomy. One notable feature which every participant will remember was the fire (and smoke) that swept across the Conference Centre on the penultimate day.

The GIREP Conference (GIREP stands for the International Group on Research in Physics Education) was held in Torun (Poland) this year. This time, theme was on teaching about reference frames from Copernicus to Einstein. Torun, as the birth place of Copernicus, was the appropriate place to hold this meeting that had physicists and physics teachers. There were several lectures and lecture demonstrations. Narlikar gave a talk on reference frames in cosmology. Ralph Alpher gave an evening lecture on the hot big bang cosmology including his own pioneering work on element synthesis with Gamow and Herman.

**Abhijit Kshirsagar** attended the Sixth Marcel Grossman Meeting on GR (MG6), held in Kyoto during June 24-29, 1991, where he presented an oral contribution related to 'Pure-connection Formulation of GR'. The conference opened with a small ceremony bestowing the Marcel Grossmann award upon Stephen Hawking whose award-lecture was titled: 'The Chronology Protection Conjecture'; an issue related to closed time-like curves, singularities and topology changing processes.

There were six plenary sessions covering topics: deep redshift surveys (D. Koo), COBE results (Smoot), status report on LIGO (Vogt), experimental tests (Will), string theory (Gross), topology change (Gibbons and Horowitz), cosmological perturbations (Grischuk and Piran) and more. The parallel sessions included classical GR, early universe, gravity waves, large scale structure, quantum gravity (highlighted by Abhay Ashtekar's status report on non-perturbative canonical gravity) and cosmology, computer-aided relativity, observational cosmology etc., in

addition to several poster-sessions. Total participation approached six hundred. Following MG6, Abhijit toured North America for ten weeks visiting JPL, Pasadena; University of North Carolina, Chapel Hill; Tufts, Massachusetts; McGill University and Universit   d'Montreal, Montreal; University of Maryland, College Park; and University of Colorado, Boulder.

## A PLANET ORBITING A PULSAR

It is very difficult to detect planets outside the Solar System, because of the low luminosity and small angular separation relative to the parent star. An indirect way to detect a planet would be to observe the perturbation due to it on the star, but because of the smallness of the effect, this also has proved to be impractical using conventional techniques. But the great stability of the pulse period of radio pulsars make possible the detection of such extremely small effects.

Recently Bailes, Lyne and Shemar (Nature 352, 311, 1991) have reported the detection of a planet sized body around the pulsar PSR 1829-10, based on the Doppler effects on the observed arrival time of pulses from the rotating neutron star which constitutes the pulsar. The most straightforward (but at present not unique) interpretation of the data is in terms of binary motion with one body being the pulsar with assumed mass  $1.4 M_{\odot}$ , and the other a planet-sized object. The system has low eccentricity ( $e < 0.1$ ) and an orbital period of 184 days. The mass of the planet is likely to be about 12 times the mass of the Earth. It is possible that there are more planets in the system. It is difficult to understand the existence of such a system from the point of view of the conventional theories for the formation of neutron stars. Podsiadlowski, Pringle and Rees (Nature 352, 783, 1991) have provided two possible scenarios for the formation of the system, one involving the evolution of a binary system of two white dwarfs, and the other a collision between a neutron star and a planetary system like ours.

## IMAGE PROCESSING WORKSHOP

A mini-workshop on Image Processing was held at IUCAA during July 21 to 26, 1991. The event was originally scheduled for February 1991, but had to be postponed due to the Gulf war. About 40 participants from various university departments and institutions attended the workshop. The



schedule consisted of lectures in the morning and early afternoon, followed by demonstrations and practice sessions in the IUCAA Computer Centre. Patricia Monger of McMaster University gave four lectures on Hardware and Software Trends, Unix, Windowing and Scientific Visualization, while Jack Sulentic of the University of Alabama delivered four lectures on various aspects of Image Processing in Astronomy. Both these lecturers spent a considerable amount of time installing software and demonstrating techniques at workstations, for which the organizers of the workshop are most grateful. Various applications of the techniques were elucidated in shorter lecture sets and seminars by G.C. Anupama, P.N. Bhat, S. Bhatnagar, U.C. Joshi, V. Kulkarni, Ramsagar, K.P. Singh, C.R. Subramanya and Vijaymohan.

## CALENDAR OF EVENTS

### Mini Workshops/Conferences/Meetings

- Automated Photoelectric Telescopes, at IUCAA, October 21-25, 1991.
- Regional Meeting for the Universities of Western India, at M.L. Sukhadia University, Udaipur, November 16, 1991.
- Photoelectric Photometry, at Gauhati University, December 2-7, 1991 (those interested in participation may contact **Professor H.L. Duorah**, Department of Physics, Gauhati University, Gawahati 781 014).
- XVI th Meeting of the Indian Association for General Relativity and Gravitation at Sardar Patel University, Vallabh Vidyanagar, December 10-11, 1991.
- International Conference on Gravitation and Cosmology (ICGC-91) at Physical Research Laboratory, Ahmedabad, December 13-18, 1991.
- Quasars - Continuum and Line Radiation, at Ravishankar University, Raipur, December 23-27, 1991 (those interested in participation may contact **Professor R.K. Thakur**, Department of Physics, Ravishankar University, Raipur 492 010).
- IUCAA Foundation Day Lecture by **A.K. Raychaudhuri**, December 29, 1991.
- Second All India Amateur Astronomers' Meet at Gandhi Ashram, Sevagram, January 4-5, 1992 (those interested in participation may contact **The Convener, Second All India Amateur Astronomers' Meet, C/o B.D. Sahasrabhojane**, 27, Panchasheel Cinema Building, Sitabuldi, Nagpur 440 012).

- Early Universe, at Jadavpur University, Calcutta, January 28 - February 1, 1992 (those interested in participation may contact **Professor A. Banerjee**, Department of Physics, Jadavpur University, Jadavpur, Calcutta 700 032).

### Lectures and Discussions

- Pulsars, by S.R. Kulkarni, Caltech (December - dates to be finalised), at IUCAA.
- Quantum Gravity, by Abhay Ashtekar, Syracuse University, at IUCAA, December 20, 1991 - January 5, 1992.

### AN ASTRONOMICAL BET

Here is how a bet was settled between two distinguished astronomers.

In 1951 Walter Baade had identified the radio source Cygnus A with what appeared to be a pair of colliding galaxies. The radio astronomer Rudolf Minkowski was sceptical of the whole scenario, believing the radio sources to be galactic objects. Angered by Minkowski's attitude, Baade bet him a thousand dollars that Cygnus A is a collision of galaxies. Minkowski found the stakes too high to afford in case he lost the bet. So they reduced it to a bottle of whisky. The evidence to decide the bet was the detection of emission lines of high excitation.

Subsequently emission lines were found and Minkowski conceded the bet. However, he took advantage of ambiguity of what constituted a 'bottle'. So instead of the quart bottle Baade was expecting, he got a hip flask which he kept intact as a trophy in his house. To add to his sense of injustice Minkowski visited him two days later and during conversation drank all the whisky himself!

But there is a postscript to this episode. A few years later it became clear that Cygnus A is not a collision of galaxies. So Minkowski was post facto justified in consuming that whisky.

### How To Communicate With IUCAA?

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