

# ANNUAL REPORT

2010-2011



Indian Institute of Science Education  
and Research (IISER) Mohali

March 31, 2011



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# 1 Preface

The Indian Institutes of Science Education and Research (IISERs) were established by the Ministry of Human Resource Development (MHRD), Government of India, based on the recommendation of the Scientific Advisory Council to the Prime Minister. Currently, five IISERs have been created and are functioning at Pune, Kolkata, Mohali, Bhopal and Thiruvananthapuram. The IISERs have been patterned after the Indian Institute of Science (IISc) Bangalore in terms of high quality research in the basic sciences, but the IISERs in addition have a focus on high quality education in the basic sciences at the undergraduate as well as the postgraduate level. Each IISER is an autonomous institution and will award its own degrees. The financial outlay for each IISER is around Rs. 500 crores over a period of seven years, with the aim to create state-of-the art research and teaching laboratories, library and computational facilities. The projected strength of each IISER in the coming years is around 2000 students (undergraduate as well as doctoral research fellows) and 200 faculty members in all core disciplines.

The basic mandate of the IISERs is to carry out research in frontier areas of science and to provide quality science education at the undergraduate and the postgraduate level. The major focus at IISER Mohali is to create a world class scientific institution with an intellectually alive research atmosphere.

IISER Mohali started operations in 2007 with a small batch of students. IISER Mohali's transit campus is currently located at MGSIPAP Complex, Sector 26, Chandigarh, in space allocated by the Government of Punjab. IISER Mohali's fully residential campus is coming up on 125 acres of land in the Knowledge City at Sector 81 Mohali and a number of activities have now been shifted to this campus. The new campus is around 15 km from the center of Chandigarh city, and will be easily accessible from Mohali's envisaged international airport. Architectural plans for the new integrated campus include academic blocks, an administrative block, hostels for students, central computing facility and library buildings, central analytical facility, faculty and staff residential complex, sports and recreation facilities, institute guest house, and additional support infrastructure such as a health center, creche and childcare facilities, a bank and a post office.

The five-year BS-MS dual degree in Science at IISER Mohali admits students after 10+2. The course structure is interdisciplinary and research oriented in nature, with a focus on the basic sciences. The curriculum provides comprehensive core courses in the first two years of the program in all areas of basic sciences: chemical, physical, mathematical and biological sciences. After the first two core years, students choose their major in one of the science subjects, which is expected to train them to work in contemporary areas of research of their choice. In addition to the basic courses, the IISERs will also have courses in the interdisciplinary areas of earth, planetary and environmental sciences, computational sciences, and humanities and social sciences. With a firm

foundation in basic sciences and mathematics in the first two years, the students will be in a position to choose the subject in which they will major including interdisciplinary areas. An early exposure to research through summer training in other laboratories and institutions of the country, including industrial organizations, and counseling schemes for major R&D career opportunities are other attractive features of the program. In the 2007-08 academic year, 25 students were admitted to the Masters program at IISER Mohali in the session that began on 16th August 2007. In the 2008-09 academic year, 40 students were admitted to the Masters program in the session that began in August 2008. In 2009-10, 120 students were admitted to the Masters program in the session that began in August 2009. The number of students admitted has remained stable with a total of 116 students joining the institute in Aug.2010. While *Kishore Vaigyanik Protsahan Yojana* (KVPY) scholars were admitted “automatically” to the BS-MS dual degree, the JEE merit listed students were admitted on the basis of their ranks. The direct channel of admissions, where top 1% of students in each examination board can apply, became operational this year and a number of students( )were admitted through this channel. The 5-Year BS-MS graduates of IISER Mohali are expected to take up science as a career, although the diverse skills gained will equip them to pursue high-profile careers in any field, including industry and government.

The fifth year of the Masters program will be devoted to full time research or to a technical project or to specialized training, in which the students will have to write a dissertation. The research component would result in lowering of the average period for obtaining a PhD degree for those students who pursue a doctoral program at IISER. Provision for an accelerated development for deserving individuals will be a special feature of the program. The IISERs will maintain a high standard of education, training and scholarship, comparable to that in the best Indian institutes and international universities in various areas of learning. In addition to the Masters program, the IISERs will also have a post BSc integrated PhD program, as well as a regular PhD program (post MSc). All teaching activities are based on a semester system accompanied by vigorous teacher-student contact time through research, journal clubs, seminars and colloquia. Rigorous laboratory courses are an essential part of the program.

The PhD program at IISER Mohali involves course work, a qualifying examination, thesis work and a thesis examination, leading to the award of a PhD degree. Besides research, scholars will be involved in several professional activities such as seminars, workshops and review meetings. The institute has a provision for a number of post-doctoral fellowships as well. A total of 69 PhD scholars in the core research disciplines of chemistry, physics, biology and mathematics have been admitted to the PhD program at IISER Mohali since August 2008, and are currently in varying stages of their research career.

Research infrastructure currently available at IISER Mohali includes a computing

facility, a sophisticated instrumentation facility and a modern library with access to many research journals and on-line databases. IISER Mohali aims to have a strong core faculty selected on a highly competitive basis and supported by attractive startup research grants. Young bright scientists including those who want to return to India for teaching and research careers will be specially considered for faculty positions. Current faculty research at IISER Mohali spans a diverse spectrum including theoretical chemistry, quantum information processing, X-ray diffractometry, NMR spectroscopy, low temperature physics, nano materials, cosmology, inorganic, organic and physical chemistry, algebra, immunology, chemical biology, single-molecule fluorescence spectroscopy, prion proteins and biophysics. IISER Mohali aims to be a *knowledge basin* in the northern region in India within the next decade. In this context, the institute plans on developing a synergetic network with other academic institutions both in India and abroad, and will hold regular conferences, seminars and symposia in research areas as well as workshops aimed at addressing fundamental issues in science education in India.

## 2 Board of Governors

- Dr. R. A. Mashelkar (Chairman)  
CSIR Bhatnagar Fellow, National Chemical Laboratory,  
Pune 411 008.
- Ms. Vibha Puri Das, IAS (Member)  
Secretary (HE),  
Department of Higher Education,  
Ministry of Human Resource and Development,  
Shastri Bhavan,  
New Delhi 110001.
- Shri S.C. Agarwal, IAS (Member)  
Chief Secretary  
Punjab Civil Secretariat  
Government of Punjab  
Chandigarh 160 001
- Dr. M. K. Bhan (Member)  
Secretary,  
Department of Biotechnology (DBT)  
CGO Complex, Lodi Road  
New Delhi 110 001
- Ms. S. Jalaja (Member)  
Secretary (AYUSH),  
Department of AYUSH  
1, Red Cross Building  
New Delhi 110 114
- Dr. S. Ayyapan (Member)  
Secretary,  
Deptt. of Agriculture Research and Education (DARE)  
& Director General, ICAR  
Krishi Bhavan  
New Delhi - 110 114
- Professor P. Balaram (Member)  
Director, Indian Institute of Science  
Bangalore 560 012



- Professor M. K. Surappa (Member)  
Director, IIT Ropar  
Nangal Road, Rupnagar  
Punjab 140 001.
- Professor K. N. Ganesh (Member)  
Director,  
Indian Institute of Science Education & Research Pune  
900 NCL Innovation Park  
Homi Bhabha Road,  
Pune 411 008
- Dr. Lalji Singh (Member)  
Bhatnagar Fellow (CSIR)  
Centre for Cellular and Molecular, Biology  
Uppal Road, Hyderabad - 500 007
- Dr. Sibaji Raha (Member)  
Director, Bose Institute  
Centenary Campus  
p1/12, C.I.T. Road, Scheme - VIIM  
Kolkata 700 054  
West Bengal
- Professor Ram Sagar (Member)  
Director,  
Aryabhata Research Institute of Observation Sciences (ARIES)  
Manora Peak  
Nanital 263 129  
Uttarakhand
- Dr. S. Kathirola (Member)  
Chief Scientist  
National Institute of Ocean Technology NIOT Campus  
Velachery - Tambaram Main Road  
Narayanapuram, Pallikaranai  
Chennai 600 100  
Tamil Nadu
- Shri. S.K. Ray  
Joint Secretary & Financial Advisor  
Ministry of Human Resources and Development

Shastri Bhawan  
New Delhi 110 001

- Professor Arvind  
IISER Mohali  
Sector 81, Mohali
- Professor Sudeshna Sinha  
IISER Mohali  
MGSIPAP Complex  
Sector 26, Chandigarh
- Professor N. Sathyamurthy  
Director, IISER Mohali  
MGSIPAP Complex  
Sector 26, Chandigarh
- Dr. P. Bapaiah (Secretary)  
Registrar, IISER Mohali,  
MGSIPAP complex,  
Chandigarh 160019.

### 3 Academic Senate

- Professor N. Sathyamurthy (Chairman)  
Director, IISER Mohali  
MGSIPAP Complex, Sector 26, Chandigarh
- Professor Ashok Sahni (Member)  
Centre for Advanced Study in Geology  
Panjab University, Chandigarh
- Professor S. V. Kessar (Member)  
Department of Chemistry,  
Panjab University, Chandigarh
- Dr. Girish Sahni (Member)  
Director, IMTECH, Sector 39  
Chandigarh
- Professor B. N. Goswami (Member)  
Emeritus Professor, Panjab University  
Chandigarh 160 014
- Professor M. K. Surappa (Member)  
Director, IIT Ropar  
Nangal Road, Rupnagar  
Punjab -140 001
- Professor R. C. Sobti (Member)  
Vice-Chancellor, Panjab University  
Chandigarh
- Dr. Rakesh Tuli (Member)  
Director, National Agri-Food Biotechnology Institute (NABI)  
C-127, Industrial Area  
Phase VIII, Mohali 160 071
- Professor K. K. Bhutani (Member)  
National Institute of Pharmaceutical Education and Research(NIPER)  
Sector 67, Phase X  
SAS Nagar, Mohali -160062
- Professor Arvind (Member)  
Dean Students, IISER Mohali  
Sector 81, Mohali

- Professor Kapil Hari Paranjape (Member)  
Dean Academics, IISER Mohali  
MGSIPAP Complex  
Sector 26, Chandigarh - 160019
- Professor Sudeshna Sinha (Member)  
IISER Mohali  
MGSIPAP Complex  
Sector 26, Chandigarh - 160019
- Professor A. K. Bachhawat (Member)  
Dean Faculty , IISER Mohali  
MGSIPAP Complex  
Sector 26, Chandigarh - 160019
- Professor P. Guptasarma (Member)  
IISER Mohali, MGSIPAP Complex  
Sector 26, Chandigarh - 160019
- Professor J. S. Bagla (Member)  
Dean (Research and Development) , IISER Mohali  
MGSIPAP Complex  
Sector 26, Chandigarh - 160019
- Professor Ramesh Kapoor (Member)  
IISER Mohali, MGSIPAP Complex,  
Sector 26, Chandigarh
- Professor C. G. Mahajan (Member)  
IISER Mohali, MGSIPAP Complex,  
Sector 26, Chandigarh
- Professor I. B. S. Passi (Member)  
Honorary Professor, IISER Mohali  
MGSIPAP Complex, Sector 26, Chandigarh
- Dr. Sanjay Mandal (Member)  
Associate Professor, IISER Mohali  
Sector 81, Mohali
- Dr. N. G. Prasad (Member)  
Assistant Professor

IISER Mohali, MGSIPAP Complex,  
Sector 26, Chandigarh

- Dr. Chanchal Kumar  
Assistant Professor, IISER Mohali  
MGSIPAP Complex, Sector 26, Chandigarh
- Dr. Anu Sabhlok (Member)  
Assistant Professor  
IISER Mohali, MGSIPAP Complex  
Sector 26, Chandigarh 160 019
- Dr. P. Bapaiah (Secretary)  
Registrar, IISER Mohali  
MGSIPAP Complex  
Sector 26, Chandigarh 160 019

## 4 Administration

Director	Prof. N. Sathyamurthy
Dean (Faculty)	Prof. A. K. Bachhawat
Dean (Academic)	Prof. Kapil Paranjape
Dean (Students)	Prof. Arvind
Dean (R&D)	Prof. J. S. Bagla
Registrar	Dr. P. Bapaiah
Coordinator	Dr. Jagdeep Singh (Punjab Govt.)
Assistant Registrar	Sh. Sandeep Ahlawat
Deputy Librarian	Dr. Visakhi
Executive Engineer cum Estate Officer	Mr. Praveen Kumar Srivastava
Stores & Purchase Officer	Sh. Kulwant Singh
Honorary Counsellor	Mrs. Suguna Sathyamurthy
Warden (Boys hostel)	Dr. Sanjay Singh
Warden (Boys hostel)	Dr. Arulananda Babu
Warden (Girls hostel)	Prof. Sudeshna Sinha
Warden (Girls hostel)	Dr. Anu Sabhlok
Resident Warden (Hostel 5)	Dr. K. P. Yogendran
Security Officer cum PRO	Sh. J. N. Ahuja

## 5 Academic Staff

### 5.1 Faculty

1. Prof. N. Sathyamurthy (Professor, Chemistry)  
Research area: Molecular Reaction Dynamics and Potential Energy Surfaces
2. Prof. R. Kapoor (Professor, Chemistry)  
Research area: Inorganic chemistry

3. Prof. C. G. Mahajan (Professor, Physics)  
Research area: Atomic/ Molecular Spectroscopy
4. Dr. Arvind (Professor, Physics)  
Research area: Quantum information theory, Quantum optics
5. Dr. Kavita Dorai (Assistant Professor, Physics)  
Research area: Biomolecular NMR, Quantum computing
6. Dr. Sanjay Singh (Assistant Professor, Chemistry)  
Research area: Synthetic Inorganic and Organometallic Chemistry
7. Dr. Tapan Mukherjee (Assistant Professor, Biology)  
Research area: Molecular medicine
8. Dr. Dinesh Khurana (Assistant Professor, Mathematics)  
Research area: Ring theory, Non-commutative algebra
9. Dr. Amit Kulshrestha (Assistant Professor, Mathematics)  
Research area: Quadratic forms, Central simple algebras and related structures
10. Dr. Sanjay Mandal (Associate Professor, Chemistry)  
Research area: Organometallic Chemistry, Nanomaterials, and X-ray Diffractometry
11. Dr. Chanchal Kumar (Assistant Professor, Mathematics)  
Research area: Algebraic Geometry and Combinatorial Commutative Algebra
12. Dr. Ramandeep Singh Johal (Assistant Professor, Physics)  
Research area: Statistical Physics, Thermodynamics and Quantum Theory
13. Dr. Samrat Ghosh (Assistant Professor, Chemistry)  
Research area: Materials chemistry
14. Dr. R. Ramesh (Assistant Professor, Chemistry)  
Research area: Development of Solid-state NMR methods, Quantum mechanics
15. Dr. Lingaraj Sahu (Assistant Professor, Mathematics)  
Research area: Operator Theory, Operator Algebras
16. Dr. S. Mukhopadhyay (Assistant Professor, Biology/Chemistry)  
Research area: Protein folding, Misfolding, Prion & Amyloid biology
17. Dr. N. G. Prasad (Assistant Professor, Biology)  
Research area: Evolutionary genetics

18. Dr. S. Arulananda Babu (Assistant Professor, Chemistry)  
Research area: Synthetic organic chemistry
19. Dr. A. Mukhopadhyaya (Assistant Professor, Biology)  
Research area: Immunology
20. Dr. K. Chattopadhyay (Assistant Professor, Biology)  
Research area: Structure-Function Studies on Pore-Forming Protein Toxins
21. Dr. Rajeev Kapri (Assistant Professor, Physics)  
Research area: Statistical Mechanics
22. Dr. Lolitika Mandal (Assistant Professor, Biology)  
Research area: Hematopoiesis, Cardiogenesis and Molecular pathways in stem and progenitor cell development in *Drosophila*.
23. Dr. Sudip Mandal (Assistant Professor, Biology)  
Research area: Mitochondrial regulation of cellular function
24. Dr. Kamal P Singh (Assistant Professor, Physics)  
Research area: Ultrafast Quantum Dynamics and Stochastic nonlinear dynamics
25. Dr. Pranaw Rungta (Assistant Professor, Physics)  
Research area: Quantum Information and Computation
26. Dr. A. R. Choudhury (Assistant Professor, Chemistry)  
Research area: X-ray Crystallography
27. Dr. K. P. Yogendran (Assistant Professor, Physics)  
Research area: Quantum aspects of Gravity
28. Dr. R. Vijaya Anand (Assistant Professor, Chemistry)  
Research area: Synthetic organic chemistry
29. Dr. Kapil Hari Paranjape (Professor, Mathematics)  
Research area: Geometry
30. Dr. Sudeshna Sinha (Professor, Physics)  
Research area: Nonlinear Dynamics, Chaos, Complex Systems, Networks, Computation
31. Dr. Anu Sabhlok (Assistant Professor, Humanities)  
Research area: Postcolonial studies, feminist geography, Political-economy of contemporary India, Globalization , Identity (gender and nation), Participatory Action Research, Ethnography



32. Dr. Samarjit Bhattacharyya (Assistant Professor, Biology)  
Research area: Neurobiology
33. Dr. Ananth Venkatesan (Assistant Professor, Physics)  
Research area: Mesoscopic Electronic & Electromechanical systems
34. Dr. Jasjeet Singh Bagla (Professor, Physics)  
Research area: Cosmology
35. Dr. Krishnendu Gongopadhyay (Assistant Professor, Mathematics)  
Research area: Groups, Geometry & Dynamics
36. Dr. Vinayak Sinha (Assistant Professor, Earth Sciences & Chemistry)  
Research area: Environmental Science: Atmospheric Chemistry Field Experiments
37. Dr. Sanchayan Neal Gupta (Assistant Professor, Organic Geochemistry)  
Research area: Organic Geochemistry, Geobiology, Biogeochemistry
38. Dr. Anand K. Bachhawat (Professor, Biology)  
Research area: Glutathione and Sulphur Metabolism in Yeasts
39. Dr. Purnananda Guptasarma (Professor, Biology)  
Research area: Protein Engineering & Structural Biochemistry
40. Dr. Sanjeev Kumar (Assistant Professor, Physics)  
Research area: Condensed Matter Theory: Correlated electron systems, disordered systems
41. Dr. Santanu Kumar Pal (Assistant Professor, Chemistry)  
Research area: Liquid Crystals, Interfacial Phenomena, Colloid and Gel Chemistry, Chemical and Biological Sensing, Nanoscale Science and Engineering
42. Dr. Yogesh Singh (Assistant Professor, Physics)  
Research area: Experimental Condensed Matter Physics
43. Dr. Harvinder Kaur Jassal (Assistant Professor, Physics)  
Research area: General Relativity and Cosmology
44. Dr. K. R. Shamasundar (Assistant Professor, Chemistry)  
Research area: Quantum Chemistry

## 5.2 Honorary Faculty

1. Prof. I. B. S. Passi (Professor, Mathematics)  
Research area: Algebra
2. Prof. Ashok Sahni (Professor, Earth Sciences)  
Research area: Earth Sciences
3. Prof. Anil Kumar (Professor, Physics)  
Research area: NMR Spectroscopy

## 5.3 Visiting Faculty

1. Prof. T. R. Rao (Visiting Professor, Biology)
2. Prof. Satish Shirali (Professor, Mathematics)
3. Prof. H. L. Vasudeva (Visiting Professor, Mathematics)
4. Prof. K. K. Sharma (Visiting Professor, Physics)
5. Prof. Meera Nanda (Visiting Professor, History & Philosophy of Science)

## 5.4 Adjunct Faculty

1. Dr. Girish Sahni (Biology), Director, IMTECH, Chandigarh
2. Prof. C. S. Aulakh (Physics), Professor, PU, Chandigarh
3. Dr. Jagdeep Singh (Biology), Punjab Government
4. Dr. S. A. Ramakrishna (Physics), Associate Professor, IIT Kanpur
5. Prof. Dhruv Raina (Social Science), Professor, JNU, New Delhi
6. Prof. Amitabh Joshi (Biology), Professor, JNCASR, Bangalore
7. Dr. Rakesh Tuli (Biology), Executive Director, NABI Mohali
8. Dr. Amitabha Chattopadhyay (Biology), Deputy Director, CCMB Hyderabad

## 6 Progress made in 2010-11

### 6.1 Milestones

- Independence day (August 15 2010) was celebrated at IISER Mohali's new campus. The CNR Rao Foundation award was given to Mr. Agastya P. Bhatti. Academic excellence awards were given to Mr. Keshav Aggarwal, Mr. Rishi Raj Trivedi, Ms. Amita Agarwal, Ms. Rajni Ranjan and Mr. Amol A. Deshmukh.
- IISER Mohali Foundation Day 2010 was celebrated on 27th September 2010. This was the first foundation day to be celebrated in the Mohali campus. Prof. N. Sathyamurthy, Director IISER gave the welcome address, which was followed by the Foundation Day Lecture by Prof. P. Rama Rao (International Advanced Research Centre for Powder Metallurgy and New Materials, Hyderabad), former chairman of the board of governors of IISER Mohali.
- Republic Day was celebrated on January 26, 2010 at the IISER Mohali campus. Mr. Samant Manas Arun, Ms Tanya Kaushal Srivastava and Mr. Arul Ganesh S. S. received the CNR Rao foundation prize for the 2010-2011 first Semester. Mr. Agastya P. Bhatti, Ms. Abhilasha Joshi, Mr. Nilmani Singh, Mr. Kapil Dave, Mr. Sumit Mittal, Mr. Jithin Paul M. and Mr. Vikesh Siddhu were given the academic excellence prize for the best performing students.
- Prof. Anthony Leggett visited IISER Mohali during Jan.15-16, 2011 and gave a special talk entitled *Testing The Limits Of Quantum Mechanics*. This was the first talk by a Nobel laureate to the institute. Prof. Leggett had an extended interaction with students during his stay, apart from discussions with the faculty.
- Hostel 5 and Hostel 7 were inaugurated during this year: Hostel 5 was inaugurated on December.3, 2010 and Hostel 7 was inaugurated on January.26, 2011. All the MS students and nearly all the PhD students now stay in the hostels at the Mohali campus.

### 6.2 Meetings of the Institute Bodies

During 2010-2011, various administrative bodies of the Institute met for deliberations.

#### Board of Governors Meeting

8 <sup>th</sup> meeting of BOG	: 05/06/2010
9 <sup>th</sup> meeting of BOG	: 02/11/2010

### Academic Senate Meeting

7 <sup>th</sup> meeting of Academic Senate	:	20/05/2010
8 <sup>th</sup> meeting of Academic Senate	:	15/12/2010

### Research Advisory Committee Meeting

3 <sup>rd</sup> meeting of Research Advisory Committee	:	21/12/2010
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### Curriculum Committee

A national level curriculum committee to design the curriculum for the 5- year Integrated BS-MS dual degree at IISER Mohali was setup in 2007 with Professor Arvind as the convener. The third the concluding meeting of the curriculum committee was held during November 21-22, 2010. Apart from the IISER faculty, a number of experts from all over the country participated in this event. The list of experts included: Prof Shobha Madan (IIT Kanpur), Dr Yogananda (Mysore Engineering College), Prof Sunil Kumar (IIT Madras), Professor Amitabha Joshi (JNCASR Bangalore), Professor D P Sarkar (Delhi University), Professor Uday Maitra (IISc Bangalore) and Dr Sundar Sarukkai (NIAS Bangalore). The tasks for the committee were to complete the exercise of curriculum design and to review and fine-tune the structure and contents of all MS courses based on the teaching experience at IISER Mohali for the past three years. The committee in its final recommendation gave clear guidelines for the curriculum, which were later adopted by the IISER Mohali Senate in its meeting in December 2010. A course and curriculum booklet is being prepared with full details of the BS-MS dual degree.

## 6.3 New Campus

The IISER Mohali new campus construction activity remained the main focus in the year 2010-2011. Hostel buildings became operational. Construction of Director's residence, and senior faculty housing was completed. Construction of apartment blocks for faculty, scientific and administrative staff is in full swing. In the next financial year, the work on lecture hall complex and academic block is likely to be completed. Most of the teaching activity has already shifted to the new campus and we expect that the entire research and teaching activity will shift to the Mohali campus in the coming financial year. With this, IISER Mohali's new fully residential 125 acre campus coming up in the Knowledge City at Sector 81, Mohali is fast becoming a reality.

## 6.4 Facilities created/augmented

### 6.4.1 Computing Facility

The transit campus LAN was augmented with wireless points to help students access the Internet from a few class rooms that are used as study areas in the evening. Automation of campus processes is proceeding and several processes related to admission have already been automated and more processes are being added. A new computing laboratory was created in the hostel premises in the new campus so that students can access computing and net facilities. A computer laboratory has also been set up in the Central Analytical Facility to help with the tutorials of computation related courses.

A 3 Tera flop high performance scientific computing facility is being added and will be available to users in the coming financial year.

### 6.4.2 Library

The Library of IISER Mohali is a unique place with its rich collection of monographs and Journals in Mathematics, Physics, Chemistry, Biology, Computer Science, Humanities, Earth/Environmental Science, Astrophysics etc. The collection includes textbooks for the Under Graduate & Post Graduate courses in the basic sciences as well as applied sciences. The Library is the knowledge center that offers access to essential and specialized information resources and services to meet the growing information needs of the user. It is a host of information services, like online catalogue ( WebOPAC), e-journals, on-line full text databases, online bibliographic service, abstracting databases, e-mail alert service, current awareness service, document delivery service, inter-library loan facility, photocopying facilities, reference service, and so on. The housekeeping activities of the Library has been computerized by implementing Open Source Library Management Software *Koha*.

The library at IISER Mohali currently houses over 4952 monographs which are classified as per DDC 22nd edition Classification Scheme and catalogued as per AACR2 revised edition. The Library of Congress Subject Heading (LCSH) is being used to provide subject headings. The library subscribes to about 20 print journals and more than 4343 e-journals with full text access in both transit Campus as well as Mohali Campus.

IISER Mohali Library functions at both transit campus at Sector 26 Chandigarh and the main campus at Sector 81, Mohali. The library remains open from Monday-Saturday ( 9am-10pm), Sunday and Holidays (9am-5pm), 9am -12pm during examinations (including Saturdays, Sundays and Holidays ) except seven national holidays.

During the period under report the Library Catalogue has been computerized by implementing Open Access Library Management Software *Koha*:

- Made the computerized catalogue online through WebOPAC so that users of the

library can search the catalogue from outside the campus.

- Profile of bonafide members has also been computerized.
- Circulation Process (Borrowing & Lending of Books) has been computerized.
- Acquisition process has been partially computerized.
- Library Patron Search has been computerized by assigning unique user name and password to user to enable the borrower ( Patron) to login into his account for reservation of document which is under issue, to see his circulation history, Carting the document for further reference, making the list of his subject interest, suggestion for new books, modification of his profile etc.
- Developed an attractive, well featured library website through which user can access complete information about resources and services in print as well electronic medium.

The IISER Mohali Library is one of the core members of INDEST as well as IISERs Consortia, and also Associate Member of UGC-Infonet Digital Library Consortium. Under these Consortia, library has seamless access to thousands of electronic journals in the field of basic sciences. Some of the Online full text databases available for access are Science On-line, ACS (Web Edition), Nature Online, APS, AIP, AMS, MAA, RSC, IOP, International press, Annual Reviews, JSTOR, Project Muse, Project Euclid, Sciencedirect, Springer-online, T&F, Wiley, World Scientific, etc. IISER Library also provides access to Bibliographical & Abstracts Databases like MathSciNet, SciFinder, Scopus and JCCC. The Library is an institutional member of the British Council library and the Panjab University library.

### **6.4.3 Student Amenities**

A gym equipped with modern fitness equipment has been set up in the hostel premises of the new campus. A volleyball court and some playing area has been created in the vicinity of the hostels. Common room with TV has been provided in the two hostels. Various existing student amenities have been augmented.

### **6.4.4 Institute Creche**

Inaugurated in August 2009, the institute creche facility has become a great asset for faculty, staff and other members of the IISER community. The number of regular users is close to ten and there are other less frequent users of the creche facility.

### 6.4.5 Research Laboratories

Various equipments were also added to the existing research laboratories, where several faculty members and PhD students work by sharing lab space and resources. The labs have a modern design and take into consideration safety measures and environmental aspects.

### 6.4.6 Teaching Labs

New teaching labs have been set up in the new campus. Facilities in the existing labs in the transit campus were also augmented. A list of teaching laboratories in different fields is given below alongwith the individual capacity of each lab.

Name	Number	Capacity
Biology Teaching Lab	2	30
Physics Teaching Lab	2	30
Chemistry Teaching Lab	2	30
Electronics Teaching Lab	1	30

### 6.4.7 Lecture Rooms

Name	Number	Individual Capacity
Seminar Room	2	75
Conference Room	2	50
Class Room	5	100

## 6.5 Equipment Procured during the Financial Year 2010-11

- Axiosope A1 upright fluorescence microscope
- Stemi 2000 binoculars
- Carl Zeiss Fluorescent Microscope
- MS Biosciences Rocking incubator
- Laser Raman and Scanning Probe Microscopy (AFM, NSOM & TERS) facilities

- IKA Rotary Evaporator
- IKA Magnetic Stirrers
- KNF-LABOPORT: Diaphragm Vacuum Pump
- Samsung Refrigerator
- Refrigerator
- An oven
- One sartorius balance
- Ductless fume cupboard
- Ice flaker
- DM water system
- An Optical Spectrophotometer for Remote Sensing Atmospheric Pollutants<sup>1</sup>

## 7 Academic Programs

In August 2010, 116 students were admitted to the 5-year BS-MS dual degree program. These students were admitted based on KVPY and IIT JEE merit list as well as direct admissions for students who are in the top 1% of the students in their respective board. A total of 34 PhD scholars in chemistry, physics, biology and mathematics were admitted to the PhD program at IISER Mohali in the semester beginning August 2010 and in the winter semester beginning January 2011. The total number of undergraduate students in the Institute at present is 248 ( ) and the total number of PhD students is 69.

A total of 113 courses were offered in the academic year 2010–2011, including close to 30 elective courses. The growing number of elective courses represents options available to students and also the increasing breadth of expertise available at IISER Mohali.

IISER received support from NITTTR, Chandigarh and the Nuclear Physics Laboratory, Physics Department, Panjab University for conducting some courses.

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<sup>1</sup>Acquired through a collaboration with Prof. Thomas Wagner, Head, Satellite Remote Sensing Group, Max Planck Institute for Chemistry, Mainz, Germany.



## **8 Events**

### **8.1 Foundation Day Celebrations**

The third Foundation Day of IISER Mohali was celebrated on September 27, 2010 in the new campus. The foundation day lecture was given by Prof. P. Rama Rao (International Advanced Research Centre for Powder Metallurgy and New Materials, Hyderabad), former chairman of the board of governors of IISER Mohali.

### **8.2 Session on Abel Prize**

A special session on the Abel prize was organized where Dr. Amit Kulshrestha gave an exposition on the work of Prof. John Torrence Tate, the Abel Laureate for 2010.

### **8.3 Session on Nobel prizes in science**

A set of popular lectures were organized around the theme of the 2010 Nobel prizes in Science on October 13, 2010 at IISER Mohali. Dr. Sudip Mandal (IISER Mohali), Dr. R. Vijaya Anand (IISER Mohali) and Dr. Ananth Venkatesan (IISER Mohali) delivered lectures on the occasion.

### **8.4 Celebration of Science Day**

Science Day was celebrated on February 28, 2011 at the transit campus of IISER Mohali. Students of the 5-year. BS-MS dual degree program organized a science quiz, an elocution competition as well as a treasure hunt on the occasion for school students from the Chandigarh area. IISER students also set up a number of exhibits for school students.

## **9 Meetings/Conferences/Workshops organized**

### **9.1 KVPY Summer Science Camp**

A national level summer science camp for KVPY scholars was organized at IISER Mohali during May 31, 2010 to June 05, 2010. About 150 young scholars from around the country participated in the camp. The camp comprised of talks (using a novel lecture/demo format) by eminent scientists from other institutions as well as by faculty from IISER Mohali. The list of speakers included: Prof. N. Sathyamurthy (Director, IISER Mohali), Prof. Ashok Sahni (PU Chandigarh), Prof. R. Shankar (IMSc Chennai), Dr. Sanjay Wategaonkar (TIFR), Dr. Lalit Bhardwaj (CSIO Chandigarh), Dr. R.

K. Kohli (PU Chandigarh), Dr. S. Sahajpal (PU Chandigarh), Prof. Kapil Paranjape (IISER Mohali), Dr. R. Mehrotra (NPL New Delhi), Dr. S. Mukhopadhyay (IISER Mohali), Prof. I. B. S. Passi (IISER Mohali), Dr. A. Ramakrishna (IITK), Dr. K. S. Vishwanathan (IGCAR), Dr. N. G. Prasad (IISER Mohali) and Dr. Kavita Dorai (IISER Mohali). The camp was co-ordinated by Prof. Arvind with logistics help by IISER Mohali faculty: Prof. C. G. Mahajan, Dr. Jagdeep Singh, Dr. Sudip Mandal, Dr. Arunika Mukhopadhyay and Dr. Kaushik Chattopadhyay. A novel part of the camp was the setting up of laboratory experiments in chemistry, biology, physics and mathematics. The biology experiments were co-ordinated by Dr. Prasad and Dr. Lolitika Mandal, the chemistry experiments were co-ordinated by Dr. Vijay Anand and Dr. S. A. Babu, the physics experiments were co-ordinated by Dr. K. P. Singh, Dr. Rajeev Kapri and Dr. R. S. Johal, and the math demos were organized by Prof. Kapil Paranjape and Dr. Chanchal Kumar. A few PhD and undergraduate students from IISER Mohali also participated in this exercise. According to the feedback received, these experimental demonstrations seem to have fired the imagination of many participants. The national co-ordinator of KVPY camps, Prof Dipankar Bhattacharya from IISc Bangalore, also attended the camp at IISER Mohali and delivered a talk to the students. An evening interaction session on “Identity” was co-ordinated by Dr. Anu Sabhlok (IISER Mohali). On the last day of the camp, Dr. R. A. Mashelkar (Chairman Board of Governors IISER Mohali) gave an inspiring talk on the notion of creativity in science, which was appreciated by the students. Apart from talks and laboratory activities, KVPY scholars were given tours of the Central Analytical Facility at IISER Mohali (housing the NMR Research Facility, X-Ray lab and AFM/Laser Raman lab) in the new campus in Sector 81 facilitated by Dr. Sanjay Mandal, Dr. Kavita Dorai and Dr. Samrat Mukhopadhyay. Tours to nearby scientific institutions in Chandigarh such as Institute of Microbial Technology, Punjab University, Central Scientific Instruments Organization and National Institute of Pharmaceutics Education and Research were also organized.

## 9.2 NMR at the interface of physics, chemistry and biology

An international conference on “Nuclear Magnetic Resonance at the interface of physics, chemistry and biology” was organized at IISER Mohali during November 29-30 2010 to mark the launch of NMR research activity at IISER Mohali. The NMR Research Facility at IISER Mohali was inaugurated in March 2010 and currently houses two NMR spectrometers (400 MHz and 600 MHz). The conference had a number of invited talks by speakers from India and abroad and was well-attended with 150 student participants (both undergraduate and postgraduate) from IISER Mohali and neighboring institutes such as Panjab university Chandigarh, CSIR Palampur, IMTECH Chandigarh, GNDU Amritsar and Central University Bhatinda. The Keynote Address was deliv-

ered by Professor Anil Kumar (IISc Bangalore) on "Quantum Information Processing by NMR:Status and Challenges". The list of other invited speakers included:

- Prof. Anil Kumar (IISc Bangalore)
- Prof. C. L. Khetrapal (CBMR Lucknow)
- Prof. R. V. Hosur (TIFR Mumbai)
- Prof. N. Chandrakumar (IITM Chennai)
- Prof. N. R. Jagannathan (AIIMS New Delhi)
- Prof. A. S. Brar (GNDU Amritsar)
- Prof. A. C. Kunwar (IICT Hyderabad)
- Prof. K. V. Ramanathan (IISc Bangalore)
- Prof. N. Suryaprakash (IISc Bangalore)
- Prof. Walter Chazin (Vanderbilt University USA)
- Prof. Daniel Canet (Nancy University France)
- Prof. Steffen Glaser (TU Munich Germany)
- Prof. Janez Plavec (Ljubljana University Slovenia)
- Prof. Paul Gooley (Melbourne University Australia)
- Prof. Martin Stone (Monash University Australia)
- Prof. Shantanu Sinha (University California San Diego USA)

The conference introduced the students at IISER Mohali to the exciting world of NMR research, encompassing all applications from Biological NMR to Quantum Computing, Medical Diagnostics MRI, fMRI and Environmental Science.

### 9.3 3rd Inter IISER Chemistry Meet at IISER Mohali

Since 2008 an Inter IISER Chemistry Meet is organized every year to bring all researchers in Chemistry together to share research activities of various groups through oral and poster presentations. The first and the second such meet were organized by IISER Pune and IISER Kolkata respectively. This year IISER Mohali hosted the 3rd Inter IISER Chemistry Meet held during February 20-21, 2011 at its new campus. This meet focused on the current status and future projections of research in various fields of Chemistry and related areas. In this meet oral (26) and poster (9) presentations by various faculty members and students showcased the interdisciplinary research activities in the five premier institutes of India. Through these presentations it was expected to have exchange of ideas for generating scope for collaborations as well as to give an opportunity to young minds to interact with others. 2011 is the International Year of Chemistry and thus it was a great opportunity to celebrate it together. Dr. Sanjay Mandal was the convener, Prof. Ramesh Kapoor, Dr. S. Mukhopadhyay and Dr. R. Vijay Anand of IISER Mohali were co-conveners of this meet. Major sponsors of this meet were Bruker AXS, India, Rigaku Corporation, Japan, and IR Technology, India.

## 10 Faculty Activity

### 10.1 Research Activity

Current research in Mathematics at IISER Mohali is focused on dimension subgroups, algebraic structure of group rings, cyclic homology and geometric group theory, theory of rings and modules and algebraic geometry.

Research in Physics at IISER Mohali currently emphasizes quantum information theory, biomolecular NMR and quantum computing, statistical mechanics, nonlinear dynamics, string theory, cosmology and ultrafast lasers. Research in dynamics of coupled systems shows that stochastic resonance between two driven bistable systems is governed by chaos in case of weak coupling whereas strong coupling leads to coherence. Response of atomic and molecular systems to short pulses of radiation was studied theoretically. Work on thermodynamics of quantum systems hints at a connection between thermodynamic behaviour and the concept of information. Thermodynamic aspects of coupled quantum systems were studied. A study of synthetic gene networks indicates the flexible parallel processing potential of this biological system. In quantum information, the tripartite nonlocality in three qubit pure states was studied.

Research in Chemistry at IISER Mohali currently focuses on theoretical chemistry, inorganic, organometallic and synthetic organic chemistry as well as materials chemistry and solid-state NMR spectroscopy. Electronic structure and chemical dynamics computations using quantum chemistry packages, such as Gaussian (available in IISER

Mohali's computing facility) focus on dynamics of elementary chemical reactions, molecular clusters, gas hydrates, heteromolecular clusters, host-guest interactions in endohedral fullerenes and the chemistry of guest species trapped inside nanotubes. Solid-state NMR spectroscopy is another tool used by chemists at IISER Mohali to understand the biological implications of structural transformations taking place in proteins and their role in protein related diseases. Synthetic inorganic and organometallic chemistry research is directed toward exploring methods to synthesize heterometallic compounds and develop their applications.

Current research in Biology covers a broad spectrum of challenging fields that ranges from Development, Evolution, Genetics, Immunology, Mitochondrial Biology, Molecular Biology and Protein Biology. While one of the laboratories is involved in understanding the structural and functional aspects of bacterial Pore-Forming Protein Toxins, another laboratory is focusing on unraveling the role of porins of different pathogenic bacteria in modulating the host innate and adaptive immune responses. To address questions related to Protein folding and misfolding, Prion and amyloid biology, single-molecule and time-resolved fluorescence methodologies in combination with a range of biophysical, biochemical and molecular biology techniques are being employed. The Evolutionary Biology laboratory is focusing on issues related to inter-sexual conflict, life-history evolution, evolution of learning, memory and behaviour. Works in molecular cell and developmental genetics are focused on understanding the role of mitochondria in regulating diverse cell biological processes, such as cell growth, proliferation and differentiation, genetic dissection of the signaling pathways involved in hematopoiesis, cardiogenesis as well as niche-stem cell interactions. It was found that the mitochondrial function controls proliferation and early differentiation potential of embryonic stem cells. The role of calcium in long term depression was investigated.

This year saw emergence of two new areas of research: Earth and Environmental sciences, and, Humanities.

Research in humanities focussed on the concept of national identity.

Measurement of OH reactivity in a boreal forest show evidence of unknown reactive emissions. Use of *Chitin* as a marker for studies of geobiology was discussed.

## 10.2 Conferences & Invited Talks

1. **Prof. N. Sathyamurthy** gave an invited talk on *Playing with the buckyball* at the XVIII European Conference on Dynamics of Molecular Systems, Curia/Andia, Portugal, September 5-10, 2010.
2. **Prof. N. Sathyamurthy** gave an invited talk on *Playing with the buckyball* at the Department of Chemistry, Panjab University, Chandigarh, Sep. 13, 2010.

3. **Prof. N. Sathyamurthy** gave an invited talk on *IITK should be No. 1 again!* at the REACH Symposium, IIT Kanpur, Kanpur, Oct. 10-12, 2010.
4. **Prof. N. Sathyamurthy** gave an invited talk on *Playing with the buckyball* at the Theoretical Chemistry Symposium, IIT Kanpur, December 9, 2010.
5. **Dr. Amit Kulshrestha** attended the *International Conference of Mathematicians 2010*, University of Hyderabad, Hyderabad, August 19-28 2010.
6. **Dr. Amit Kulshrestha** gave an invited talk on *Value functions on central simple algebras* at the 25th Annual conference of Ramanujam Mathematical Society, NIT Jalandhar, May 04 2010.
7. **Dr. Amit Kulshrestha** gave an invited talk on *A quick introduction to GAP* at IIT Bombay during a visit, May 15-29, 2010.
8. **Dr. Amit Kulshrestha** gave a series of lectures on *I-adic completions and extensions of commutative domains*, Advanced Instructional School on Representation Theory, Indian Statistical Institute Bangalore, June 9-11 2010.
9. **Prof. Anand K. Bachhawat** gave an invited talk on *Glutathione transport and utilization in fungi* at the Small Meeting on Yeast Transporters and Energetics (SMYTE), New Delhi, September 23-26, 2010.
10. **Prof. Anand K. Bachhawat** gave an invited talk on *Glutathione and sulphur metabolism in pathogenic yeast* at CCMB, Hyderabad, October 12, 2010.
11. **Prof. Anand K. Bachhawat** gave an invited talk on *Glutathione metabolism: New Insights from Yeast* at Panjab University, Chandigarh, January 9, 2011.
12. **Prof. Anand K. Bachhawat** gave an invited talk on *Glutathione metabolism: New Insights from Yeast* at TIFR, Mumbai, March 14, 2011.
13. **Dr. Anu Sabhlok** gave an invited talk on *Participatory Action Research and sustainable democracy* at INTERRA (Novosibirsk, Russia) in the Siberian parliamentary hearings of the Council of Deputies, Nov. 2010.
14. **Prof. Arvind** was invited to attend the IAP-International conference on *Taking Inquiry-based Science Education into Secondary Education* at University of York UK, October 27-29 2010.
15. **Prof. Arvind** attended the international conference on *75 years of quantum entanglement* at Kolkata, Jan 6-10 2011 and gave an invited talk.

16. **Prof. Arvind** gave an invited talk at the CHASCON Science Congress at Panjab University Chandigarh on February 28, 2011.
17. **Prof. Arvind** gave the Keynote Address of the Second National Conference on *Recent Advances in Electronics and Communication Technology* at Guru Nanak Dev Engineering College Ludhiana on March 04 2011.
18. **Dr. S. Arulananda Babu** gave a talk on *Stereoselectivity: Metal-Mediated C-C Bond Formations* during a visit to the Department of Chemistry, IGCAR Kalpakkam, Feb.28-Mar.1, 2011.
19. **Dr. S. Arulananda Babu** gave a talk on *Stereoselective C-C Bond Formations* during a visit to the CSMCRI Bhavnagar, Mar.17-19, 2011.
20. **Dr. S. Arulananda Babu** gave a talk on *Metal-Mediated and Catalyzed Stereoselective C-C Bond Formations* at the National Seminar on Nanostructured Materials and Applications (NSNMA-2011), School of Chemistry, Madurai Kamaraj University, Madurai, Mar. 4-5, 2011.
21. **Dr. Dinesh Khurana** gave an invited talk on *A theorem of Frobenius and its applications* at a conference at D.A.V. College, Jalandhar, Feb.5, 2011.
22. **Dr. S. Arulananda Babu** gave a talk on *Stereoselectivity: Metal-Mediated C-C Bond Formations* during a visit to the Department of Chemistry, IGCAR Kalpakkam, Feb.28-Mar.1, 2011.
23. **Dr. S. Arulananda Babu** gave a talk on *Stereoselective C-C Bond Formations* during a visit to the CSMCRI Bhavnagar, Mar.17-19, 2011.
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25. **Dr. Dinesh Khurana** attended the *International Conference of Mathematicians 2010*, University of Hyderabad, Hyderabad, August 19-28 2010.
26. **Dr. Dinesh Khurana** gave an invited talk on *A theorem of Frobenius and its applications* in a conference at D.A.V. College, Jalandhar, Feb.5, 2011.
27. **Dr. S. N. Gupta** gave an invited talk on *Preservation of biomolecules in the rock record* at IMTECH, Chandigarh, Oct.7, 2010.

28. **Dr. S. N. Gupta** gave an invited talk on *Characterization of geo-organic materials through mass spectrometric and spectroscopic tools* at NIPER, Mohali, Oct.27, 2010.
29. **Dr. S. N. Gupta** gave an invited talk on *Biomolecular transformations in organisms through time* at IISc, Bangalore, Jan.12, 2011.
30. **Dr. S. N. Gupta** gave talks on *Life on Mars* and *Identification of geo-biopolymeric material in Earth samples using NEXAFS spectroscopy: Implications for astrobiology* during Planex sessions at PRL-ISRO, Ahmedabad, Mar.24-25, 2011.
31. **Prof. I. B. S. Passi** gave an invited talk on *Growth of Groups* at the Annual Conference of the Ramanujan Mathematical Society, Dr. B R Ambedkar National Institute of Technology, Jalandhar, May 3, 2010.
32. **Prof. I. B. S. Passi** gave a series of lectures on *Geometric Group Theory* at the Advanced Instructional School on Theory of Groups, IIT Bombay, May 2010.
33. **Prof. I. B. S. Passi** gave a lecture on *Matrices and Theory of Equations* at the valedictory function of Indian national Mathematical Olympiad Training Camp, Homi Bhabha Centre for Science Education, TIFR, Mumbai, May 27, 2010.
34. **Prof. I. B. S. Passi** gave two lectures on *Equation Theory* under the Unity of Mathematics programme of ATM Schools, at the Annual Foundation School-II, Bhaskaracharya Pratishthan and University of Pune, May 31 - June 1, 2010.
35. **Prof. I. B. S. Passi** gave a lecture on *Matrices and Equation Theory* at the KVPY camp, IISER Mohali, June 3, 2010.
36. **Prof. I. B. S. Passi** gave a lecture on *Hyperbolic Unit Groups* at Workshop on Geometric Group Theory, University of Goa, Aug. 10, 2010.
37. **Prof. I. B. S. Passi** gave an invited lecture on *Symmetric Ideals in Group rings and Simplicial Homotopy* at the International Congress of Mathematicians, Hyderabad, Aug.20, 2010.
38. **Prof. I. B. S. Passi** gave an invited lecture on *Hyperbolic Unit Groups* at International Conference on Groups, Actions and Computation, HRI, Allahabad, Sep.11, 2010.
39. **Prof. I. B. S. Passi** gave two lectures on *Equation Theory Over Division Rings* at the Refresher Course for College Teachers, Panjab University, Chandigarh, Nov.-Dec.2010.



40. **Prof. I. B. S. Passi** gave four lectures on *Algebraic Elements in Group Rings* under the Unity of Mathematics programme of ATM Schools, at the Annual Foundation School-I, Panjab University, Chandigarh, Dec.2010.
41. **Prof. I. B. S. Passi** gave two lectures on *Equation Theory Since Everiste Galois* and *Group Rings* at the Conference on Recent Trends in Algebra and Analysis, DAV College, Jalandhar, Feb. 4, 2011.
42. **Prof. I. B. S. Passi** gave a lecture on *Equation Theory* at the Science Conference, Kurukshetra University, Kurukshetra, Feb. 10, 2011.
43. **Prof. J. S. Bagla** gave an invited talk on *Hyperfine transition of  $^3\text{He II}$  as a cosmological probe* at NCRA-TIFR, Pune, Nov. 15, 2010.
44. **Prof. J. S. Bagla** gave two lectures on *High Performance Scientific Computing* at the Physics Department, Panjab University, Chandigarh, Nov. 2010.
45. **Prof. J. S. Bagla** attended the *Chandrasekhar Centennial Conference*, IIA Bangalore, Dec.7-11, 2010.
46. **Prof. J. S. Bagla** gave an invited talk on *The Universe* at the Science College, Raipur, Feb.22, 2011.
47. **Prof. J. S. Bagla** gave a contributed talk on *Hyperfine transition of  $^3\text{He II}$  as a cosmological probe* at the 29th meeting of the Astronomical Society of India, Pt. Ravishankar Shukla University, Raipur, Feb.24, 2011.
48. **Dr. Jagdeep Singh** gave a lecture at the *UGC National Seminar on Bio-fuel: Scope and Future Prospectives in Rural Regions of India*, Khalsa College for Women, Sidhwan (Ludhiana), Sep.25, 2010.
49. **Dr. Jagdeep Singh** was the resource person for the *Workshop on Curriculum Analysis in Biotechnology Engineering*, Panjab technical University, Jalandhar, Jan. 23-24, 2011.
50. **Dr. Kamal P. Singh** gave an invited talk on *1. Control of Electron Localization in Molecules Using Attosecond Pulse Train and IR pulses* during a visit to the Max Planck Institute for the Physics of Complex Systems, Dresden Germany, July 2010.
51. **Dr. Kamal P. Singh** gave an invited talk on *Attosecond control of electron localization in Deuterium Molecules* at JNU, New Delhi, March 2011.

52. **Prof. R. Kapoor** gave two lectures on *I. Synthesis of Compounds containing Non-metal cations and metal anions* and *I. Why Gold is a non-volatile, high melting, yellow shining metal while its neighbouring element, Mercury is a volatile, environmentally unfriendly, liquid metal* I. at a Refresher Course for Chemistry teachers at Chemistry Deptt, Panjab University, Chandigarh, Sep. 2010.
53. **Prof. R. Kapoor** gave an invited talk on *Some unusual trends in periodic behaviour of heavy elements* at the GGSDS College, Jan.1, 2011.
54. **Prof. R. Kapoor** gave an invited talk on *Chemistry in daily life* at Chandigarh College of Education, Landran, Mohali, on Feb.28, 2010.
55. **Prof. Kapil H. Paranjape** gave a talk on *Characterising Varieties over Number Fields* in CAAG X (Commutative Algebra and Algebraic Geometry) at IISc, Bangalore, Dec.10, 2011.
56. **Prof. Kapil H. Paranjape** gave a talk on *Using Pari/GP for Number Theory* in FOSSME (Workshop on using Free and Open Source Software for Mathematics and Education) at Bhaskaracharya Pratishthan, Pune, Jan. 27-29, 2011.
57. **Prof. Kapil H. Paranjape** gave a talk on *Teaching Mathematics to Science Undergraduates* in the second Indo-Sweden Conference on Mathematics Education at Homi Bhabha Centre for Science Education, Mumbai, Feb. 24-26, 2011.
58. **Dr. Kavita Dorai** attended the *Annual international meeting of the National Magnetic Resonance Society (NMRS)* at Guru Nanak Dev University Amritsar, Mar. 1-4, 2011.
59. **Dr. Krishnendu Gongopadhyay** attended the International Congress of Mathematicians (ICM), Hyderabad, August 19-27, 2010.
60. **Dr. Krishnendu Gongopadhyay** gave a talk on *Algebraic characterization of isometries of the hyperbolic space* at the Conference on Discrete Groups in Complex Geometry, ICTP, Trieste, July 12-16, 2010.
61. **Dr. Krishnendu Gongopadhyay** gave lectures on *Basic Hyperbolic Geometry* at the ATM School for Lecturers in Geometric Complex Analysis, Delhi University, March 25-26, 2011.
62. **Dr. Lolitika Mandal** attended the 10th Annual Meeting of the Human Frontier Science Program (HFSP), Thiruvananthapuram (Trivandrum), Kerala, Oct.31 - Nov.4, 2010.

63. **Dr. N. G. Prasad** gave an invited talk on *The Making of a Super Male: An Evolutionary Perspective* at DAV College Chandigarh.
64. **Dr. Rajeev Kapri** gave a talk on *Asymptotic shape of an Eulerian Walker on a Square Lattice* at the Institute of Physics, Bhubaneswar, June 2010.
65. **Dr. Rajeev Kapri** gave an invited talk on *Unzipping DNA by Force: Phase diagrams of simple exactly solvable models* at the Workshop on DNA Physics, BHU Varanasi, Aug. 11-13, 2010.
66. **Dr. Rajeev Kapri** gave an invited talk on *Unzipping an Adsorbed Polymer and DNA by Force* at the Department of Physics, Panjab University, Chandigarh, Nov.2010.
67. **Dr. Rajeev Kapri** visited the Novosibirsk Russia to attend 2nd International Youth Innovation Forum INTERRA 2010, Sep. 21-26, 2010.
68. **Dr. R. S. Johal** gave three lectures at a Refresher course on *Contemporary Non-equilibrium Thermodynamics and Statistical Mechanics*, organised by Indian Academy of Sciences, Bangalore and held at R.T.M. Nagpur University from Oct. 20-Nov. 02, 2010.
69. **Dr. Samrat Mukhopadhyay** gave an invited talk at the *Indian Academy of Sciences meeting*, Goa, Nov.2010.
70. **Dr. Sanjay Mandal** gave an invited talk on *Diversity in Carboxylate binding to a metal center: Metalloenzymes and metal organic frameworks* at the 3rd Inter IISER Chemistry Meet, IISER Mohali, Feb.20-21, 2011.
71. **Dr. Vinayak Sinha** gave an invited talk on *Atmospheric OH Reactivity Measurements: A robust new tool to investigate missing reactive emissions, fast ozone chemistry and air mass pollutant loadings* at the National Conference on Recent Advances in Chemistry and the Environment (NRACE), Punjabi University, Patiala, Feb.15, 2011.
72. **Prof. Sudeshna Sinha** gave an invited talk in *Dynamic Days South America*, Brazil, July 2010.
73. **Prof. Sudeshna Sinha** was an invited speaker in the conference on *Modeling Infectious Diseases*, Mahabalipuram, Sep. 2010.
74. **Dr. Sudip Mandal** attended the *International Conference on Functional Genomics: Challenges and Prospects*, Department of Zoology, Banaras Hindu University, Varanasi, Oct. 2-4, 2010.

75. **Dr. Sudip Mandal** attended the *Young Investigators Meet (YIM)*, Bhubaneswar, Feb. 13-17, 2011.
76. **Dr. Sudip Mandal** gave an invited talk on *Regulation of Cell-cycle Progression by Mitochondria During Conditions of Metabolic Stress in Drosophila* at the International Symposium on Alternate Animal Models in Biological Research: Present and Future Perspective in Toxicology, Organized by Indian Institute of Toxicology Research (IITR), Lucknow, Oct. 29-31, 2010.
77. **Dr. Sudip Mandal** gave an invited talk on *Mitochondrion: its role in Embryonic Stem Cell self-renewal and early differentiation* at the Institute of Stem Cell Biology and Regenerative Medicine (inStem) - California Institute of Regenerative Medicine (CIRM) Collaborative Meeting, Organized by Institute of Stem Cell Biology and Regenerative Medicine (inStem), Bangalore, Mar. 21-22, 2011.
78. **Dr. Vijay Anand** attended the *Golden Jubilee Chemistry Conference*, IIT Kanpur, Oct. 1-3, 2010.
79. **Dr. Vijay Anand** attended the *National Organic Symposium Trust Conference*, Cidade de Goa, Dec. 5-8 2010.
80. **Dr. Vijay Anand** attended the *Junior National Organic Symposium Trust Conference*, Central University Hyderabad, Jan. 28-31, 2011.
81. **Dr. K. P. Yogendran** gave an invited talk on *BEC/BCS crossover using gauge gravity duality* at the Institute of Mathematical Sciences, Chennai, Mar. 16, 2011.
82. **Dr. K. P. Yogendran** gave an invited talk on *Superfluids using holography* at the Chennai Mathematical Institute, Chennai, Mar. 18, 2011.

### 10.3 Research Publications

1. **Anu Sabhlok**, *National Identity in Relief*, Geoforum **41:5**, 743-751 (2010)
2. Zhou Wang, Jianlong Chen, **Dinesh Khurana**, Tsit-Yuen Lam, *Rings of Idempotent Stable Range One*, Algebras and Representation Theory 1-6, (2011)
3. **Dinesh Khurana**, T. Y. Lam, Invertible commutators in matrix rings, J. Alg. Appl. **10**, 51-71 (2011)
4. **N. S. Gupta** and G. D. Cody, *Identification and characterization of chitin in organisms*, Topics in Geobiology **34**, 117-132 (2011)

5. **N. S. Gupta** and R. E. Summons, *Fate of chitinous organisms in the geosphere*, Topics in Geobiology **34** 133-152 (2011)
6. **N. S. Gupta**, *Transformation of chitinous tissues in elevated P-T conditions: additional insights from experiments from plant tissues*, Topics in Geobiology **34**, 153-168 (2011)
7. **I. B. S. Passi**, Mahender Singh and Manoj K. Yadav, *Automorphisms of Abelian group extensions*, J. Algebra **324**, 820-830 (2010)
8. A. Kenfack and **Kamal P. Singh**, *Stochastic Resonance in coupled Underdamped Bistable Systems*, Phys Rev E **82**, 046224 (2010)
9. B. Sutar, **Kamal P. Singh**, V. Bhide, D. Zollman and Ashok Mody, *Application of single-slit diffraction to measure Young's modulus*, Lat. Am. J. Phys. Edu. **4**, 497 (2010)
10. A. Kenfack and **Kamal P. Singh**, *From Physics to control through an emergent view*, World Scientific, Series B, vol.**15**, 63-68 (2010)
11. **Kamal P. Singh** and Jan M. Rost, *Atomic and molecular systems driven by intense random light*, Chemical Physics **375**, 144 (2010)
12. P. Kapoor, A. P. S. Pannu, G. Hundal, **R. Kapoor**, M. Corbella and N. Aliaga-Alcalde, M. S. Hundal, *First report on an N, N-diisoalkylisonicotinamide 1D coordination network containing linear trinuclear  $[Co_3L_4Cl_6]$  units with mixed  $Co^{II}(T_d)$ - $Co^{II}(O_h)$ - $Co^{II}(T_d)$  geometries*, Dalton Trans. **39**, 7951-7959 (2010)
13. P. Kapoor, A. P. S. Pannu, M. Sharma, M. S. Hundal, **R. Kapoor**, M. Corbella and N. Aliaga-Alcalde, *Synthesis, X-ray crystal structure and magnetic studies of a new dinuclear  $Cu^{II}$  complex  $[Cu_2(\mu Cl)_2L_2Cl_2]$* , J. Mol. Str. **961**, 40-45 (2010)
14. P. Kapoor, A. P. S. Pannu, M. Sharma, M. S. Hundal and **R. Kapoor**, *Synthesis & X-ray crystal structures of 5-, and 6-coordinate  $Cu^{II}$  complexes of N,N,N',N'-tetraalkylpyridine-2,6-dicarboxamides containing  $-OCIO_3$  and  $-OSO_2CF_3$  counter ions*, J. Coord. Chem. **63**, 3635-3647 (2011)
15. P. Kapoor, A. P. S. Pannu, M. Sharma, G. Hundal, **R. Kapoor** and M. S. Hundal, *Synthesis and structures of  $Co^{II}$ ,  $Ni^{II}$  and  $Cu^{II}$  complexes with N,N,N',N'-tetraalkylpyridine-2,6-dicarboxamides containing  $NO_3^-$  as the counter ion*, J. Coord. Chem. **64**, 256-271 (2011)
16. **Krishnendu Gongopadhyay**, *Conjugacy classes in Möbius groups*, Geometriae Dedicata **151**, 245-258 (2011)

17. **Krishnendu Gongopadhyay** and Ravi S. Kulkarni, *On the existence of invariant non-degenerate bilinear form under a linear map*, Linear Algebra and its Applications **434**, 89–103 (2011)
18. P. Kumar and **N. Sathyamurthy**, *Potential energy curves for neutral and multiply charged carbon monoxide*, Pramana J. Phys. **74**, 49-55 (2010)
19. B. K. Mishra, J. S. Arey and **N. Sathyamurthy**, *Stacking and spreading interaction in N-heteroaromatic systems*, J. Phys. Chem. A **114**, 9606-9616 (2010)
20. **Debmalya Roy**, B. Shastri, C. N. Ramachandran, B. K. Mishra, K. Mukhopadhyay, **N. Sathyamurthy** and K. U. Bhasker Rao, *Germanium encaged fullerene-synthesis, extraction, theoretical calculation and their possible application in: Germanium: Properties, Production and Applications*, Editor: Regina V. Germano 2011 Nova Science Publishers, Inc.
21. S. Duley, S. Giri, **N. Sathyamurthy**, R. Islas, G. Merino, P. K. Chattaraj, *Aromaticity and hydrogen storage capability of planar N6(4-) and N4(2-) rings: A conceptual DFT approach*, Chem. Phys. Letters **506**, 315-320 (2011)
22. Ashok Ajoy and **Pranaw Rungta**, *Svetlichny's inequality and genuine tripartite nonlocality in three-qubit pure states*, Phys. Rev. A **81**, 052334 (2010)
23. **R. S. Johal**, *Universal efficiency at optimal work with Bayesian statistics*, Phys. Rev. E **82**, 061113 (2010)
24. **G. Thomas** and **R. S. Johal**, *Coupled Quantum Otto Cycle*, Phys. Rev. E **83**, 031135 (2011)
25. Ami Citri,\* **Samarjit Bhattacharyya**,\* Cong. Ma, Wade Morishita, Scarlett Fang, Jose Rizo, and Robert Malenka, *Calcium binding to PICK1 is essential for the intracellular retention of AMPA receptors underlying long-term depression*, Journal of Neuroscience **30(49)** 16437-52, 2010
26. **M. Bhattacharya**, **N. Jain** and **S. Mukhopadhyay**, *Insights into the Mechanism of Aggregation and Fibril Formation from Bovine Serum Albumin*, J. Phys. Chem. B **115(14)**, 4195-4205 (2011)
27. G. Giovannetti, **S. Kumar**, A. Stroppa, J. van den Brink, S. Picozzi, and J. Lorenzana, *High-Tc Ferroelectricity Emerging from Magnetic Degeneracy in Cupric Oxide*, Phys. Rev. Lett. **106**, 026401 (2011)

28. D. Mogensen, S. Smolander, A. Sogachev, L. Zhou, **V. Sinha**, A. Guenther, J. Williams, T. Nieminen, M. Kajos, J. Rinne, M. Kulmala, and M. Boy, *Modelling atmospheric OH-reactivity in a boreal forest ecosystem*, Atmos. Chem. Phys. Discuss. **11**, 9133-9163 (2011)
29. **V. Sinha**, J. Williams, J. Lelieveld, T. Ruuskanen, M. Kajos, J. Patokoski, H. Hellen, H. Hakola, D. Morgensen, M. Boy, J. Rinne, M. Kulmala, *OH reactivity measurements within a boreal forest: Evidence for unknown reactive emissions*, Environmental Science and Technology, **44(17)**, 6614-6620 (2010)
30. M. Shrimali, S. Poria and **Sudeshna Sinha**, *Under what kind of parametric fluctuations is spatiotemporal regularity the most robust?* Pramana J. Phys. **74**, 895-906 (2010)
31. A.R. Bulsara, A. Dari, W.L. Ditto, K. Murali and **Sudeshna Sinha**, *Logical Stochastic Resonance*, Chemical Physics **375**, 424-434 (2010)
32. J. P. Crutchfield, W. L. Ditto and **Sudeshna Sinha**, *Introduction to Focus Issue: Intrinsic and Designed Computation: Information Processing in Dynamical Systems - Beyond the Digital Hegemony*, Chaos **20**, 037101 (2010)
33. W. L. Ditto, A. Miliotis, K. Murali, **Sudeshna Sinha** and M. L. Spano, *Chaos-gates: Morphing logic gates that exploit dynamical patterns*, Chaos (Focus Issue on "Intrinsic and Designed Computation: Information Processing in Dynamical Systems") **20**, 037107 (2010)
34. S.M. Kamil, G.I. Menon and **Sudeshna Sinha**, *A Coupled Map Lattice Model for Rheological Chaos in Sheared Nematic Liquid Crystals*, Chaos **20**, 043123.1 - 043123.14 (2010)
35. Neeraj Kumar Kamal and **Sudeshna Sinha**, *Imbalance of positive and negative links induces regularity*, Chaos, Solitons and Fractals **44**, 71-78 (2011)
36. H. Ando, **Sudeshna Sinha**, R. Storni and K. Aihara *Synthetic gene networks as potential flexible parallel logic gates*, Europhysics Letters **93**, 50001 (2011)
37. **S. Mandal**, A. G. Lindgren, A. S. Srivastava, A. T. Clark and U. Banerjee, *Mitochondrial function controls proliferation and early differentiation potential of embryonic stem cells*, Stem Cells **29(3)**, 486-95 (2011)
38. Ville Kernen, Esko Keski-Vakkuri, Sean Nowling, and **K. P. Yogendran**, *Inhomogeneous structures in holographic superfluids. I. Dark solitons* Phys. Rev. D **81**, 126011 (2010)

39. Ville Kernen, Esko Keski-Vakkuri, Sean Nowling, and **K. P. Yogendran**, *Inhomogeneous structures in holographic superfluids. II. Vortices* Phys. Rev. D **81**, 126012 (2010)

## 10.4 Faculty Visits

1. **Dr. Amit Kulshrestha** visited the Indian Institute of Technology Bombay during May 15-29 2010.
2. **Dr. Amit Kulshrestha** visited the Indian Statistical Institute Bangalore during June 02-24 2010.
3. **Dr. Kamal P. Singh** visited the Max Planck Institute for the Physics of Complex Systems, Dresden Germany, July 2010.
4. **Dr. Krishnendu Gongopadhyay** visited the International Centre for Theoretical Physics, Trieste, June 26-July 16, 2010
5. **Dr. Krishnendu Gongopadhyay** visited the Einstein Institute of Mathematics, Hebrew University of Jerusalem, December 22, 2010 - Jan 6, 2011.
6. **Dr. Rajeev Kapri** visited the Institute of Physics, Bhubaneswar, June 2010.
7. **Dr. K. P. Yogendran** visited the Helsinki Institute of Physics during May-July 2010.

## 10.5 Awards & Honors

- Prof N Sathyamurthy:
  - Is the Vice-President (International Affairs), Indian National Science Academy.
  - Is a member of the Editorial Board, European Journal of Physics D, Springer-Verlag.
- Prof I B S Passi:
  - Nominated member of the Inter-Academy Panel constituted by the Indian National Science Academy for the DST INSPIRE Programme.
  - Nominated member of the State Resource Group in Science Education, Haryana Prathmik Shiksha Pariyojna Parishad (Sarv Shiksha Abhiyaan - Haryana).
  - Member of the Programme Advisory Committee - Mathematical Sciences, Department of Science and Technology, Government of India.



- Prof Kapil Paranjape:
  - Elected as Academic Secretary of the Ramanujan Mathematical Society.
  - Is an Associate Editor, Proceedings of the Indian Academy of Sciences (Math. Sci.), since December 1995.
  - Is a member, Editorial Board, Journal of the Ramanujan Mathematics Society, since January 1996.
  - Is a member, Editorial Board, Texts and Readings in Mathematics, since July 1998.
- Prof Sudeshna Sinha has been Serving as an Editor of ‘Chaos’, American Institute of Physics.
- Guest Editor (along with J.P. Crutchfield and W.L. Ditto) of a Focus Issue on ”Intrinsic and Designed Computation: Information Processing in Dynamical Systems”, in Chaos (2010)
- Prof J S Bagla:
  - Is an editor of the journal *Research in Astronomy and Astrophysics*,
  - Is a member and secretary of the National Committee of IAU (ICSU-IAU) for a period of four years starting Jan.1, 2008. This committee is constituted by the Indian National Science Academy.
  - Is the secretary of the Astronomical Society of India for three years starting Jan.2010.
- Dr Vinayak Sinha is a member of the scientific advisory board for the Sankar Foundation Research Institute, Vishakhapatnam, A.P., India since October, 2010.
- Dr Vinayak Sinha has also been appointed reviewer for proposals submitted to US-Israel binational science foundation.
- Dr S, N, Gupta has been awarded the Ramanujan fellowship.
- Dr Ananth Venkatesan has been awarded the Ramanujan fellowship.
- Dr Sanjeev Kumar has been awarded the Ramanujan fellowship.
- Dr Yogesh Singh has been awarded the Ramanujan fellowship.

## 11 Visiting Faculty

IISER Mohali invites speakers from other institutions who contribute towards enrichment of the courses by giving guest lectures and special seminars. The following speakers visited IISER Mohali for both short- and long-term stays:

- Dr. V. Arvind (IMSc, Chennai)
- Dr. Meera Nanda
- Prof. S. Shirali
- Prof. H. L. Vasudeva
- Dr. Monika Kumar
- Dr. Sarabjit Kaur
- Prof. K. K. Sharma
- Prof. T. R. Rao
- Prof. Abhay Bhatt (ISI Delhi)

## 12 On-going Sponsored Research Projects

1. **Project Title:** “Conformational Dynamics of Model Tripeptides using NMR and Vibrational Spectroscopic Techniques”

Funding Agency	: DST
PI	: Dr. Kavita Dorai (IISER Mohali)
Duration	: 2007-2010
Amount	: 5.7 Lakhs

2. **Project Title:** “Studies of dissipative dynamics in quantum computers using NMR techniques”

Funding Agency	: CSIR
PI	: Dr. Kavita Dorai (IISER Mohali)
Co-PI	: Dr. Arvind (IISER Mohali)
Duration	: 2007-2010
Amount	: 9.45 Lakhs

3. **Project Title:** “Exploring biomolecular dynamics using cross correlated spin relaxation in NMR”

Funding Agency	: DBT
PI	: Dr. Kavita Dorai (IISER Mohali)
Co-I	: Dr. P. B. Sunil Kumar (IIT-Madras)
Duration	: 2007-2010
Amount	: 53.04 Lakhs

4. **Project Title:** “Unraveling the importance of Receptor for Advanced Glycation End Products Signaling in Breast Cancer Development and Drug Resistance”

Funding Agency	: ICMR
PI	: Dr. Tapan Mukherjee (IISER Mohali)
Duration	: 2008-2011
Amount	: 6.99 Lakhs

5. **Project Title:** “Modern science in India:Colonial compulsions nationalist aspirations and global conventions”

Funding Agency	: CSIR
PI	: Dr. R. Kochhar (IISER Mohali)
Duration	: 2008-2011
Amount	: 4.80 Lakhs

6. **Project Title:** “Bio-molecular Solid-State NMR-Theory, Experiments and Application”

Funding Agency	: DST
PI	: Dr. Ramesh Ramachandran (IISER Mohali)
Duration	: 2009-2012
Amount	: 34.80 Lakhs

7. **Project Title:** “Synthesis, structure, and spectroscopic studies of low valent late transition metal complexes with N-arylimidoylamidine and other neutral chelating ligands”

Funding Agency	: DST
PI	: Dr. Sanjay Singh (IISER Mohali)
Duration	: 2009-2012
Amount	: 19.95 Lakhs

8. **Project Title:** “Synthesis, characterization and aggregation studies on prion octapeptide and its covalently-linked oligomers”

Funding Agency	: DST
PI	: Dr. Mily Bhattacharya (IISER Mohali)
Duration	: 2010-2013
Amount	: 16.68 Lakhs

9. **Project Title:** “Co-crystallization of active pharmaceutical ingredients: Pathway for enhanced properties”

Funding Agency	: DST
PI	: Dr. Angshuman Roy Choudhary (IISER Mohali)
Duration	: 2009-2012
Amount	: 19.31 Lakhs

10. **Project Title:** “Studies on organometallic - based stereoselective noncarbohydrate synthetic strategies towards stereodivergent iminosugars, iminosugar phosphonates, iminosugar C-Glycosides and investigation of biological activities”

Funding Agency	: DST
PI	: Dr. S. Arulananda Babu (IISER Mohali)
Duration	: 2010-2013
Amount	: 19.75 Lakhs

11. **Project Title:** “Quantum computing with trapped neutral atoms and cold ions: Towards fault tolerant computation”

Funding Agency	: DST
PI	: Dr. Bindiya Arora (IISER Mohali)
Duration	: 2010-2013
Amount	: 19.32 Lakhs

12. **Project Title:** “The Z-classes in classical groups”

Funding Agency	: DST
PI	: Dr. K. Gongopadhyay (IISER Mohali)
Duration	: 2011-2014
Amount	: 3.24 Lakhs

13. **Project Title:** “Exploring surface polymer interaction via external forcing of the polymer”

Funding Agency	: DST
PI	: Dr. Rajeev Kapri (IISER Mohali)
Duration	: 2011-2014
Amount	: 5.04 Lakhs

14. **Project Title:** “Conformational plasticity and amyloid aggregation of human serum albumin”

Funding Agency	: CSIR
PI	: Dr. S. Mukhopadhyay (IISER Mohali)
Duration	: 2011-2014
Amount	: 11.14 Lakhs

15. **Other Projects:** “INSPIRE Fellowship”, “CSIR Scholarships”, “KVPY Scholarships”

## 13 Institute Colloquia

- March 29, 2011 (Tue 5:00pm) Prof. Frank Keppler (MPI Nuclear Physics, Heidelberg) “The forgotten Methane source”
- March 25, 2011 (Fri 5:00pm) Prof. Terrence W. Deacon (UC Berkeley) “How can a molecule come to be about anything: Origins of life and meaningful information”
- March 22, 2011 (Tue 5:00pm) Prof. Naresh Dadhich (IUCAA, Pune) “Why Einstein (Had I been born in 1844!)?”
- March 21, 2011 (Mon 6:00pm) Prof. Partha Ghose (Bose Institute, Kolkata) “J C Bose’s double prism experiment and a quantum avatar”
- March 10, 2011 (Thu 5:00pm) Prof. Anil Kumar (IISc) “NMR a versatile tool”
- March 8, 2011 (Tue 5:00pm) Prof. I. S. Dua (Panjab University) “From Darwin to Dolly and beyond”
- February 22, 2011 (Tue 5:00 pm) Dr. Stavros Farantos (University of Crete) “How does a chemical bond break? Non-linear molecular dynamics for understanding chemical reactivity”
- February 9, 2011 (Wed 4:00 pm) Dr. Vikramaditya Prakash (University of Washington) “Preservation and Uncertainty: The Modern City in the Age of Globalization”
- February 2, 2011 (Wed 4:00pm) Prof. Deshdeep Sahdev (IIT Kanpur), “Resolving atoms in our backyards”
- Jan 28, 2011 (Fri 5:00 pm) Dr. V. Ramamurthy (University of Miami, Coral Gables, FL, USA) “Controlling Chemical Behavior Molecules with Confinement and Weak Interactions”
- Jan.15, 2011 (Sat 11:00am) Prof. Anthony Leggett (University of Illinois at Urbana-Champaign) “Testing The Limits Of Quantum Mechanics”
- January 12, 2011 (Wed 4:00 pm) Prof. Utpal Banerjee (UCLA) “Signal transduction and metabolic control of cell fate”
- November 25, 2010 (Thu 5:00 pm) Prof. Somdatta Sinha (CCMB Hyderabad) “Modelling infectious disease - genomes to populations”

- November 24, 2010 (Wed 4:00 pm) Prof. Judith A. K. Howard (Durham) “Structure - Property Relationships from Unusual Diffraction Data”
- November 8, 2010 (Mon 4:00 pm) Prof. Raghbir Athwal (Temple University) “Identification of Cancer Genes by Function”
- October 27, 2010 (Wed 4:00pm) Prof. T. R. Rao (IISER Mohali) “Biodiversity and its Conservation”
- September 06, 2010 (Wed 5:00 pm) Prof. Ramesh Sreekantan (Indian Statistical Institute, Bangalore) “A Visit to the Land of Zeta Values”
- September 29, 2010 (Wed 4:00 pm) Prof. Sabyasachi Sarkar (IIT Kanpur) “Whiskers, Cuboids and Dots (From Faraday, Edison , Iijima and beyond)”
- September 22, 2010 (Wed 4:00 pm) Prof. C. S. Dalawat (HRI, Allahabad) “Splitting primes”
- September 16, 2010 (Thu 5:00 pm) Prof. G. Ravindra Kumar (TIFR, Mumbai) “Extreme Light!”
- September 15, 2010 (Wed 5:00 pm) Prof. T. S. Radhakrishnan (IGCAR, Kalpakkam) “Magnetoencephalography- a technique to probe the dynamics of the brain”
- August 25, 2010 (Wed 4:00 pm) Prof. Mriganka Sur (Massachusetts Institute of Technology, USA) “Brains and Computers”
- May 3, 2010 (Mon 4:00 pm) Prof. Yashwant Gupta (NCRA Pune) “The Giant Metrewave Radio Telescope : Providing a new view of the Universe”
- April 14, 2010 (Wed 4:00 pm) Professor D P Sarkar (University of Delhi South Campus) “Effect of host cell signalling on the entry of enveloped animal virus: Impact on targeted gene delivery/therapy”
- April 12, 2010 (Mon 4:45 pm) Dr. Krishan Lal (Former Director NPL, New Delhi) “High resolution X-Ray techniques to understand real structure and chemical composition of materials”

## 14 Technical Seminars

- March 31, 2011 (Thu 4:00 pm) Dr. Puneet Khandelwal (University of Pittsburgh, USA) “Bladder Umbrella Cells: Life Under Constant Challenge”

- March 24, 2011 (Thu 4:00 pm) Dr. Gargi Dutta (IISc. Bangalore) “Computer modelling in materials”
- March 23, 2011 (Wed 3:00 pm) Dr. C. P. Singh (RRCAT Indore) “Controlling energy transfer efficiency of a dendrimer molecule by femtosecond pulse shaping”
- March 23, 2011 (Wed 11:00 am) Dr. T Rathinavelan (Department of Molecular Biosciences, The University of Kansas, USA) “Understanding the functional mechanisms of Gram-negative bacterial type III secretion system using computational and experimental methods”
- March 22, 2011 (Tue 4:00 pm) Dr. Alok Ranjan Paital (University of Missouri, Columbia, USA) ”Metallacarborane based Molecular Motors and nanowires”
- March 21, 2011 (Mon 4:00 pm) Dr. Laxmidhar Rout (Technical University Munich, Germany) “New Reagents, Methods, and Strategies for Organic Synthesis”
- March 11, 2011 (Fri 4:00 pm) Dr. Rashmi Mishra (Max Planck Institute, Dresden, Germany) “Uncovering The Secrets Behind Cellular Polarization: Different Systems, Common Platform”
- March 11, 2011 (Fri 3:00 pm) Dr. Rajib Goswami (The Scripps Research Institute, San Diego, California, USA) “Natural product synthesis to therapeutics antibody-an overview”
- March 10, 2011 (Thu 3:00 pm) Dr. Vivek Polshettiwar (KAUST Catalysis Center, KSA) “Green Chemistry by Nano-Catalysis”
- March 9, 2011 (Wed 4:00 pm) Dr. Khashti Ballabh Joshi (Goethe-University Frankfurt) “Making and Machining of Biotin-Based Soft Structures”
- March 8, 2011 (Tue 11:00 am) Prof. Urmie Ray (Universite de Reims, France) “On Lie algebras”
- March 7, 2011 (Wed 4:00 pm) Dr. Pradeep C Parameswaran (Indian Institute of Technology Mandi) “Polyoxometalate chemistry - towards new functional materials”
- March 4, 2011 (Fri 4:00 pm) Dr. Soumitra Kar (University of Central Florida, USA) “Physical Aspects of Doping and Alloying in Semiconductor Nanostructures”



- March 3, 2011 (Thu 3:00 pm) Dr. Madhavaiah Chandra (University of Illinois at Urbana-Champaign, USA) “DNA as a Versatile Reagent: Structural Component for Branched Networks and Catalyst for Organic and Bioorganic Reactions”
- March 3, 2011 (Thu 11:00 am) Dr. Kirankumar R. Hiremath (Zuse Institute Berlin, GERMANY) “Computational Optics-Photonics: Avenues, challenges and opportunities”
- March 2, 2011 (Wed 11:00 am) Dr. Vishal Agrawal (Department of Pediatrics, University of California San Francisco, USA) “Pharmacogenetics of P450 oxidoreductase (POR)”
- March 2, 2011 (Wed 10:00 am) Dr. Rachna Chaba (Dept. of Microbiology and Immunology, University of California San Francisco, USA) “Design of Stress Signaling Pathways in Bacteria”
- March 1, 2011 (Tue 4:00 pm) Dr. Bobby Ezhuthachan (HRI Allahabad), “Strings at Strong Coupling”
- March 1, 2011 (Tue 3:00 pm) Dr. Purusharth Rajyaguru (Dept. of Molecular and Cellular Biology, University of Arizona), “mRNP Transitions”
- February 28, 2011 (Mon 3:00 pm) Dr. Ajay D. Thakur (IITB, Mumbai, India) “Physics of Vortices in Sub-Micro Engineered Superconducting Structures”
- February 25, 2011 (Fri 4:00 pm) Dr. Ranber Singh (Max-Planck-Institute Stuttgart, Germany) “Semiconductor quantum dot as a source of on demand single photons and entangled photon pairs”
- February 24, 2011 (Thu 4:00 pm) Dr. Apurba Laha (Institute of Electronic Materials and Devices, Leibniz University Hannover, Germany) “Semiconductor/Oxide Heterostructures on Silicon for CMOS and Beyond”
- February 23, 2011 (Wed 11:00 am) Dr. Pravin A. Nair (Molecular Biology Program, Sloan-Kettering Institute, New York, USA) “Mechanistic insights to DNA ligases through biochemical and structural studies”
- February 18, 2011 (Fri 4:00 pm) Dr. Sunil Singh Kushvaha (Institute of Materials Research & Engineering, A\*-STAR, Singapore) “Growth and Characterization of Functional Nanomaterials using Scanning Probe Microscopy”
- February 17, 2011 (Thu 5:00 pm) Dr. M R Bhutiyani (SASE Chandigarh), “Climate Change Scenario: An Indian Perspective”

- February 16, 2011 (Wed 4:00 pm) Dr. Harapriya Rath (The University of Manchester, UK) “Large Pi-Conjugated Macrocycles with Twist: From Aromaticity to Device Chemistry”
- February 16, 2011 (Wed 3:00 pm) Dr. Atul Suresh Deshpande (University of Pittsburgh, USA) “Nanoparticles to nanostructured materials: A bottom-up approach for the synthesis of solid oxide fuel cell materials”
- February 16, 2011 (Wed 11:00 am) Dr. Ram Yadav (University of California, Riverside) “Understanding the inner functioning of Arabidopsis shoot apical meristem”
- February 10, 2011 (Thur 3:00 pm) Dr. Vivek Rai (Department of Medicine, New York University Medical Center, New York, USA) “The RAGE axis: Novel insights and key regulations in cardiovascular complication and tumorigenesis”
- February 7, 2011 (Mon 5:00 pm) Professor Dinakar Ramakrishnan (California Institute of Technology) “Diophantine Equations”
- February 4, 2011 (Fri 4:00 pm) Dr. Rakesh Sohal (IHP microelectronics, Germany) “Semiconductors beyond Si and dielectrics beyond SiO<sub>2</sub>”
- February 4, 2011 (Fri 3:00 pm) Dr. Sudha Rajamani (FAS Center for Systems Biology, Harvard University) “Replication of Information on the Prebiotic Earth”
- February 4, 2011 (Fri 11:00 am) Dr. Gnana Sutha Siluvai (Montana State University, USA) “Structure and Reactivity of the Red Copper Protein Sco”
- February 3, 2011 (Thu 5:00 pm) Dr. G Krishnamoorthy (TIFR, Mumbai) “What do we learn from internal motional dynamics in Nucleic acids and proteins?”
- February 3, 2011 (Thu 3:00 pm) Dr. Colin Benjamin (University of Georgia, USA) “Majorana bound states”
- February 1, 2011 (Tue 4:00 pm) Dr. Anant Kumar (Department of Rural Development, Xavier Institute of Social Service) “Maternal death in India: what solutions we have?”
- Jan 28, 2011 (Fri 3:00 pm) Dr. Narendra Sahu (University Libre de Bruxelles, Belgium) “Direct and Indirect Search of Dark Matter Interacting via Higgs Portal”
- Jan 27, 2011 (Thu 3:00 pm) Dr. S K Arun Murthi (Asst. Professor, Azim Premji University, Bangalore) “How They Pose a Challenge to the Essentialist Theory of Laws?”

- January 25, 2011 (Tue 4:00 pm) Dr. Naveen Surendran (MPIPKS, Dresden, Germany) “Topological order in three dimensions”
- January 24, 2011 (Mon 4:00 pm) Dr. Harvinder K. Jassal (IISER Mohali) “Perturbations in dark energy”
- January 19, 2011 (Wed 3:00 pm) Prof. Anil Bhalekar (Professor and Ex-Emeritus Scientist, CSIR RTM Nagpur University) “Irreversibility: a thermodynamic insight”
- January 19, 2011 (Wed 4:00 pm) Dr. Sashikumaar Ganesan (WIAS-Berlin, GERMANY) “Modeling and finite element simulation of two-phase flows with soluble surfactants”
- January 18, 2011 (Tue 4:00 pm) Dr. Satadeep Bhattacharjee (Uppsala University Sweden) “Some Theoretical Studies on Magnetic Materials”
- January 17, 2011 (Mon 4:00 pm) Dr. J Nithyanandhan (University of Miami, USA) “Chemistry in Confined Space: Chemistry in water-soluble cavitands and dendrimers”
- January 17, 2011 (Mon 3:00 pm) Dr. Abdur Rub (Deptt. of Medical Elementology & Toxicology Hamdard University, New Delhi) “Lipid raft disruption associated with Leishmania major infection alters macrophage CD40 signalosome composition and effector function”
- January 17, 2011 (Mon 2:00 pm) Dr. Ayesha Begum (University of Wisconsin-Madison, USA) “Dwarf Galaxies as Cosmological Probes”
- January 14, 2011 (Fri 4:00 pm) Dr. Tejender Thakur (IISc Bangalore) “Computational and experimental studies on weak non-bonded interactions”
- January 13, 2011 (Thu 4:00 pm) Dr. Subhashis Gangopadhyay (School of Physics and Astronomy University of Nottingham) “Scanning Probe Microscopy and Spectroscopy of Si(100) at Low Temperatures: Beyond conventional Imaging”
- January 12, 2011 (Wed 3:00 pm) Dr. Baerbel W. Sinha (MPI Mainz Germany) “Nanoscope approaches in earth and environmental sciences”
- January 11, 2011 (Tue 11:00 am) Dr. Ritesh Tandon (Emory School of Medicine Georgia, USA) “Viral tegument proteins and host factors in human cytomegalovirus maturation”

- January 7, 2011 (Fri 4:00 pm) Dr. Kedar Khare (GE Global Research, New York, USA) “Topics in Imaging Research”
- January 04, 2011 (Tue 3:00 pm) Dr. Hrushikesh M. Joshi (Northwestern University, USA) “Advanced Nanostructures for Applications in Diagnostics and Therapeutics”
- January 03, 2011 (Mon 4:00 pm) Dr. Goutam Sheet (Materials Science Division, Argonne National Laboratory Argonne, USA) “Andreev reflection spectroscopy on unconventional superconductors”
- December 13, 2010 (Mon 4:00 pm) Dr. Sanjay Kumar Singh (National Instt. of Advanced Industrial Science & Tech., Ikeda, Osaka, Japan) “Metal Complexes and Nanoparticles: Synthesis, Characterization and Properties”
- December 13, 2010 (Mon 2:30 pm) Dr. Ram Mohan (Illinois Wesleyan University, Bloomington, Illinois, USA) “Environmentally Friendly Organic Synthesis Using Bismuth Compounds”
- December 13, 2010 (Mon 11:00 am) Dr. A. Chandrashekar (IIT Madras) “Linear Complementarity Problems”
- December 3, 2010 (Fri 4:00 pm) Dr. Amitava Mukherjee (Aalto University, Finland) “A Nonparametric Shewhart-Lepage type Control Chart for Simultaneous Detection of Shift in Location and Scale in Phase-II”
- December 2, 2010 (Thu 4:00 pm) Dr. Sathish Narayanan (Dept. of Microbiology, School of Dental Medicine, Univ. of Pennsylvania, USA) “Tegument Proteins of Herpesviruses: Insights into their Functional Roles”
- November 19, 2010 (Fri 3:00 pm) Dr. Gurpreet Matharoo ”Structural origins on Dynamical Heterogeneity in ST2 water”
- November 17, 2010 (Wed 3:00 pm) Dr. Dhananjay Sant (University of Baroda, Vadodara) “Paraglacial landforms: Leh Valley Ladakh Himalayas”
- November 16, 2010 (Tue 4:00 pm) Dr. Ved Prakash Gupta (IMSc. Chennai) “Bimodules, Subfactors, Planar Algebras and Perturbations”
- November 15, 2010 (Mon 4:00 pm) Dr. Jagpreet Singh Nanda (DBBC, Johns Hopkins University School of Medicine) “Genes to Proteins. Good beginning makes a good ending”

- November 12, 2010 (Fri 11:00 am) Prof. M.D. Sharma (Kurukshetra University) “Science for Sprituality”
- November 11, 2010 (Thu 4:00 pm) Dr. Irfan Yunus Tamboli (Dept of Neurology, Univ Hospital Bonn) “Understanding the cholesterol connection of Alzheimer’s Disease”
- November 11, 2010 (Thu 3:00 pm) Prof. Jaspal Singh Aujla (NIT Jalandhar) “Convex functions and Matrix inequalities”
- November 10, 2010 (Wed 4:00 pm) Professor Sudesh K. Khanduja (Panjab University) “Some Extensions and Applications of Eisenstein-Schonemann Irreducibility Criterion”
- October 29, 2010 (Fri 4:00 pm) Prof. Apurva Patel (CHEP IISc. Bangalore) “Nanocomputing and Nanodevices: Physics meets Biology”
- October 21, 2010 (Thu 4:00 pm) Dr. Velavan Kathirvelu (Pondicherry University) “Distance Measurement by Pulsed EPR and Recent Advancements”
- October 19, 2010 (Tue 4:00 pm) Dr. Debesh Ranjan Roy (Virginia Comonwealth University, USA) “Physics and Chemistry of Clusters: A Density Functional Theory Approach”
- October 14, 2010 (Thu 3:00 pm) Dr. Brijesh Kumar (JNU, New Delhi) “Quantum ground state in the classical limit of frustrated quantum antiferromagnets”
- October 13, 2010 (Wed 3:00 pm) Dr. Baerbel Sinha (MPI Mines) “Environmental pollution and mitigation strategies”
- October 7, 2010 (Thu 4:00 pm) Dr. Rakesh K. Joshi (University of South Florida, USA) “Nanomaterials for Gas Sensors and Solar Cells”
- September 30, 2010 (Thu 3:00 pm) Dr. Ramesh Sreekantan (Indian Statistical Institute, Bangalore) “Conjectures on special values of L-function”
- September 28, 2010 (Thu 2:30 pm) Dr. Anant Kulkarni (Universtiy of Minnesota, USA) “Computational Quantum Chemistry in some of its Exotic Multifaceted Manifestations”
- September 23, 2010 (Thu 4:00 pm) Prof. C.S. Dalawat (HRI, Allahabad) “Serre’s mass formula in prime degree”

- September 13, 2010 (Mon 4:00 pm) Dr. Tapas Kumar Mandal (Sikkim (Central) University) “Solid State Chemistry for Next Generation of Functional Materials: Role of New Synthetic Methods and Compounds”
- September 3, 2010 (Fri 11:00 am) Anindya Goswami (INRIA, Campus de Beaulieu, RENNES Cedex, France) “Risk Sensitive Optimization of Portfolio Wealth in a Semi-Markov Modulated Market”
- August 12, 2010 (Thu 5:00 pm) Dr. Arvinder Sandhu (University of Arizona, Tucson AZ, USA) “Real Time Visualization of Electron Dynamics: New possibilities in measurement and control on attosecond timescale”
- July 28, 2010 (Wed 3:00 pm) Dr. A.N. Gupta (National University of Singapore) “Free energy reconstruction and verification of Jarzynski equality from single molecule force spectroscopy experimental data”
- July 26, 2010 (Mon 3:00 pm) Dr. Parthasarathi Bera (National Aerospace Laboratories, Bangalore) “Catalysis for energy and environment”
- July 6, 2010 (Tue 4:00 pm) Dr. Suman Sanyal (Marshall University, Huntington, West Virginia) “Stochastic Dynamic Equations”
- June 25, 2010 (Fri 4:00 pm) Dr. Subhas Pan (Scripps Research Institute, Florida, USA) “Total Synthesis of Bioactive Natural Products & Catalytic Asymmetric Reactions using Organocatalysts & Organometallic Catalysts”
- June 17, 2010 (Tue 4:00 pm) Dr. Meera Nanda “Cultivating the critical spirit of science: Reflections on history and philosophy of science”
- June 16th, 2010 (Wed 3:00 pm) Dr. Pitamber Mahanandia (Technical Univ. Darmstadt, Germany) “Preparation and transport properties study of carbon nanotubes”
- June 9th, 2010 (Wed 3:00 pm) Dr. Prasanth Jose (University of California, Irvine, USA) “Study of structure and dynamics in condensed phases using molecular simulations”
- June 7th, 2010 (Mon 4:00 pm) Dr. Santanu Kumar Pal (Univ. of Wisconsin, Madison, USA) “Chemically Responsive Gels Prepared from Microspheres Dispersed in Liquid Crystals”
- May 28th, 2010 (Fri 2:00 pm) Dr. Vijay Rangachari (University of Southern Mississippi, USA) “Amyloid Beta-peptides in Alzheimer’s Disease: Pathways, Polymorphism, Interfaces and Inhibition”

- May 24th, 2010 (Mon 4:00 pm) Dr. Bidisa Das (IACS, Kolkata) “Functional molecules for nanodevices”
- May 18th, 2010 (Tue 4:00 pm) Dr. Debabrata Pradhan (University of Waterloo, CANADA) “Electrochemical Control on the Shape and Size of Oxide Nanomaterials for Potential Applications”
- May 13th, 2010 (Thu 4:00 pm) Dr. Sanjay Dutta (UCSD, USA) “Targeting RNA by small molecules: Synthesis of diazapanes of natural product-like complexity from rearrangement of epoxy-I-lactams”
- May 5th, 2010 (Wed 3:00 pm) Dr. S. Nagarajan (Annamalai University) “Bottom-up approaches in Nanoscale Surface Patterning”
- April 30th, 2010 (Fri 3:00 pm) Sanjay Swain (NISER Bhubhaneshwar) “Introducing Large Hadron Collider (LHC)”
- April 19th, 2010 (Mon 4:00 pm) Dr. Pravabati Chingangbam (KIAS Korea) “Primordial non-Gaussianity in the CMB”
- April 16th, 2010 (Fri 4:00 pm) Dr. N. Jayaraman (IISc, Bangalore) “Poly(ether imine) and poly(alkylaryl ether) dendrimers”
- April 14th, 2010 (Wed 11:00 am) Dr. Sanjeev Kumar (IFW Dresden) “Spin-orbital frustrations in undoped iron-pnictides”
- April 7th, 2010 (Wed 3:00 pm) Dr. Sanjib Gupta (LANL USA) “Nucleosynthesis in dense stellar plasmas : X-ray bursts and Superbursts on accreting neutron stars”
- April 5th, 2010 (Mon 5:00 pm) Dr. V. Subramanian (Central Leather Research Institute, Chennai) “Molecular and Brownian Dynamics Studies on Model Collagen Like Peptides”
- April 5th, 2010 (Mon 4:00 pm) Dr. Rituparna Sinha (Roy Brigham and Women’s Hospital, Harvard Medical School, USA) “Engineering Novel Biomolecules for Biology and Medicine”
- April 5th, 2010 (Mon 3:00 pm) Dr. Amritlal Mandal (Dept of Physiology, University of Arizona, USA) “Hydrostatic Pressure Induced Activation of Sodium Hydrogen Exchanger in Optic Nerve Head Astrocytes: Role of Calcium”
- April 1st, 2010 (Thu 4:00 pm) Dr. Apoorva Nagar (MPI, Potsdam) “Effect of mutators on evolution”

- April 1st, 2010 (Thu 3:00 pm) Dr. Jaiswal Nagar (Gethe Universitt, Germany)  
“Magnetocaloric effect and magnetic cooling near a field-induced quantum-critical point”



## **15 Account Statement**

The Annual Statement of Accounts of the Institute for the Financial Year 2010-11 has been finalized and prepared in the prescribed format (Form of Financial Statement Non-Profit Organization) provided by MHRD and duly approved by CAG of India. This includes the Balance Sheet, Income & Expenditure Account and Receipt & Payment Account. The Accounts have been prepared on accrual basis. The Statement of Account of the Institute is audited by a Chartered Accountant firm of Chandigarh (Prem Garg & Associates), who had been appointed as internal auditor of the Institute. Final Accounts are audited by C.A.G. of India / PAG (Punjab & UT).

### **15.1 Plan Grant**

The Institute received a sum of Rs. 9000.00 Lakh as Grant-in-Aid from MHRD in the Year 2010-11. As per utilization certificate on account of 2009-10, there is an opening balance of Rs. 91.20 Lakh. Out of the total amount of Rs. 9091.20 Lakh (9000.00 Lakh + Rs. 91.20 Lakh) available under plan grant, the following expenditure has been made under different budget heads in 2010-11.

<b>Budget Head</b>		<b>(Rs. in Lakh)</b>
(i)	Salary Component :	569.76
(ii)	Non- Salary Component :	1429.74
(iii)	Purchase of Equipment :	1245.73
(iv)	Purchase of Furniture :	124.03
(v)	Purchase of Vehicle :	11.40
(vi)	Construction of Building (Including Deposit money) :	5522.78
(vii)	Library Books :	14.25
(viii)	Computers Accessories & Peripherals :	14.95
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Total		8932.64
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The Institute has its internal receipts of Rs. 70.78 Lakh from Interest on Fixed Deposits, Rs. 51.39 Lakh from Student Fee and Rs. 13.39 Lakh from other resources under Plan Head (in 2010-11).

## 15.2 Research & Development Grant

In addition to the Plan Grant, the Institute also received a sum of Rs. 475.88 Lakh (in 2010-11) under Research & Development Account (with an opening balance of Rs. 84.63 Lakh carried over from the year 2009-10). In case of Research and Development

(R & D A/c) account, the details are as follows :

**Income:**

	(Rs. in Lakh)
(i) Opening Balance as on 01.04.2010	84.63
(ii) Grant received in 2010-11	475.88
Total	560.51

**Expenditure:**

(i) Pay and Allowances	14.27
(ii) TA	0.52
(iii) Scholarship	102.32
(iv) Purchase of Equipment	9.95
(v) Contingency	42.25
(vi) Consumables	6.64
(vii) Overheads	2.00
(viii) Other Expenditure	15.19
Total	193.14

Thus, the total amount available was Rs. 560.51 Lakh, out of which Rs. 193.14 Lakh was spent under R & D A/c with a closing balance of Rs. 367.37 Lakh.

### 15.3 Endowment Fund

The Board of Governors had approved to open an Endowment Fund Account in its 5<sup>th</sup> meeting held on 30.04.2009. Balance available under this account is Rs. 229.16 Lakh as on March 31, 2011.

### 15.4 Student Welfare Account

In addition to the above, there is a Student Welfare Account with a closing balance of Rs. 53.89 Lakh at the end of financial year 2010-11.