UM-DAE CBS
CENTRE FOR EXCELLENCE IN BASIC SCIENCES
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FIVE YEAR REPORT
(August 2007 – March 2012)

UM-DAE CBS

University of Mumbai (UM) – Department of Atomic Energy (DAE)

Centre for Excellence in Basic Sciences (CBS)

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Preface

The Centre for Excellence in Basic Sciences (CBS) was created in 2007 as a project of the Board of Research in Nuclear Sciences (BRNS), a wing of DAE, with the objective of sustaining a brand institution in the field of Basic Sciences on the campus of a University. The principal thrust was to impart high quality undergraduate and post graduate education in the midst of a vibrant research environment with emphasis on the experimental component within a multi-disciplinary framework. This was, indeed a novel initiative, and if successful, this would form a role model for many Universities to follow.

CBS formally came into existence on March 26, 2007, with the signing of an MoU between the University of Mumbai and the Department of Atomic Energy (DAE). The Centre has *ipso-facto* autonomy with regard to academic, financial and administrative activities. The University made available a 5- acre plot of land on the Kalina campus, Santa Cruz (E) for the construction of permanent buildings while DAE has been providing all the necessary funds. For the first five years BRNS sanctioned Rs. 51.50 crores for the CBS project.

In 2007 the Centre started the 5-year Integrated M. Sc programme for which the degrees to students will be awarded by the University of Mumbai. The students are admitted after the 12^{th} standard or equivalent examination on the basis of a nationwide entrance test called National Entrance Screening Test (NEST). CBS started on a modest scale, initially with only the Physics stream, and since last year other streams of Basic Sciences, namely, Mathematics, Chemistry, and Biology have been added. The students of CBS have been performing extremely well in national competitive examinations in Physics and Mathematics and have won several laurels. Recently, the Ph. D. programme has also been introduced in the Centre. All the degrees to CBS students will be awarded by the University of Mumbai. The Centre has established excellent organic linkages with the University Departments and Constituent Colleges.

CBS is a residential campus and the students are provided with excellent facilities for living, study and recreation. Students have created Science, Art, Music and Film clubs at their own initiative and CBS has nurtured creativity in all forms.

CBS has established modest research facilities for the core faculty appointed; since the Centre is at the moment running in a Project Mode, all appointments at CBS are on contract basis. In addition to carrying out research at CBS, the faculty also collaborate with scientists in other well established research institutions with access to major equipments. It is very encouraging to note that the faculty at CBS have been able to produce excellent research which has been published in reputed international journals, and till date 63 papers have been published in refereed Journals. The productivity has been increasing steadily and during the last year alone 21 papers have been published in reputed International Journals.

One of the hall marks of CBS is its Visitors' programme. Visiting and Adjunct faculty coming from proximate research institutions contribute immensely to the teaching and research programmes at the Centre. There have been foreign nationals as well who have come and taught courses of lectures to the students. Distinguished scientists, which include several Nobel Laureates have delivered Colloquia and Public Lectures.

This document lists all the activities and accomplishments of the Centre and it is satisfying to note that CBS has lived up to the dreams of its creators; it has successfully established itself as a brand institution for teaching and research in the area of 'Basic Sciences', and to embark on setting an example for other Universities to follow, which when accomplished would contribute immensely to the growth and improvement of higher education in the Country.

R. V. Hosur
Director

Contents

1. Preamble

The Centre for Excellence in Basic Sciences (CBS) has been created with the objective of sustaining a brand institution in the field of Basic Sciences on the campus of a University. The principal thrust is to impart high quality undergraduate and post graduate education in the midst of a vibrant research environment with emphasis on the experimental component within a multi-disciplinary framework.

CBS formally came into existence on March 26, 2007, with the signing of a MoU between the University of Mumbai (UoM) and the Department of Atomic Energy (DAE), Government of India. The University made available a 5- acre plot of land in the Kalina campus, Santa Cruz (E), for the construction of permanent buildings while the DAE is providing all the necessary funds. The Centre has *ipso-facto* autonomy with regard to academic, financial and administrative activities.

2. Management of CBS

CBS is managed by a Governing Council consisting of the following members:

Chairman, AEC and Secretary, DAE - Chairperson
Vice Chancellor, Mumbai University - Co-Chairperson
Director, BARC - Member
Director, TIFR - Member
Director, IIT-Bombay - Member
Pro Vice Chancellor, UoM, - Member
Joint Secretary R&D (DAE) – Member
Prof. S. K. Joshi, NPL- Member
Centre Director, CBS - Member Secretary

The academic activities of the Centre are designed and overseen by the Academic Board of the Centre whose current members are:

- Prof. S. M. Chitre, CBS - Chairperson
- Prof. R. V. Hosur, Director, CBS - Member
- Prof. J. V. Narlikar, IUCAA – Member
- Prof. Arvind Kumar, formerly HBCSE - Member
- Prof. M. S. Ragunathan, formerly TIFR - Member
- Prof. J. Maharana, IoP, Bhubaneshwar - Member
- Dr. Swapan Ghosh, BARC - Member
- Prof. Dipan Ghosh, IIT-Bombay - Member
- Prof. N. Mukunda, IISc-Bangalore - Member
- Prof. K. N. Ganesh, IISER-Pune - Member
- Dr. R. R. Puri, HBNI - Member
- Prof. G. D. Yadav, ICT-Mumbai - Member
- Prof. N. Sathyamurthy, IISER, Mohali- Member
- Prof. A. M. Narsale, UM - Member
- Prof. Deepak Dhar, TIFR - Member
- Dr. S. K. Apte, BARC – Member

3. Honors and Distinctions

- Prof. Shashikumar Chitre, Emeritus Professor and Chairperson Academic Board of CBS received '**PADMA BHUSHAN'** award by the President of India in the discipline of Science and Engineering for the year 2012.

- Prof. M. S. Raghunathan, Member Academic Board of CBS received '**PADMA BHUSHAN'** award by the President of India in the discipline of Science and Engineering for the year 2012.

- Prof. R. V. Hosur invited **to nominate candidates for the award of THE NOBEL PRIZE IN CHEMISTRY for 2012** by Noble Committee for Chemistry.

- Prof. R. V. Hosur, Director CBS received '**Prof. G. N. Ramachandran Award-2009'** by the Council of Scientific & Industrial Research (CSIR) for his outstanding contribution in deciphering protein structure and dynamic using Nuclear Magnetic Resonance (NMR) spectroscopy.

- Prof. Arvind Kumar received **'PADMA SHRI'** award by the President of India in the discipline of Literature and Education for the year 2010.

- Professor Deepak Mathur was awarded the **J.C. Bose National Fellowship**, and was elected as a **Member, Commission C15, (Atomic, Molecular and Optical Physics) of IUPAP 2008**, and was Convener, DAE's Specialist Group on Advanced Physical Sciences.

4. Infrastructure

4.1 Permanent buildings

To begin with the University made available part of its Health Centre building and the Anna Bhau Sathe Bhavan hostel building to CBS to start its activities. The Health Centre building was used to house the offices and some of the laboratories and all the students were accommodated in the Anna Bhau Sathe Bhavan hostel. Construction of the first phase of the permanent buildings of CBS, which include one hostel block and one laboratory/faculty block, started in January 2010, after completing all the necessary initial steps such as appointing architects, obtaining structural designs, screening financial quotations etc, and the civil work is expected to be completed by February 2012. It is anticipated that CBS will occupy these buildings by June 2012.

Proposed Permanent Building (Phase -1)

4.2 Prefabricated structures

Prefabricated Structure –Block 2 (PF-BH)

In order to cater to the increasing demand for hostel rooms, faculty offices, and labs as students are admitted every year, three sets of prefab structures (total area ~ 24000 sq ft) have been built till date on a site adjacent to the Annabhau Sathe Bhavan. These structures have housed Chemistry, Biology and Computer teaching labs, Library, Canteen, class rooms, a large seminar room, faculty offices, and student rooms. Internet connections have been provided in all the faculty offices, computer labs and the Library. A new generator has been installed to supply power to all these places. All student rooms and faculty offices have attached toilet/baths. With the availability of these blocks, all the first year Chemistry and Biology practicals are conducted in the Kalina campus itself and transporting of the students to HBCSE, as was being done initially, has been discontinued. Along with the Annabhau Sathe Bhavan, this location has now become the hub of activities of the Centre.

Prefabricated Structure –Block 2 (PF-BH)

Prefabricated Structure –Block 3(PF-CH)

CBS's Permanent Buildings Construction Work is under progress

Permanent Building Front View

Permanent Building Rear View

CBS's Permanent Buildings Construction Work is under progress

Hostel Building Front View

Hostel Building Rear View

5. Academic programmes

The academic activities of CBS encompass both teaching and research. The *modus operandi* here is best described in the following statements made by Homi Bhabha in 1950 in a note to the Planning Commission.

> “Research should be an integral part of a University's activity, and the number of staff in any subject be such as to allow any member of the staff to devote at least half his time to research if he so desires. In general, only those who have contributed to the advance of a subject, have a deep enough insight into it to impart a sound knowledge of it to their students. Similarly, teaching, provided it does not take up the major part of a scientific worker's time, has a good effect on his research work in suggesting new approaches to the subject and often in suggesting new ideas. Thus, each of the research institutes which have already been established in India should cooperate closely with a university in their neighborhood in its teaching activities. Only thus will some of our best scientists, who are at present locked up in research institutes, be able to give off their best to the country, not only by doing their own research but by helping to teach the future generations in the universities. The beneficial effect on universities by such close collaboration will be far-reaching, for if students have received courses of lectures from those who are leaders in their subject then they will immediately have a standard by which to measure the quality of the lectures given by others, and this in turn will have the effect of compelling the other teachers to improve the quality of their teaching."

CBS provides an excellent platform to achieve precisely this objective by imparting multi-disciplinary education. Besides its own core faculty - who are recruited after rigorous peer review - CBS invites scientists and young researchers from proximate research establishments like Bhabha Atomic Research Centre (BARC), Tata Institute of Fundamental Research (TIFR), Indian Institute of Technology- Bombay (IITB), Homi Bhabha Centre for Science Education (HBCSE) of TIFR, Institute of Chemical Technology (ICT),.. to participate in the teaching programmes of the Centre as Adjunct and Visiting faculty. The faculty from the University and its affiliated colleges also participate in teaching and instructions in the labs.

In the light of these considerations, CBS is expected to have only a small number of core, permanent faculty compared to those at IISERs and NISER – which have similar mandates as of CBS - in each of their Basic Science streams. These institutes have typically 40-50 sanctioned faculty positions per stream, and they would be filled over a period of 10-15 years. As against this, one may envision a strength of about 12-15 per stream in the asymptotic limit for CBS. These again will have to be filled over a period of 10 years in a phased manner. The rest of the teaching faculty will be drawn from proximate research institutions and laboratories in the form of Adjunct and Visiting faculty.

Seminar Room

Class Room

Computer Laboratory

Library

Hostel Room – inside view

5.1 Five year integrated M. Sc. in Basic Sciences

In 2007 the Centre started the 5-year Integrated M. Sc programme for which the degrees will be awarded by the University of Mumbai. The students are admitted after the 12th standard or equivalent examination on the basis of a nationwide entrance test called National Entrance Screening Test (NEST). CBS started on a modest scale, initially with only the Physics stream, and since last year other streams of Basic Sciences, namely, Mathematics, Chemistry, and Biology have been added. Last year (August 2011), 31 students were admitted to the Centre. Currently, there are 110 students enrolled for the M. Sc programme at CBS. The first batch of students is now in the 5th year and would graduate in April 2012.

All students admitted to CBS live in hostels in the campus and are provided with excellent facilities for study and recreation. They have easy access to internet and computing facilities. The year-wise list of students and their demographical distribution is included in ***Appendix I***.

The curriculum for the Master's programme at CBS is a good mix of theoretical and experimental components, starting from the basics to very high level of cutting-edge science. It is a credit based semester system with the following structure:

Spring Semester: August 1 - November 30
Fall Semester: January 1 – April 30

The months of December and May-July are vacation months and the students are encouraged to do summer projects at various places in the country during this period.

The first year of training is common to all the students and from the second year onwards students branch out into areas such as Physics, Chemistry, Biology and Mathematics. However, even in those there is fair amount of interdisciplinary approach built into the 'course structure'. In the fourth and the fifth years, the students are given special elective courses. In the 7th semester the students are required to do a reading project devoting half a day per week. In the 8th semester the students perform a mini project devoting one day a week. The whole of 9th semester is devoted to a project which can lead to a Thesis. The 9th semester is chosen for the full semester project so that the students can combine the vacations preceding and following the semester so that the students get 8 months for carrying out the project. Projects carried out by students at different institutions are listed in ***Appendix II***.

Visiting faculty had a major role to play in the teaching activities of CBS. These lectures are drawn from various research institutions. The list of all such lecturers is included in ***Appendix III.***

Physics & Electronics Laboratory

Chemistry Laboratory

Biology Laboratory

Mathematics Computational Laboratory

5.1.1 Scholarships:

All the students admitted to CBS get INSPIRE scholarships (according to INSPIRE guidelines) from the Department of Science and Technology (DST), Govt. of India.

5.1.2 Fee structure:

The tuition fee structure at UM-DAE CBS is as follows:

- General Category students: - Rs. 1750/- per semester
- Reserved Category Students: - Rs.75/- per semester

In addition, students pay a nominal rent of Rs. 400/- per semester for hostel accommodation; boarding facilities are made available on payment of actual costs (approximately Rs.2500/- per month).

5.1.3 Performance by M. Sc students in National and International Level:

Exposure to advanced facilities in nearby research institutions, visits to premier scientific institutes in Mumbai and elsewhere in the country, has inculcated a spirit of healthy competition amongst the students. Quite a few of our students have been participating in various national-level science events like Madhava Mathematics Competition (MMC), National Graduate Physics Examination (NGPE).

- **Photonics Fellowship of India**

  Mr. Lavish Pabbi has been selected for the **Photonics Fellowship of India**. This is a national fellowship awarded to only about 10-15 students each year for working in the field of Photonics for a period of 3 to12 months. Lavish Pabbi will be working under this fellowship from May to July 2012 with Dr. Sen Mathews at SAMEER, Mumbai.

- Mr Mohanish Borana was selected through the **National Initiative on Undergraduate Studies** to participate in the Asian Science Congress, Korea.

- Mr Shrikrishna Varma was selected for a semester project at **GSI, Damsdart, Germany.**

- **National Graduate Physics Examination (NGPE)**

  - Five of our students were in the top 25 out of a total of approximately 5,800 who appeared for the exam. Of these 2 students were awarded Gold Medals (Top 25: Ms Rashi Verma, Mr Lavish Pabbi, and Mr Dhruv Ringe and Gold Medalist Mr Sarath Shankar and Mr Dharmaj Soni).
  - Last year, one of our students (Mr Amit Seta), came in the top 25 out of a total of approximately 7000 students who appeared for the exam.

- **Joint Entrance Screening Test (JEST)**

  - In JEST 2011, 3 of our students (Mr. Dharmaj Soni, Mr. Lavish Pabbi and Mr. Udaya Maurya**)** were in the top 100 out of a total of 5000 students who appeared for this examination.

- **Madhava Mathematics Competition (MMC)**

  - In MMC 2010, 3 of our students (Shri. Udaya Maurya, Shri. Dhruv Ringe, Shri. Ram Shila) selected for prize

  - In MMC 2011, 5 of our students (Shri. Sarath Sankar, Shri. Mayank Singh, Shri. Shashank Markande, Mr. Koushik Senapati Mr. Plawan Das) selected for prize

- **Selected for Ph. D.**

  - Mr Rohit Sharma has been selected for Ph.D. by the **NCRA-TIFR**

  - Mr Udaya Maurya has been selected for Ph.D. by **IUCAA**

  - Mr Lavish Pabbi has been offered Ph.D. by **Dukes University** and also by the **Bristol University**

  - Ms. Rashi Verma has been offered Ph.D. by **Virginia University** and also by the **Boston University**

- **UGC-NET**

  - Out of 19 students 18 students appeared for UGC-NET in which **11 students successfully qualified UGC-NET** and **Mr. Mritunjay Kumar Verma scored second rank** all over India

5.1.4 Summer/Winter Projects

To expose the students to advanced research facilities and to further their academic career, CBS encourages its students to do projects during their summer and winter vacation, subject to approval by the CBS Academic Staff. Several students have undertaken such projects in prestigious institutions like:

- Harish Chandra Research Institute, Allahabad (HR)
- Institute of Mathematics Sciences, Chennai (MSc.)
- Chennai Mathematics Institute (CMI)
- Indian Institute of Science Education and Research (IISER), Kolkata
- Indian Institute of Science Education and Research (IISER), Mohali
- Udaipur Solar Observatory (USO)
- Indian Astronomical Observatory, Hanley
- Indian Institute of Science (IISc.)
- Tata Institute of Fundamental Research (TIFR)
- Bhabha Atomic Research Centre (BARC)
- Indian Institute of Technology, Bombay, Mumbai
- Jawaharlal Nehru University (JNU)
- Inter University Accelerator Centre (IUAC)
- Indian Statistical Institute (ISI)
- Saha Institute of Nuclear Physics (SINP)

A few CBS students have been selected for the Visiting Students Research Program (VSRP by TIFR and also by NCRA).

5.1.5 Educational Trips

Outdoor learning is a great way to develop inquiry based learning. It engages students in active and independent thinking when they come across things that stimulate their interest and curiosity. In order to expose the young minds to the advanced research being carried out in different establishments in the country, CBS has been regularly organizing educational trips for students. In the recent past, we have taken students to:

1. Radio Astronomy Centre (RAC), Udhagamandalam Dec 2008 & 2010
2. Gamma Ray Astronomy at PeV EnergieS (GRAPES), Udhagamandalam Dec 2008 & 2010
3. National Aerospace Lab (NAL), Bangalore December 2010
4. ISRO Satellite Tracking Centre (ISTC), Bangalore December 2010
5. National Centre for Biological Sciences, Bangalore December 2008 and Dec 2010
6. National Balloon Facility (NBF), Hyderabad December 2010
7. Nuclear Fuel Complex (NFC), Hyderabad December 2010
8. Centre for Cellular & Molecular Biology (CCMB), Hyderabad December 2010
9. Indian Institute of Chemical Technology (IICT), Hyderabad December 2010
10. Electronics Corporation of India Limited (ECIL), Hyderabad December 2010
11. Sriharikota Rocket Launch Centre (SHAR) December 2008
12. Bhabha Atomic Research Centre (BARC), Mumbai, 18th August (Sem I and III)
13. Tata Institute of Fundamental Research (TIFR), Mumbai, Several visits
14. Giant Meterwave Radio Telescope, Pune, 7th November, 2009 (All)
15. Overnight Sky Observations, Murbad, February 2010 - All
16. Indian Meteorological Department, Colaba, 18th August 2009, Sem VI
17. ACG Worldwide, Pune, 25th February, 2011
18. Sewri Bay, Flamingo Watch – 25th March 2009 – all
19. Uran to see natural flora and fauna -29th September, 2007

Educational Trips of CBS

GMRT - Narayangaon

NCBS -Lab in Bangalore

Sewri Bay, Flamingo watch

Ooty Trip -2

A study of secondary cosmic ray flux variation during the annular eclipse of 15 January2010 at Rameswaram, India

Balloon Facility – Hyderabad

5.2 Ph. D. programme at CBS

CBS has started a Ph. D. program in basic sciences. Students are selected following guidelines defined by the University of Mumbai. Many of the core faculty at CBS are recognized guides of Mumbai University. Besides, while the students carry out research at CBS, they can also register with faculty of other Departments of the University. The list of such students is given below:

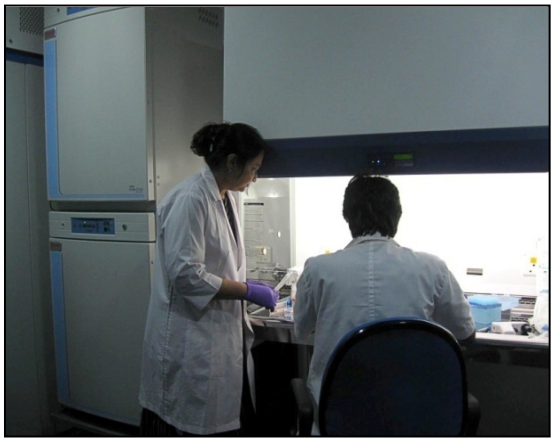
1.	Name of the Student	:	Ms. Dolly Khona
	Thesis Title	:	"Characterization of BolA-like protein form green chlorophyte Chlamydomonas reinhardtii"
	Internal Guide	:	Dr. Jacinta D'Souza, UM-DAE CBS
	External Guide	:	Dr. Majushree A. Deodhar, Faculty, Dept of Botany, K. E. T's V.G. Vaze College, Mulund, Mumbai
2.	Name of the Student	:	Mr. Venkatramanan G. Rao
	Thesis Title	:	Characterization of Flagellar Associated "Protein174 (FAP174) from the green chlorophyte *Chlamydomonas reinhardtii"*.
	Internal Guide	:	Dr. Jacinta D'Souza
	External Guide	:	Dr Prabhakar M. Dongre, Department of Biophysics, University of Mumbai
3.	Name of the Student	:	Mr. Mustaffa Motiwalla
	Thesis Title	:	"Differential gene expression in Mycobacterium leprae Infected Schwann cells to investigate nerve damage in leprosy"
	Internal Guide	:	Dr. Jacinta D'Souza
	External Guide	:	Dr. Yasmin Khan, Sophia College
4.	Name of the Student	:	Mr. Sushil Samant
	Thesis Title	:	"Generation of high-energy electron beams from plasma- based accelerators and their use in free-electron lasers"
	Internal Guide	:	Dr. Srinivas Krishnagopal, CBS & BARC
	External Guide	:	Dr. Radha Srinivasan, University of Mumbai

Research Laboratories at CBS

Nuclear Physics Laboratory – 1

Nuclear Physics Laboratory - 2

Stem Cell Laboratory



Chemistry Research Laboratory

Biology Research Lab – 1

Biology Research Lab – 2

5.3 Research at CBS

CBS is guided and driven by the philosophy that research and teaching are inseparable. Indeed the necessity and benefit of this philosophy for higher education is so aptly stated by Dr. Homi Bhabha as far back as 1950 in a letter which he wrote to the Planning Commission (Reproduced earlier)

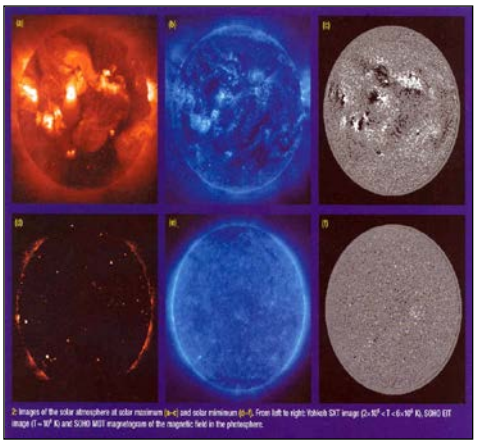
The core faculty at CBS carries out research in their areas of expertise both at CBS and also using the facilities available at other research institutions such as TIFR, BARC, Mumbai University itself, etc in the city and also at other cities in the country. Till date 63 publications have resulted from these efforts and these are in high profile international Journals. The list of CBS publications is enclosed in ***Appendix IV***.

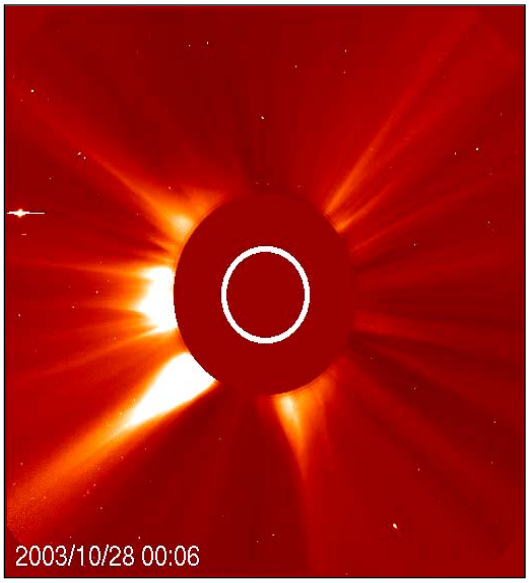
Briefly, the areas of research are as below:

- **Physics:**

Stellar Structure and Evolution

The equations of Stellar Structure and Evolution are solved numerically using the Cambridge STARS code which includes the effects of rotation and magnetic field as well as mixing due to meridional flow and instabilities. It is demonstrated that the convection zones in stars of various masses should lead to uniform specific angular momentum rather than a solid-body rotation. The resultant rotation profiles and the transport of angular momentum by magnetic fields are expected to have a significant effect on the evolutionary tracks of stars. ***(S. M. Chitre)***





Magnetic Oscillator Model for Solar Activity Cycle

The helioseismically determined average angular velocity along with its temporal variations as a function of depth and latitude, over the solar cycle can be effectively used to infer the axisymmetric component of magnetic field as well as the meridional flow in the solar interior. The basic idea is to derive the magnetic field and the circulation pattern prevailing inside the Sun that are consistent with equation of magnetic induction and the azimuthal component of momentum equation, assuming that the angular velocity variations are caused solely by the Lorentz force.

One of the outstanding problems in Solar Physics is to identify the underlying mechanism responsible for driving the solar activity cycle and to account for the correlated variations in solar oscillation frequencies, rotation rate, magnetic field and total solar irradiance with the cycle. ***(S. M. Chitre)***

Computational Astrophysics

Computational Astrophysics (Quantitative spectroscopy, PDR, and Quasar absorption lines).Understanding the chemical evolution of the universe, from the nearby low-luminosity star-forming regions within our galaxy to the highest redshift and most luminous galaxies, is a major goal in current astrophysics. Most of our understanding of the chemical and physical evolution of the universe comes from the detailed analysis of the observed spectrum produced by interstellar gas which is far from equilibrium and numerical simulations are the best way to decipher the message in the spectrum. We are greatly involved with the most commonly used numerical code CLOUDY (http://www.nublado.org) to decipher the astrophysical spectra and to understand the underlying physical processes comprehensively. ***(Gargi Shaw)***

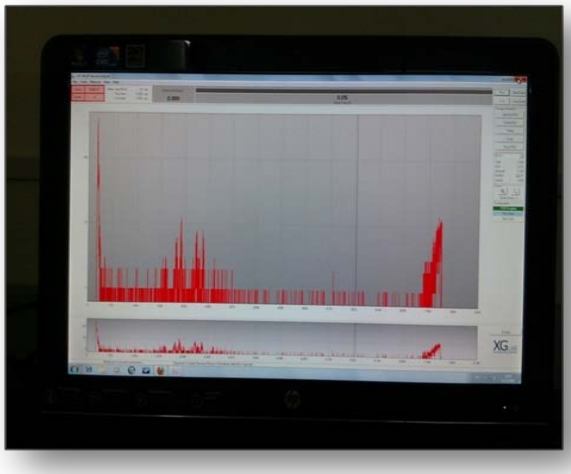
Condensed Matter Physics

Superconductivity, Magnetism, Magneto-optic investigations in ferrofluids, Material synthesis, Mossbauer Spectroscopy, Low Temperature Techniques, Solar Energy, and Instrumentation. ***(R. Nagarajan)***

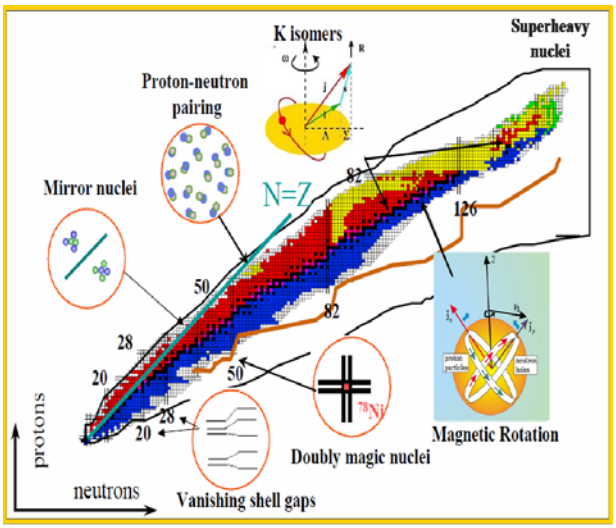
Experimental condensed matter physics with primary interest in exploring the electronic properties of various hard condensed matter systems by transport based spectroscopic techniques including scanning probe techniques like the low temperature STM. Particularly work in progress in low dimensional systems like thin films and nanoparticles, and has worked extensively in the field of mesoscopic superconductivity where the finite size effects on the superconducting ground state properties of elemental superconductors was probed. ***(Sangita Bose)***

Nuclear Physics

Experimental Nuclear Structure Studies at High Angular Momentum; Measurement of Nuclear Lifetimes, Shape Co-Existence in Nuclei using High Resolution Gamma Ray Spectroscopic Techniques; Identical Bands and Magnetic Rotation in Nuclei. Band Termination in Nuclei; "Low Cross-Section" measurements in Nuclei using Charged Particle Detectors and Recoil Mass Analyzer in Conjunction with High Resolution Gamma Detector Arrays; Nuclei away from the valley of stability; Study of "Super-deformed" and "Hyper-deformed" Nuclei. ***(S. B. Patel)***



Nuclear Physics, with a focus on gamma-ray spectroscopy –
Isomeric states in nuclei: K isomers in superheavy nuclei and in the neutron-rich A~180 mass region Novel shapes and symmetries: Prolate-oblate shape transition at high spins; triaxial superdeformed shapes in nuclei, Collective excitations in rare-earth and actinide nuclei: Rotational structures and nucleon alignments; competition between collective rotation and octupole excitations, Model calculations of deformed nuclei: Cranked shell model calculations using the Woods-Saxon and Nilsson formalisms,

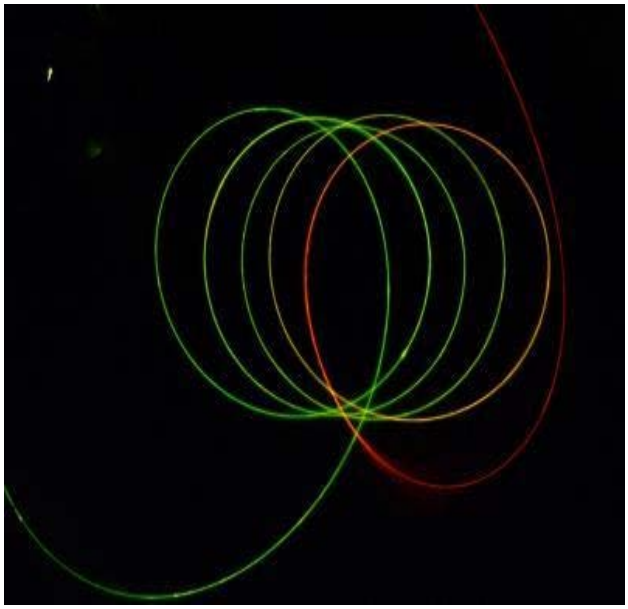


Development of new materials, instrumentation and techniques for radiation detection and digital data acquisition systems. ***(Sujit Tandel)***

Nuclear structure theory and works on semi - classical Wigner - Kirkwood expansion of the quantal partition function, and its applications to the microscopic – macroscopic approach to the ground state nuclear masses. Relativistic and non relativistic mean field description of loosely bound nuclei, and some of their decay and reaction properties. ***(Ameeya Bhagwat)***

A high resolution and high sensitive fluorescence cell for the measurement of isotope shifts and hyperfine structure using laser spectroscopy is being developed. The design incorporates various features suitable for the investigation of stable and long-lived radioisotopes (offline) with a provision for adaptation of the cell for study of online species at accelerators. This experimental set up is the first of its kind in India for laser-based nuclear physics investigations. This work is interdisciplinary and involves experimental and theoretical understanding of nuclei away from stability.

It is observed that the laser spectroscopic measurements of the root mean square charge radii of chain of isotopes of some of the nuclei show a sudden increase in the neutron rich region. The sudden jump in the observed reaction cross section and the charge radii can be correlated. Investigations on Zr and Sn isotopes suggests that an increasing excess of neutrons may lead to a steady decrease in the strength of the spin-orbit interaction as also observed by other theoretical studies based on mean-field models. Investigation by analyzing the microscopically generated proton-nucleus optical potentials are being carried out. ***(M. Hemalatha)***



Nonlinear phenomena in optical fiber communication systems

Nonlinear phenomena include four wave mixing, stimulated Raman scattering, self- and cross-phase-modulation; Ultrafast intense pulsed laser beam propagation and diagnostic techniques such as frequency-resolved-optical-gating (FROG) - In particular - GRENOUILLE - a highly simplified version of FROG; Numerical simulation of all the above phenomena using a combination of techniques such as the split-step Fourier method and finite element methods. ***(Bhaskar Khubchandani)***

Accelerator and Beam Physics

Theory of collective instabilities in electron-positron colliders, theory of free-electron lasers, development of linear accelerators including photoinjectors, development of undulators and free-electron lasers, development of radio-frequency quadrupoles and drift-tube linacs for high-intensity proton accelerators, simulations of plasma-based laser wakefield acceleration, and study of electromagnetic modes in normal- and super-conducting cavities. ***(Srinivas Krishnagopal)***

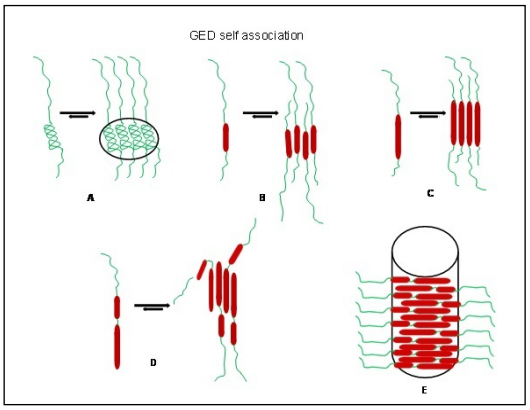
Domain of structural analysis and dynamics of particle beams in proton and heavy-ion linear accelerators. In structural analysis, work is presently involved in the analytical and simulation studies of the 1 GeV High-Intensity CW Proton Linac needed for Accelerator Driven sub-critical reactor Systems (ADS) at BARC, and low-beta superconducting resonators for upgrading the existing superconducting LINAC booster at TIFR. The effects of space-charge and mismatch which lead to emittance growth and generation of beam halos in the 1 GeV, 30 mA CW proton linac. ***(Tushima Basak)***

Physics Education

Investigating students' learning difficulties in elementary thermodynamics and in devising appropriate demonstrations that address these difficulties. Recently developed three demonstration activities, one on thermal equilibrium, one on pressure resulting from particle collisions with walls, and one on forced convection. ***(H.C. Pradhan)***

➢ Chemistry

Biological Chemistry

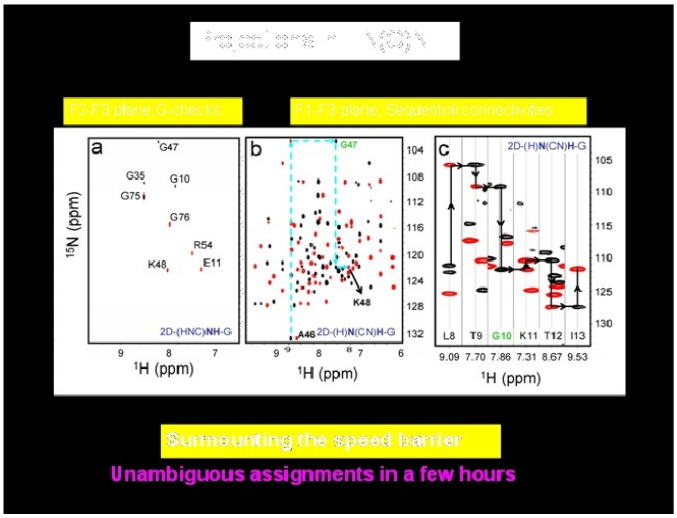


General principles of chemistry and physics govern all biological processes and the study of these constitutes what one may call as 'Biological Chemistry' or 'Biophysical Chemistry' or 'Structural Biology' or 'Biophysics'. A variety of physical tools are required to investigate the variety of processes, and this makes the above field a highly interdisciplinary branch of science. The focus of research at the Centre in this broad area is briefly summarized as below:

Protein folding and unfolding are crucial in regulating biological activity and targeting proteins to different cellular locations. Uncovering this mechanism will therefore provide a unique insight into the way in which evolutionary selection has influenced the properties of molecular system for functional advantage. A key question is how an energy landscape unique to a specific protein is defined by its amino acid sequence. The protein folding process is generally described using a funnel like energy landscape i.e. the stabilization free energy of any given structure on an average goes down as it gets closer to the native structure. The broad mouth of the funnel indicates the high entropy of the denatured states, which becomes smaller as more contacts are formed.

Among the various techniques which have been used for studying protein folding, NMR has emerged as the most powerful one, as it can provide residue level information on various states down the protein folding funnel. Measurements of equilibrium/kinetic folding events on time scales of nanosecond to hours and structural characterization of folding intermediates, partly folded states and unfolded states provide valuable insights into the protein folding mechanisms. Particular insight has come from the use of this approach to analyse the transition state for folding, namely the critical regions through which all molecules must pass through in order to reach the native fold. ***(R. V. Hosur)***

Multidimensional NMR Spectroscopy



Development of two-dimensional NMR spectroscopy in the 1970s has revolutionized NMR applications in Chemistry, Biology and Medicine. With new fields of research emerging such as proteomics, the development activities continue unabated. During the last few years a major breakthrough has been achieved by the invention of a set of 3-dimensional experiments, termed as 'HNN and HN(C)N – suite of experiments'. These are triple resonance multidimensional experiments designed to provide direct correlations between the amide proton and ^{15}N of three consecutive residues along the polypeptide chain of a (^{13}C, ^{15}N) labeled protein. These experiments led to the development of an extremely efficient protocol for rapid assignment of backbone resonances, and this has proved highly successful for both folded and unfolded proteins. Recently, these methods enabled Prof. Hosur to accomplish a so-called impossible feat, namely, structural characterization of a huge protein self assembly, ~ 5 MDa in size. This is a huge size even for X-ray crystallography. All these have tremendous implications for structural genomics research. They also led to another feat, namely, obtaining resonance assignments in medium sized proteins in less than a day; this used to take between 6 months to one year not too long ago. ***(R. V. Hosur)***

Synthetic Chemistry

Synthesis of organic materials for the applications in photo-voltaics including solar cells and organic light emitting devices; Synthesis of metal complexes for the photo-catalytic splitting of water; Synthesis of BODIPY dyes and their detailed photo-physical and electrochemical studies. ***(Neeraj Agarwal)***

Structure & Dynamics of Biomacromolecules

Studies leading understand the nature of protein disorder in biological systems and disease mechanisms. Using Advanced fluorescence and single molecule techniques, To understand the intricate details of primary and secondary structure, formation and disruption of DNA or RNA during different cellular processes like replication, mismatch recognition using time-resolved as well as single-molecule Fluorescence Resonance Energy Transfer ***(Nabanita Nag)***

Enantioselective Synthesis

Asymmetric syntheses, enantioselective kinetic resolution of biologically important molecules. Syntheses of chirality sensing systems mimicking enzymes for High Throughput Screening using UV, Fluorescence and Circular Dichroism as tools.

Designing and synthesizing new catalytic systems for stereoselective/diastereoselective transformations. Development of new macrocyclic ligands for ionic and molecular recognition. ***(Anita Pandey)***

➢ Mathematics

Commutative Algebra and Algebraic Geometry

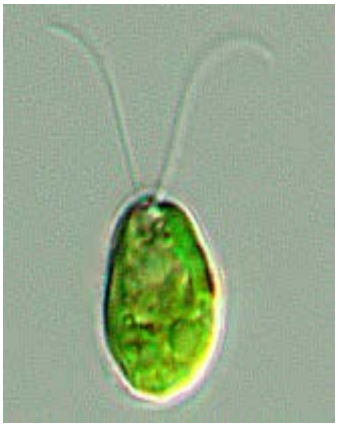
Unique factorization domains and divisor class groups; Hilbert functions of algebraic singularities and their behaviour under a blowing-up; invariants of finite groups acting on rings; differential properties of algebraic singularities; Seminormality, subintegrality, invertible modules and the Picard group. ***(Balwant Singh)***

Algebraic Number Theory and Classical Algebraic K-theory

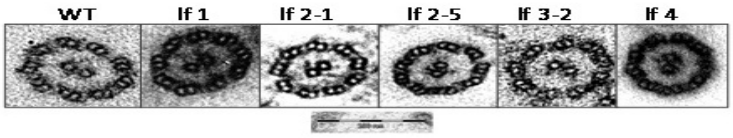
The work in algebraic number theory involves joint work with Prof. S. A. Katre on "Waring's Problem for matrices over rings of integers over algebraic number fields" in which we give a discriminant criterion for writing two-by-two matrices are sums of cubes and fourth powers. This question is open for powers greater than five and involves delicate analysis of the traces of the matrices involved. Another of her research interest involves joint work with Prof. Ravi Rao on putting nice group structures on orbit spaces on unimodular rows. These orbit spaces are closely connected to stability aspects of projective modules over rings. ***(Anuradha Garge)***

➢ Biology

Stress-induced scaffold proteins and their interactions



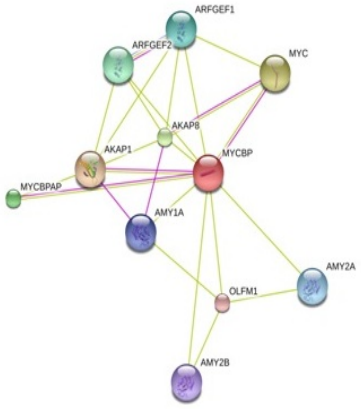
Chlamydomonas reinhardtii is a biflagellated, unicellular chlorophyte that swims in a breast- stroke manner; the organelles serving as watchtowers of the cell. The conserved '9 + 2' structure constitutes microtubular filaments, central apparatus, radial spokes, dynein motors and inter-connecting 'joints' made up of ~800 different proteins. Of these, ~15% are speculated signaling players; their spatial and temporal organization within the flagella is critical for coordinating its sensory and motility functions. In an increasing number of signaling processes, scaffold proteins are found to play a central role in physically assembling the relevant molecular components. Although most scaffolds use a simple tethering mechanism to increase the efficiency of interaction between individual partner molecules, these proteins can also exert complex allosteric control over their partners and are the targets of regulation. Scaffold proteins offer a simple, flexible strategy for regulating selectivity in pathways, shaping output behaviors, and achieving new responses from preexisting signaling components. Structures in flagella are fixed like scaffolds and we identified Flagellar Associated Proteins (FAPs) with signaling motifs, and explore their cross-talk with the motility apparatus.



A) Biophysically, long flagella mutants (available in the chlamydb) were characterized for their swimming velocity, beat frequency, angular momentum and waveform pattern. Although ultra-structurally the axonemes of mutants and WT were comparable, the beat frequency and swimming velocity of mutants decreased with an increase in flagella length, their waveforms and swimming paths were sloppy.

B) Along with a critical length, the flagella ought to have a precise position/arrangement per cell for its optimal functioning. Naturally, Monotrichous, Lophotrichous, Amphitrichous and Peritrichous are found; but it is not clear why different organisms exhibit such differing arrangements of flagella on their cells. We have methodically scored the arrangement of flagella on cells across genera. Evolutionary pressure seems to have played a role in changing the arrangement from polar to peritrichous form.

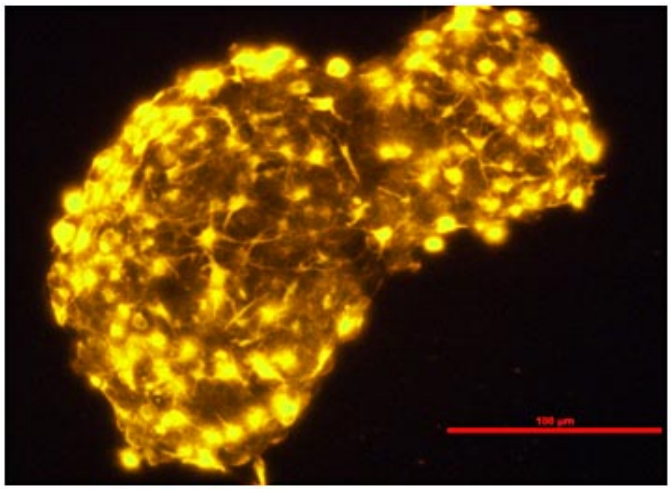
C) In the molecular approach, we have identified FAPs (FAP144, FAP174, FAP255, FAP223 and BolA) with signaling motifs and speculate the protein interactome. These genes have been cloned, the protein over-expressed, purified to homogeneity and used as a tool for further exploration. Techniques of protein-protein interaction, such as pull-downs, yeast-two-hybrids and Surface Plasmon Resonance help in verifying the speculated protein interactome.



a) An AKAP-binding protein FAP174 is shown to interact with the full-length as well as the RII-domain of CrRSP3 protein. FAP174 exists as a heterogenous mixture of monomer, dimer, hexamer or higher forms. Its solution structure using NMR is in progress.
b) CrBolA is multifunctional like EcBolA, changes morphology and induces biofilms in *E. coli* cells.
c) FAP223 is a Calcium-Dependent Protein Kinase and is induced with stress. ***(Jacinta D'Souza)***

Neural Stem Cell

Neural stem cell damage and regeneration by inflammatory mediators in the adult mammalian brain. This involves the use of primary in vitro cultures of adult neural stem cells, both dissociated and neurosphere types from hippocampus and subventricular zone and looking at physiological effects of these inflammatory mediators such as apoptosis and effects on different aspects of neurogenesis, as well as receptor-ligand interactions and signaling pathways involved. ***(Uma Ladiwala)***



Insect Behavior

There are two fields of research that are being followed. The first one, a collaborative project, is a study of sociobiology of a paper wasp, in particular in the role of dominance behaviour in regulation of reproductive and non-reproductive activities of the wasps in a colony. The second area of research to develop behavioural ecology of parasitoid wasps, especially the egg or egg-larval parasitoids. These parasitoids lay their eggs in the eggs of herbivorous insects that attack plants. Progeny of the parasitoids eventually eats up progeny of the herbivores thereby rescuing the plants from damages of herbivory. Work in pursued in studying the communication among the three players of this interaction, namely the plants, the herbivoures and the parasitoids. ***(Sujata Deshpade)***

5.4 Collaboration of CBS faculty with other departments, organization & countries

National –

- Tata Institute of Fundamental Research (TIFR), Mumbai
- Bhabha Atomic Research Centre (BARC), Mumbai
- Indian Institute of Technology (IIT-B)
- Department of Mathematics, Indian Institute of Technology (IIT-B)
- Department of Physics, University of Mumbai
- Department of Computer Sciences, University of Mumbai
- Department of Science & Technology (DST)
- Inter-University Accelerator Centre, New Delhi
- Andhra University, Vishakapatnam
- Aligarh Muslim University
- Lucknow University
- Manipal University
- Khalsa College, Mumbai

International –

- Argonne National Laboratory, USA
- University of Massachusetts Lowell, USA
- Centre de Spectrométrie Nucléaire et de Spectrométrie de Masse (CSNSM), Orsay, France
- United States Naval Academy, USA
- Max Planck Institute, Stuttgart, Germany
- Cambridge, UK
- Autonoma Universitat, Madrid, Spain
- Marquette University, USA
- Instituto de Tecnologia Química e Biológica, Portugal
- Institut de Biotechnologie des Plantes, Université Paris-Sud, France
- IPN, Orsay, France
- University of Barcelona, Spain
- KTH, Stockholm, Sweden

5.5 Externally Funded research projects

CBS encourages its faculty to write Research Grant proposals to funding agencies. The list of the successful applications is listed below:

Sr. No.	Project Name and Duration	Name of the Faculty	Funding Agency	Amount (Rs.)
1	"Microscopic Global Nuclear Mass Formula" – 3 years	Dr. Ameeya Bhagwat	Department of Science and Technology (DST), Govt. of India	21,50,000/-
2	"New Bodipy derivatives and their anthracene-fused-porphyrin composites for the up-conversation of energy" – 3 years	Dr. Neeraj Agarwal	Science & Engineering Research Board (SERB), (DST) Govt. of India	21, 00, 000/-
3	"Hadron Interaction near Threshold" – 3 years	Dr. B. K. Jain & Dr. M.Hemalatha	Department of Science and Technology (DST), Govt. of India	30,65, 600/-
4	"Proton Radioactivity in mass region A=80-120 and its dependence on structural effects, temperature, spin and isospin"- 3 years	Dr. Mamta Aggarwal	Department of Science and Technology (DST), Govt. of India	14, 01, 000/-

5.6 Workshops Organized

- WRIC (Western Regional Instrumentation Center) in association with CBS, held a four day workshop during 21st to 24th October 2009, for college teachers, on PHOENIX (Physics with Home made Equipment and Innovative Experiments) developed by Dr. B.P. Ajith Kumar of Interuniversity Accelerator Center. CBS contributed equipment resources and Prof. R. Nagarajan was the chief guest at the valedictory function.

- Physics Department of Mumbai University in association with CBS and under the aegis of UGC Academic Staff college of Mumbai University , held a refresher course during 12th to 31st December 2011, for college teachers from all over India. The laboratory sessions during 19th to 23rd December was held at CBS using CBS resources. Prof. R. Nagarajan and Ms Shalini were instructors in this course.

- On the yoga of commutators : mini-workshop in CBS from 4 February 2011--6 February 2011. Special speaker Prof. Vavilov, from St. Petersburg, Russia.

- On Chevalley groups and related topics: workshop from 13 August 2011--15 August 2011.

5.7 Invited talks/Lectures given by CBS faculty outside CBS

Prof. R. V. Hosur

1. Expanding Horizons of NMR Applications in Structural Biology, at Perspectives in Fundamental Research, held at TIFR, March 4, 2010
2. NMR in Proteomics Research, at Symposium on Emerging Tends in Cell Biology Gandhinagar, April 27, 2010
3. Surmounting the Insurmountable: The NMR Episode, at NISER Bhubaneshwar, February 20, 2010
4. Surmounting the Insurmountable: The NMR Episode, at UM-DAE CBS, Mumbai, March 9, 2010
5. Novel NMR Methods and Protocols for Structural and Functional Proteomics, at International Conference on Magnetic Resonance in Biological Systems (ICMRBS) at Cairns, Australia, August 20-25, 2010
6. NMR advances in structural biology and structural genomics research, at INDO-US symposium and workshop on macromolecular structures, IIT-Bombay, February 22, 2010
7. Moving Frontiers in Protein NMR, at the Symposium on Emerging Trends in Pure and Applied Chemistry at Delhi University, December 29, 2010
8. Protein NMR – stretching the limits, at the Annual Meeting of the Indian Chemical Society, Raipur, December 24, 2010
9. NMR in Structural and Functional Proteomics, at Symposium on NMR at the interface of Physics, Chemistry and Biology held at IISER, Chandigarh, November 29-30, 2010
10. At Stanford, USA: NMR advances in structural biology and structural genomics research, May 27, 2010
11. At UC Berkeley, USA: NMR exploration of the protein world, May 28, 2010
12. At Michigan, USA: Expanding Horizons in Protein NMR, June 3, 2010
13. At TIFR: Moving Frontiers of NMR in Chemistry, February 12, 2011
14. At PRL, Ahmedabad: Moving Frontiers in NMR, January 4, 2011
15. At UM, Dept of Chemistry, Inaugural Lecture Refresher course in Chemistry, June 2011
16. At UM, Dept of Physics, Refresher course in Physics, December 2011
17. At UM, Dept of Biophysics, Inaugural lecture to students, August 15, 2011
18. At College of Pharmacy, ‘NMR Journey Through the Continuum of Science’ October 14, 2011
19. Physics Colloquium at BARC, ‘NMR Journey Through the Continuum of Science’, September 2, 2011
20. At Aurangabad, Inspire camp, ‘Moving Frontiers of Chemistry’, August 12, 2011

Prof. S. M. Chitre

1. Chandrasekhar & His Limiting Mass
   Chandrasekhar’s Birth Century Programme
   Hall of Culture, Nehru Centre, Mumbai.
   October 2010

2. Centre for Excellence in Basic Sciences- a Novel Experiment
   International Conference on Themes of Higher Education, Prospects of Gujarat International Airport Circle, Hansol, Ahmedabad.
   November 2010.
3. Galileo's Sun Seminar on Current Trends in Physics
   Sathaye College, Vile Parle, Mumbai.
   February 2011.
4. Is there life elsewhere in the Universe!
   Vijyoshi (VIGYAN JYOTI SHIVIR) Program
   Indian Institute of Science, Bangalore.
   November 2011
5. Windows on our Sun's Interior and Exterior:
   INSPIRE lecture program.
   Dept. of Physics, University of Mumbai.
   February 2011.
6. Vision of Higher Education in India: Keynote
   epiSTEME4 Conference, Homi Bhabha Centre for Science Education, Mumbai.
   March 2011.
7. Frontiers of Astrophysics: Prof. P.A. Pandya Endowment Lecture of IPA
   Ruia College, Mumbai.
   February 2012.

Prof. R. Nagarajan

1. At Refresher course on Accelerator Physics at Physics Department of MumbaiUniversity, Mumbai
2. At Physics Department, Mangalore University, Karnataka
3. At Physics Department of University of Rajasthan at Jaipur.
4. At Physics Department of Ruia College, Mumbai
5. At Refresher course on Experimental Physics, sponsored by Indian Academy of Sciences at SICES College, Ambernath, Maharashtra
6. At the meeting of Indian Cryogenics Council at National Physical Laboratory, New Delhi, on the occasion of centenary of liquefaction of helium.
7. At the Low Temperature Workshop for Teachers at Tata Institute of Fundamental Research, Mumbai.
8. On Valence Fluctuation in Rare Earth Intermetallics: At Physics Department, Mangalore University, Karnataka.

Prof. S. B. Patel

1. "Exotic Nuclei"-- a talk given at the University of Illinois at Chicago, USA (2007)
2. "Search for Hyper-deformed Nuclei" - Invited talk given at a workshop in Puri, organized by the Institute of Physics, Bhubaneshwar (2007).

3. "New Trends in the Development of Gamma-Ray Detector Arrays" -- a talk at the Institute of Physics, Bhubaneshwar (2007).
4. “Trends in Nuclear Structure Research”, invited talk at the Vivekananda University, Kolkata, in Jan 2008.
5. "Modern Optics--Photons", 2 talks at the Ramkrishna Mission College, Belur Math, Kolkata, 2008.
6. “Trends and Truth in Science”, talk at the Rotary Club, Palghar, Near Mumbai, November 2008.
7. "Nucleus as a Laboratory" talk given in the Refresher Course organized by the Physics Department, University of Mumbai, on behalf of the Academic Staff College (2009).
8. Gave a summary Talk " Current Status & Future Directions in Research in the field of Nuclear Structure Physics" in the International Workshop on “Nuclear Structure near Yrast Line” at Indian Institute of Technology, Roorkee, October 2009.
9. Chaired and summarized a session on Nuclear Structure at the Nuclear Physics Symposium organized by DAE, December 2009.
10. Gave a series of three Lectures on "Nuclear Structure" at the DST sponsored SERC school on Nuclear Astrophysics at Calicut University, Calicut, January 2010.
11. "Nuclear Structure of Exotic Nuclei" -- talk at the Saha Institute of Nuclear Physics (SINP), Kolkata (2010)
12. " Use of Information Technology in Teaching "--a talk given at the Department of Computer Science,m University of Mumbai as a part of program sponsored by the Academic Staff College (2011).
13. "Physics of the Dizzy Nuclei" - Colloquium delivered at UM-DAE CBS, February, 2012.
14. Taught "Collective Motion in Nuclei" (about 12 lectures) t6o M.Sc. Part ii students of Nuclear Physics Option, Department of Physics, University of Mumbai (2007-11).

Prof. Balwant Singh

1. Spring 2009: Topics in Geometry II at IIT Bombay
2. Autumn 2009: PhD Algebra I at IIT Bombay
3. Spring 2010: PhD Algebra II at IIT Bombay
4. July 21, 2010: On some conjectures about the Chern numbers of Filtrations at Purdue University, USA
5. Autumn 2010: PhD Algebra I at IIT Bombay
6. Dec 27 to Dec 30, 2010: 6 lectures on an Introduction to Galois Theory at Kerala School of Mathematics, Kozhikode
7. Spring 2011: PhD Algebra II at IIT Bombay
8. Feb 14 to Mar 14, 2011: 5 lectures on Local Cohomology at IIT Bombay.

Prof. H. C. Pradhan

1. Physics Education in India and Abroad – An Overview, S.P.Pandya Memorial Lecture of Indian Physics Association, IPA Surat Chapter, Sarvajanik College, Surat, Gujarat; January 27, 2012
2. New Methodology of Teaching Mathematics and Science at Schools, Teachers' Seminar, Dnyan-Vidnyan Mahotsav, Jidnyasa Trust, New Girls' School, Thane, Maharashtra; January 3, 2012

3. The Constructivistic Approach to Teaching Science, Key Note Address, Science Teachers' Conference, Navi Mumbai Science Foundation, Gujarat Bhavan, Vashi, Navi Mumbai, Maharashtra; February 5, 2012

Dr. Jacinta D'Souza

1. As a Member: Progressive Science Centre, delivered talks on 26th April, **2008**; 23rd April, **2009** and 22nd April, **2010**, for VIIIth and IXth standard school children at a 6-day workshop under the auspices of the Progressive Science Centre held at G. N. Khalsa College, Matunga.
2. Invited to deliver a talk at the Institute of Science on the 18th of December, **2008** on the topic entitled, 'Movers and Sensors from the green chlorophyte, *Chlamydomonas reinhardtii'*.
3. Invited to deliver a talk entitled, 'Basics of Bioinformatics' as part of the one day interactive seminar on Biostatistics and Bioinformatics organized by the University Department of Biotechnology on 12th September **2009**. This seminar was in view of the revised MSc part II Biotechnology syllabus.
4. Invited to deliver a talk on 15th September, **2009** at the Bombay College of Pharmacy, Kalina, on 'Algal b (l) ooms: hype, hope and promise!'
5. Delivered an invited talk on 18th October, **2010** at the Department of Biotechnology, KC College, Churchgate on 'Movers and Sensors: the flagella of *Chlamydomonas reinhardtii*', to BSc and MSc students of the college.
6. Delivered an invited talk on 'Basic Biological Sciences and its scope in India', at the BIONEXUS...Opportunities from here on... – a one-day workshop held on the 19th October, **2010**, by the University Department of Biotechnology, University of Mumbai (with newspaper clippings).
7. Invited for one-day workshop involving a talk and experiment on, 'A study of the motion dynamics of the flagellated alga *Chlamydomonas reinhardtii* and the interactome involved in its regulation,' on 15th of November, **2010** at the Orientation *cum* Selection camp 2010 held at the Homi Bhabha Centre for Science education (TIFR).
8. Invited for half-day workshop involving a talk on, 'Flagella: Cellular Movers and Sensors,' on 4th November, **2011** at the Orientation *cum* Selection camp of NIUS 2011 held at the Homi Bhabha Centre for Science education (TIFR).
9. Invited to present a talk titled, "Flagella: the movers and sensors of a cell", at a one day Symposium on "Recent Advances in Photonics" organized by the Centre for Atomic and Molecular Physics, MIT Manipal on March 29th, **2011**.
10. Invited to deliver a talk on 18th November, **2011** for the A.I.C.T.E sponsored 'Staff Development Program on New Paradigm in Pharmaceutical Education' organized by Bombay College of Pharmacy, Kalina, on 'Flagellar micromachine: Let's hear the Proteins' cross-talk'; awarded a certificate of appreciation.
11. Invited to deliver a talk titled, "Flagella/Cilia – the Cellular sensors and movers" held on 16th December, **2011** at the University Department of Physics along with the Academic

Staff College, at the refresher course in Physics, titled "Novel Methods in Experimental Physics" from 12th December - 31st December 2011 .

Dr. Sujit Tandel

1. "High-K isomers in heavy nuclei", Workshop on Nuclear Physics using LINAC, Inter-University Accelerator Centre, New Delhi, January 21-22, 2011.
2. "Generalized band search techniques for high-fold coincidence data and systematic cranked shell model calculations", Workshop on High Performance Computing, Inter-University Accelerator Centre, New Delhi, May 24-25, 2011.
3. "Isomer and prompt spectroscopy of transplutonium nuclei", DAE Symposium on Nuclear Physics, Andhra University, Vishakhapatnam, December 26-30, 2011.
4. "Nuclear Spectroscopy at the limits of Coulomb stability: A journey towards the highest shells", UGC Refresher Course for University and College Teachers, University of Mumbai, December 16, 2011
5. "Nuclear Moments and Exotic Nuclear Decay Modes", DST-SERC School on Modern Trends in Nuclear Structure and Dynamics, IIT-Roorkee, February 6-8, 2012.
6. "K isomers as probes of nuclear structure", International Conference on Frontiers in Gamma Spectroscopy, New Delhi, March 5-7, 2012.

Dr. Ameeya Bhagwat

1. "Many Body Correlations from Dilute to Dense Nuclear Systems (MBC2011)" Organized by EFPS and IN2P3, at Institute Henri Poincare, Paris, France during 15th February, 2011 to 18th February, 2011. Presented the work on the nuclear mass formula based on the semi- classical Wigner - Kirkwood expansion.
2. "Workshop on High Performance Computing" Organized by Inter University Accelerator Centre, New Delhi, May 24-25, 2011. Presented the work on partial resummation of the semi – classical Wigner Kirkwood expansion of one body density matrix
3. Invited for delivering a lecture on Electricity and Magnetism during the BASE (Bombay Association for Science Education) Teacher Training Programme in Physics, Organized by HBCSE, Mumbai (29th July, 2011).
4. Shall be delivering a set of five lectures on 6th and 7th February, 2012 at SERC School on nuclear physics, to be organized at IIT Roorkee.

Dr. Sangita Bose

1. Talk at SINP, Kolkata on 11th February, 2011. "Tunneling based spectroscopic studies of low dimensional electronic systems"

2. Invited talk at TIFR, Mumbai in the Annual Meeting of CMPMS "Superconductivity @ 100" on 13th April, 2011. "Quantum size effects in Nanoscale Superconductors
3. Invited talk at "7th International Conference on Stripes and High Tc Superconductivity & Quantum Physics of Living Matter - STRIPES 11 - Rome, ITALY" on 12th July 2011, "Quantum size effects in Nanoscale Superconductors"
4. Invited talk at a seminar titled "Synthesis and Characterization of Nano Materials" on 11th Feb 2012 at Vikas College, MUMBAI. "Growth and characterization of single, isolated nanoparticles"
5. Invited talk and co-organizer of a workshop on "Control and enhancement of superconductivity in conventional and high Tc nanostructures between June 6 to June 8, 2012 at Lausanne, Switzerland".

Dr. Anuradha Garge

1. 1 lecture on ``Waring's Problem for matrices over orders in algebraic number fields", in One Day Symposium in Algebra, held 2 October 2010, IISER Pune.
2. 2 lectures at the Advanced Instructional School on Commutative Algebra and Algebraic Geometry, held in December 2010, IISER Pune.
3. 3 lectures on ``Filtered Rings" at IIT Bombay, March 21, 2011; March 28, 2011; April 11, 2011.
4. 5 lectures on ``Linear Algebra" in mini-MTTS, held at Ruia College, Mumbai, 2-7 April 2011.
5. 3 lectures on ``Mennicke symbols and reciprocity laws" at IISER Pune, 23-24 April 2011.
6. Participated as a teacher in main MTTS, held at ICT, Mumbai, 23 May-18 June, 2011.
7. 1 lecture at the INSPIRE programme, held by HBCSE at Vaze College, Mumbai on 22 December, 2011.
8. 1 lecture on ``Hilbert's Syzygy Theorem" in Advanced Instructional School on Commutative Algebra and Algebraic Geometry, held at NNIT, Neemrana, Rajasthan, January 18, 2012.

Dr. Uma Ladiwala

1. The Alchemy of Induced Pluripotent Stem Cells. Invited talk for ASET Colloquium at the Tata Institute of Fundamental Research, Mumbai Jan 2010.
2. Stem Cells and Multiple Sclerosis- Invited two-part guest lecture series at Sophia College, Mumbai- 20th and 27th March, 2010.
3. Neuroplasticity: The Changing Brain. Invited lecture St Xavier's College, Mumbai Dec 2010.

6. Public lectures:

CBS holds thought provoking public lectures by prominent experts in the field of science and engineering for educating the public and the students, and to give them the opportunity to hear from leading academics presenting current research. Topical issues affecting the wider community are also discussed and we host lectures by internationally acclaimed researchers.

Public Lecture by Prof. Kurt Wuthrich

Sr. No.	Date	Topic	Name of the Speaker
1.	17.08.2010	Fascinating Insights in Chemistry, Biology and Medicine by NMR	Prof. Richard Ernst Nobel Prize in Chemistry (1991)
2.	19.08.2010	Particle-Antiparticle Symmetry: CP Violation and B-factory Experiments	Prof M. Kobayashi Nobel Prize in Physics (2008)
3.	27.01.2011	The Ribosome Story	Prof. Anders Liljas Dept. of Biochemistry & Structural Biology, Lund University, Sweden
4.	07.01.2012	Impact of Research in Natural Sciences in Human Daily Life	Prof. Kurt Wuthrich Nobel Prize in Chemistry (2002)

Public Lecture by Richard Ernst

CBS students & faculty interaction with Prof. Kurt Wuthrich

7. Colloquia

CBS organizes colloquium on alternate Tuesdays on topics of academic interest by reputed speakers / researchers to facilitate the exchange of ideas. A list of the colloquium conducted over the last 5 years is appended in ***Appendix V***.

Sr. No.	Academic Year	No. of Colloquia
1	2007-2008	26
2	2008-2009	24
3	2009-2010	26
4	2010-2011	26
5	2011-2012	18-

8. Science Club

This is an event organized by the CBS Science Club, once a week in the CBS Seminar Room. It provides a platform where students present the work they have done during their project-work in vacations or otherwise during the semester. These projects may have been done in any science research institute in India (including CBS), wherever the student feels one might be best exposed to the subject. While preparing for and giving seminars, students also develop the necessary skills required for giving a scientific presentation.

Apart from project-work, students are also encouraged to pick topics from the wide spectrum of their academic interests, and present these to their peers, making a point about what fascinates them in that particular subject. With this, not only does one share one's interests with others, but also spark somebody else's interest in a field that one might be unaware of. These 'Student Seminars' are open to all. ***Appendix VI***

9. Social and other activities

Wholesome, well developed personality is an essential trait that will help a person to advance in the chosen career. CBS has taken a conscious decision to encourage its students in activities that are beyond their normal classroom activities – both academic and social. A few of the student activities in two spheres – academic and social/cultural – are enumerated here.

9.1 Science Outreach:

Under this banner, science quizzes, fortnightly science seminars etc are organized by students. A few of the CBS students had visited a village in Bhopal and with the assistance of a local NGO,

they had interacted with the slum children, explaining to them the importance of education, personal hygiene etc. A year long effort to teach under privileged students staying near the CBS was also undertaken by CBS students.

9.2 Student get togethers:

The intake of students at CBS is based on a national-wide test. We have students from all over India. A decision was taken to give the students an opportunity to get together to know each other, and interact with their colleagues. Since the intention behind this is primarily social rather than academic, such events are always organized by the students themselves under the guidance and supervision of CBS staff/faculty. It has been a tradition for the batch of the previous year to take on the responsibility of organizing this informal meet and such interactions have been a part of the CBS tradition right from its year of inception, i.e. 2007. Apart from traditional and western dance performance, other events like music, dramas etc. are also performed by the students

9.3 Faculty get-togethers

Faculty Interaction Meeting:

CBS regularly reviews its programmes – both academic and non academic – that is intimated connected with the students. All faculty members, Heads of Departments of UoM and others associated with CBS are invited to join for discussions. These discussions are held in an informal atmosphere but substantive issues related to student performance, academic activities, social and cultural activities and methodologies of teaching are discussed at such meetings. Two such meetings were organized.

9.4 Film Club:

This is a recently started activity where non-commercial films, especially art films, are screened. While there is fixed schedule for such screenings because it depends on the availability of films, this activity which was dormant for some time has been reactivated again due to the efforts of interested students and faculty members.

9.5 Sports :

Ragnarock: This is a weeklong sports event where different types of sporting events are organized which includes both indoor and outdoor games. Ragnarok comprised of 7 games with 15 events in entirety. There were 3 indoor games, Carrom, Chess and Table Tennis, and 4 outdoor games, Cricket, Volleyball, Badminton and Football.

Sports Activities at CBS

Outdoor Games

Indoor Games

9.6 Painting :

Interested students spend their free time painting using different media like canvas, oil, water colours etc. An exhibition of their paintings was organized in Nehru Centre. The Monsoon Show of Bajaj Art Gallery is open to budding artists from India where paintings are exhibited after selection by the organisers. Three paintings done by CBS students were selected and exhibited

9.7 ORIS :

It's easy to hurt, hard to please, easy to shoot down and hard to tame, easy to destroy and hard to express. We don't always try to put together withering walls and mend broken hearts or heal a dog's wound. May be its easier that way. But there are times when we take that extra care not to step on an artist's canvas and times when we see a grandma through to her place. They weren't that easy. A little inspiration along the way and we do change because there are notebooks to write on and pens to write with, magic to live on and dreams to live with.

This time it's hard and you know it. If you are thinking of a change the hard way, we at CBS will answer your when and where needs in our own humble ways, within the horizons we know. All we offer are those little increments of joy, hope and art which live long after death.

9.7.1 Event Details

A. On the ORIS Days

i. Theme Expression via Art-Form

Paint, sketch or draw in any medium you like (acrylics, water colour, pastels, charcoal, pencils....) to express the theme out of yourself in your style. Then, share your feelings and thoughts with others in the mutual discussion session.

ii. Action Painting

What better than Abstract Expressionism to express the raw: YOU. Pour out your soul onto huge canvases using acrylics/ enamel paint. Get

into a trance and indulge yourself into a sublime experience of action painting. Dance to the rhythm of your mind or the music in the background and let the color flow off the brush. A tribute to spontaneity.

iii. Poetry Recitation
Only a few words can explain the pain, love and pleasure when put together. This event includes recitation of poems which are written by the participants. All are invited to join us with their creations.

iv. Topical Debated/Discussion
Here is a platform to put your views on the topics which concern everyone, from common man to world leaders.

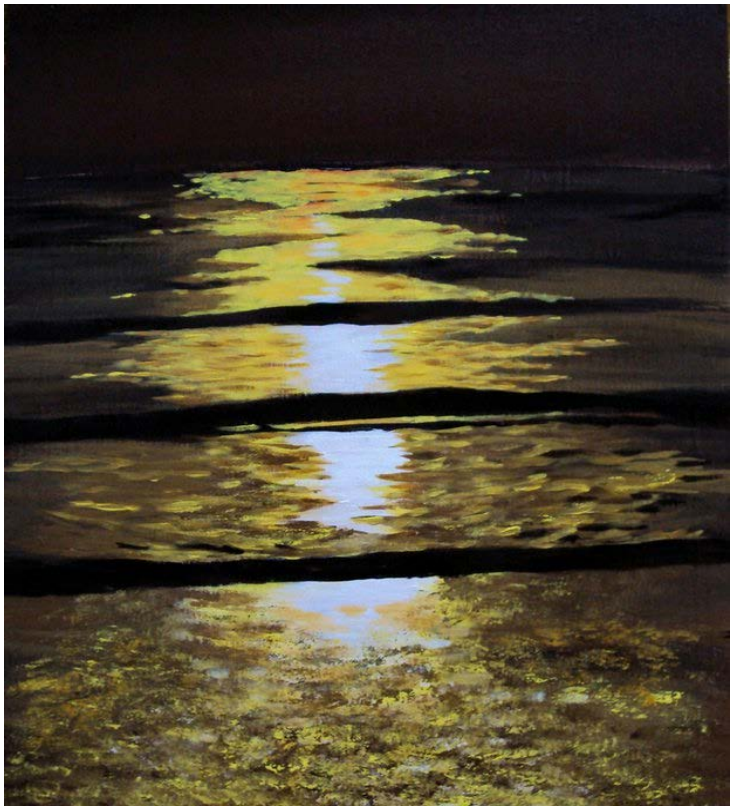
v. Mask Painting:
Masks and colours will be provided to all the participants and one just needs to hide the real face with paints so that the original identity is hidden behind the colours depicting the mood of your choice.

B. Online Events

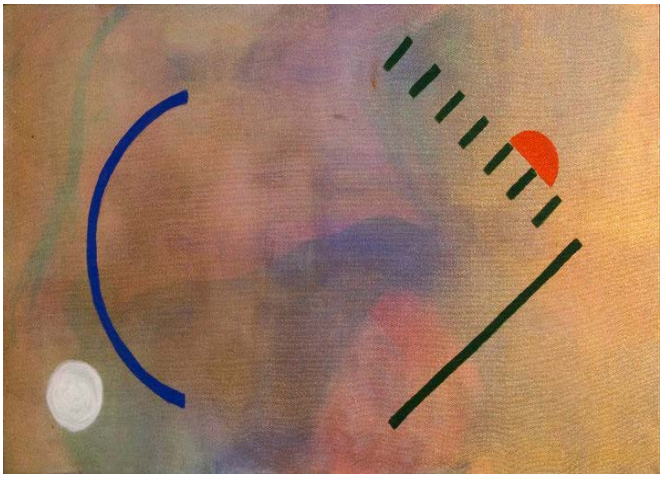
vi. Prose/Poetry Contributions:
As a part of the literature events, students upload their prose and poetry on the site for all to read, appreciate, criticize and comment. These will also serve as a prelude to the lit event on the ORIS day.

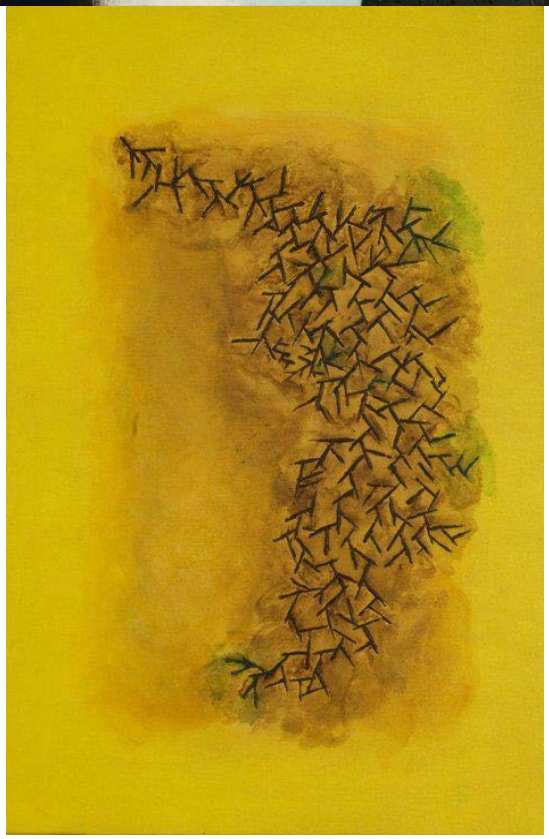
vii. Photography/Digital Art:
Upload and share the photographs shot by students and their digital art creations on the site. Selected entries will be exhibited on the ORIS days, and henceforth in CBS for common public viewing.

Paintings by CBS Students



Paintings by CBS Students





9.8 Musical Programme:

Dhwani: An annual musical concert where eminent artists are invited to perform. Apart from the artists, CBS students also exhibit their talents in singing and music. Dhwani, the musical evening, aim to enrich the vibrant academic ambiance of CBS with a classical vocal rendition by a distinguished artist.

The event enables young students to appreciate the richness of Indian Classical Music, while giving everyone in CBS a welcome getaway from the hectic schedule of an Academic Institute. The guest performance is followed by those of faculty and students, which gives expression to their creativity.

This event is organized at the Prof. D. N. Marshall Memorial Hall of the J.N.U. Library, University of Mumbai. Dhwani has received a warm response from the whole University, Academician and students alike, which has encouraged CBS students to look forward to the organization of this event every year.

At the inaugural event, Dhwani 2010, Ms. Rashmi Sule was the invited artist. She presented varied shades of the vocal tradition of classical music like *khyaal*, *bhajan*, etc. which were appreciated by one and all. It was followed by students engaging the audience for short performances. A traditional Marathi *bhajan* sung by Prof. Rajan Chitalay who is a visiting faculty in the CBS Physics department of the concluded this event.

At the 2011 event, Ms. Alka Jain and Dr. Sudhir Jain delighted the audience with a classical duet. It was followed by performances by Dr. Anuradha Garge and Dr. Sushama Yermal who are faculty members for Mathematics and Life Sciences, respectively. Student participation included exposition of diverse forms of music like classical, semi-classical, pop, rock, etc. Another unique feature was that as a musical portrait was being painted in front of the audience, members of the art club were portraying this colourful musical landscape on the canvas.

10. Future Plan of CBS

- **Construction of 2nd phase of teaching/advanced teaching laboratories:**

  The first phase of construction of the CBS building and Hostel block is getting completed and will be ready for occupation by April 2012. However for future expansion of CBS, necessary planning is under way for construction of the second phase of the building complex.

- **Student intake:**

  The intake of students is expected to be of the order of 50 every year with the asymptotic number reaching 350 by year 2017.

- **Faculty intake:**

  The strength of regular faculty would reach 50.

- **Graduate students intake :**

  Good number of Graduate students will also be admitted every year.

- **New Courses** such as Integrated Ph. D. will be introduced.

*****

Appendix I

List of Students

Year 2007

Sr. No.	M/F	Name of the student	State
1	M	Jetty Ninad Ramanand	Maharashtra
2	M	Kashyap Sitender Pratap	Maharashtra
3	M	Kolekar Kedar Shrikrishna	Maharashtra
4	M	Maurya Udaya	Madhya Pradesh
5	F	Moudekar Pooja V.	Maharashtra
6	M	Nayak Harsh	Chhattisgarh
7	M	Pabbi Lavish	Punjab
8	M	Pathak Abhishek	Uttar Pradesh
9	F	Poonam Kumari	Jharkhand
10	M	Prasad Deovrat	Jharkhand
11	M	Parmeshwar Prasad	Chhattisgarh
12	F	Renu	Haryana
13	F	Roy Shoumi	West Bengal
14	M	Sharma Rohit	Madhya Pradesh
15	M	Soni Dharmaj	Madhya Pradesh
16	M	Suman Akash	Bihar
17	M	Varma Raja P.C. Sree krishna	Kerala
18	M	Vats Amritansh	Jharkhand
19	M	Verma Mritunjay Kumar	Uttar Pradesh
20	F	Verma Rashi	Uttarkhand

Year 2008

Sr. No.	M/F	Name of the student	State
1	M	Chandan Kumar	Jharkhand
2	M	Jadhav Saurabh	Maharashtra
3	M	Mohapatra Abhishek	Uttar Pradesh
4	F	Neha	Punjab
5	F	Padmakar Pious	New Delhi
6	M	Praneet Prakash	Bihar
7	M	Ringe Dhruv	Uttar Pradesh
8	M	S. Niranjan	Andhra Pradesh
9	M	Sankar Sarath	Kerala
10	M	Sehrawat Sandeep Kumar	Haryana
11	M	Yadav Alkesh	New Delhi

Year 2009

Sr. No.	M/F	Name of the student	State
1	M	Amar Deo Chandra	Jharkhand
2	M	Bhowmick Aklant Kumar	Meghalaya
3	M	Borana Mohanish	Rajasthan
4	M	Das Plawan	Assam
5	M	Das Saptarshi	West Bengal
6	F	Gupta Kriti	Madhya Pradesh
7	F	Gupta Shubhangi	Uttar Pradesh
8	M	Jamshed Ali. K. A.	Kerala
9	F	Katyan Navneeta C.	Gujarat
10	M	Markande Shashank	Karnataka
11	M	Moitra Saranyo	West Bengal
12	F	Mondal Angana	West Bengal
13	M	Naveen Kumar	Bihar
14	M	Pathak Shashank	Madhya Pradesh
15	F	Praharaj Smita Prangya	Orissa
16	M	Prashanth Sridhar	Chennai
17	M	Ram Shila	Bihar
18	M	S. Gholam Wahid	Bihar
19	F	Santwana	Bihar
20	M	Seta Amit	West Bengal
21	F	Sheokhand Preeti	Haryana
22	F	Singh Shilpi	Bihar

Year 2010

Sr. No.	M/F	Name of the student	State
1	M	Bhatt Harsh	Punjab
2	M	Boddeti Thrinadha Ashwin Kumar	Andhra Pradesh
3	M	Bojja Aditya Reddy	Andhra Pradesh
4	M	Chandra Ashish	Uttar Pradesh
5	F	Chandrakar Pooja	Chhattisgarh
6	F	Gupta Galaxy	Punjab
7	F	Gupta Shalini Pradeep	Madhya Pradesh
8	F	Kadassery Karthika Jairaj	Kerala
9	M	Kasuba Krishna Chaitanya	Andhra Pradesh
10	M	Kumar Vikash	Bihar
11	M	Kumar Vishal	Uttar Pradesh
12	M	Kumbhar Pratik Mahadeo	Maharashtra
13	M	MD Shahnawaz	Bihar

14	F	N. Laxmi Sindhu	Andhra Pradesh
15	M	Narwar Love	Uttar Pradesh
16	F	Nivin Mothi	Kerala
17	F	Rakvi	New Delhi
18	M	Roy Jyotirmoy	West Bengal
19	M	Sanoj	Bihar
20	M	Senapati Koushik	West Bengal
21	M	Sibu Saman K K	Kerala
22	M	Singh Mayank	Bihar
23	M	Soni Vinay	Rajasthan
24	M	Upreti Lavi Kumar	Uttarakhand
25	F	Vishwakarma Akansha	Uttar Pradesh
26	M	Wajhal Sourabh	Madhya Pradesh

Year 2011

Sr. No.	M/F	Name of the student	State
1	M	Anil Kumar	Uttar Pradesh
2	M	Ajay C. J.	Kerala
3	M	Benny Joji K.	Kerala
4	M	Chaudhary Ashok	Rajasthan
5	M	Chauhan Prashant Kumar S.	Maharashtra
6	M	Chaurasia Swami Vivekanandji	Andhra Pradesh
7	F	Divya	Punjab
8	M	Garg Prateek P.	Uttar Pradesh
9	M	Joshi Sahil S.	Rajasthan
10	M	Khathuria Karan S.	Maharashtra
11	M	Kishen Balwant Priyadarshi	Uttar Pradesh
12	M	Krishnadev N.	Kerala
13	M	Malwade Akshay S.	Maharashtra
14	M	Mandwal Ayush Kumar K.	Rajasthan
15	M	Manek Bhishek A.	Chhattisgarh
16	M	Maurya Somendu Kumar	Uttar Pradesh
17	M	Mirishkar Sai Ganesh	Andhra Pradesh
18	F	Mohanpuria Neha	Rajasthan
19	M	Padwal Vishal A.	Maharashtra
20	M	Patel Anurag	Uttar Pradesh
21	M	Rana Santosh Kumar	Chhattisgarh
22	F	Ray Anushree	Gujarat
23	M	Saifullah Mohammad R.	Maharashtra
24	M	Saket Suman P.	Maharashtra
25	M	Samanta Praneel	West Bengal

26	F	Shah Phalguni S.	Maharashtra
27	M	Singhal Ankush S.	Uttar Pradesh
28	F	Sonavane Sumalata R.	Karnataka
29	M	Tinku Kumar	Bihar
30	M	Vamsi Gugulothu	Andhra Pradesh
31	M	Varma Abhijith R.	Kerala

Demographical Distribution

Sr. No.	State	No. of Students
1	Maharashtra	13
2	Madhya Pradesh	7
3	Chhattisgarh	5
4	Punjab	5
5	Uttar Pradesh	15
6	Jharkhand	5
7	Haryana	3
8	West Bengal	8
9	Bihar	12
10	Kerala	10
11	Uttarkhand	2
12	New Delhi	3
13	Meghalaya	1
14	Rajasthan	6
15	Assam	1
16	Gujarat	2
17	Karnataka	2
18	Orissa	1
19	Chennai	1
20	Andhra Pradesh	8
Total	**20**	**110**

Appendix II

Batch 2007

Sr. No.	Name of the Student	Semester Year	Project Title	Guide
1.	Ms. Rashi Verma	VII, 2010-2011	Interacting Fermions in Phase Transitions - the Tomonaga-Luttinger Model	Dr. Tejaswini Dalvi, CBS
		VIII, 2010-2011	Novel Phases in Doped Mott Insulators	Dr. Pratap Raychaudhuri, TIFR
		IX, 2011-2012	Phase Transitions and Critical Phenomena	Dr. Kedar Damle, TIFR
2.	Ms. Renu Redhu	VII, 2010-2011	Study of Optical and Electrical properties of Quantum Dots	Prof. Vijay Singh, HBCSE-TIFR
		VIII, 2010-2011	Single Crystal Growth of Pnictides	Prof. Tamilvel, TIFR
		IX, 2011-2012	Study of Ultrafast Dynamics	Prof. G. Ravindra Kumar, TIFR
3.	Mr. Rohit Sharma	VII, 2010-2011	Landau Damping in Pulsar	Dr. Reji Thomas, NCRA-TIFR,Pune
		VIII, 2010-2011	Designing Beam Transport line.	Dr. Tushima Basak, CBS,Mumbai
		IX & X, 2011-2012	Plasma Wakefield Accelerators.	Dr. Srinivas Krishnagopal, BARC and CBS, Mumbai
4.	Mr. Ninad R. Jetty	VII, 2010-2011	Nuclear Structure - A Basic View	Prof. S. B. Patel, CBS
		VIII, 2010-2011	Nuclear Excited States through Gamma-Ray Coincidence Spectroscopy	Dr. Sujit Tandel, CBS
		IX & X, 2011-2012	Study of Quantum Coherence of Light	Prof. C. S. Unnikrishnan, TIFR
5.	Ms. Poonam Kumari	VII, 2010-2011	Study of diffraction through small holes	Dr. Srinivas Krishnagopal, BARC and CBS, Mumbai
		VIII, 2010-2011	Basic aspects of Superconductivity	Prof. S. Ramakrishna, TIFR
		IX & X, 2011-2012	Study of hexagonal manganites using Neutron diffraction technique	Dr. Amitabh Das, BARC
6.	Mr. Dharmaj Soni	VII, 2010-2011	Vibrating Membranes & Isospectral Domains	Prof. Ajay Patwardhan, Xaviers College
		VIII, 2010-2011	Deep Inelastic Scattering - The Statistical Model of the Nucleon	Prof. Rajeev Bhalerao, TIFR

6.	Mr. Dharmaj Soni	IX & X, 2011-2012	Deep Inelastic Scattering - The Statistical Model of the Nucleon	Prof. Rajeev Bhalerao, TIFR
7.	Mr. Sitender P. Kashyap	VII, 2010-2011	Topology	Prof. Balwant Singh, CBS
		VIII, 2010-2011	Quantum measurements	T.P. Singh, TIFR
		IX & X, 2011-2012	Renormalization of 5^4 theory	Prof. Arvind Kumar, HBCSE and CBS
8.	Mr. Kedar S. Kolekar	VII, 2010-2011	Tranmutation of forces for keplarian orbits	Prof. Gopal Srinivas, IITB
		VIII, 2010-2011	Mathematics of Soap film and maps	Prof. Gopal Srinivas, IITB
		IX & X, 2011-2012	Stationary superfluid flow on S3	Prof. Shiraz Minwalla, TIFR
9.	Mr. Udaya Maurya	VII, 2010-2011	Topology	Prof. Balwant Singh, CBS
		VIII, 2010-2011	Matrix Group	Dr. Vikram Aithal, CBS
		IX-X 2011-2012	Integral Equations	Prof. Gopal Srinivasan, IITB
10.	Mr. Harsh Nayak	VII, 2010-2011	Theoretical study on Halo-nuclei at the limit of stability	Dr. Mamta Agrawal, CBS
		VIII, 2010-2011	Exoplanets	Prof. M.N. Vahia, TIFR
		IX-X 2011-2012	Experimental infrared – Astronomy related topic	Prof. B.A. Acharya, TIFR
11	Mr. Lavish Pabbi	VII, 2010-2011	Discrimination of neutron and gamma rays in nuclear radiation detector	Dr. Tushima Basak, CBS
		VIII, 2010-2011	Onsagar solution of 2-D Ising model	De. Sudhir Jain, BARC
		IX-X 2011-2012	Tunneling Spectroscopy of superconductors	Prof. Pratap Raychaudhury, TIFR
12	Mr. Abhishek Pathak	VII, 2010-2011	Study of generation of ultrashort laser pulses	Dr. Aditya Dharmadhikary, TIFR
		VIII, 2010-2011	Propagation of ultrashort laser pulses in transparent media	Dr. Aditya Dharmadhikary, TIFR
		IX-X 2011-2012	Mode Stability in Free Electron Lasers	Dr. Srinivas Krishnagopal, BARC, and CBS

13.	Mr. Deovrat Prasad	VII, 2010-2011	Almost Democratic model and CKM mechanism	Prof. Sreerup Roychaudhury, TIFR
		VIII, 2010-2011	Almost Democratic model and numerical study	Prof. Sreerup Roychaudhury, TIFR
		IX-X 2011-2012	Study of resonance particles by numerical method	Prof. Nilmani Mathur, TIFR
14.	Mr. Parmeshwar Prasad	VII, 2010-2011	Non-linear Dynamics and Chaos	Dr. D. Biswas, BARC
		VIII, 2010-2011	Femtosecond Laser	Prof. G. Ravindrakumar, TIFR
		IX-X 2011-2012	Measurment of $2P^2\,{}^3P^e$ state of Hydrogen negative ion	Dr. Vivek Datar, BARC
15.	Mr. Shoumi Roy	VII, 2010-2011	Review of Stochastic problems in Physics and Astronomy – paper by S. Chandrasekhar	Prof. Deepak Dhar, TIFR
		VIII, 2010-2011	Inverse scattering transform and soliton solution	Dr. Sudhir Jain, BARC
		IX-X 2011-2012	Topological Insulators	Prof. Krishnendu Sengupta, IACS, Kolkata
16.	Mr. Akash Suman	VII, 2010-2011	Mechanics of heavenly bodies	Prof. Gopal Srinivasan, IITB
		VIII, 2010-2011	Experimental characeterization of Semiconductors	Prof. Arnab Bhattacharya, TIFR
		IX-X 2011-2012	Study of III-V photodetectors	Prof. Arnab Bhattacharya, TIFR
17.	Mr. Mrutyunjay K. Verma	VII, 2010-2011	Relativistic generalization of Inertial forces	Prof. Arvind Kumar, HBCSE and CBS
		VIII, 2010-2011	Unruh effect	Prof. Arvind Kumar, HBCSE and CBS
		IX-X 2011-2012	Renormalization in gauge theory	Prof. Arvind Kumar, HBCSE and CBS
18.	Mr. Sreekrishna Raja Varma P.C.	VII, 2010-2011	Motion at low Reynold number	De. Sudhir Jain, BARC
		VIII, 2010-2011	Optical Interferometers	Prof. C.S. Unnikrishnan, TIFR
		IX-X 2011-2012	EPICS control system for TACQUILA at GSI, Darmstadt, Germany	Dr. Heik Simon, GSI, Darmstadt, Germany

19	Mr. Amritansh Vats	VII, 2010-2011	Review of Maxwell's original paper	Dr. Srinivas Krishnagopal, BARC, and CBS
		VIII, 2010-2011	Zubarev's green function and BCS theory of SC	Prof. Vijay Singh, HBCSE-TIFR
		IX-X 2011-2012	Study of fragmentation and ionization of bio-molecules using high energy electrons	Prof. Lokesh Tribedi, TIFR

Batch 2008

Sr. No.	Name of the Student	Semester Year	Project Title	Guide
1.	Mr. Chandan Kumar	VII, 2011-2012	Superconductivity	Dr.Sangita Bose (CBS)
2.	Mr. Saurabh Jadhav	VII, 2011-2012	Magnetic Multilayers	Dr.Sangita Bose (CBS)
3.	Mr. Abhishek Mohapatra	VII 2011-2012	Unification of Electromagnetic & Weak Interaction through Spontaneous Symmetry Breaking	Dr. Arvind Kumar, HBCSE- TIFR , CBS
4.	Ms. Neha Singh	VII, 2011-2012	Study of Cosmic Ray muons using plastic scintillators	Prof. Kajari Mazumdar, TIFR
5.	Mr. Praneet Prakash	VII, 2011-2012	Tight Binding Theory of nanoparticles	Prof. Vijay Singh, HBCSE
6.	Mr. Dhruv Ringe	VII, 2011-2012	Nucleon Density Distributions in finite nucelii	Dr. Ameeya Bhagavat, CBS
7.	Mr. S. Niranjan	VII, 2011-2012	Bunch length effects in the beam-beam interaction	Dr. Srinivas Krishnagopal, BARC, CBS
8.	Mr. Sarath Sankar	VII, 2011-2012	Helioseismology	Prof. H. Antia, TIFR
9.	Mr. Sandeep Kumar Sehravat	VII, 2011-2012	Path Integrals in Quantum Mechanics	Dr. Ameeya Bhagwat, CBS
10.	Mr. Alkesh Yadav	VII, 2011-2012	Study of Timing and Spectral characteristics of X-rays from X-ray binary stars	Dr. Manojendu Choudhury Internal Guide - Prof. PC Agrawal, CBS
11.	Ms. Pooja Moudekar	VII, 2011-2012	Finite Difference Time Domain simulations for periodic dielectric structures	Prof. Achanta Venu Gopal. TIFR

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Appendix III

List of Visiting and Core faculty

Academic Year 2007-08

Physics		
Sr. No.	**Name**	**Affiliation**
1.	S. M. Chitre	UM-DAE CBS
2.	R. Nagrajan	UM-DAE CBS
3.	S. B. Patel	UM-DAE CBS
4.	Anwesh Mazumdar	Homi Bhabha Centre for Science Education, Mumbai
5.	Vijay Singh	Homi Bhabha Centre for Science Education, Mumbai
6.	Rajesh Khaparde	Homi Bhabha Centre for Science Education, Mumbai
7.	Abbas Rangwala	University of Mumbai
8.	Ashok Modi	Mithibhai College
9.	Rajan Chitalay	Mithibhai College
10.	P. Shashidharan	Vartak College

Mathematics		
Sr. No.	**Name**	**Affiliation**
1.	Balwant Singh	UM-DAE CBS
2.	Gopala K. Srinivasan	Indian Institute of Technology, Mumbai

Chemistry		
Sr. No.	**Name**	**Affiliation**
1.	Nabanita Nag	UM-DAE CBS
2.	S. K. Kulshreshta	AEES
3.	M. Sudersanam	University of Mumbai
4.	V. R. Ajgaonkar	University of Mumbai
5.	S. R. Dharwadkar	*Formerly* Bhabha Atomic Research Centre, Mumbai

Biology		
Sr. No.	**Name**	**Affiliation**
1	Jacinta D'Souza	UM-DAE CBS
2	M. H. Fulekar	University of Mumbai
3	Medha Rajadhyaksha	Sophia College
4	Sheela Donde	St. Xavier's College

Law, History of Science, World Literature, Computer Science etc.		
Sr. No.	**Name**	**Affiliation**
1.	S. P. Shouche	Bhabha Atomic Research Centre, Mumbai
2.	H. C. Pradhan	Homi Bhabha Centre for Science Education, Mumbai
3.	M. N. Sanglikar	University of Mumbai

Academic Year 2008-09

Physics		
Sr. No.	**Name**	**Affiliation**
1.	S. M. Chitre	UM-DAE CBS
2.	R. Nagrajan	UM-DAE CBS
3.	S. B. Patel	UM-DAE CBS
4.	Arvind Kumar	UM-DAE CBS
5.	Tushima Basak	UM-DAE CBS
6.	Mamta Aggarwal	UM-DAE CBS
7.	Srinivas Krishnagopal	UM-DAE CBS & Bhabha Atomic Research Centre, Mumbai
8.	R. R. Puri	Bhabha Atomic Research Centre, Mumbai
9.	H. M. Antia	Tata Institute of Fundamental Research, Mumbai
10.	Anwesh Mazumdar	Homi Bhabha Centre for Science Education, Mumbai
11.	Vijay Singh	Homi Bhabha Centre for Science Education, Mumbai
12.	Aniket Sule	Homi Bhabha Centre for Science Education, Mumbai
13.	Rajesh Khaparde	Homi Bhabha Centre for Science Education, Mumbai
14.	P. P. Divakaran	IUCAA, Pune

15.	Ajay Patwardhan	St. Xavier College
16.	Rajan Chitalay	Mithibhai College
17.	P. Shashidharan	Vartak College
18.	Jyoti Rao	Ruia College
19.	Shyamala Bodhane	St. Xavier College
20.	P. Dasgupta	Siddharth College
21.	Wendrich Soares	Vikash College
22.	Jayashree Chitalay	MC &TV College
23.	M. Nyayate	Bandodkar College

Mathematics		
Sr. No.	**Name**	**Affiliation**
1.	Balwant Singh	UM-DAE CBS
2.	Poornima Raina	University of Mumbai
3.	I. K. Rana	Indian Institute of Technology, Mumbai
4.	G. K. Srinivasan	Indian Institute of Technology, Mumbai
5.	Ashish Das	Indian Institute of Technology, Mumbai
6.	Dinesh Helwade	Indian Institute of Technology, Mumbai

Chemistry		
Sr. No.	**Name**	**Affiliation**
1.	Nabanita Nag	UM-DAE CBS
2.	N. V. Thakkar	The Institute of Science, Mumbai
3.	M. Sudersanam	University of Mumbai
4.	Savita Ladge	Homi Bhabha Centre for Science Education, Mumbai
5.	R. K. Vatsa	Bhabha Atomic Research Centre, Mumbai
6.	S. C. Dhume	Khalasa College
7.	Swapan Ghosh	Bhabha Atomic Research Centre, Mumbai
8.	Alok Samanta	Bhabha Atomic Research Centre, Mumbai

Biology		
Sr. No.	**Name**	**Affiliation**
1	Jacinta D'Souza	UM-DAE CBS
2	Sushama Yermal	UM-DAE CBS
3	Rekha Vartak	Homi Bhabha Centre for Science Education, Mumbai
4	Sheela Donde	St. Xavier's College
5.	Deepak Modi	NRIHH
6.	Medha Rajadhyksha	Sophia college

Law, History of Science, World Literature, Computer Science etc.		
Sr. No.	**Name**	**Affiliation**
1.	H. C. Pradhan	Homi Bhabha Centre for Science Education, Mumbai
2.	Helan Mathur	-
3.	M. N. Sanglikar	University of Mumbai

Academic Year 2009-10

Physics		
Sr. No.	**Name**	**Affiliation**
1.	S. M. Chitre	UM-DAE CBS
2.	R. Nagrajan	UM-DAE CBS
3.	S. B. Patel	UM-DAE CBS
4.	Arvind Kumar	UM-DAE CBS
5.	M. Hemalatha	UM-DAE CBS
6.	Tejaswini Dalvi	UM-DAE CBS
7.	Tushima Basak	UM-DAE CBS
8.	Bhaskar Khubchandani	UM-DAE CBS
9.	Mamta Aggarwal	UM-DAE CBS
10.	Srinivas Krishnagopal	UM-DAE CBS & Bhabha Atomic Research Centre, Mumbai
11.	R. R. Puri	Bhabha Atomic Research Centre, Mumbai
12.	H. M. Antia	Tata Institute of Fundamental Research, Mumbai

13.	Rajeev Bhalerao	Tata Institute of Fundamental Research, Mumbai
14.	Sreerup Raychoudhury	Tata Institute of Fundamental Research, Mumbai
15.	B. Banerjee	*Formerly* Tata Institute of Fundamental Research, Mumbai
16.	Anwesh Mazumdar	Homi Bhabha Centre for Science Education, Mumbai
17.	Vijay Singh	Homi Bhabha Centre for Science Education, Mumbai
18.	Aniket Sule	Homi Bhabha Centre for Science Education, Mumbai
19.	Ajay Patwardhan	St. Xavier College
20.	Rajan Chitalay	Mithibhai College
21.	P. Shashidharan	Vartak College
22.	Jyoti Rao	Ruia College
23.	Shyamala Bodhane	St. Xavier College
24.	P. Dasgupta	Siddharth College
25.	Wendrich Soares	Vikash College
26.	Jayashree Chitalay	MC &TV College
27.	M. Nyayate	Bandodkar College

Mathematics		
Sr. No.	**Name**	**Affiliation**
1.	Balwant Singh	UM-DAE CBS
2.	Vikram Aithal	UM-DAE CBS
3.	Poornima Raina	University of Mumbai
4.	Alladi Subramanyam	Indian Institute of Technology, Mumbai
5.	Usha Ananthakumar	Indian Institute of Technology, Mumbai

Chemistry		
Sr. No.	**Name**	**Affiliation**
1.	Nabanita Nag	UM-DAE CBS
2.	D. K. Palit	UM-DAE CBS
3.	M. Sudersanam	University of Mumbai
4.	Savita Ladge	Homi Bhabha Centre for Science Education, Mumbai
5.	R. K. Vatsa	Bhabha Atomic Research Centre, Mumbai

6.	Swapan Ghosh	Bhabha Atomic Research Centre, Mumbai
7.	Alok Samanta	Bhabha Atomic Research Centre, Mumbai
8.	E. Coutinho	Bombay College of Pharmacy

Biology		
Sr. No.	**Name**	**Affiliation**
1.	Jacinta D'Souza	UM-DAE CBS
2.	Sushama Yermal	UM-DAE CBS
3.	Rekha Vartak	Homi Bhabha Centre for Science Education, Mumbai
4.	Sheela Donde	St. Xavier's College

Law, History of Science, World Literature, Computer Science etc.		
Sr. No.	**Name**	**Affiliation**
1.	Manojendu Chaudhary	Homi Bhabha Centre for Science Education
2.	S. G. Gokarn	Indian Institute of Geomagnetism, Navi Mumbai
3.	S. K. Arora	*Formerly* Bhabha Atomic Research Centre, Mumbai
4.	S. C. Patel	Indian Institute of Technology, Mumbai
5.	Chitra Natrajan	Homi Bhabha Centre for Science Education, Mumbai
6.	Helan Mathur	-

Academic Year 2010-11

Physics		
Sr. No.	**Name**	**Affiliation**
1.	S. M. Chitre	UM-DAE CBS
2.	R. Nagrajan	UM-DAE CBS
3.	S. B. Patel	UM-DAE CBS
4.	Arvind Kumar	UM-DAE CBS
5.	B. K. Jain	UM-DAE CBS
6.	Sujit Tandel	UM-DAE CBS
7.	Bhaskar Khubchandani	UM-DAE CBS
8.	Gargi Shaw	UM-DAE CBS

9.	M. Hemalatha	UM-DAE CBS
10.	Tejaswini Dalvi	UM-DAE CBS
11.	Tushima Basak	UM-DAE CBS
12.	Mamta Aggarwal	DST Scientist
13.	Ameeya Bhagwat	UM-DAE CBS
14.	Sangita Bose	UM-DAE CBS
15.	J. V. Narlikar	IUCAA, Pune
16.	Sudhir Jain	Bhabha Atomic Research Centre, Mumbai
17.	Srinivas Krishnagopal	UM-DAE CBS & Bhabha Atomic Research Centre, Mumbai
18.	D. Biswas	Bhabha Atomic Research Centre, Mumbai
19.	S. K. Singh	Bhabha Atomic Research Centre, Mumbai
20.	H. M. Antia	Tata Institute of Fundamental Research, Mumbai
21.	D. Narsimha	Tata Institute of Fundamental Research, Mumbai
22.	Lokesh Tribedi	Tata Institute of Fundamental Research, Mumbai
23.	Vandana Nanal	Tata Institute of Fundamental Research, Mumbai
24.	S. Wategaonkar	Tata Institute of Fundamental Research, Mumbai
25.	Ravindra Kumar	Tata Institute of Fundamental Research, Mumbai
26.	Sreerup Raychoudhury	Tata Institute of Fundamental Research, Mumbai
27.	B. M. Arora	*Formerly* Tata Institute of Fundamental Research, Mumbai
28.	B. Banerjee	*Formerly* Tata Institute of Fundamental Research, Mumbai
29.	Angelika Sebald	York University, UK
30.	D. P. Roy	Homi Bhabha Centre for Science Education, Mumbai
31.	Vijay Singh	Homi Bhabha Centre for Science Education, Mumbai
32.	Aniket Sule	Homi Bhabha Centre for Science Education, Mumbai
33.	Ajay Patwardhan	St. Xavier College
34.	Rajan Chitalay	Mithibhai College
35.	P. Shashidharan	Vartak College
36.	Jyoti Rao	Ruia College
37.	Shyamala Bodhane	St. Xavier College

38.	P. Dasgupta	Siddharth College
39.	Wendrich Soares	Vikash College
40.	Shekhar Deodhar	Wilson College
41.	M. Nyayate	Bandodkar College
42.	Chetan Garuda	University of Mumbai
43.	Radha Srinivasan	University of Mumbai

Mathematics

Sr. No.	Name	Affiliation
1.	Balwant Singh	UM-DAE CBS
2.	Anuradha Garge	UM-DAE CBS
3.	Vikram Aithal	UM-DAE CBS
4.	Poornima Raina	University of Mumbai
5.	Inder K. Rana	Indian Institute of Technology, Mumbai
6.	Gopala K Srinaivasan	Indian Institute of Technology, Mumbai
7.	Ashish Das	Indian Institute of Technology, Mumbai
8.	Ajit Kumar	Institute of Chemical Technology, Mumbai

Chemistry

Sr. No.	Name	Affiliation
1.	Neeraj Agarwal	UM-DAE CBS
2.	Nabanita Nag	UM-DAE CBS
3.	M. Sudersanam	University of Mumbai
4.	A.V. Karnik	University of Mumbai
5.	S. H. Masharqui	University of Mumbai
6.	R. K. Vatsa	Bhabha Atomic Research Centre, Mumbai
7.	Swapan Ghosh	Bhabha Atomic Research Centre, Mumbai
8.	Alok Samanta	Bhabha Atomic Research Centre, Mumbai
9.	S. R. Dharwadkar	*Formerly* Bhabha Atomic Research Centre, Mumbai
10.	P. K. Madhu	Tata Institute of Fundamental Research, Mumbai
11.	E. Coutinho	Bombay College of Pharmacy

Biology		
Sr. No.	**Name**	**Affiliation**
1.	Jacinta D'Souza	UM-DAE CBS
2.	Sushama Yermal	UM-DAE CBS
3.	Uma Ladiwala	UM-DAE CBS
4.	S. Sivakami	University of Mumbai

Law, History of Science, World Literature, Computer Science etc.		
Sr. No.	**Name**	**Affiliation**
1.	Manojendu Chaudhary	Homi Bhabha Centre for Science Education
2.	S. G. Gokarn	Indian Institute of Geomagnetism, Navi Mumbai
3.	S. K. Arora	*Formerly* Bhabha Atomic Research Centre, Mumbai
4.	Prachi Kamath	Freelancer
5.	G. Nagarjuna	Homi Bhabha Centre for Science Education, Mumbai
6.	Shriprasad M.	Chetna College of Management
7.	Nilufer Bharucha	University of Mumbai
8.	Bindu Variath	K. C. College of Law
9.	Preetha Rajesh	K. C. College of Law
10.	Anil Variath	Siddharth College

Academic Year 2011-12

Physics		
Sr. No.	**Name**	**Affiliation**
1.	S. M. Chitre	UM-DAE CBS
2.	R. Nagrajan	UM-DAE CBS
3.	S. B. Patel	UM-DAE CBS
4.	Arvind Kumar	UM-DAE CBS
5.	B. K. Jain	UM-DAE CBS
6.	Sujit Tandel	UM-DAE CBS
7.	Bhaskar Khubchandani	UM-DAE CBS

8.	Gargi Shaw	UM-DAE CBS
9.	M. Hemalatha	UM-DAE CBS
10.	Tushima Basak	UM-DAE CBS
11.	Atanu Bandyopadhyay	DST Scientist
12.	Ameeya Bhagwat	UM-DAE CBS
13.	Sangita Bose	UM-DAE CBS
14.	Sudhir Jain	Bhabha Atomic Research Centre, Mumbai
15.	Srinivas Krishnagopal	Bhabha Atomic Research Centre, Mumbai
16.	D. Biswas	Bhabha Atomic Research Centre, Mumbai
17.	S. K. Singh	Bhabha Atomic Research Centre, Mumbai
18.	V. M. Datar	Bhabha Atomic Research Centre, Mumbai
19.	M. V. Hosur	Bhabha Atomic Research Centre, Mumbai
20.	H. M. Antia	Tata Institute of Fundamental Research, Mumbai
21.	Pratap Raychoudhuri	Tata Institute of Fundamental Research, Mumbai
22.	D. Narsimha	Tata Institute of Fundamental Research, Mumbai
23.	Lokesh Tribedi	Tata Institute of Fundamental Research, Mumbai
24.	D. P. Roy	Homi Bhabha Centre for Science Education
25.	Urjit Yajnik	Indian Institute of Technology, Mumbai
26.	S. H. Patil	Indian Institute of Technology, Mumbai
27.	Ajay Patwardhan	St. Xavier College
28.	Rajan Chitalay	Mithibhai College
29.	P. Shashidharan	Vartak College
30.	Jyoti Rao	Ruia College
31.	H. C. Pradhan	*Formerly* Homi Bhabha Centre for Science Education
32.	B. Banerjee	*Formerly* Tata Institute of Fundamental Research, Mumbai
33.	Vijay Singh	Homi Bhabha Centre for Science Education
34.	Pravin Pathak	Homi Bhabha Centre for Science Education
35.	M. Krishnamoorthy	Tata Institute of Fundamental Research, Mumbai
36.	Sreerup Raychaudhury	Tata Institute of Fundamental Research, Mumbai
37.	Arnab Bhattacharya	Tata Institute of Fundamental Research, Mumbai
38.	Saibal Basu	Bhabha Atomic Research Centre, Mumbai

39.	Ravindra Kumar	Tata Institute of Fundamental Research, Mumbai
40.	Achanta Venugopal	Tata Institute of Fundamental Research, Mumbai

Mathematics

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1.	Balwant Singh	UM-DAE CBS
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3.	Vikram Aithal	UM-DAE CBS
4.	Poornima Raina	University of Mumbai
5.	Inder K. Rana	Indian Institute of Technology, Mumbai
6.	Gopala K Srinaivasan	Indian Institute of Technology, Mumbai
7.	Shripad M. Garge	Indian Institute of Technology, Mumbai
8.	Sharad S. Sane	Indian Institute of Technology, Mumbai
9.	Ashish Das	Indian Institute of Technology, Mumbai
10.	Ajit Kumar	Institute of Chemical Technology
11.	Pramod Patil	Indian Institute of Technology, Mumbai
12.	Alladi Subramanyam	Indian Institute of Technology, Mumbai

Chemistry

Sr. No.	Name	Affiliation
1.	Neeraj Agarwal	UM-DAE CBS
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3.	M. Sudersanam	University of Mumbai
4.	Shyamla Mazumdar	Tata Institute of Fundamental Research, Mumbai
5.	P. K. Madhu	Tata Institute of Fundamental Research, Mumbai
6.	S. K. Ghosh	Bhabha Atomic Research Centre, Mumbai
7.	R. K. Vatsa	Bhabha Atomic Research Centre, Mumbai
8.	A.V. Karnik	University of Mumbai
9.	S.H. Mashraqui	University of Mumbai
10.	Sudipta Maiti	Tata Institute of Fundamental Research, Mumbai
11.	S. R. Dharwadkar	*Formerly* Bhabha Atomic Research Centre, Mumbai

12.	V. R. Ajgaonkar	University of Mumbai
13.	K. P. Kalliappan	Indian Institute of Technology, Mumbai
14.	Rhodney Fernades	Indian Institute of Technology, Mumbai
15.	Suvarn Kulkarni	Indian Institute of Technology, Mumbai
16.	P. K. Madhu	Tata Institute of Fundamental Research, Mumbai
17.	Y. U. Sashidhar	Indian Institute of Technology, Mumbai
18.	Nand Kishore	Indian Institute of Technology, Mumbai
19.	E. Coutinho	Bombay College of Pharmacy

Biology		
Sr. No.	**Name**	**Affiliation**
1.	Jacinta D'Souza	UM-DAE CBS
2.	Sujata Deshpande	UM-DAE CBS
3.	Uma Ladiwala	UM-DAE CBS
4.	S. Sivakami	University of Mumbai
5.	Ullas Koltur	Tata Institute of Fundamental Research, Mumbai

Energy & Environment, Law, History of Science, World Literature, Computer Science etc.		
Sr. No.	**Name**	**Affiliation**
1.	Manojendu Chaudhary	Homi Bhabha Centre for Science Education
2.	S. G. Gokarn	Indian Institute of Geomagnetism, Navi Mumbai
3.	S. K. Arora	*Formerly* Bhabha Atomic Research Centre, Mumbai
4.	Prachi Kamath	Freelancer
5.	H. C. Pradhan	*Formerly* Homi Bhabha Centre for Science Education
6.	Bhagyashree Bavre	University of Mumbai
7.	Alik Porwal	Indian Institute of Technology, Mumbai
8.	M. C. Arunan	Homi Bhabha Centre for Science Education

*** ***

Appendix IV

List of CBS Publications:

2007

1. D. Narasimha and S.M. Chitre
   Current Sci. 93, 1506 (2007)
   Gravitational lens systems to probe extragalactic magnetic fields

2008

A. Publications

2. K.R. Sivaraman, H. M. Antia and S. M. Chitre
   Solar Phys. 251, 149 (2008)
   Zonal velocity bands and the solar activity cycle

3. H.M. Antia, S. Basu and S.M. Chitre
   Astrophys. J. 681, 680 (2008)
   Solar rotation rate and its gradients during cycle 23

4. H.M. Antia, S.M. Chitre and D.O. Gough
   Astron. Astrophys. 477, 657 (2008)
   Temporal variations in the Sun's rotational kinetic energy

5. K. Bambardekar, A.K. Dharmadhikari, J.A. Dharmadhikari, D. Mathur and S. Sharma
   J. Biomed. Optics 13, 064021 (2008)
   Measuring erythrocyte deformability with fluorescence, fluid forces and optical trapping

6. Mamta Aggarwal
   Int. J. Mod. Phy. E 17, 1091 (2008)
   Neutron emission spectra and level density of hot rotating ^{132}Sn

7. D. Mathur, F.A. Rajgara, A.K. Dharmadhikari and J.A. Dharmadhikari
   Phys. Rev. A 78, 023414 (2008)
   Strong-field ionization of water by intense few-cycle laser pulses

8. D. Mathur, A.K. Dharmadhikari, and F.A. Rajgara
   Phys. Rev. A 78, 013405 (2008).
   Molecular symmetry effects in the ionization of CS2 by intense few-cycle laser pulses

9. A.K. Dharamdhikari, J.A. Dharmadhikari, F.A. Rajgara and D. Mathur
Opt. Express 16, 7083 (2008)
Polarization and energy stability of filamentation-generated few-cycle pulses

B. Gene Bank Submissions

10. Rao V. G., Khona D. K. and D'Souza J. S. (03-NOV-**2008**) Cloning of *fap144* (CBS-1), a flagellar gene from *Chlamydomonas reinhardtii*. Accession no. FJ377311.

2009

A. Publications

11. D. Mathur and F.A. Rajgara
Laser Phys. 19, 1686 (2009)
Strong optical fields induce ultrafast rearrangement of H-atoms in ethanol molecules

12. F.A. Rajgara, A.K. Dharmadhikari, D. Mathur and C.P. Safvan
J. Chem. Phys. (Commun.) 130, 231104 (2009)
Strong fields induce ultrafast rearrangement of H atoms in H2O

13. G. Ramanandan, A.K. Dharmadhikari, J.A. Dharmadhikari, H. Ramachandran and D. Mathur
Opt. Express 17, 9614 (2009)
Bright visible emission from carbon nanotubes spatially constrained on a micro-bubble

14. A.K. Dharmadhikari, J.A. Dharmadhikari and D. Mathur
Appl. Phys. B 94, 259 (2009)
Visualization of multiple focusing-refocusing cycles during filamentation in BaF_2

15. R.P.N. Rao, N. Yadav, and M.N. Vahia
Proc. Nat. Acad. Sci. USA 106, 13685 (2009)
A Markov model of the Indus script

16. R.P.N. Rao, N. Yadav and M.N. Vahia
Science 324, 1165 (2009)
Entropic Evidence for Linguistic Structure in the Indus Script

17. M. Aggarwal and I. Mazumdar
Phys. Rev. C 80, 024322 (2009)
Deformation and shape transitions in hot rotating neutron deficient Te isotopes

18. M. Hemalatha, Y.K. Gambhir and W. Haider
Phys. Rev. C 79, 057602 (2009)
Predicted weakening of the spin-orbit interaction with the addition of neutrons

19. M. Hemalatha, Y. K. Gambhir, W. Haider, and S. Kailas
Phy. Rev. C79, 057602 (2009)
Predicted weakening of the spin-orbit interaction with the increase of neutron number

20. Jacinta S. D'Souza, Mohanram Gudipati, Jayashree A. Dharmadhikari, Aditya K. Dharmadhikari, *Abhishek Kashyap, *Manaswini Aiyer, Usha Rao, Deepak Mathur and Basuthkar Jagadeeshwar Rao
Biochem. Biophys. Res. Comm. 380: 266–270 (*Equal contribution). (IF: 2.855) (2009)
Flagella-generated forces reveal gear-type motor in single cells of the green alga, *Chlamydomonas reinhardtii.*

21. Magnetization and heat capacity studies of double perovskite compounds Ba2SmRuO6 and Ba2DyRuO6, Rakesh Kumar, C. V. Tomy, P. L. Paulose, R. Nagarajan, and S. K. Malik, Physica B 404 (2009) 2369.

B. Invited Articles

22. Jacinta S. D'Souza and Meenakshi Munshi
(2009) Biotech News IV (3): 14
India's first Research Centre for Energy Biosciences

C. Gene Bank Submissions

23. Khona D. K., Rao V. G. and D'Souza J. S. (31-MAR-2009) Cloning of *fap255* (CBS-2), a flagellar gene from *Chlamydomonas reinhardtii*. (Accession no. FJ808743).

24. Ruhi Sarafdar, Rao V. G., Khona D. K. and D'Souza J. S. (29-APR-2009)Cloning of *fap174* (CBS-3), a flagellar gene from *Chlamydomonas reinhardtii* (Accession no. FJ986299).

25. Motiwalla, M. J., D'Souza, J. S. and Kelkar-Mane, V. (11-MAY-2009) Isolation of a new strain of *Bacillus pumilus* (CBS-i1) from mangrove soil (Accession no. GQ220330).

2010

A. Publications

26. Mamta Aggarwal
Phys. Lett. B 693, 489 (2010)
Proton radioactivity at non-collective prolate shape in high spin state of ^{94}Ag

27. Mamta Aggarwal and S. Kailas
Phys. Rev. C 81, 047302 (2010)
Angular momentum dependence of nuclear level density parameter

28. Ramakrishna V. Hosur and Jeetender Chugh
J Ind Chem Soc, 87, 43-52 (2010)
NMR Advances toward Structural Characterization of Huge Protein Assemblies

29. Dinesh Kumar, Subhradeep Paul and Ramakrishna V. Hosur
J. Magn. Reson. 204, 111-117 (2010)
BEST-HNN and 2D (HN)NH experiments for rapid backbone assignment in proteins

30. Dinesh Kumar, Jithendra Reddy and Ramakrishna V. Hosur
J. Magn. Reson. 206, 134-138 (2010)
hnCOcaNH and hncoCANH pulse sequences for rapid and unambiguous backbone assignment in (13C, 15N) labeled proteins

31. Swagata Chakraborty and Ramakrishna V. Hosur
Biomol NMR Assign. 2011 Apr;5(1):59-61. Epub 2010 Oct 9.
Resonance assignments of GTPase Effector Domain (GED) of Dynamin in the aprotic solvent deuterated Dimethyl Sulfoxide

32. Dinesh Kumar and Ramakrishna V. Hosur
Curr. Sci. 99, 1581-1586 (2010)
An efficient high-throughput protocol based on 2D-HN(C)N for unambiguous H^N and ^{15}N backbone assignment in small folded proteins in less than a day

33. P. M. Krishna Mohan, Swagata Chakraborty and Ramakrishna V. Hosur*
Biophys. Chem. 153, 17-26 (2010)
Hierarchy of local structural and dynamics perturbations due to sub-denaturing urea in the native state ensemble of DLC8 dimer

34. Swagata Chakraborty and Ramakrishna V. Hosur
J Mol Biol. 2011 Feb 4;405(5):1202-14. Epub 2010 Dec 7
NMR insights into the core of GED assembly by H/D exchange coupled with DMSO dissociation and analysis of the denatured state

35. M. Nambiar, G. Goldsmith, B. Moorthy, S. Raghavan, M. Lieber, M. Joshi, B. Choudhary, and R. V. Hosur
Nucleic Acids Res. 2011 Feb;39(3):936-48. Epub 2010 Sep 29
Evidence that a G-quadruplex Contributes Towards Single-strandedness at the BCL2 Major Breakpoint Region of the t(14;18) Translocation in Follicular Lymphoma

36. Sushil A Samant, D. Sarkar, Ajay K Upadhyay, S. Krishnagopal and P. Jha,
Physics of Plasmas 17, 103110 (2010)
Optimization of laser parameters to obtain high energy, high quality electron beams through laser -plasma acceleration

37. P.K Nayak, N. Agarwal, F. Ali, M.P. Patankar, K. L. Narasimhan, N. Periasamy
J. Chem. Sci. 2010, 122, 847-855.
Blue and white light electroluminescence in a multilayer OLED using a new aluminium complex

38. S. K. Tandel, P. Chowdhury, S. Lakshmi, U. S. Tandel, I. Ahmad, M. P. Carpenter, S. Gros, R. V. F. Janssens, T. L. Khoo, F. G. Kondev, J. P. Greene, D. J. Hartley, T. Lauritsen, C. J. Lister, D. Peterson, A. Robinson, D. Seweryniak, and S. Zhu
Physical Review C 82, 041301(2010)
Rotational bands in odd-A Cm and Cf isotopes: Exploring the highest neutron orbitals

39. X. Wang, D.J. Hartley, M.A. Riley, L.L. Riedinger, A. Aguilar, M.P. Carpenter, C.J. Chiara, P. Chowdhury, I. Darby, U. Garg, Q. Ijaz, R.V.F. Janssens, F.G. Kondev, S. Lakshmi, T. Lauritsen, W.C. Ma, E.A. McCutchan, S. Mukhopadhyay, E.P. Seyfried, I. Stefanescu, S.K. Tandel, U.S. Tandel, C. Teal, J. R. Vanhoy, and S. Zhu
Physical Review C 82,034315 (2010)
Multi-quasiparticle structures up to spin ~44$\hbar$ in the odd-odd nucleus 168Ta

40. D.J. Hartley, R.V.F. Janssens, L.L. Riedinger, M.A. Riley, X. Wang, A. Aguilar, M.P. Carpenter, C.J. Chiara, P. Chowdhury, I.G. Darby, U. Garg, Q.A. Ijaz, F.G. Kondev, S. Lakshmi, T. Lauritsen, W.C. Ma, E.A. McCutchan, S. Mukhopadhyay, E.P. Seyfried, U. Shirwadkar, I. Stefanescu, S.K. Tandel, J.R. Vanhoy, and S. Zhu,
Physical Review C 82, 057302 (2010)
Band crossings in 166Ta

2011

A. Publications

41. S. Chakraborty and R.V. Hosur
Biomol NMR Assign. 2011 Apr;5(1):59-61 (2011)
Resonance assignments of GTPase effector domain of dynamin in the aprotic solvent deuterated dimethyl sulfoxide

42. D. Kumar, R.V. Hosur.
Magn Reson Chem. 2011 49, 575.
hNCOcanH pulse sequence and a robust protocol for rapid and unambiguous assignment of backbone ((1) H(N) , (15) N and (13) C') resonances in (15) N/ (13) C-labeled proteins

43. A.N. Borkar, M.K. Rout, R.V. Hosur
PLoS One. 2011;6(6):e19830. Epub 2011 Jun 29.
Visualization of early events in acetic acid denaturation of HIV-1 protease: a molecular dynamics study

44. A.N. Borkar, D. Kumar, R.V. Hosur
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B. Gene Bank Submissions

60. Dongre, S., Khona, D. K., Rao, V. G. and D'Souza, J. S. (2011) Cloning of bolA (CBS-4) from *Chlamydomonas reinhardtii*. BankIt1420468 bolA BK007979.

2012

A. Publications

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PLoS ONE, 7(1): e30109 (2012)
NMR derived Model of GED self association: relevance to dynamin assembly

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Biochimie, 94, 231-241 (2012)
Residual structure and dynamics in DMSO-d6 denatured DLC8

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J. Biomol. NMR, 52, 5–10 (2012)
Simultaneous acquisition of 13Ca-15N and 1H-15N-15N sequential correlations in proteins: Application of dual receivers in 3D HNN

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Rovibrationally Resolved Direct Photodissociation through the Lyman and Werner Transitions of H2 for FUV/X-Ray-irradiated Environments

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Eur. Phys. J. D (2012) 66: 30
Light scattering from a magnetically tunable dense random medium with dissipation: ferrofluid

B. Invited Articles

67. Rakesh Chandarana, Jacinta S. D'Souza and Evans Coutinho (2012)
Springer-Verlag
Glucose Dependent Insulinotropic Polypeptide Receptor (*GIPR*) Chapter in Encyclopedia of Signaling Molecules.

68. Jacinta S. D'Souza, Venkatramanan G. Rao and Dolly K. Khona (2012)
CuttingEdge: A Spinco Biotech Publication, February issue, pages 25-28.
BioSimilars: twin but not the clone.

Appendix V

Colloquium Series

Academic Year 2007-2008

Sr. No.	Date	Topic	Name of the Speaker
1.	17/09/07	Unity of Science	Dr. M. N. Vahia, TIFR
2.	10/10/07	Exploring the Interface of Physics and Biology: Using Light for 'Engineering' at the Nano and Micro Levels	Dr. Deepak Mathur, TIFR/CBS
3.	17/10/07	Is There Intelligent Life Elsewhere in the Universe?	Dr. S. M. Chitre, CBS
4.	22/10/07	Recent Results in Mathematics Related to Data Transmission	Dr. Michel Waldschmidt
5.	31/10/07	Nuclear Science, Technology and Society	Dr. S. Kailas, BARC
6.	14/11/07	India in Space	Dr. M. N. Vahia, TIFR
7.	21/11/07	Vikram Sarabhai and Indian Space Pragramme	Dr. M. N. Vahia, TIFR (Amrute Shaha)
8.	28/11/07	Nobel Review Colloquium	Dr. Pratap Raychaudhari, TIFR
9.	05/12/07	Superconductivity in Quaternary Borocarbides - A Classic Case of how a Scientific Discovery is Made	Dr. R. Nagrajan, CBS
10.	12/12/07	Nobel Chemistry -2007	Dr. Deepa Khushalani, TIFR
11.	19/12/07	Indus Culture and its Script	Ms. Nisha Yadav, TIFR
12.	26/12/07	Entanglement - a Quantum Magic?	Prof. Dipan Ghosh, IIT-B
13.	06/02/08	Frontiers of Radio Astronomy: The Giant Meter Wave Radio Telescope	Prof. Govind Swarup, NCRA, FRS
14.	13/02/08	Descent of the Heavens	Shri. Bhargav Ram, TIFR
15.	20/02/08	Nano Materials: Past, Present and Future	Dr. A. K. Tyagi, Indira Gandhi Centre for Atomic Research, Kalpakkam
16.	27/02/08	Smart Structure	Dr. V.K. Wadhawan, BARC
17.	05/03/08	The Gravity-Gauge Theory Correspondence	Dr. Shiraz Minwalla, TIFR
18.	12/03/08	The lighter side of Gravity	Dr. Jayant Narlikar, IUCAA
19.	19/03/08	Hindustani Music: History, Structure	Ms. Purvi Parikh
20.	26/03/08	Calculus under the Cocoanut Trees	Prof. P.P. Divakaran, IUCAA
21.	09/04/08	The Elusive Neutrino	Dr. Amol Dighe, TIFR

22.	16/04/08	Converting on Idea into a Product	Dr. M.V. Pitke, Director; Nichegan Technologies
23.	23/04/08	(Knock) INs and (Knock)- OUTs in Biology	Dr. P. Hari Kumar, Centre for Water Resources Development and Management
24.	30/04/08	Molecular Motion is Essential for Life	Prof. G. Krishnamoorthy, TIFR
25.	07/05/08	Wonderful World of Dead Stars	Prof. R. K. Manchanda, TIFR
26.	21/05/08	Creativity in Science	Prof. Sunil Mukhi, TIFR

Academic Year 2008-2009

Sr. No.	Date	Topic	Name of the Speaker
1.	06/08/08	Going to the Moon	Dr. K. Kasturirangan, FRS
2.	12/08/08	The Joy And Challenge of doing Experimental Particle Physics	Mr. B. Satyanarayana, TIFR
3.	19/08/08	Computer Analysis and Synthesis of Indian Music	Mr. Paritosh K. Pandya, TIFR
4.	02/09/08	Quantum Wells, Wires, and Dots: Why Small is Good in the Semiconductor World	Dr. Arnab Bhattacharya, TIFR
5.	09/09/08	Making New Neurons in the Adult Brain-Repairing Circuits	Dr. Vidita Vaidya, TIFR
6.	16/09/08	Cryogenics: An Important Accessory to Modern Research	Mr. K.V. Srinivasan, TIFR
7.	07/10/08	Orbital Diamagnetism: Surprise of Physics	Prof. N. Kumar, Raman Research Institute, Bangalore
8.	14/10/08	Nano Science: Why Small is Big	Prof. Pushan Ayyub TIFR
9.	21/10/08	Semiconductors for our Energy Needs	Prof. Brij Mohan Arora, TIFR
10.	04/11/08	Journey Through the Wonderful World of Protons and Neutrions	Dr. S. Kailas, BARC
11.	11/11/08	To Die or Not to Die: Movers and Sensors have it all?	Dr. Jacinta D'Souza, TIFR
12.	18/11/08	Tera-Scale Energy Frontier: LHC, CMS and India in CMS	Prof. Atul Gurtu, TIFR
13.	06/01/09	Excitement and Challenges of Space Astronomy	Prof. P. C. Agrawal, TIFR
14.	13/01/09	Dark Energy: The Challenge of the Millennium	Prof. T. Padmanabhan, IUCCA
15.	20/01/09	Dholavira – A Futuristic Metropolis of the Past	Prof. Mayank Vahia, TIFR

16.	24/01/09	Special Talk: Cosmic Rays and Global Warming	Sir Arnold Wolfendale, University of Manchester
17.	27/01/09	Natural Dyes: Turning a Red Industry Green	Dr. Bosco Henrigues ; TechnoSource
18.	03/02/09	Black Holes in Yang Mills Theories	Prof. Shiraz Minwalla; TIFR
19.	10/02/09	Creativity and Innovation	Mr. Vijay Tase, MD, Peer Technical Service Pvt. Ltd.
20.	17/02/09	Examination Phobia	Prof. Archana Shukla, TIFR
21.	03/03/09	Laser Cooling of Atoms	Dr. Hema Ramachandran, Raman Research Institute
22.	10/03/09	Modern Trends in Telecommunications	Mr. Parag Mahajani, TIFR
23.	17/03/09	Dynamics of Harappan Civilization	Ms. Kavita Gangal, TIFR
24.	24/03/09	Gravitational Lansing	Prof. D. Narasimha, TIFR

Academic Year 2009-2010

Sr. No.	Date	Topic	Name of the Speaker
1.	04/08/09	Ayurvedic Biology: The Frontier	Dr. M. S. Valiathan, University of Manipal
2.	11/08/09	Perceptions of Reality in Literature	Prof. Sitanshu Yasashchandra, Maharaj Sayajirao University, Vadodara
3.	18/08/09	Making Computers Listen to You	Dr. K. Samudravijaya, TIFR
4.	25/08/09	Tera Hertz Spectroscopy	Dr. S. Prabhu, TIFR
5.	01/09/09	Spectroscopic Signature of Star Formation at High Redshift	Dr. Gargi Shaw, TIFR
6.	08/09/09	Neutrino: A New Window to the Universe	Prof. N.K. Mondal, TIFR
7.	15/09/09	Making Computers Listen to You	Dr. K. Samudravijaya, TIFR
8.	22/09/09	Nuclear Energy: Energy Security and Climate Change	Dr. R. Chidambaram, Principal Scientific Advisor to the Government of India,
9.	06/10/09	Probing the Universe with QSO Absorption Line	Prof. R. Srianand, IUCAA
10.	15/10/09	Care Earth Trust and its Conservation Mission	Dr. R. Daniels, TIFR
11.	20/10/09	From Euclid to Euler: The Two Thousand Year Evolution of Calculus	Prof Alex Craik, University of Andrews, UK
12.	27/10/09	Hippocratic Medicine	Elizabeth Craik, University of Andrews, UK
13.	03/11/09	Stem Cells... and more	Dr. Uma Ladiwala, CBS
14.	10/11/09	Polytopes	Dr. Arvind Nair, TIFR

15.	17/11/09	Einstein's Theory of Relativity and Radio Astronomy Observations	Prof. S. Ananthakrishnan, INSA
16.	24/11/09	Magnetizing the Universe	Prof. K. Subramanian, IUCAA
17.	05/01/10	Lights: From T-rays to X-rays	Dr. Srinivas Krishnagopal, BARC
18.	12/01/10	Radio Sounding of Solar Corona and Heliosphere	Prof. P.K. Manoharan, Radio Astronomy Centre
19.	19/01/10	Energy Economics	Dr. B. Sudhakara Reddy, Indira Gandhi Institute of Development Research
20.	02/02/10	Natural History of Indian Butterflies	Mr. Issac Kehimkar, Natural History Society
21.	16/02/10	Diophantine Equations	Prof. C. S. Rajan, TIFR
22.	02/03/10	Nuclear Energy: Energy Security and Climate Change	Dr. R. Chidambaram, Principal Scientific Advisor to the Government of India
23.	09/03/10	Surmounting the Insurmountable: The NMR Episode	Prof. R. V. Hosur, Director CBS
24.	16/03/10	Heart of Matter	Prof. Rohini Godbole, Indian Institute of Science
25.	23/03/10	A Glimpse at the Nuclear World	Prof. R.G. Pillay, TIFR
26.	30/03/10	Muscles, Nerves and the Development of Movement	Prof. K. Vijay Raghavan, Director, National Centre for Biological Sciences

Academic Year 2010-2011

Sr. No.	Date	Topic	Name of the Speaker
1.	03/08/10	Our Energy Future: What We Need to Do	Dr. Anil Kakodkar, Atomic Energy Commission of India, BARC
2.	10/08/10	Extreme Light	Prof. G. Ravindra Kumar, TIFR
3.	31/08/10	Accelerating Universe in String Theory and Einstein's Dream	Prof. Sandip Trivedi, TIFR
4.	07/09/10	To Adapt or not: That is the Question	Dr. Vidita Vaidya, TIFR
5.	14/09/10	Gravity: g, G and G_{ik}	Prof. C.S. Unnikrishnan, TIFR
6.	21/09/10	Biology of Genome Dynamics: A peep into its Various Regimes from Nano-Sec to Evolutionary Time Scales	Prof. B. J. Rao, TIFR
7.	05/10/10	Pico Newton Tug of Wars in Living Cell	Dr. Roop Mallik, TIFR

8.	12/10/10	The Self-Packing Protein Puzzle: How do Proteins Fold and Unfold?	Prof. Jayant Udgaonkar, TIFR-National Centre for Biological Sciences
9.	19/10/10	Development of the Idea of Symmetry through Geometric Examples	Prof. Ravi Kulkarni, Institute Chair Professor, Department of Mathematics, IIT-B
10.	26/10/10	Super Magnetic Storm: Hazard to Society	Dr. G.S. Lakhia, Indian Institute of Geomagnetism
11.	02/11/10	The Megalith Builders of South India	Mr. Srikumar Menon, University of Manipal
12.	09/11/10	Physics of a Two or Three Level Atom: An Introduction to Quantum Optics	Dr. R. D'Souza, BARC
13.	16/11/10	Analogical (Lateral) Research in Physics	Dr. V. Prasanna Bhat, Former MD, ITCOT
14.	04/01/11	An Introduction to Indo-European Rules of Language	Dr. James Clackson, Jesus College, Cambridge
15.	11/01/11	Quantum Mechanics: An Unfinished Story	Prof. T. P. Singh, TIFR
16.	18/01/11	Some Space, Some Randomness, Some Error	Prof. Jaikumar Radhkrishnan, TIFR
17.	25/01/11	Equivalence of Clocks	Prof. Anil Gangal, IISER
18.	01/02/11	Exploring the Propagation of Ultrashort Laser Pulses in Matter	Dr. Aditya Dharmadhikari, TIFR
19.	08/02/11	Oral Precancer: The Key to Understanding of Oral Cancer	Dr. D.K. Daftary, TIFR
20.	15/02/11	Knot Theory: A Happy Hunting Ground for Group Theorists and Topologists	Prof. R.V. Gurjar, School of Mathematics, TIFR
21.	01/03/11	Citizen Cyberscience: A New Frontier for Indian Research	Mr. Francois Grey, CERN, Geneva
22.	08/03/11	Photophysics in Supramolecular Environments: Learning from Nature	Dr. Sharmistha Dutta Choudhury, Radiation & Photochemistry Division, BARC
23.	15/03/11	Basic Constituents of Matter and their Interactions	Prof. D.P. Roy, HBCSE
24.	29/03/11	LHC: The Big Deal	Prof. Kajari Mazumdar, TIFR
25.	05/04/11	Division Algebra, and their Application to Wireless Communication	Prof. B.A. Sethuraman, California State University Northridge, USA
26.	19/04/11	Towards A Blueprint For Building The Brain	Prof. Shubha Tole, TIFR

Appendix VI

List of Students Seminar talk

Academic Year 2010-2011

Sr. No.	Date	Name of the student	Title of the talk
1.	13/08/10	Mr. Amritansh Vats	Rediscovery of quantum mechanics by Feynman.
2.	13/08/10	Mr. Rohit Sharma	Landau Damping in pulsars.
3.	20/08/10	Mr. Lavish Pabbi	Growth of Quantum Dot Superlattices by Molecular Beam Epitaxy.
4.	20/08/10	Mr. Abhishek Pathak	Technology That Makes Images Alive.
5.	27/08/10	Ms. Renu Redhu	Study of Interaction & Detection of Charged Particles and Gamma Rays with Matter
6.	27/08/10	Mr. Sitender Pratap Kashyap	Svetlichny's Inequality and Tripartite nonLocality.
7.	03/10/10	Mr. Mritunjay Kumar Verma & Mr. Udaya Maurya	String Theory
8.	09/10/10	Mr. Deovrat Prasad	Elusive Neutrinos
9.	08/10/10	Ms. Poonam Kumari	Calibration of Optical Tweezers.
10.	08/10/10	Ms. Rashi Verma	An Introductory Exploration of the Standard Model of Elementary Particle Interactions.
11.	20/10/10	Mr. Amit Seta	Solar Magnetic Field as "Maxwell Demon's"
12.	20/10/10	Mr. Mohanish Borana	Mixed Micellization & Adsorption behavior of Binary Surfactant Mixtures
13.	27/10/10	Mr. Dhruv Ringe & Mr. Abhishek Mohapatra	Introduction to Algebraic Topology
14.	06/01/11	Mr. Praneet Prakash	Chaotic Waterwheel: The mechanical model of weather
15.	09/03/11	Mr. Amit Seta	Properties of Pulsar Emmission at Low Frequencies
16.	09/03/11	Ms. Preeti Sheokand	Plant Tissue Culture.
17.	02/03/11	*Group discussion*	Doing Science with 3 idiots way

Academic Year 2011-2012

Sr. No.	Date	Topic	Name of the Speaker
1.	09/08/11	Regulation of gene expression in the malaria parasite P. falciparum: Choices, choices, choices!	Prof. Swati Patankar, IIT-B
2.	23/08/11	Polynomial Equations	Prof. J. K. Verma, IIT-B
3.	17/09/11	Great Discoveries in Radio Astronomy: Key Qs. Today	Prof. Govind Swarup, FRS
4.	20/09/11	q-binominal theorem	Prof. S. Krishnan, IIT-B
5.	04/10/11	Plasmonic Crystals for enhancing Optical Nonlinearities	Prof. Achanta Venugopal, TIFR
6.	11/10/11	The Inconstant Sun	Prof. S. M. Chitre, CBS
7.	18/10/11	Solving Polynomial Equations – A Journey through Renaissance	Prof. Sudhir Ghorpade, IIT –B
8.	25/10/11	Understanding the Protein World	Prof. R. V. Hosur, CBS
9.	01/11/11	Introduction to Stem Cells	Dr. Deepa Bhartiya, NIRRH
10.	08/11/11	Faster than Light Particles	Prof. E. C. George Sudarshan, University of Texas, USA
11.	10/01/12	Surface Characterization Techniques: Role of Electrons	Prof. Varsha Bhattacharya, UM
12.	17/01/12	Understanding Biology: A Physicist's Dilemma	Prof. BDN Rao, Indianapolis, USA
13.	24/01/12	Centenary of the discovery of Superconductivity – The Discoverer, the Phenomenon, Materials and Applications	Prof. R. Nagarajan, CBS
14.	31/01/12	The strange world of the neutrino	Dr. V. M. Datar, BARC
15.	07/02/12	Physics of Dizzy Nuclei	Prof. S. B. Patel, CBS
16.	14/02/12	Primes in Arithmetic Progressions	Prof. T. N. Venkataramana, TIFR, Mumbai

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Academic Year 2011-2012

Sr. No.	Date	Name of the student	Title of the talk
1.	04/08/11	Ms. Preeti Sheokhand	Organic Photovoltaic Cells
2.	11/08/11	Mr. Mritunjay Kumar Verma	Hawking Radiation
3.	16/08/11	Mr. Ram Shila	Search for Numbers
4.	18/08/11	Mr. Plawan Das	Introduction to The Theory of Partitions- In spirit of Ramanujan
5.	25/08/11	Mr. Jyotirmoy Roy	Stellar Structure
6.	01/09/11	Mr. Mayank Singh	Affine Geometry
7.	08/09/11	Mr. B.T Ashwin Kumar	Raman Spectroscopy
8.	15/09/11	*Group discussion*	Do Schools Kill Creativity?
9.	06/10/11	Mr. Kaushik Senapati	Taxi-Cab Geometry
10.	27/10/11	Ms. Angana Mondal	Accelerators
11.	17/01/20	Ms. Shilpi Singh	Shared her work which is publish in The European Journal of Physics

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