



JAWAHARLAL NEHRU CENTRE FOR  
ADVANCED SCIENTIFIC RESEARCH

*ANNUAL  
REPORT*

1991-92

Indian Institute of Science Campus  
Bangalore 560 012

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## FOREWORD

The Centre entered its third year during 1991-92. The academic programmes launched during the previous years were augmented and intensified during the year. Over a dozen seminars and discussion meetings on important scientific topics in frontier and emerging areas were organised. These meetings drew scientists from all over the country and a few from abroad. There is much to report on the research work with the participation of its honorary faculty, the visiting scientists and the faculty of the Indian Institute of Science, who are contributing to the activities of the Centre. Under the Visitors' Programme more than 20 scientists spent a few weeks to a few months each at the Centre interacting with our faculty members and others on various topics of scientific research. A novel Summer Research Fellowship programme for bright young students arranged during 1991 was highly successful. The Programme for the summer of 1992 was announced and about 42 students selected. Several books were published during the year. The Centre, with the support of many leading scientists of the country who are honorary members of the faculty, and others, looks forward to a bright and purposeful future.

The office (which houses the library as well), the lecture hall and the dining hall-cum-lounge, all located on the campus of the Institute are being fully used. Much progress has been made in the programme of construction of buildings at Jakkur campus.

The Indian Institute of Science has continued to support the activities of the Centre in so many ways and the Department of Science and Technology, Government of India has given its financial support. I would like to place on record my sincere thanks to these organizations.

C.N.R. Rao  
President

## INTRODUCTION

This Centre, devoted to research in frontier and emerging areas of science and engineering, was established by the Government of India to commemorate the Centenary Year (1989) of Pandit Jawaharlal Nehru, who promoted the cause of science in India in a big way. The Department of Science and Technology evinced active interest in the establishment of the Centre and has been fully supporting it.

The Centre was registered as a Society under the Karnataka Societies Registration Act, 1960. It started functioning in June 1989 and initiated various academic activities with the help of the faculty of the Indian Institute of Science and also honorary faculty of the Centre. It functions as an independent, autonomous national centre devoted to research, without however awarding any degrees. It is governed by a Council of Management consisting of distinguished scientists and administrators.

The Centre, located on the campus of the Indian Institute of Science, has strong academic links with the Institute, and this association with an established scientific research institution undoubtedly assures the growth of the Centre.

Certain essential infrastructural facilities for the Centre have been created at the Indian Institute of Science campus. The main campus of the Centre is being developed on lands gifted by the Government of Karnataka in Jakkur, which is in the proximity of the Indian Institute of Science.

## OBJECTIVES

The main objectives of the Centre are:

- (a) To carry out and promote front-line research in selected areas of science;
- (b) To promote collaborative research with scientists at the Indian Institute of Science and other institutions in the country;

- (c) To provide a national and international forum for in-depth discussions on important scientific topics in areas of vital interest to scientists of the Centre and in the country at large;
- (d) To organize periodic winter and summer schools in certain areas, where young talented scholars would be associated;
- (e) To provide opportunities to carry out research projects for talented young students;
- (f) To provide facilities to visiting scholars and faculty from all over India, and abroad, to spend extended periods at the Centre;
- (g) To publish monographs and reports on frontier and futuristic areas of science as well as monographs of educational value.

The Centre generally promotes emerging as well as interdisciplinary areas of science and engineering. This is sought to be achieved by making use of the facilities at the Indian Institute of Science and other advanced research institutions nearby and by developing such facilities of its own for theoretical studies and laboratory work as are essential.

#### SOCIETY

The Society of the Jawaharlal Nehru Centre for Advanced Scientific Research consists of 10 members. The Annual General Meeting of the Society was held on 16th November 1991.

COUNCIL OF MANAGEMENT

Dr. Raja Ramanna  
Chairman of the Council of the  
Indian Institute of Science  
(*ex-officio*)

(Chairman)

Mr. S.B. Krishnan  
Joint Secretary & Financial Adviser  
Department of Science & Technology, New Delhi

Prof. N. Mukunda  
Chairman  
Division of Physical & Mathematical Sciences  
Indian Institute of Science

Prof. C.N.R. Rao,  
Director, Indian Institute of Science  
& President of the Centre

Prof. P. Rama Rao  
Secretary, Department of Science & Technology  
New Delhi

Prof. H. Sharat Chandra  
Professor, Department of Microbiology &  
Cell Biology  
Indian Institute of Science

Prof. M.M. Sharma  
Director  
University Department of Chemical Technology  
Bombay

Prof. O. Siddiqi  
Professor of Molecular Biology  
Tata Institute of Fundamental Research, Bombay

Mr. L. Raghavendra Rao  
Administrative Officer  
(*ex-officio*)

(Secretary)

The Council held its meetings on 13th April and  
16th November 1991.

ACADEMIC ADVISORY COMMITTEE

Prof. C.N.R. Rao  
President of the Centre (Chairman)

Prof. A. Chakravorty  
Indian Association for the Cultivation  
of Science, Calcutta

Prof. S.K.Joshi  
Director-General, Council of Scientific  
and Industrial Research, New Delhi

Prof. N. Kumar  
Indian Institute of Science

Prof. R. Kumar  
Indian Institute of Science

Prof. R.A. Mashelkar  
National Chemical Laboratory, Pune

Prof. R. Narasimha  
National Aeronautical Laboratory, Bangalore

Prof. G. Padmanaban  
Indian Institute of Science

Prof. V. Rajaraman  
Indian Institute of Science

Prof. T.V. Ramakrishnan  
Indian Institute of Science

Mr. L. Raghavendra Rao  
Administrative Officer (Secretary)

Prof. N. Mukunda  
Indian Institute of Science (Coopted member)

The Committee held its meeting on 6th September  
1991 and 3rd March 1992.

## HONORARY PROFESSORS

### Biological Sciences

Prof. B.K. Bachhawat, F.A.Sc., F.N.A.  
University of Delhi, New Delhi

Prof. D. Balasubramaniam, F.A.Sc., F.N.A.  
Centre for Cellular & Molecular Biology, Hyderabad

Prof. Madhav Gadgil, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. G. Padmanaban, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. V. Sasisekharan, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. H. Sharat Chandra, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. O. Siddiqi, F.A.Sc., F.N.A., F.R.S.  
Tata Institute of Fundamental Research, Bombay

Prof. M.S. Valiathan, F.A.Sc., F.N.A.  
Sree Chitra Tirunal Institute for Medical  
Sciences & Technology, Thiruvananthapuram

Prof. M.A. Viswamitra, F.A.Sc., F.N.A.  
Indian Institute of Science

### Chemical Sciences

Prof. A. Chakravorty, F.A.Sc., F.N.A.  
Indian Association for the Cultivation  
of Science, Calcutta

Prof. M.V. George, F.A.Sc., F.N.A.  
Regional Research Laboratory, Thiruvananthapuram

Prof. V. Krishnan, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. G. Mehta, F.A.Sc., F.N.A.  
University of Hyderabad, Hyderabad

Prof. C.N.R. Rao, F.A.Sc., F.N.A., F.R.S.  
Indian Institute of Science



## Engineering Sciences

Prof. R. Kumar, F.A.Sc., F.N.A.  
Indian Institute of Science

Dr. R.A. Mashelkar, F.A.Sc., F.N.A.  
National Chemical Laboratory, Pune

Prof. R. Narasimha, F.A.Sc., F.N.A., F.R.S.  
National Aeronautical Laboratory, Bangalore

Prof. V. Rajaraman, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. P. Rama Rao, F.A.Sc., F.N.A.  
Department of Science & Technology, New Delhi

Prof. M.M. Sharma, F.A.Sc., F.N.A., F.R.S.  
University Department of Chemical Technology  
Bombay

## Physical and Mathematical Sciences

Prof. S. Chandrasekhar, F.A.Sc., F.N.A., F.R.S.  
Centre for Liquid Crystal Research, Bangalore

Prof. R. Chidambaram, F.A.Sc., F.N.A.  
Bhabha Atomic Research Centre, Bombay

Prof. S.K. Joshi, F.A.Sc., F.N.A.  
Council of Scientific & Industrial Research  
New Delhi

Prof. N. Kumar, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. N. Mukunda, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. M.S. Narasimhan, F.A.Sc., F.N.A.  
Tata Institute of Fundamental Research, Bombay

Prof. Jayant Narlikar, F.A.Sc., F.N.A.  
Inter-University Centre for  
Astronomy and Astrophysics, Pune

Prof. T.V. Ramakrishnan, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. Virendra Singh, F.A.Sc., F.N.A.  
Tata Institute of Fundamental Research, Bombay

## HONORARY SENIOR FELLOWS

Prof. C. Dasgupta, F.A.Sc.  
Indian Institute of Science

Prof. H.R. Krishnamurthy, F.A.Sc.  
Indian Institute of Science

Prof. V. Nanjundiah, F.A.Sc.  
Indian Institute of Science

Prof. S. Ramasesha, F.A.Sc.  
Indian Institute of Science

Prof. M.R.S. Rao, F.A.Sc., F.N.A.  
Indian Institute of Science

Prof. A.K. Sood, F.A.Sc.  
Indian Institute of Science

## APPOINTMENTS

The following scientists worked at the Centre as Visiting Professors, etc. and were engaged in the activities indicated against their names:

### VISITING PROFESSORS

Dr. A. Jayaraman (AT&T Bell Laboratories): Research in high pressure Raman scattering on oxides and semi-conductors; Dec. 1990-Feb. 1992.

Prof. K. Krishna Prasad (Technical University, Eindhoven, The Netherlands): Writing of a book on "Wood Stoves"; May-July 1991.

Prof. Thomas Kailath (Stanford University, U.S.A.): Interaction with the active research community at IISc in Electrical, Electronics, Computer Engineering and Mathematics; June-July 1991.

Prof. A.K. Rajagopal (Naval Research Laboratory, Washington D.C., U.S.A.): Research in Physics of low dimensional condensed matter, in association with Prof. T.V. Ramakrishnan and Prof. N. Kumar; Sept.-Dec. 1991.

## SENIOR ASSOCIATES

- Prof. G.V. Anantha Iyer (Retired Professor of IISc): Writing of a monograph on Precambrian Crustal Evolution for use by geologists, chemists and other researchers in the field; Oct. 1990 onwards.
- Dr. Radhakrishna (Laboratoire Leon Brillouin, France): Experiments on magnetism, in association with Prof. K.J. Rao/Materials Research Centre, IISc; December 1990 onwards.
- Dr. B.V. Subbarayappa (Retired Executive Secretary, INSA and an historian of Science): Writing of a book 'In Pursuit of Excellence - a history of the Indian Institute of Science'; Feb. 1991 onwards.
- Prof. P.S. Narayanan (Retired Professor of IISc): Research in non-linear optics; June 1991 onwards.
- Prof. V.S.R. Rao (Retired Professor of IISc): Research in Molecular Modelling, design and development of carbohydrate databank and writing of a book on Conformational Analysis of Carbohydrates; Aug. 1991 onwards.

## FELLOWS

- Dr. Amit J. Basu: Research in Fluid Dynamics, in association with Prof. R. Narasimha; February 1991 onwards.
- Dr. D. Sengupta: Research in Fluid Mechanics, in association with Prof. R. Narasimha; Oct. 1991 onwards.

## VISITING SENIOR FELLOW

- Prof. V.N. Rajasekharan Pillai (Mahatma Gandhi University, Kottayam): Interaction with Prof. V. Krishnan et al in Organic Polymer Chemistry; Jan. 1992 onwards.

## VISITING FELLOWS

Dr. **May Sadiq** (Yarmouk University, Jordan):  
Study of the Research Pattern on the formation  
in amoeba, in association with V. Nanjundiah:  
May-Aug. 1991.

Dr. **Ramendu Bhattacharjee** (Edmund's College, Shil-  
long): Interaction with Prof. C.N.R.Rao et al in  
Chemistry: Aug. 1991-Jan. 1992.

Dr. **M. Verelst** (Toulouse Paul Sabatier University,  
France): Research in the Synthesis of oxides and  
other solids, in association with C.N.R.Rao and  
others; Sept. 1991 onwards.

Dr. **A.D. Schwarz-van Manen** (Technical University,  
Eindhoven, The Netherlands): Research in Atmos-  
pheric Boundary Layer, in association with Prof.  
R. Narasimha; Nov. 1991-Feb. 1992.

## VISITING SCIENTISTS

Prof. **D. Ramakrishna** (Purdue University, U.S.A.):  
June-July 1991.

Dr. **Basavaraj V. Hiremath** (Bell Labs., Princeton):  
Interaction with Prof. R. Kumar and others in  
Chemical Engineering; July 1991.

Prof. **Marcus W. Feldman** (Stanford University,  
California, U.S.A.): Research in Theoretical  
Population Biology, in association with Prof.  
Madhav Gadgil; Dec. 1991.

## JUNIOR RESEARCH FELLOWS

Mr. **G. V. Shivashankar**: Research in Scanning Tunnel-  
ing Microscopy under the guidance of Prof. N.  
Kumar and Dr. A.K. Ray Chaudhuri; Oct. 1990-July  
1991.

Ms. **Nagalakshmi Seshadri** (University of Poona,  
Pune): Research in DNA methylation in *D. melan-  
ogaster*, in association with Prof. H. Sharat  
Chandra; Sept. 1991 onwards.

## CHAIRS BY INDUSTRY

Messrs. Gharda Chemicals Ltd. and Messrs. CMC Limited have instituted Chairs in the Centre. These are in addition to the chair endowed by Messrs. Hindustan Lever Ltd. during the previous year.

## ANNUAL GET-TOGETHER OF THE FACULTY

On 16th November 1991, an annual get-together of the honorary faculty was held. Apart from discussing academic matters of interest to the Centre, a programme of lectures by five of the faculty members on the status of, and the latest developments in, their respective fields of interest had been arranged for an open audience. The texts of these talks are being published as a Special Issue of the Journal of the Indian Institute of Science.

## ADMINISTRATIVE AND SUPPORT SERVICES

An office has been established with the minimum staff. Services of some members of the staff of the Indian Institute of Science are being utilised in several ways. The construction programme of the Centre is being supervised by the Engineering staff of the Institute.

The Centre also has the benefit of the advice of some of the scientists who are associated with it as Honorary Professors.

## LAND AND BUILDINGS

The office building, the lecture hall and the dining hall which were completed in all respects at the Indian Institute of Science were put to use. The library also is functioning in the office building. A laboratory-cum-office for the President was also completed and started functioning. Work on a few more buildings has been in progress at the Indian Institute of Science. These are:

Estimated Cost

1. Guest House, office and stores .. ..	Rs.40 lakhs
2. Visitors' House .. ..	Rs.75 lakhs
3. President's house .. ..	Rs.20 lakhs
4. Staff housing .. ..	Rs.60 lakhs

The main campus of the Centre is being developed on land (15.55 acres gifted to the Centre by the Government of Karnataka) near Jakkur, about 11 kms from the Indian Institute of Science. Most of the area has now been enclosed with a boundary wall. Construction of the following buildings designed by the noted architect, Mr. Charles Correa has been progressing in this campus:

Estimated Cost

1. Academic and Administrative Block .. ..	Rs.130 lakhs
2. Visitors' Hostel .. ..	Rs. 90 lakhs

RESEARCH SUPPORT

The following support was extended by the Centre to the faculty and other scientists during the year:

Dr. S.A. Shivashankar/Prof. C.N.R. Rao - Rs.8 lakhs, in addition to Rs.20 lakhs sanctioned earlier, for research in Scanning Tunneling Microscopy and Atomic Force Microscopy (STM and AFM).

Prof. V. Krishnan/Dr. S. Umapathy - Rs.5 lakhs, besides Rs. 8 lakhs approved earlier, for equipment for research in Time-resolved Resonance Raman Spectroscopy.

Prof. G. Mehta - Rs. 1 lakh as recurring expenses for research in the new state-of-the-art projects in Organic Chemistry.

Prof. M.A. Viswamitra - Rs.2 lakhs for chemicals and other consumables, spares and minor equipment for structural studies on biologically important molecules.

Prof. G. Padmanaban - Rs.27,235 for minor equipment for research in Molecular Biology.

Dr. Radhakrishna - Rs.40,000 besides Rs.90,000 sanctioned earlier, for chemicals for research in magnetism.

Prof. M.R.S. Rao - Rs.2.2 lakhs for equipment for research in Meiotic Recombination Process.

Prof. V. Rajaraman and Dr.B.V. Subbarayappa - Rs.17,500 for Optical Character Recognition system software for research in Indus Script Recognition.

Prof. H. Sharat Chandra - Rs.2.5 lakhs for research in sex determination and dosage compensation.

Prof. N. Kumar, Prof. T.V. Ramakrishnan, Prof. C. Dasgupta and Prof. H.R. Krishnamurthy - Rs.50,000 for consumables and contingent expenditure for research in Physics.

Besides the above, a superminicomputer costing around Rs.31 lakhs has been installed as a central facility for use by research workers in theoretical physics, chemistry and other areas.

## RESEARCH

The main areas in which research work was carried out during the year are:

Biochemical mechanism of action of Chloroquine and the Genetic Basis for its resistance in *P.falciparum* (G. Padmanaban).

Evolution of human cultural traits relating to resource use (Madhav Gadgil).

Biologically important molecules like oligonucleotides, DNA drug complexes, cytoprotecting peptides, liver peptides, model steroids and proteins (M.A. Viswamitra).

New state-of-the-art project in organic synthesis (G.Mehta).

Theoretical research in physics and chemistry pertaining to properties of correlated electron states in molecular and extended systems and other areas, with the help of a superminicomputer (*S. Ramasesha, D.D. Sarma, S. Yashonath, H.R. Krishnamurthy and A. Patel*).

High Pressure Laser Raman Spectroscopic Studies (*A. K. Sood, A. Jayaraman and group*).

Scanning Tunneling Microscopy (*A. K. Raychaudhuri and group*).

Scanning Tunneling Microscopy and Atomic Force Microscopy (*C.N.R. Rao, K.J. Rao and S.A. Shivashankar*).

Magnetic studies of nitrided  $RFe_{17}$  type of alloys and phosphate glasses (*Radhakrishna, C.N.R. Rao, A.M. Umarji, A.K. Sood and S.V. Subramanyam*).

Computational Fluid Dynamics - Studies in two different directions: Viscous Vortex Methods and Direct Numerical Simulation of Turbulence (*R. Narasimha and Amit Basu*).

Optical Phase conjugation (*P.S. Narayanan and C.K. Subramanyam*).

13 papers arising out of these researches were published, 4 were presented at an International Conference held in Bangalore.

#### DISCUSSION MEETINGS, ETC.

The Centre has a programme of seminars, workshops and discussion meetings on important and exciting topics in science and engineering arranged in order to promote interaction and collaboration among scientists of the Centre in general and those in the country at large, and to stimulate young talented scholars. During the year, 13 discussion meetings were organised, keeping the number of participants small. Experts from overseas also participated in a few of these programmes and added to their value. Some of the areas covered were Artificial Intelligence, New Materials, Gene Structure and Expression, Catalysis, Hardness.



## SUMMER RESEARCH FELLOWSHIP PROGRAMME

During the year an annual summer research fellowship programme for talented students was initiated; students (selected out of about 1,000 candidates) were provided training in the methods of research under the expert guidance of honorary faculty in Bangalore and a few other places in the country during summer; the experience was very good. The second summer fellowship programme for the (Summer of 1992) was announced and about 40 students were selected.

## PUBLICATION PROGRAMME

### Monographs and Popular Science Books

The Centre has a three level publication programme under this head:

- Advanced monographs series aimed at promoting the publication of scientific books of an international standard and at research level;
- Educational monographs with short presentation (about 100 pages each) aimed at Indian students in science at graduate and post-graduate levels;
- Popular science books meant for the general reader. Where possible, these books are produced in Hindi also.

A popular book in Hindi, entitled, "Computer - Child's Play" by Dharma Rajaraman was got published by Prentice-Hall.

Monographs/books by several honorary professors and other were at various stages of preparation.

Proceedings of Conferences, Symposia, etc.

The Centre supports the publication of the Proceedings of important conferences, symposia, etc. sponsored by it.

During the year the following Proceedings were published:

Proceedings of the International Conference on Perspectives in Primate Reproductive Biology (5-7 February 1990), N.R.Moudgal, K. Yoshinaga, A.J.Rao and P.R. Adiga (Eds.), Wiley Eastern.

Proceedings of the Discussion Meeting on Solvation Dynamics & Charge Transfer Reactions (12-13 March 1990), B. Bagchi and V. Krishnan (Eds.), World Scientific, Singapore.

Proceedings of the Discussion Meeting on Magnetic Resonance (14-18 Jan. 1991), C.L. Khetrpal and G. Govil (Eds.), Narosa.

Proceedings of the Workshop on Superconductivity (29 January-2 February 1991), S. Gregoli, B. Raveau and C.N.R. Rao (Eds.), published by the Commission of the European Communities.

Proceedings of the Discussion Meeting on New Materials (24-26 October 1991), S.K. Joshi, C.N.R. Rao, T. Tsuruta and S. Nagakura (Eds.), Narosa.

The Proceedings of a few more conferences/discussion meetings were at various stages of publication.

#### Books

A book on the History of the Indian Institute of Science, entitled 'In Pursuit of Excellence', written by Dr. B.V. Subbarayappa, a Senior Associate of the Centre, was under print (Tata McGraw Hill).

#### Special Publication

A special issue of the Journal of the Indian Institute of Science, embodying the five lectures delivered by the honorary faculty at the Annual Faculty Meeting of the Society in November 1990, was brought out during the year.

#### FACULTY PUBLICATIONS

The faculty published 23 scientific papers and authored one book.

## LIBRARY

At the end of the year the Library had around 500 books. It continued to subscribe to 10 current journals on Science and Engineering to meet the essential needs of the faculty and others.

## RECOGNITIONS

The Centre continued to be recognised as a scientific/industrial research organisation by the Ministry of Scientific & Industrial Research (Department of Scientific & Industrial Research). It has also been approved for the purpose of Section 35(1)(ii) of the Income Tax Act, 1961.

## FINANCES

The Department of Science & Technology, Government of India released a grant of Rs.453 lakhs during the year 1991-92; this included Rs.81 lakhs which had been sanctioned during 1990-91. An expenditure of Rs.228.80 was incurred on both recurring and non-recurring items during the year.

## AUDIT

The audit of the accounts of the Centre for the year was carried out by Messrs. B.R.V. Goud & Co.

FORM NO. 10 B  
AUDIT REPORT UNDER SECTION 12 A(b) OF  
THE INCOME TAX ACT, 1961.

We have examined the Balance Sheet of JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH, Indian Institute of Science Campus, Bangalore 560 012, as at 31st March, 1992, and the Income and Expenditure Account for the year ended on that date which are in agreement with the Books of Account maintained by the said Centre.

We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit. In our opinion, proper books of accounts have been kept by the Centre, so far as it appears from our examination of the books of accounts subject to the comments given hereunder:

In our opinion and to the best of our knowledge and according to information given to us, the said accounts give a true and fair view:-

- (i) In case of the Balance Sheet of the State of Affairs of JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH as at 31st March, 1992.

AND

- (ii) In the case of the Income and Expenditure Account of the Excess of Income over Expenditure for the year ended that date.

for B.R.V. GOUD & CO.,

sd. B.R.V. Goud  
PARTNER

**BALANCE SHEET AS AT 31ST MARCH 1992**

Liabilities	Rs.	P	Assets	Rs	P
<b>CAPITAL FUND</b>			<b>FIXED ASSETS</b>		
FIXED ASSETS			As per Schedule		
As per contra	2,92,17,551	52	No.2, as per contra	2,92,17,551	52
<b>SURPLUS</b>					
As per Income & Expenditure Account	2,01,09,276	99			
	4,93,26,828	51			
			<b>ADVANCES &amp; DEPOSITS</b>		
			As per Schedule	32,79,394	95
			No.3		
<b>SUNDRY CREDITORS</b>					
As per Schedule No.1	15,11,104	08			
<b>ENDOWMENT FUND</b>	21,95,177	45	<b>ENDOWMENT FUND DEPOSITS</b>	21,95,177	45
			<b>FIXED DEPOSIT</b>	1,71,98,821	00
			Stock of Seminar Bags	10,998	25
			<b>CASH AT CANARA BANK</b>	11,31,166	87
			SB A/c No.13474		
<b>TOTAL</b>	<b>5,30,33,110</b>	<b>04</b>	<b>TOTAL</b>	<b>5,30,33,110</b>	<b>04</b>

As per our report of even date  
for B.R.V. GOUD & CO.  
Chartered Accountants

Place: Bangalore  
Date: 30.7.1992

Sd. C.N.R. Rao  
President

Sd. B.R.V. Goud  
Partner

Jawaharlal Nehru Centre for  
Advanced Scientific Research

18A

Expenditure	Rs	P	Income	Rs	P
<b>RECURRING EXPENDITURE:</b>					
To Salaries & Allowances	4,24,551	00	By Grant in Aid		
" Honorarium	6,60,491	00	" From DST, Govt. of India	4,13,00,000	00
" Medical reimbursement	4,869	91	" Interest		
" Bonus	998	00	On Term		
" Staff Training	950	00	Deposit	8,18,451.00	
" Discussion Meetings etc.	12,24,225	70	On Savings		
" Research Support	19,558	35	Bank A/c	1,92,874.00	
" Publication of Books	62,755	55			
" Summer Students' Programme (CTS/IISc) 1991	10,616	00	" Misc. Income	1,96,225	83
" Students' Summer Research Fellowship Programme 1991	53,425	50			
" Students' Summer Research Fellowship Programme 1992	83,360	00			
" Council & other meetings	91,023	45			
" Consumables	3,62,270	73			
" Repairs & Maintenance	65,465	85			
" Printing & Stationery	1,52,128	02			
" Postage	30,756	20			
" Telephone Charges	36,102	00			
" Misc. Expenses	40,300	23			
" Conveyance	20,635	55			
" Bank Charges	18,384	00			
" Security Services	34,286	15			
" Advertisement Expenses	27,160	00			
<b>Remuneration to Auditors</b>					
Audit Fees	7,500.00				
Other Services	2,100.00				
		9,600			00
" Garden Maintenance		67,082			00
" Electricity/Water		2,160			00
" Surplus	3,90,04,395	64			
<b>Total</b>	<b>4,25,07,550</b>	<b>83</b>	<b>Total</b>	<b>4,25,07,550</b>	<b>83</b>
<b>NON-RECURRING EXPENDITURE:</b>					
To Opening balance as on 1.4.91	1,15,139	98	By Balance b/d	3,90,04,395	64
" Building Construction	1,17,24,457	15			
" Off. Equipment & Appliances	2,97,913	86			
" Scientific Equipment	59,34,380	71			
" Furniture	1,60,115	50			
" Books & Journals	6,63,111	45			
" Excess of Income over Expenditure	2,01,09,276	99			
<b>Total</b>	<b>3,90,04,395</b>	<b>64</b>	<b>Total</b>	<b>3,90,04,395</b>	<b>64</b>

As per our records of bank data  
for B.R.V. GOND & CO.  
Chartered Accountants

Place: Bangalore  
Date: 30.7.1992

Sd. B.R.V. Gond  
President  
Jawahar Lal Nehru Centre for  
Advanced Scientific Research

Sd. B.R.V. Gond  
Partner

SCHEDULE - No.1 Sundry Creditors

Sl. No.	Particulars	Rs	P	Rs	P
<b>A. Retention money and EMD</b>					
1.	Decorin	20,500	00		
2.	Doddamane Bros.	1,78,556	00		
3.	Entee Enterprises	800	00		
4.	Interior India	1,350	00		
5.	R. Muniswamy	86,200	50		
6.	M.M. Agencies	5,000	00		
7.	K. Narasimhulu	4,36,101	00		
8.	M. Nagappa	1,74,242	00		
9.	New India Interiors	21,300	00		
10.	Pradeep Kumar	9,730	00		
11.	R.K.V. Rangan	17,980	00		
12.	B.V. Sreenivas	71,943	50		
13.	Shapoorji & Pallonji & Co	65,000	00		
14.	S.P.S. Borewell	3,469	00		
15.	Suresh P.R.	605	00		
16.	Royal Furnishing Co.	20,500	00		
17.	Vijayaraghava Reddy H.N.	1,82,188	00		
18.	Inside Design & Furniture	800	00		
19.	N. Diwakar	1,71,509	00	14,67,774	00
<b>B. IISc. - Water Supply</b>				32,230	08
<b>C. Audit fees payable</b>				7,500	00
<b>D. Security Charges payable</b>				3,600	00
<b>Total A + B + C + D</b>				<b>15,11,104</b>	<b>08</b>

As per our report of even date  
for B.R.V. Goud & Co.  
Chartered Accountants

Place: Bangalore  
Date: 30.7.1992

Sd. C.N.R. Rao  
President

Sd. B.R.V. Goud  
Partner

Jawaharlal Nehru Centre for  
Advanced Scientific Research

SCHEDULE No.2 - Fixed Assets

Sl. No.	Name of the Asset	As on 31.3.91		Additions during the year		As on 31.3.92	
		Rs	P	Rs	P	Rs	P
1	Land at Jakkur (granted by Govt. of Karnataka free of cost, vide order No.RD.174-LGB-87(P)/21.9.89)						
2	Building - Lecture Hall	-		5,52,866	97	5,52,866	97
3	Buildings - Under construction	92,41,628	72	1,11,71,590	18	2,04,13,218	90
4	Off. Equipment & Appliances	--		2,97,913	86	2,97,913	86
5	Scientific Equipment	4,51,292	01	59,34,380	71	63,85,672	72
6	Furniture	4,38,395	07	1,60,115	50	5,98,510	57
7	Books and Journals	3,06,257	05	6,63,111	45	9,69,368	50
<b>Total</b>		<b>1,04,37,572</b>	<b>85</b>	<b>1,87,79,978</b>	<b>67</b>	<b>2,92,17,551</b>	<b>52</b>

As per our report of even date  
for B.R.V. Goud & Co.  
Chartered Accountants

Place: Bangalore  
Date: 30.7.1992

Sd. C.N.R. Rao  
President  
Jawaharlal Nehru Centre for  
Advanced Scientific Research

Sd. B.R.V. Goud  
Partner



**SCHEDULE No.3 - Advances & Deposits**

Sl. No.	Particulars	Rs	P	Rs	P
A	<b>Mobilisation Advance:</b>				
	K. Narasimhulu	41,091	00		
	H.N.Vijayaraghava Reddy	2,91,622	20		
	N. Diwakar	11,54,783	00		
				14,87,496	20
B	<b>Material Advance:</b>				
	K. Narasimhulu	65,143	35		
	N. Diwakar	10,85,530	08		
	Doddamane Bros.	1,39,534	48		
				12,90,207	91
C	<b>Research Grant:</b>				
	Prof. G. Mehta	2,00,000	00		
	Prof. Gadgil	30,000	00		
				2,30,000	00
D	<b>Telephone Deposit:</b>				
	Telephone Deposit			33,000	00
E	<b>Cement Deposit:</b>				
	IISc.			2,37,483	84
F	<b>TA Advance:</b>				
	B. Nanjappa	665	00		
	K.S. Chandrashekhar	542	00		
				1,207	00
	<b>Total A+B+C+D+E+F</b>			<b>32,79,394</b>	<b>95</b>

As per our report of even date  
for B.R.V. Goud & Co.  
Chartered Accountants

Place: Bangalore  
Date: 30.7.1992

Sd. C.N.R. Rao  
President

Sd. B.R.V. Goud  
Partner

Jawaharlal Nehru Centre for  
Advanced Scientific Research

**CENTRE ADMINISTRATION**

**President**

Prof. C.N.R. Rao, F.A.Sc., F.N.A., F.R.S.

**Administrative Officer**

Mr. L. Raghavendra Rao, B.A.

**Co-ordinator**

Dr. R.B. Iyengar, D.Sc.

**Accounts Officer**

Mr. T. Ranganatha Rao, B.Com., LL.B.

**Honorary Advisor (Projects)**

Mr. K.C. Reddy, B.E., M.S. (Purdue)

**Honorary Project Engineer**

Mr. N. Munivenkataswamy, B.E.

**Honorary Finance-cum-Audit Officer**

Mr. C.A. Seshagiri Rao, B.Com.

**Honorary Medical Officer**

Dr. B.S. Subba Rao, M.B.B.S.

**Honorary Librarian**

Mr. N.M. Malwad, M.Lib.Sc., A.D.R.

