

Harish-Chandra Research Institute

Chhatnag Road, Jhunsi, Allahabad - 211 019



ANNUAL REPORT

(2009-10)

CONTENTS

| | |
|--------------------------------------------------|----|
| 1. About the Institute | 3 |
| 2. Director's Report | 6 |
| 3. Governing Council | 10 |
| 4. Summary of Research Activities in Mathematics | 12 |
| 5. Summary of Research Activities in Physics | 16 |
| 6. Library | 21 |
| 7. Computer Centre | 23 |
| 8. Construction Activity | 25 |
| 9. Note on Persons with Disabilities & SC/ST | 26 |
| 10. Vigilance and Security Report | 27 |
| 11. Auditor's Report | 28 |
| 12. Annual Accounts | 30 |
| 13. Action Taken Report (on Auditor's Report) | 44 |

About the Institute

Early Years

The Harish-Chandra Research Institute is one of the premier research institutes in the country. It is an autonomous institute fully funded by the Department of Atomic Energy, Government of India. Till October 10, 2000 the Institute was known as Mehta Research Institute of Mathematics and Mathematical Physics (MRI) after which it was renamed as Harish-Chandra Research Institute (HRI) after the internationally acclaimed mathematician, late Prof Harish-Chandra.

The Institute started with efforts of Dr. B. N. Prasad, a mathematician at the University of Allahabad, with initial support from the B. S. Mehta Trust, Kolkata. Dr. Prasad was succeeded in January 1966 by Dr. S. R. Sinha, also of Allahabad University. He was followed by Prof. P. L. Bhatnagar as the first formal Director. After an interim period in January 1983, Prof. S. S. Shrikhande joined as the next Director of the Institute. During his tenure the dialogue with the Department of Atomic Energy (DAE) entered into decisive stage and a review committee was constituted by the DAE to examine the Institute's future. In 1985 N. D. Tiwari, the then Chief Minister of Uttar Pradesh, agreed to provide sufficient land for the Institute and the DAE promised financial support for meeting both the recurring and non-recurring expenditure. In January 1990, about 66 acres of land was acquired in Jhansi, Allahabad and the Institute came up at this site.

Prof. Shrikhande was followed by Prof. H. S. Mani who took over as the Director in January 1992. With his joining and the shift to the new campus at Jhansi in 1996, the Institute's activities picked up pace. This phase of rapid growth still continues.

New Phase

After a distinguished tenure of about nine years Prof. Mani retired in August 2001 and the charge was taken over by Prof. R. S. Kulkarni. After Prof. Kulkarni's tenure, Prof. Amitava Raychaudhuri has taken over as Director from July 19, 2005. The Institute continues to be devoted to fundamental research in diverse areas of mathematics and theoretical physics. Research is carried out by faculty members, visiting members, post-doctoral fellows and Ph. D. students.

Since 1992 the Institute has attracted worldwide attention, as is evident from the recognition received by many of its members. Among them are Ashoke Sen, A. Raychaudhuri, B. Mukhopadhyaya, Pinaki Majumdar, Rajesh Gopakumar are all winners of the prestigious S. S. Bhatnagar award. Ashoke Sen was also awarded the Padmashri and was elected to the Fellowship of the Royal Society. Prof. Rajesh Gopakumar had earlier won the Swarnajayanti fellowship of Department of Science and Technology and the International Centre for Theoretical Physics (ICTP) prize for 2006. Recently, Prof. Ashoke Sen was chosen for the prestigious Infosys prize in 2009.

Research in Mathematics

The mathematics group at HRI carries out research in several areas. In algebra, work is done on algebraic groups and related structures, the theory of groups and group rings, representation theory, and infinite-dimensional Lie algebras. Work in analysis is in the field of harmonic analysis of Lie groups.

Activity in geometry includes discontinuous groups and Riemann surfaces, algebraic topology, variational problems on manifolds, Chow groups of rational surfaces, and moduli of vector bundles. The number theory group works on algebraic, analytic and combinatorial number theory, automorphic forms and cryptography.

Research in Physics

Research in Physics at HRI is carried out in the fields on astrophysics, condensed matter physics, quantum information and computing, high energy phenomenology and string theory. In astrophysics, work is done on the cosmic microwave background, large scale structure formation and galaxy evolution. Main areas of activity in condensed matter physics are strongly correlated electron systems, mesoscopic systems, quantum Hall effect and superconductivity. In string theory, perturbative and non-perturbative aspects of string theory and quantum field theory are being actively investigated. Research in neutrino physics, strong interactions, lattice gauge theory, supersymmetry and various aspects of physics beyond the standard model is done in high-energy phenomenology. The Institute is a member of the India-based Neutrino Observatory (INO) collaboration.

The Institute has a residential campus in Jhansi, Allahabad with a library, state of the art computational facility and fast Internet link to the outside world. There is an active graduate program and a large traffic of visiting scientists and students.

Director's Report

Harish-Chandra Research Institute (HRI) continued its excellent work in 2009-10. One indicator of the Institute's stature today is the steady increase in the number of national and international conferences, workshops, and meetings at HRI. These conferences attract prominent scientists of all levels (senior faculty to students) from India and all over the world. Keeping this in mind, the facilities in the HRI auditorium have been upgraded. A better projection facility, wireless internet connectivity, and new Tower ACs have recently been added.

The Institute is widely recognized as a premier research institution. The innovative research publications which attract good citations, the invitations to conferences and meetings nationally and internationally, the awards and recognitions, and the popularity among intending post-docs and students are all a testimony of the Institute's quality. The Institute is generously supported by the Department of Atomic Energy which has enabled HRI to meet the demands that such a status entails.

I am particularly happy that a promotion policy for the administrative and technical members of HRI has been approved. Over the last year a large number of staff of these categories have received the benefits from this policy.

The XI Plan construction projects intend to expand the library, computer, and office space, to add a new students' hostel, expand the community centre, etc. The tender documents for these constructions have been prepared. The work for these will commence in the year ahead.

In the 2009-10 academic year six students joined the Ph.D. programme in mathematics while ten joined the Ph.D. programme in physics. All Ph.D. students of HRI register with the Homi Bhabha National Institute (HBNI). In this period eight students finished their Ph.D.s in physics and two did so in mathematics.

This year there was a review of HBNI by a committee constituted specially by the UGC. As a part of this, on behalf of the Committee Professor N. Mukunda, IISc, Bangalore visited the Institute for two days in March 2010

and reported on his observations. The Report spoke highly about the accomplishments of HRI.

The recurrent long power outages had been a longstanding issue for the Institute. Though DG sets used to be pressed into service during these periods, power was certainly a cause for concern. I am happy to report that a 33kV dedicated connection from the Uttar Pradesh Power Corporation Limited is now functional.

Infosys Foundation had made a monetary grant of Rs. 12 Lakhs to HRI in 2005 which was utilized for three purposes: (a) to support the travel of foreign participants to the International Workshop on Teichmuller Theory and Modular problems which was organized at HRI in January 2006, (b) for book grants to senior graduate students in 2005-06, and (c) for modest financial support for foreign travel for senior graduate students to attend summer schools and meetings. Since then, Infosys Foundation expressed an interest to make a second similar monetary grant. The Institute warmly welcomed this step. A grant of Rs. 25 Lakhs has now been received from Infosys Foundation.

July 22, 2009 was a day when total solar eclipse could be seen from areas near Allahabad. On this occasion HRI arranged an eclipse observation event at St. John's Academy, a school in nearby Karchana. Members of HRI made an introductory presentation for the school children. The children were curious about the event and had many questions. They watched the event with enthusiasm. HRI also joined the efforts of other organizations of the city in arranging for school children the observation of the eclipse from a point in Madhya Pradesh, a few hours away from Allahabad.

During the last year one HRI-Triveni Lecture and two HRI-Girdharilal Mehta Lectures were arranged. Professor Alexei Smirnov, ASICTP, Italy delivered the 4th HRI-Triveni Lecture entitled 'Neutrinos: Another image of the Universe' on 11th February 2010. On 8th December 2009 the 7th HRI-Girdharilal Mehta Lecture on 'The Physics of Synchrony: from Huygens to Higgs, via Kamerlingh Onnes, Bose and Einstein' was delivered by Professor Peter B. Littlewood, Cambridge University, UK. Professor N. Mukunda, Indian Institute of Science, Bangalore spoke on 'Science and the Human Predicament' in the 8th HRI-Girdharilal Mehta Lecture on March 26, 2010.

The Institute intends to develop in the area of Quantum Information/Quantum Computing. Two faculty members specialized in this area . Dr. Ujjwal Sen and Dr. Aditi Sen (De) – have joined and steps have been initiated to secure an XI Plan project support for research in this subject. Also, during the year Dr. G.V. Pai, who is a condensed matter physicist, has joined the Institute.

Dr. Srubabati Goswami, who was granted lien for one year to join the Physical Research Laboratory, requested a further years extension, which was granted. Dr. Debashis Ghosal, who was on lien and had joined the Jawaharlal Nehru University, tendered his technical resignation. This has been accepted. Dr. Justin David, had joined the Centre for High Energy Physics, Indian Institute of Science, Bangalore, on lien from HRI. He has since tendered his technical resignation which has been accepted. Dr. Manoj Gopalakrishnan had joined the Indian Institute of Technology Madras, Chennai keeping a lien on his position at HRI. He has also submitted his technical resignation and this has been accepted. The Stores and Purchase Officer of HRI, Mr. Deepak Srivastava, moved to a sister DAE institution. Mr. P.S. Babu has joined as the Stores and Purchase Officer.

Like other years, HRI scientists have again been decorated with a number of awards and distinctions. It is a matter of great pride that Professor Ashoke Sen has been awarded the Infosys Award for Mathematical Sciences for 2009. Professor Sen has also been conferred a Doctor of Science (*honoris causa*) by the Indian Institute of Technology, Kharagpur. Professor Rajesh Gopakumar has been selected for the Shanti Swarup Bhatnagar Award in Physical Sciences for 2009. Professor Gopakumar has also been elected to the Fellowship of the Indian National Science Academy (INSA). Dr. Manoj Kumar was selected for the 2009 INSA Young Scientist Award in Mathematics. Dr. Suvrat Raju, post-doctoral fellow at HRI, has been awarded the Ramanujan Fellowship by the Department of Science of Technology. Professor Amitava Raychaudhuri has been selected for the J.C. Bose Fellowship also of the Department of Science and Technology.

It may not be out of place to take note of some of the accomplishments of the last five years. The Institute members have won many awards and distinctions during this period. The Institute is now a top destination for intending Ph.D. students. The students after their Ph.D.s have been picked up by leading institutions all over the world with post-doctoral fellowships. The HRI-Triveni and HRI-Girdharilal Mehta Lectures have been initiated. A

new group on the fast-developing area of Quantum Information and Quantum Computation has been created with two faculty members and a third, who has been offered and accepted, is to join soon. Through the Homi Bhabha National Institute affiliation, the Institute has established a number of academic linkages with other DAE units and autonomous institutes. HRI undertook an External Peer Review in 2007, chaired by Professor M.S. Narasimhan, which commended the Institute for its rapid development and quality research. A promotion policy for the administrative and technical staff of the Institute has been implemented and many have already benefited. Under the XI Plan the Institute's project funding has been increased five-fold compared to the X Plan. Every academic group has an XI Plan project which has helped, among other things, support academic exchanges and increased the number of conferences and meetings at the Institute. A much enhanced XI Plan High Performance Computing (Cluster) facility is providing the essential computational power for the Institute's research. A Regional Centre for Accelerator-based Particle Physics has been set up under the XI Plan. A dedicated 33 kV power connection has been established for the Institute. These days reliable and fast internet connectivity has become essential to keep up with international research. Accordingly, the internet bandwidth – which was 2.25 MBps in 2005. Now stands at 36 MBps and will be increased even further. Enough redundancy in Internet Service Providers has been built in so that the downtime of any one of them does not affect the work of the Institute. The Institute, including the auditorium, now has wireless connectivity. A new larger tea-pantry has been set up which has become very popular among all Institute members. Construction of a students' hostel and work towards the expansion of the library, office, and computer centre space is expected to start very soon. The issue which needs most immediate attention is that the Institute is now in dire need of new faculty positions.

A. Raychaudhuri
Director

Governing Council

1. Prof. M. S. Raghunathan
(Chairman) School of Mathematics
Tata Institute of Fundamental Research
Homi Bhabha Road
Mumbai – 400 005

2. Prof. R. Balasubramanian Institute of Mathematical
Sciences CIT Campus, Taramani
Chennai – 600 113

3. Dr. J. N. De BH-135, Sector II
Salt Lake
Kolkata – 700 091

4. Prof. Narendra Kumar Raman Research Institute
C.V. Raman Avenue,
Sadashivnagar
Bangalore – 560 080

5. Prof. H. S. Mani 2, Fourth Cross Street
Durga Colony, Sembakkam
Chennai - 600 073

6. Mr. S. L. Mehta 4, Clive Row
Kolkata – 700 001

7. Mr. Avnish Mehta 4 Penn Road
Kolkata – 700 027

8. Mr. Rama Kant Mishra 23/1E, P. C. Banerjee Road Allen
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10. Prof. A. Raychaudhuri
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Summary of Research Activities in Mathematics

Research in Algebra and surroundings areas

Classification problem of the finite dimensional irreducible integrable representations of the Lie Tori $Sl_{n+1}(C_q)$ was solved, where C_q is the quantum tori associated to the $n \times n$ matrix q of non-zero complex numbers with some conditions on the entries of q .

Let G be a finite group of nilpotency class 2. Central automorphisms of G were studied and necessary and sufficient conditions on the group G were found such that all central automorphisms fix the centre of G elementwise. Automorphisms of abelian extension of finite groups and its relation with the second cohomology group were also studied.

Research in Topology

Topology group considered mostly the research problem in the field of nonmetrizable manifolds. The basic question has been to determine the groups of homeomorphisms of the powers of the long ray or long line, and this has been done by the group to a good extent. In a joint work with M. Ballif and David Gauld, the mapping class groups of these cases were determined. The work has been accepted for publication in the journal "Topology and its Applications". The notion of eventually constant spaces was also introduced, which is a far reaching generalization of finite dimensional manifolds. In this connection, an interesting generalization of a result of M. Ballif was obtained. This result has been published in the J. Indian Mathematical Society.

Research in Mathematical Physics

Work was done on giving a rigorous proof of the curvature formula which appears in the geometric quantization of various moduli spaces. Work was also done on the mathematical study of multitransonicity of black-hole accretion.

Research in Harmonic Analysis

In a joint work, the problem on an uncertainty principle on the Heisenberg group was considered. The result is in spirit of the classical Benedick's theorem, which says in essence that a nontrivial function and its fourier transform cannot both be supported on a set of finite measure. From a general view point, an uncertainty principle essentially says that a function and its fourier transform cannot both be highly localised. In a theorem for the Heisenberg group, the size of the Heisenberg fourier transform (which is an operator) by its rank was measured and the result essentially says that if a square integrable function on the Heisenberg group is compactly supported and its group fourier transform is a finite rank operator almost everywhere, then the function has to be identically zero. Interestingly, analogous results (in terms of rank) do not hold on other lie groups, say for instance, in the Euclidean space, or say rank one semi-simple lie groups etc.

Research in Algebraic Geometry and in Arithmetic

The problem on certain generalizations of the Serre-Swan Theorem relating vector bundles to finitely generated projective modules was considered. Certain aspects of determinant bundles of parabolic vector bundles on a curve were also considered. Certain approaches to construction of moduli spaces using projective limits were also investigated.

Local kummerian extensions of exponent equal to the residual characteristic were investigated, along with their upper and lower ramification breaks. The existence of such extensions with given breaks, their possible degrees when there is just one break, and the valuation of the discriminant in all these cases were considered.

Research in Number Theory

People here pursue research in various areas of Number Theory.

Research in Analytic Number Theory

It is shown that when A and B are subsets of the integers in $[1, X]$ and $[1, Y]$ respectively, with $|A| > \alpha X$ and $|B| > \beta Y$, the number of rational numbers expressible as a/b with (a,b) in $A \times B$ is $\gg (\alpha\beta)^{1+\epsilon} XY$ for any

$\epsilon > 0$, where the implied constant depends on ϵ alone and α, β are in $(0,1)$. Further, examples were constructed that show that this bound cannot in general be improved to $\gg \alpha\beta XY$. The natural generalisation of these observations to arbitrary subsets C of the integer points in $[1,X] \times [1,Y]$ were also obtained. Finally, these conclusions were applied to answer a question concerning the differences of consecutive terms of the product sequence of a given integer sequence posed by the mathematician Sarkozy.

Research in Combinational Number Theory

Work is going on in several areas of additive combinatorics and some new results have been obtained. A long standing open problem related to visibility of integer lattice points in the plane has been solved in a joint work with Andrew Granville. Using the density of subset of prime numbers for which every element of the given finite subset S of integers is a quadratic residue mod those primes, the explicit degree of some number fields generated by S was computed.

Research in Automorphic Forms

As an application of the work on the twisted averages of Lfunctions of modular forms of half-integral weight, it is shown that a positive proportion of twists of the L-functions of modular forms of half-integral weight do not vanish. In another research work, the pseudoeigenvalues of the Atkin-Lehner W -operators on newforms of half-integer weight have been studied and those were expressed in terms of the Fourier coefficients of the corresponding form of integral weight.

Research in Algebraic Number Theory

Various questions relating to the class number of number fields have been pursued and some interesting results have been proved. Work relating to several questions on special functions is in progress and some results have been obtained on this topic. Work relating to questions on non-vanishing of L-functions associated to automorphic forms and its

possible applications is in progress. The concept of modular symbols over quadratic fields has been studied in this regard.

Throughout the year the members of the Mathematics group have visited many Institutes/Universities within India and abroad to attend conferences for giving invited talks and for collaborative research.

Summary of Research Activities in Physics

Research activities are carried out in five major areas of Physics at HRI. These are: Astrophysics, Condensed Matter Physics, High Energy Physics, Quantum Information and Computing and String Theory.

Astrophysics

The astrophysics group at HRI carries out research in the astrophysical fluid dynamics, compact objects, cosmological dark energy, large scale structure formation in the Universe, reionization and the intergalactic medium, inflationary cosmology and the early universe, and different aspects of black hole physics and semi-classical gravity. In the area of astrophysical fluid dynamics, chaos is investigated using the Hill problem and the dynamics of a particle at the outer equatorial halo region of a multipolar potential source. In the field of compact objects, properties and formation routes of the millisecond pulsars found in globular clusters and galactic discs have been investigated. In the field of dark energy, the perturbations in the scalar field models of dark energy and their scale-dependence have been studied. In the area of large scale structure formation, the scale of homogeneity of our Universe has been determined using N-body simulations. Simulations have been used to make predictions about future surveys of neutral hydrogen at high redshifts. The hyperfine transition of singly ionized helium-3 has been proposed as a probe of the high redshift universe. In the field of reionization and intergalactic medium, the physical processes related to the cosmological reionization, like star formation, chemical enrichment and feedback, have been modelled using semi-analytical methods. The comparison of these models with different observations is being performed using a detailed principal component analysis. In the field of inflationary cosmology, deviations from slow roll inflation and features in the primordial spectrum have been investigated. In the area of black holes, general relativistic accretion phenomena onto astrophysical black hole is being examined at a close proximity of the event horizon to reveal the spectral signature of black hole spin. In the area of semi-classical gravity, duality modified propagators in spacetimes with constant curvature have been calculated.

Condensed Matter Physics

The work in condensed matter group has been on three major areas: electronic structure, correlated electronic systems, and mesoscopic physics.

Electronic structure of Sc=Ti doped alkali clusters was studied in detail and strategies to tune their magnetic moments were proposed. Using Ni encapsulated Ge clusters as a prototype, it was shown that electron counting rules can explain the relative stability of such structures. The unusual magnetism in KO₂ was understood as due to an orbital ordered ground state, the first example of such ordering in a p-orbital material. In correlated systems, the effect of antisite disorder on transport, spatial correlations, and spin polarisation of double perovskite magnets was studied. The global phase diagram of double perovskites in three dimensions revealed the existence of several noncollinear magnetic phases. A new scheme for accessing magnetic fluctuations in these systems to infer the spatial inhomogeneity from neutron scattering was formulated. Study of orbital ordering in insulating manganites is being carried out. In mesoscopic physics, it was shown that a three wire Luttinger liquid junction allows an unusual enhancement of tunneling density of states. Studies of transmission in a modified stub geometry, obtained by connecting it to a superconductor, revealed that a perfect spin transport is possible. It was found that resonant transport through a superconducting double barrier also leads to a pure spin current and this was generalized to include a graphene sheet. A three terminal set up was proposed to probe the helical nature of the Luttinger liquid edges in quantum spin Hall systems. Another theme in mesoscopic systems was the development of a phenomenological theory of quantum spin transport using the scattering approach that led to a unified description of charge and spin transport using quaternionic formulation. It was shown that spin transport is a topological quantity related to the deformations of the Bloch sphere. Work is being carried out to obtain tunable spin filtering using a quantum wire network.

High Energy Physics

The members of the group have been mainly working in two fields: neutrino and collider physics.

Neutrinos are tiny, very light particles which hardly interact with ordinary matter, but which have an important impact in many areas of physics. The main unresolved questions in neutrino physics today are the precise magnitude of the masses of different neutrino species and their mixing pattern. These are among the key inputs when constructing unified theories beyond the Standard Model of particle physics. Members of the neutrino physics group have worked on models to explain some of the properties of neutrinos and studied their signals at various experiments. In particular, they are actively involved in the development and physics studies

of the India-based Neutrino Observatory (INO), which is planned as India's largest basic science project. It will measure the properties of neutrinos by detecting neutrinos generated in the atmosphere and using long-baseline neutrino beams. Other important results include work on the fluxes of ultra high energy neutrinos in the presence of physics beyond the Standard Model.

The collider physics group is working under the umbrella of the Regional Centre for Accelerator-based Particle Physics (RECAPP) at HRI. The group mainly focuses on systematic studies of physics signals at the Large Hadron Collider (LHC), the biggest ever international experiment in the history of fundamental science, which has recently started its operation in Geneva. The LHC is expected to shed light on fundamental theoretical issues like the origin of mass (search for the Higgs boson) and the prevalence of matter over anti-matter in the universe. It is also expected to directly produce so-called dark matter particles, a mysterious invisible component of the Universe. The group has intensively worked on all these aspects, mostly in the context of supersymmetric extensions of the Standard Model. Work on the implications of a non-standard Higgs sector and extra space-time dimensions has also been carried out. An important activity was to find out how to distinguish all these models at the LHC, i.e. how to deduce the underlying theory from the experimentally measured data. The importance of same-sign trilepton and four-lepton events in eliciting the signature of a class of new physics scenarios has recently been conclusively demonstrated. Since hadronic activities play an important role at the LHC, perturbative quantum chromo-dynamics predictions for new physics signals as well as important Standard Model processes have been studied in detail. Further work was done on the baryon asymmetry in the Universe, Grand Unified Theories and the anomalous magnetic moment of the muon.

Quantum Information and Computing

Quantum correlations aka entanglement has been identified as a key resource in quantum information processing. Applications of quantum information had started off in the fields of communication, cryptography, computation, and thermodynamics, and has since diffused into diverse areas such as condensed matter physics, ultra-cold gases, and statistical mechanics. There has been two main themes of research by the quantum information and computation (QIC) group at HRI in the academic year 2009-2010: (a) Capacities of multi-port quantum channels; (b) Using quantum information concepts to solve many-body physics problems. Commercially viable use of quantum channels will require the understanding of channel capacities in a multi-access scenario. The QIC group has investigated the connection of multi-port quantum channel capacities with genuine multi-party entanglement. Multi-port classical channels are useful resources in classical communication networks. Likewise, multi-port quantum channels are the prime resources with which a commercially viable quantum communication network can potentially be built. Such quantum networks are known to outperform their classical counterparts. The QIC group has also introduced a new multiparty entanglement measure, and has employed it to study frustrated quantum many-body systems. Frustrated many-body systems are one of the center-stages of research in many-body physics. They are, for example, potentially important for understanding high-T_c superconductivity. Recently, the QIC group has also presented a method (called Entanglement Mean Field Theory (EMFT)) for solving many-body physics Hamiltonians, which is a natural generalization of the Mean Field Theory (MFT) initiated by P. Weiss in 1907. While MFT is an important method for approximate descriptions of single-body physical parameters like magnetization, EMFT can be used to approximately calculate two-body physical parameters like correlations and entanglement.

String Theory

A major part of the work done by the string theory group is to understand the microscopic analysis of the quantum entropy functions of the black holes. A precise and first principle calculation of this is possible for the supersymmetric extremal black holes using string theory. An algorithm is developed to calculate the exact entropy of different types of extremal black holes. Also a thorough analysis is made between microscopic and macroscopic entropies of different types of black holes with identical near horizon geometries. It is identified how they differ only due to the degrees freedom living outside the horizon which is popularly known as black hole

hairs. The path integral partition function of different types of blackholes with different dyonic charges are evaluated. Exact logarithmic corrections for the extremal black holes are calculated. Using Ads2/CFT1 correspondence it is shown that black holes carry more informations than the conventionally perceived only degeneracies as the degrees of freedom. A heat kernel method of calculating the Laplacian for the particles of different spins in the Ads3 space time is developed which enables to calculate the propagators for quantum loops of gravities and supergravities. A Galilean limit of the conformal algebra is found which paves the way to analyse the Schroedinger's limit of the Ads/CFT duality. Very recently considering presence of non-relativistic massive Dirac fermions and its back-reaction it is shown that the space-time metric of extremal black holes gets modification. A covariant formulation of the Navier-Stokes equation for Galilean conformal algebra is also developed. Also Ads/CFT duality between Boltzman system and Einstein gravity is developed. A fast evaluating procedure of S-matrix elements of different supersymmetric Yang-Mills theory is developed. A considerable progress is also made in inflationary cosmology and pre-heating of the universe using D-branes.

Library

The Institute's library is one of the best-equipped libraries in the region. Being a research oriented institute, it provides the required support to the academic and research activities. It remains open on all working days between 8 a.m. to 2 a.m. including Saturdays. It also remains open during the Sundays and the Gazetted holidays between 10 a.m. to 6 p.m. It had added 1362 (One thousand three hundred sixty two) books, this increased the total number of books to 19249 (Nineteen thousand two hundred forty nine) which includes 677 books as gifted ones. It also added 1794 bound volumes of the journals during the period from 1st April 2009 to 31st March 2010, this has increased bound volumes collection to 32928. The institute's library has a total collection of 52177 (Fifty two thousand one hundred seventy seven) of books and bound volumes. The library also subscribed to 2230 journals during this period. It includes 110 as online journals.

The physical stock verification has been recently completed with the help of PDT (Portable Data Terminal) for collection of Bar Codes, since the whole collection is 'Bar Coded' and equipped with 'Tattle Tapes' for security, no loss of titles in books or journals was found.

During the last year basic emphasis had been to provide more space for users. We have shifted some of the less used back volumes to the first floor storage area and created some more reading space for the users through rearranging of the book and back volume display racks. We provided better systems to our users for browsing the library OPAC and related search. We procured one more photocopying machine to provide better photocopying services. We inducted one library trainee to provide training in library activities and provide better library services to our users under the XIth plan "Library Development Project. We enriched our Building of the Digital Depository of the HRI, which includes the submitted articles, thesis, lectures etc. The library web page has been updated which provides more detailed information about the library such as subscribed databases, archives, library rules, library staff, list of online journals, online link to the Video lectures and other useful links. The emphasis was also given to procure maximum number of journals on line. We have been providing on-line access of the periodical to our users for 110(One hundred ten) titles. We have provided the Web Enabled library catalogue to our users. The library can be termed as completely automated library system, which includes acquisition,

cataloguing, circulation, search modules etc. This online catalogue had increased the opportunities of the use of our library resources by the neighboring organizations such as INSDOC, TIFR etc. through the Document Delivery Services (DDS). Normally we provide the DDS on request through post, at a very nominal cost, but requests had also been honoured through e-mail. We had encouraged the use of the library by providing the library consultation facilities to the research scholars from the neighboring institutes. We had strengthened our library security with the implementation of Electro-magnetic Tattle Tapes to reduce the losses. It has been made completely functional.

Computer Centre

1. Newer versions of different flavours of Linux operating systems were loaded on the desktops.
2. Internet bandwidth through Sify Ltd. was upgraded to 10 Mbps to suffice the increased Internet usage.
3. 16 Mbps broadband Internet bandwidth through Reliance Communications was upgraded to 22 Mbps. A reliable proxy server on this link was set up for the users.
4. A new webmail server for the Institute was set up for the Institute e-mail users.
5. New internal mail server and domain name server were set up.
6. Computing related to conferences were held in the conference computer room.
7. New versions of several applications software were loaded on users' systems, computer centre and conference room systems.
8. All the computer centre NIS client machines were upgraded with Ubuntu (LTS).
9. Two 100 KVA ONLINE central UPS with parallel redundancy (N+1) was installed and commissioned to provide redundant UPS power supply to all computers, peripherals and networking equipments within the Institute building.
10. Expansion of wireless networking to cover up most of the places of Institute building and library building has been done.

Current activities and plans

1. Purchase order for the up-gradation of existing Local Area Network with Optical Fiber Cable Giga backbone and with Gigabit node connectivity has been released.
2. Purchase order for up-gradation of existing file server with high end Network Storage Systems (NAS) with redundancy and automated backup facility has been released.

3. Purchase of a few high end mono laser printers is being processed.
4. Up-gradation of Institute's Mail Server, Name Server, Web Server, and firewall servers are designed.

Construction Activity

1. Tender for “Construction of ‘Hostel’, ‘Extension of Institute Building, Library, Computer Centre’, ‘Engineering Building’ and ‘Community Centre Annexe’ at HRI” has been issued to the short-listed parties under Pre-qualification of contracting agencies. The technical bid has been opened and necessary exercise for opening of financial bid is under progress.
2. The work for 33 KV uninterrupted power supply line directly from 132 KV Substation by UPPCL and other associated works under the scope of HRI have been completed. The 33 KV power line has been energized.
3. Following miscellaneous works were also carried out during the financial year:
 - Electrical & Air Conditioning works related to Upgradation of UPS room.
 - Supply & Fixing vertical blinds in pantry.
 - Fencing for 33 KV switchyard
 - Conductive and antistatic flooring in Cluster room.
 - Renovation of toilets in Hostel-1
 - Attachment of servant quarters to main unit in old type-E houses.
 - Parking shed near Hostel-1 building.

Note on Persons with Disabilities & SC/ST

This Institute is devoted to theoretical research in the field of Physics and Mathematics, is financially supported by the Department of Atomic Energy, Government of India. Its activities are overseen by the Governing Council and its day-to-day activities are administered by the Director of the Institute. The Institute has a very limited number of sanctioned positions, which are evenly distributed between the Academic & Administrative posts. The Institute does not have any specific scheme catering to persons with disabilities and therefore there is no specific budget allocated in this regard. The recruitment of Academic members is done based on merit whereas recruitment in other sections of the Institute is done through an open advertisement. However, the Institute is sensitive to the subject of recruitment of persons with disabilities and would support such persons as and when the occasion arises.

Also the Institute is aware of its social obligation towards representation of Scheduled Castes and Scheduled Tribes in its services and follows the appropriate norms in recruitment.

Vigilance Report

There is nothing to report from vigilance point of view for the period up to March 31, 2010.

Auditor's Report

1. We have audited the attached Balance Sheet of Harish-Chandra Research Institute, Allahabad as at 31st March, 2010 and also the Income and Expenditure Account for the year ended on that date annexed thereto. These financial statements are the responsibility of the management of the Institute. Our responsibility is to express an opinion on these financial statements.
2. We conducted our audit in accordance with auditing standards generally accepted in India. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining on a test basis, evidence supporting the accounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.
3. Subject to our comments as per annexure – “A” read with significant accounting policies and notes on accounts appearing in Schedule-15 annexed hereto, we report that:
 - a. We have obtained all the information and explanation, which to the best of our knowledge and belief were necessary for the purpose of our audit.
 - b. In our opinion, proper books of accounts as required by law have been kept by the Institute, so far as it appears from our examination of the books.
 - c. The Balance Sheet and Income and Expenditure Account dealt with by this report are in agreement with the books of accounts.
 - d. In our opinion and to the best of our information and according to the explanations given to us, the said accounts give a true and fair view:
 - i. In case of Balance Sheet, of the state of affairs of the Institute as at 31st March, 2010.
 - ii. In case of Income and Expenditure Account, of the excess of Expenditure over income of the Institute for the year ended on that date.

For Balram Chandra & Associates
Chartered Accountants

Place : Allahabad
Dated: 10.08.2010

Rajesh Mishra
Partner

Annexure to the Auditor's Report

(Referred to in paragraph 3 of our Report of even date)

1. Current year expenses include a sum of Rs.1,42,93,504/- towards 60% of arrears on account of revision of salaries in terms of recommendations of sixth pay commission for which no provision was made in the previous years,
2. During the year Institute has switched over to rate of depreciation as per IT Act 1961. The effect of such change is an increase in Depreciation provision by Rs.3,86,56,661.79 during the year vis-à-vis depreciation rates in previous years.
3. Balance of EMD, Security Deposits, Sundry Creditors, Loan & Advances and Claims Recoverable etc. are subject to confirmation, reconciliation and consequential adjustments thereof.
4. Library & Publications includes receipt of current journals during the current year for Rs.18730015/-. The amount has been derived at by adding advances made during the year to opening balances of advances as on 01.04.09 and subtracting there from the outstanding of advances as on 31.03.10. Institute has prepared inventory of current journals outstanding as on 31.03.2010 but could not make available inventory of current journals received during the year. The Current journals received have also not been capitalized in books of accounts.
5. Amount recoverable against completed projects shown as claims recoverable and Advance for Journals are outstanding since long. Institute should take necessary steps to recover or write off the following amounts:

| | | |
|---------------------------------------------|------------|-------------|
| A. CARDMATH DST | Since 2004 | Rs.14848.00 |
| B. DST (CS Dalawat) | Since 2005 | Rs.12986.00 |
| C. NBHM Grant-K. Gangopadhyay | Since 2007 | Rs.47533.00 |
| D. NBHM Grant-Joseph Samuel | Since 2007 | Rs.17030.00 |
| E. I & II Com.-Publisher (Adv for Journals) | Since 2002 | Rs.37221.00 |
6. Institute has carried out a physical verification of fixed assets. The quantitative & value reconciliation are being done with fixed assets register, as such it is not possible for us to comment whether financial records are in agreement with physically verified fixed assets.
7. Cash payments in excess of Rs.20000/- have occasionally been made during the year.

**HARISH-CHANDRA RESEARCH INSTITUTE
ALLAHABAD 211 019**

BALANCE SHEET AS AT 31ST MARCH 2010

| <i>As on 31st March 2009</i> | CAPITAL FUND & LIABILITIES | Sch. | Amount in Rs. | <i>As on 31st March 2010</i> Amount - Rs. |
|----------------------------------|--------------------------------------------------------|-------------|----------------------|---------------------------------------------------------|
| 148643188.12 | CORPUS / CAPITAL FUND | 1 | | 95394232.31 |
| 44755521.50 | PLAN GRANT - Carried over | 2 | 81343111.75 | 81343111.75 |
| 16136726.00 | Add: ADVANCE PAYMENT-WORK-IN-PROGRESS | | 0.00 | |
| 12541579.43 | NON-PLAN GRANT Carried over | 3 | | 12282357.93 |
| 101649674.10 | CURRENT LIABILITIES AND PROVISIONS | 4 | | 127484508.10 |
| 323726689.15 | TOTAL ==> | | | 316504210.09 |
| | ASSETS | | | |
| | FIXED ASSETS | 5 | | |
| 513742188.54 | GROSS BLOCK | | 513742188.54 | |
| | ADD : Capitalization of assets- Revenue Grant | | 3771849.00 | |
| | ADD : Capitalization of assets- Plan Grant | | 20374699.00 | |
| | LESS: Adjustment of Prev. Years | | 0.00 | |
| -313799552.35 | LESS: CUMULATIVE DEPRECIATION | | -386872171.16 | |
| 199942636.19 | W.D.V | | 151016565.38 | |
| 16136726.00 | ADD : Work-in-progress (Power) | | 0.00 | 151016565.38 |
| 0.00 | DEFERRED REVENUE EXPENSES (POWER) | 6 | | 15877526.00 |
| 2043029.58 | INVESTMENTS | 7 | | 2145365.58 |
| 105604297.38 | CURRENT ASSETS, LOANS AND ADVANCES ETC. | 8 | | 147464753.13 |
| 323726689.15 | TOTAL ==> | | | 316504210.09 |
| | SIGNIFICANT ACCOUNTING POLICIES & NOTES ON ACCOUNTS | 15 | | |

For HARISH-CHANDRA RESEARCH INSTITUTE

As per our separate report of even date attached

For Balram Chandra & Associates
CHARTERED ACCOUNTANTS

RAAJ GULATI
ACCOUNTS OFFICER

P.B.CHAKROBORTY
REGISTRAR

A. RAYCHAUDHURI
DIRECTOR

Partner

Place : Allahabad
Date : Aug.10th 2010

**HARISH-CHANDRA RESEARCH INSTITUTE
ALLAHABAD 211 019**

**INCOME AND EXPENDITURE ACCOUNT
FOR THE YEAR ENDED ON 31ST MARCH 2010**

| Amount in Rs. Year 2008-09 | <i>INCOME</i> | <i>Sch.</i> | <i>Amount in Rs.</i> | Amount in Rs. Year 2009-10 |
|-------------------------------|-----------------------------------------------------------------------------------------|-------------|----------------------|-------------------------------|
| 129700000.00 | GRANTS / SUBSIDIES | 9 | | 143200000.00 |
| 109917.00 | INCOME ON INVESTMENTS | 10 | | 99782.00 |
| 2124281.58 | INTEREST EARNED | 11 | | 2600255.00 |
| 1956439.00 | OTHER INCOME | 12 | | 2635645.00 |
| 133890637.58 | TOTAL (A) ==> | | | 148535682.00 |
| | <i>EXPENDITURE</i> | | | |
| 54970201.00 | ESTABLISHMENT EXPENSES | 13 | 73378896.00 | |
| 67212345.00 | OTHER ADMINISTRATIVE EXPENSES | 14 | 72922642.50 | 146301538.50 |
| 36442113.71 | DEPRECIATION - Current Year (Net total at the year end - corresponding to Schedule 5 | | | 73072618.81 |
| 295639.00 | LOSS ON SALE OF ASSETS | | | 0.00 |
| 36094753.00 | PENSION, GRATUITY, ENCASHMENT OF EL- Current Year | | | 21782053.00 |
| 195015051.71 | TOTAL(B) ==> | | | 241156210.31 |
| -61124414.13 | BALANCE BEING EXCESS OF EXPENDITURE OVER INCOME (B-A) Transferred to General Fund | | | -92620528.31 |
| | SIGNIFICANT ACCOUNTING POLICIES & NOTES ON ACCOUNTS | 15 | | |

For HARISH-CHANDRA RESEARCH INSTITUTE

As per our separate report of even date attached

For Balram Chandra & Associates

CHARTERED ACCOUNTANTS

RAAJ GULATI
ACCOUNTS OFFICER

P.B.CHAKROBORTY
REGISTRAR

A. RAYCHAUDHURI
DIRECTOR

Partner

Place : Allahabad
Date : Aug.10th 2010

**HARISH-CHANDRA RESEARCH INSTITUTE
ALLAHABAD 211 019**

| Amount - Rs. | SCHEDULE - 1 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2010 | Amount - Rs. |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| As on 31st March 2009 | CORPUS / CAPITAL FUND | As on 31st March 2010 |
| 152002935.85 2847264.00 65020491.50 | Balance as at the beginning of the year Add: Assets purchased out of Non-Plan Grant Add: Assets purchased out of Plan Grant | 148643188.12 24146548.00 |
| -531437.10 -61124414.13 | Less/Add : Adjustments of previous years Less : Excess of Expenditure over Income transferred from Income and Expenditure Account | 14965803.00 -92620528.31 |
| -9571652.00 | Less : Unspent Recurring Grant transferred from/to Non-Plan Grant (Recurring) a/c | 259221.50 -77395503.81 |
| 148643188.12 | BALANCE AS AT THE YEAR END | 95394232.31 |

| Amount - Rs. | SCHEDULE - 2 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2010 | Amount - Rs. |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| As on 31st March 2009 | PLAN GRANT (Non-Recurring) | As on 31st March 2010 |
| 142036000.00 | OPENING BALANCE (Xlth Plan) ADD : Received during the year from DAE <i>Total Plan Grant Amount</i> | 142036000.00 90000000.00 232036000.00 |
| -23405225.00 -71286275.50 -2588978.00 | LESS : Revenue Utilisation LESS : Capitalization of Assets LESS : Advances & work-in-progress (Detail Chart enclosed at enclosure 1) | -49975903.75 -91660974.50 -9056010.00 -150692888.25 |
| 64451999.00 | BALANCE Carried over | 81343111.75 |

| Amount - Rs. | SCHEDULE - 3 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2010 | Amount - Rs. |
|------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------|
| As on 31st March 2009 | NON- PLAN GRANT (Recurring) | As on 31st March 2010 |
| 2969927.43 129700000.00 2054198.00 | OPENING BALANCE ADD : Received during the year from DAE ADD : Other Receipts | 12541579.43 143200000.00 2842317.00 146042317.00 |
| -122182546.00 | LESS : Utilisation during the year Balance transferred to/from General Fund | -146301538.50 -259221.50 -259221.50 |
| 12541579.43 | CLOSING BALANCE | 12282357.93 |

"Executive Summary of Xlth Plan Projects"- As on March 31st 2010

ENCL. I

| Xlth Plan Grants | Received | Utilisation | | | | | | Balance Amount |
|-----------------------------------------------------------|--------------------|--------------------|--------------------|-------------------------------|-----------------------------|---------------------------|--------------------------|--------------------|
| | | Total | Revenue | Capitalised | | | Advance/Work in Progress | |
| | | | | Capitalisation-upto last year | Capitalisation-Current Year | Capitalised Value (Gross) | | |
| High Performance Scientific Computing | 54317000.00 | 51140632.00 | 4047220.00 | 40932167.00 | 6161245.00 | 47093412.00 | | 3176368.00 |
| Contingency | | 3069319.00 | 3069319.00 | | | | | |
| Domestic Travel | | 154963.00 | 154963.00 | | | | | |
| Machinery & Equipments | | 38958514.00 | | 37248632.00 | 1709882.00 | 38958514.00 | | |
| Major Work(Elect. & Civil) | | 4698129.00 | 25000.00 | 3683535.00 | 989594.00 | 4673129.00 | | |
| Office Expenses | | 273512.00 | 273512.00 | | | | | |
| Salaries | | 429520.00 | 429520.00 | | | | | |
| Supplies & Materials | | 3556675.00 | 94906.00 | | 3461769.00 | 3461769.00 | | |
| Infrastructure(Housing) | 35000000.00 | 674160.00 | | | | | 674160.00 | 34325840.00 |
| Advance - IIT Mumbai | | 674160.00 | | | | | 674160.00 | |
| Infrastructure(Non-Housing) | 30300000.00 | 17136721.00 | 16152571.00 | | | | 984150.00 | 13163279.00 |
| Advance to Architect | | 984150.00 | | | | | 984150.00 | |
| Civil Works -Infrastructure (Non Housing) | | 910298.00 | 910298.00 | | | | | |
| Contingencies-Misc.(Non-Housing) | | 2112100.00 | 2112100.00 | | | | | |
| Salaries | | 229935.00 | 229935.00 | | | | | |
| Power Requirement & Air-Conditioning(Non-Housing) | | 12900238.00 | 12900238.00 | | | | | |
| Library Development Project | 17960000.00 | 18892461.00 | 288007.00 | 11008421.00 | 7596033.00 | 18604454.00 | | -932461.00 |
| Back Volumes | | 18281526.00 | | 10973421.00 | 7308105.00 | 18281526.00 | | |
| Mach. & Equipments | | 577587.00 | 254659.00 | 35000.00 | 287928.00 | 322928.00 | | |
| Salaries | | 33348.00 | 33348.00 | | | | | |
| Regional Center- Accelerator Based Particle Physic | 18183000.00 | 13487973.50 | 5098188.50 | 6888877.00 | 1500908.00 | 8389785.00 | | 4695026.50 |
| Machinery & Equipments | | 4937173.00 | | 3438989.00 | 1498184.00 | 4937173.00 | | |
| Supplies & Materials | | 4043008.50 | 764956.50 | 3275328.00 | 2724.00 | 3278052.00 | | |
| Major Works (Electrical & AC) | | 174560.00 | | 174560.00 | | 174560.00 | | |
| Salaries | | 1531545.00 | 1531545.00 | | | | | |
| Domestic Travel | | 510034.00 | 510034.00 | | | | | |
| Foreign Travel | | 475541.00 | 475541.00 | | | | | |
| Consultancy | | 519121.00 | 519121.00 | | | | | |
| Contingencies - Collaboration Meetings | | 1296991.00 | 1296991.00 | | | | | |
| Scientific Computing & Networking(Xlth Plan) | 48500000.00 | 26810135.50 | 11069275.50 | 5477693.00 | 3160767.00 | 8638460.00 | 7102400.00 | 21689864.50 |
| Machinery & Equipment | | 6371975.00 | 101794.00 | 5456389.00 | 813792.00 | 6270181.00 | | |
| Major Works | | 1626459.00 | 80700.00 | | 1545759.00 | 1545759.00 | | |
| Books & Softwares | | 822520.00 | | 21304.00 | 801216.00 | 822520.00 | | |
| Office Expenses | | 229713.00 | 229713.00 | | | | | |
| Salaries | | 293033.00 | 293033.00 | | | | | |
| Band Width | | 10364035.50 | 10364035.50 | | | | | |
| Adv.for UPS-PCI Ltd. | | 7102400.00 | | | | | 7102400.00 | |
| Special Year in Mathematics | 6440000.00 | 5742469.00 | 4483562.00 | 60900.00 | 1198007.00 | 1258907.00 | | 697531.00 |
| Salaries | | 191107.00 | 191107.00 | | | | | |
| Domestic Travel | | 276557.00 | 276557.00 | | | | | |
| Foreign Travel | | 1066633.00 | 1066633.00 | | | | | |
| National Discussion Meetings | | 928142.00 | 928142.00 | | | | | |
| International Discussion Meetings | | 806939.00 | 806939.00 | | | | | |
| Funding for discussing results at International Fors | | 464664.00 | 464664.00 | | | | | |
| Supplies & Materials | | 1198507.00 | 500.00 | | 1198007.00 | 1198007.00 | | |
| Consultancy / honorariums | | 202900.00 | 202900.00 | | | | | |
| Contingencies | | 508375.00 | 508375.00 | | | | | |
| Misc.Expenses | | 98645.00 | 37745.00 | 60900.00 | | 60900.00 | | |

"Executive Summary of XIth Plan Projects"- As on March 31st 2010

Encl. 1

| XIth Plan Grants | Received | Utilisation | | | | | | Balance Amount |
|--------------------------------------------------------|---------------------|---------------------|--------------------|-------------------------------|-----------------------------|---------------------------|--------------------------|--------------------|
| | | Total | Revenue | Capitalised | | | Advance/Work in Progress | |
| | | | | Capitalisation-upto last year | Capitalisation-Current Year | Capitalised Value (Gross) | | |
| Equipping & Furnishing of Conference Centre | 1906000.00 | 368180.00 | 5100.00 | 363080.00 | | 363080.00 | | 1537820.00 |
| <i>Machinery & Equipment</i> | | 368180.00 | 5100.00 | 363080.00 | | 363080.00 | | |
| Scientific Human Resources Training | | | | | | | | |
| Astrophysics Project | 3690000.00 | 2599801.75 | 1735534.75 | 411519.00 | 452748.00 | 864267.00 | | 1090198.25 |
| <i>Machinery & Equipment</i> | | 843767.00 | | 411519.00 | 432248.00 | 843767.00 | | |
| <i>Supplies & Materials</i> | | 82124.00 | 61624.00 | | 20500.00 | 20500.00 | | |
| <i>Salaries</i> | | 94414.00 | 94414.00 | | | | | |
| <i>Foreign Travel</i> | | 223154.00 | 223154.00 | | | | | |
| <i>Domestic Travel</i> | | 90548.00 | 90548.00 | | | | | |
| <i>International Schools</i> | | 195384.00 | 195384.00 | | | | | |
| <i>International Meetings</i> | | 583352.75 | 583352.75 | | | | | |
| <i>Office Expenses</i> | | 5469.00 | 5469.00 | | | | | |
| <i>Contingencies-Visitors Prog.</i> | | 383589.00 | 383589.00 | | | | | |
| <i>Contingencies-National Meetings</i> | | 98000.00 | 98000.00 | | | | | |
| Condensed Matter Physics | 4350000.00 | 2892020.00 | 2103606.00 | 709750.00 | 53664.00 | 763414.00 | 25000.00 | 1457980.00 |
| <i>Machinery & Equipment</i> | | 763414.00 | | 709750.00 | 53664.00 | 763414.00 | | |
| <i>Supplies & Materials</i> | | 86315.00 | 86315.00 | | | | | |
| <i>Office Expenses</i> | | 76702.00 | 76702.00 | | | | | |
| <i>Foreign Travel</i> | | 216573.00 | 216573.00 | | | | | |
| <i>Instructional Schools</i> | | 543457.00 | 543457.00 | | | | | |
| <i>International Discussion Meetings</i> | | 1017971.00 | 1017971.00 | | | | | |
| <i>National Level Collaboration Meetings</i> | | 162588.00 | 162588.00 | | | | | |
| <i>CMP-Advance</i> | | 25000.00 | | | | | 25000.00 | |
| Neutrino Project | 7245000.00 | 6722522.50 | 2262095.00 | 4455857.50 | 4570.00 | 4460427.50 | | 522477.50 |
| <i>Machinery & Equipment</i> | | 4170279.00 | | 4170279.00 | | 4170279.00 | | |
| <i>Supplies & Materials</i> | | 336341.50 | 46193.00 | 285578.50 | 4570.00 | 290148.50 | | |
| <i>Salaries</i> | | 402283.00 | 402283.00 | | | | | |
| <i>Domestic Travel</i> | | 295649.00 | 295649.00 | | | | | |
| <i>Foreign Travel</i> | | 1134808.00 | 1134808.00 | | | | | |
| <i>Contingencies</i> | | 383162.00 | 383162.00 | | | | | |
| String Theory Project | 4145000.00 | 4225812.00 | 2730744.00 | 978011.00 | 246757.00 | 1224768.00 | 270300.00 | -80812.00 |
| <i>Machinery & Equipment</i> | | 1219668.00 | | 978011.00 | 241657.00 | 1219668.00 | | |
| <i>Supplies & Materials</i> | | 652384.00 | 647284.00 | | 5100.00 | 5100.00 | | |
| <i>Domestic Travel</i> | | 404548.00 | 404548.00 | | | | | |
| <i>Foreign Travel</i> | | 670971.00 | 670971.00 | | | | | |
| <i>Salaries</i> | | 302026.00 | 302026.00 | | | | | |
| <i>Consultancy</i> | | 705915.00 | 705915.00 | | | | | |
| <i>Advance for Furniture</i> | | 270300.00 | | | | | 270300.00 | |
| Grand Total | 232036000.00 | 150692888.25 | 49975903.75 | 71286275.50 | 20374699.00 | 91660974.50 | 9056010.00 | 81343111.75 |

| Amount - Rs. | SCHEDULE - 4 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2010 | | Amount - Rs. |
|----------------------------------|--------------------------------------------------------------------|-------------|----------------------------------|
| As on 31st March 2009 | CURRENT LIABILITIES AND PROVISIONS | | As on 31st March 2010 |
| | A- Current Liabilities | | |
| 3187235.90 | 1. EMD/ Security Deposits Payable | | 5606810.90 |
| | 2. Sundry Creditors | | 11277407.20 |
| 7960133.00 | a. Parties - Amount Payable | 7805905.00 | |
| 595149.80 | b. Staff - Amount Payable | 644934.80 | |
| 957969.00 | c. Staff- Terminal Dues transfers | 957969.00 | |
| 1184440.40 | d. Other Recoveries Refundable | 1868598.40 | |
| | 3. Statutory Liabilities | | 433555.00 |
| 335000.00 | a. Income Tax (deducted from staff) Payable | 358400.00 | |
| 106408.00 | b. Income Tax (deducted from parties) Payable | 71681.00 | |
| 11137.00 | c. Trade Tax / VAT (deducted from parties) Payable | 3474.00 | |
| | 4. Amounts refundable against completed sponsored projects/schemes | | 91680.50 |
| 55400.50 | Serc Schools | 55400.50 | |
| 197439.00 | NBHM - Projects | 36280.00 | |
| | 5. Receipts against ongoing sponsored projects/schemes | | 4109807.50 |
| 146004.00 | CSIR Grants | 48004.00 | |
| 292147.00 | DST Project- H K Jassal | 127104.00 | |
| 0.00 | DST Project- Aaarti Girdhar | 192184.00 | |
| 0.00 | J.C.Bose Fellowship (Ashoke Sen) | 301740.00 | |
| 0.00 | EU Research Project(Prof. Pinaki Majumdar) | 1488675.00 | |
| 0.00 | DAE-SRC Outstanding Research Investigator Award | 651016.00 | |
| 165295.00 | Infosys Foundation | 0.00 | |
| 1354246.50 | UK-India Research Educational Fund | 960965.50 | |
| 57352.00 | Science Education Prog.-INSA | 8332.00 | |
| 38643.00 | TPSC Fund | 38643.00 | |
| 23395.00 | CPSTIO Project | 23395.00 | |
| 804600.00 | Swarnjayanti Fellowship (Rajesh Gopakumar) | 269749.00 | |
| 17471995.10 | Total A | | 21519261.10 |
| | B- PROVISIONS | | |
| 48066381.00 | 1. Pension ,Gratuity, encashment of E.L.(Prior Period) | 84161134.00 | |
| 36094753.00 | Pension ,Gratuity, encashment of E.L.(Current Period) | 21782053.00 | 105943187.00 |
| 16545.00 | 2. Audit Fee payable | | 22060.00 |
| 84177679.00 | Total B | | 105965247.00 |
| 101649674.10 | Total A + B | | 127484508.10 |

Statement of Fixed Assets , Depreciation & Depreciation Fund

| Sl.No. | Description | Gross Block | | | | | | Depreciation Reserve | | | | | | Net Block of Assets | |
|--------------------|------------------------|---------------------------------------|----------------------------------------|------------------------------------------------|----------------------------------------------|-----------------------------------------|--------------------------------------------|----------------------|----------------------|--------------------------------------------|-----------------------------------|-----------------------------------------|-------------|---------------------------------------|----------------------|
| | | Gross Block of Assets | | Opening Gross Block of Assets as on 01.04.2009 | Addition during the year | | Total Gross Block of Assets as on 31.03.10 | Depreciation Rate | W.D.V.as on 31.03.09 | Depreciation Charge value as on 31.03.2010 | Depreciation for the year 2009-10 | Cumulative dep.Reserve as on 31.03.2009 | Adjustments | Depreciation Reserve up to 31.03.2010 | W.D.V.as on 31.03.10 |
| | | (Other than Xlth Plan) as on 31.03.09 | (From Xlth Plan Grants) as on 31.03.09 | | Funded from Non-Plan Grants as on 31.03.2010 | Funded from Plan Grant as on 31.03.2010 | | | | | | | | | |
| 1 | 2 | 3 | 4 | (3+4)=5 | 6 | 7 | (5+6+7)=8 | 9 | 10 | (10+6+7)=11 | 12 | 13 | 14 | 15.00 | 16 |
| 1 | Land & Building | 146821373.85 | 2247467.00 | 149068840.85 | 319428.00 | 408058.00 | 149796326.85 | 10% | 64403103.41 | 65130589.41 | 6513058.84 | 84665737.44 | 0.00 | 91178796.28 | 58617530.57 |
| 2 | Furniture & Fixtures | 35024090.32 | 616008.00 | 35640098.32 | 297477.00 | 2750996.00 | 38688571.32 | 10% | 16456332.84 | 19504805.84 | 1950480.58 | 19183765.48 | 0.00 | 21134246.06 | 17554325.26 |
| 3 | Other Assets | 25638453.20 | 2593334.00 | 28231787.20 | 864921.00 | 397921.00 | 29494629.20 | 15% | 12596689.65 | 13859531.65 | 2078929.75 | 15635097.56 | 0.00 | 17714027.30 | 11780601.90 |
| 4 | Guest House Assets | 3360218.34 | 0.00 | 3360218.34 | 155983.00 | 0.00 | 3516201.34 | 10% | 1488733.17 | 1644716.16 | 164471.62 | 1871485.17 | 0.00 | 2035956.79 | 1480244.54 |
| 5 | Library Assets | 156737533.02 | 6087445.00 | 162824978.02 | 1919047.00 | 7308105.00 | 172052130.02 | 25% | 23033327.84 | 32260479.83 | 8065119.96 | 139791650.18 | 0.00 | 147856770.14 | 24195359.87 |
| 6 | Machinery & Equipments | 77290360.90 | 53475192.50 | 130765553.40 | 170598.00 | 9455955.00 | 140392106.40 | 60% | 80478333.38 | 90104886.38 | 54062931.83 | 50287220.03 | 0.00 | 104350151.85 | 36041954.55 |
| 7 | Misc. Equipments | 3849667.41 | 1045.00 | 3850712.41 | 44395.00 | 53664.00 | 3948771.41 | 15% | 1486115.91 | 1584174.90 | 237626.24 | 2364596.50 | 0.00 | 2602222.74 | 1346548.67 |
| Grand Total | | 448721697.04 | 65020491.50 | 513742188.54 | 3771849.00 | 20374699.00 | 537888736.54 | | 199942636.19 | 224089184.16 | 73072618.81 | 313799552.35 | 0.00 | 386872171.16 | 151016565.36 |

| Amount - Rs. | SCHEDULE - 6 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2010 | | Amount - Rs. |
|----------------------------------|------------------------------------------------------------------|-------------|----------------------------------|
| As on 31st March 2009 | Deferred Revenue Expenses (Power) | | As on 31st March 2010 |
| 0.00 | Composite Work for Power Line | 15877526.00 | |
| 0.00 | Less : Trfd. Back to GeneralFund | 0.00 | |
| 0.00 | Total | | 15877526.00 |

| Amount - Rs. | SCHEDULE - 7 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2010 | | Amount - Rs. |
|----------------------------------|------------------------------------------------------------------|------------|----------------------------------|
| As on 31st March 2009 | Investments | | As on 31st March 2010 |
| 1637364.00 | Fixed Deposit in State Bank Of India | 1637364.00 | |
| 281432.00 | Add: Interest Accrued but not due | 508001.58 | |
| 1918796.00 | Total | | 2145365.58 |

| Amount - Rs. | SCHEDULE - 8 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2010 | | Amount - Rs. |
|----------------------------------|------------------------------------------------------------------|-------------|----------------------------------|
| As on 31st March 2009 | CURRENT ASSETS, LOANS AND ADVANCES ETC. | | As on 31st March 2010 |
| | A- Current Assets | | |
| 4626.25 | 1. Cash Balance in hand | | 81823.25 |
| | 2. Bank Balances | | |
| | a. Current Accounts | | |
| 6533914.97 | SBI (MB) Current A/C | | 51684.97 |
| | b. Savings Accounts | | 118128694.12 |
| 1122015.89 | Bank Of Baroda - 101 A/C | 37098651.89 | |
| 63937699.00 | Bank Of Baroda - 102 A/C | 62685577.00 | |
| 14926003.63 | Bank Of Baroda - 108 A/C | 15451322.38 | |
| 2074111.85 | Bank Of Baroda - 109 A/C | 2893142.85 | |
| 2013210.00 | c. Short Term Deposits with BoB HRI Branch Ald. | | 2013210.00 |
| 20883.12 | 3. Postage in hand (Franking Machine) | | 1104.12 |
| 90632464.71 | Total A | | 120276516.46 |

| | | SCHEDULE -8 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2010 | | | |
|--------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------------------------|---------------------|--|
| Amount - Rs. | CURRENT ASSETS, LOANS AND ADVANCES ETC. | contd. | Amount - Rs. | | |
| As on 31st March 2009 | B - LOANS, ADVANCES AND OTHER ASSETS | | As on 31st March 2010 | | |
| | 1. Loans to Staff | | 293798.00 | | |
| 11400.00 | Festival Advance | 29400.00 | | | |
| 103509.00 | Vehicle Advance | 69000.00 | | | |
| 170000.00 | Medical Advance | 0.00 | | | |
| 17325.00 | LTC Advance | 0.00 | | | |
| 211136.00 | Traveling Advance -Within India | 101798.00 | | | |
| 517750.00 | Traveling Advance -Outside India | 93600.00 | | | |
| | 2. Advances and other amounts recoverable in cash or in kind or for value to be received : | | | | |
| | a. On Capital Account | | | 20715135.00 | |
| 15973011.00 | Advance to Suppliers for Journals | 20715135.00 | | | |
| | b. Deposits | | | 4318220.67 | |
| 955800.00 | With UPSEB | 2574200.00 | | | |
| 262580.67 | With Telephone Deptt. | 262580.67 | | | |
| 39900.00 | With Gas Agency | 39900.00 | | | |
| 812679.00 | Securities in Hand -Fixed Deposits of Parties | 1441540.00 | | | |
| | 3. Income Accrued : | | | 697412.00 | |
| 349210.00 | a. On Short Term Deposits with Banks | 642332.00 | | | |
| | b. On Loans and Advances | | | | |
| 46229.00 | 1. Vehicle | 55080.00 | | | |
| | 4. Claims Receivable | | | 729614.00 | |
| | a. Amount Recoverable against completed projects/schemes | | | | |
| 14848.00 | CARDMATH(DST Meeting) | 14848.00 | | | |
| 12986.00 | DST (C S Dalawat) | 12986.00 | | | |
| 58636.00 | Grant Receivable-DST-SFT (Manoj Kumar) | 33961.00 | | | |
| 117300.00 | DST - Fellowship (Peter Brusov) | 0.00 | | | |
| 47533.00 | Grant Receivable - NBHM (Krishnendu G.) | 47533.00 | | | |
| 17030.00 | Grant Receivable - NBHM (Joseph samuel) | 17030.00 | | | |
| 83000.00 | WHEPP - VII | 0.00 | | | |
| 249372.00 | INO Conference | 417389.00 | | | |
| 15787.00 | Grant Receivable-CSIR (Dr.Ashok Sethia) | 0.00 | | | |
| 178779.00 | NBHM Fellowships | 185867.00 | | | |
| | b. Others | | | 178857.00 | |
| 52108.00 | Claims Receivables- Parties | 68272.00 | | | |
| 98256.00 | Claims Receivables- Staff | 110585.00 | | | |
| | 5. Payment against ongoing sponsored projects/schemes | | | 255200.00 | |
| 30000.00 | Deptt.of Physics Berhampur University | 0.00 | | | |
| 561200.00 | C-Dac Pune | 0.00 | | | |
| 50000.00 | International Workshop-Win 07 -Kolkatta | 0.00 | | | |
| 200000.00 | ISM 06 | 0.00 | | | |
| 50000.00 | Registrar IIT Roorkee | 50000.00 | | | |
| 16000.00 | Registrar IIT Kanpur | 16000.00 | | | |
| 25000.00 | ISCQI-2008 Bhubneshawar | 25000.00 | | | |
| 0.00 | ICM 2010 | 30458.00 | | | |
| 0.00 | Jest Examination | 103742.00 | | | |
| 0.00 | IIT Guwahati | 30000.00 | | | |
| 21348364.67 | Total B | | | 27188236.67 | |
| 111980829.38 | TOTAL A + B | | | 147464753.13 | |

HARISH-CHANDRA RESEARCH INSTITUTE
ALLAHABAD 211 019

SCHEDULES FORMING PART OF INCOME & EXPENDITURE FOR THE YEAR ENDED ON 31ST MARCH 2010

| Amount in Rs. Year 2008-09 | SCHEDULE 9 - GRANTS / SUBSIDIES (Grants & Subsidies Received) | | Amount in Rs. Year 2009-10 |
|-------------------------------|-------------------------------------------------------------------------|--------------|-------------------------------|
| 129700000.00 | 1. Central Government - DAE | 143200000.00 | |
| 0.00 | 2. State Government | 0.00 | 143200000.00 |
| 129700000.00 | Total | | 143200000.00 |

| Amount in Rs. Year 2008-09 | SCHEDULE 10 - INCOME ON INVESTMENTS | | Amount in Rs. Year 2009-10 |
|-------------------------------|----------------------------------------------------------------------|----------|-------------------------------|
| 109917.00 | 1. INTEREST on Securities / Bonds | 0.00 | |
| 0.00 | 2. OTHERS (Specify) (Misc. Receipts -Recovery of Excess Pension) | 99782.00 | 99782.00 |
| 109917.00 | Total | | 99782.00 |

| Amount in Rs. Year 2008-09 | SCHEDULE 11- INTEREST EARNED | | Amount in Rs. Year 2009-10 |
|-------------------------------|---------------------------------------------|------------|-------------------------------|
| 2026522.58 | 1. On Term Deposits with Scheduled Banks | 2493365.00 | |
| 88473.00 | with Scheduled Bank(On A/C 101) | 99205.00 | 2592570.00 |
| 9286.00 | 2. On Loans to Employees /Staff | | 7685.00 |
| 2124281.58 | Total | | 2600255.00 |

| Amount in Rs. Year 2008-09 | SCHEDULE 12 - OTHER INCOME | | Amount in Rs. Year 2009-10 |
|-------------------------------|----------------------------------------------------|--|-------------------------------|
| 831643.00 | 1. License Fee & Electricity from Rented Buildings | | 1492984.00 |
| 556441.00 | 2. Guest House Receipts | | 551982.00 |
| 206160.00 | 3. Pantry Receipts | | 242610.00 |
| 59300.00 | 4. Sale of Tenders | | 89450.00 |
| 93107.00 | 5. Recovery of Telephone Charges | | 50720.00 |
| 66900.00 | 6. Recovery of Cable TV Charges | | 57600.00 |
| 57236.00 | 7. Recovery of Transport Charges | | 75867.00 |
| 22844.00 | 9. Sale of Scraps | | 3600.00 |
| 62808.00 | 10. Misc.Income | | 70832.00 |
| 1956439.00 | Total | | 2635645.00 |

| Amount in Rs. Year 2008-09 | SCHEDULE 13 - ESTABLISHMENT EXPENSES | | Amount in Rs. Year 2009-10 |
|-------------------------------|---------------------------------------------------|--|-------------------------------|
| 37372055.00 | (A) PAY AND ALLOWANCES | | 52588593.00 |
| 11476666.00 | (B) FELLOWSHIP & HONORARIUM | | 12681920.00 |
| 1348293.00 | (C) CONTRIBUTION TO PROVIDENT FUND (CPF & NPS) | | 1958730.00 |
| 1203208.00 | (D) PENSION | | 1509950.00 |
| 88709.00 | (E) RETIREMENT BENEFITS | | 319101.00 |
| 162850.00 | (F) OVERTIME ALLOWANCE | | 155444.00 |
| 396702.00 | (G) LEAVE TRAVEL CONCESSION | | 840546.00 |
| 2516078.00 | (H) MEDICAL AID | | 2820176.00 |
| 405640.00 | (I) STAFF WELFARE ACTIVITIES | | 504436.00 |
| 54970201.00 | Total | | 73378896.00 |

**HARISH-CHANDRA RESEARCH INSTITUTE
ALLAHABAD 211 019**

SCHEDULES FORMING PART OF INCOME & EXPENDITURE FOR THE YEAR ENDED ON 31ST MARCH 2010

| Amount in Rs. Year 2008-09 | SCHEDULE 14 - OTHER ADMINISTRATIVE EXPENSES ETC. | Amount in Rs. Year 2009-10 |
|-------------------------------|--------------------------------------------------------------|-------------------------------|
| 1584258.00 | a) Travel Expenses - Academic & Admin. Staff Within India | 1500291.00 |
| 1046247.00 | Outside India | 1352447.00 |
| 830330.00 | b) Conference /Symposia | 624648.00 |
| 76137.00 | c) Furniture & Fixtures - From Non-Plan Grant | 293717.00 |
| 5447723.00 | d) Computers and Computer Service & Maintenance | 2984370.00 |
| 608720.00 | e) Supplies & Materials | 1081333.00 |
| 16221467.00 | f) Library & Publications | 20759940.00 |
| 5857598.00 | g) Watch & Ward Services | 4674903.00 |
| 4597007.00 | h) House Keeping Services | 7920944.00 |
| | i) Maintenance Expenses | |
| 1637067.00 | Civil Maintenance | 2748379.00 |
| 1350476.00 | Lawn Maintenance | 1477339.00 |
| 616746.00 | Electrical Installations | 634710.00 |
| 1981068.00 | Misc. Equipment / Installations | 1120107.00 |
| 1120873.00 | Air Conditioners | 1239230.00 |
| 0.00 | Gas Bank | 30800.00 |
| 44080.00 | Aqua Guards | 72110.00 |
| 0.00 | Elevator | 36000.00 |
| 82270.00 | Photocopiers | 55978.00 |
| | j) Departmental Canteen / Guest House & Hostels | |
| 411547.00 | Pantry | 590793.00 |
| 126142.00 | City Guest House | 124943.00 |
| 599217.00 | Campus Guest House & Hostels | 708865.00 |
| | k) Electricity & Power | |
| 8317728.00 | Electricity | 9017748.00 |
| 7527021.00 | Generator Expenses | 6953394.00 |
| | l) Vehicle Running & Maintenance | |
| 77870.00 | Staff Cars | 76560.00 |
| 173700.00 | Hired Autos | 175878.00 |
| 3179186.00 | Hired Buses | 3121886.00 |
| 407499.00 | Hired Vehicles (Vans etc.) | 467196.00 |
| | m) Postage Telephone & Communication Charges | |
| 70154.00 | Postage | 129288.00 |
| 1506100.00 | Telephone, Telex ,Telegrams Etc. | 1373416.00 |
| 491169.00 | n) Stationery & Printing | 397912.00 |
| 447997.00 | o) Consultancy & Legal Expenses | 84105.00 |
| 16545.00 | p) Auditors Remuneration | 22060.00 |
| 473029.00 | q) Advertisements | 682140.00 |
| | r) Others | |
| 54509.00 | Bank Charges | 83619.50 |
| 56685.00 | Binding Charges | 58255.00 |
| 51600.00 | HRI Pre-School | 47100.00 |
| 5096.00 | Liveries | 2806.00 |
| 45301.00 | Misc. Expenses | 51426.00 |
| 36941.00 | News Papers & Periodicals | 44221.00 |
| 35242.00 | Office Expenses | 101785.00 |
| 67212345.00 | Total | 72922642.50 |

**HARISH CHNADRA RESERACH INSTITUTE
ALLAHABAD-211019**

**SCHEDULE-15 FORMATTING PART OF BALANCE SHEET AND INCOME AND
EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31st
MARCH 2010.**

SIGNIFICANT ACCOUNTING POLICIES & NOTES ON ACCOUNTS.

Basis of Accounting

1. The accounts are prepared under historical cost convention on an accrual basis.
2. Accounting policies not specifically referred to otherwise are consistent and inconsonance with generally accepted accounting principles except as stated in Sl. No. 10 & 11 below.
3. Figures of the previous year and current year have been regrouped wherever necessary to confirm classification.

Fixed Assets

4. Fixed Assets are stated at cost of acquisition inclusive of freight, duties, taxes and incidental expenses related to the acquisition.

DEPRECIATION

5. Depreciation on Fixed Assets has been provided on written down value method as per rates specified in the Income Tax Act.1961 w.e.f.01.04.2009.
 - A Land : Nil
 - B Building : 10%
 - C Plant Mach. & Equipments : 15%
 - D Vehicles : 15%
 - E Furniture & Fixtures : 10%
 - F Office Equipments : 15%
 - G Computer/Peripherals : : 60%
 - H Electrical Installations: : 10%
 - I Books & Journals : 25%
 - J Other Fixed Assets : 15%
- 5.1 Depreciation has been charged for the full year on additions made during the year. No Depreciation is charged on assets, which is sold during the year.
- 5.2 Book value of assets sold is written off to the Income & Expenditure Account in the year of sale. Realisation made from sale of scrap is taken as Misc. Income in the year of receipt.

Investment

6. Investments are valued at cost plus interest accrued thereon.

Plan Funds

7. Assets purchased from XIth plan funds for Rs. 2,03,74,699.00/- have been capitalized under the appropriate heads of accounts of Fixed Assets.

Funds for Projects/Schemes

8. All grants in respect of projects/Schemes are accounted on realization basis.

The unspent amount of grants received in respect of the projects/Schemes is shown under Current Liabilities in the Balance Sheet under the head “receipts against ongoing sponsored projects/schemes” and excess of payments made over the grants received in respect Project /Schemes are shown under Current Assets in the Balance Sheet under the head “Payments against ongoing sponsored Projects/Schemes”.

Expenses

9. Consumable, stores and stationery are charged to the Income and Expenditure Account in the year of its purchase.
10. Email, VSAT facility, Internet / Broadband charges, Annual Maintenance charges of fixed assets, Up-date Allowances are charged to the Income & Expenditure account in the year of its payment. Rent receipts are taken into Income & Expenditure account on cash basis.

Income /Receipts

11. Interest income on UPPCL deposit and bank accounts are recognized on receipt basis.

Fixed Assets

12. Fixed Assets have been regrouped on 31st March 2010 for the purpose of charging Depreciation. The Fixed Assets are subject to physical verification.

Retirement Benefits

13. Provision for accrued liability towards Gratuity, Leave Encashment and Pension has been made on actuarial valuation basis.

Taxation

14. In view of there being no taxable income under the Income Tax Act, 1961, no provision for Income Tax has been considered necessary.

As per our separate report of even date attached.

Balramchandra & Associates
Chartered Accountants

for Harish Chandra Research Institute

Sd/-
Partner

Sd/-
(Raaj Gulati)
Accounts Officer

Sd/-
(P.B. Chakraborty)
Registrar

Sd/-
(Amitava Raychoudhuri)
Director

Place: Allahabad
Date: 10-08-2010.

Harish-Chandra Research Institute
Receipt & Payment Account
Year 2009-10

| Amount FY 08-09 | Inflow | Amount Year 2009-10 | Amount FY 08-09 | Outflow | Amount Year 2009-10 |
|---------------------|---------------------------------------------------|---------------------|---------------------|------------------------------------------------------|---------------------|
| 4626.25 | Cash-in-hand (Opening Balance) | 71952.25 | 71952.25 | Cash-in-hand (Closing balance) | 81823.25 |
| 90606955.34 | Bank Accounts (Opening Balance) | 77405214.34 | 77405214.34 | Bank Accounts (Closing balance) | 120193589.09 |
| | Other Grants & Receipts | 8534040.00 | | Other Grants & Receipts | 7467074.00 |
| 1026659.00 | DST Projects | 954159.00 | 1408752.00 | DST Projects | 625278.00 |
| 679187.00 | NBHM Projects | 30000.00 | 851923.00 | NBHM Projects | 191159.00 |
| 0.00 | DEA Travel Grant | 50000.00 | 13179.00 | Ramanujan Math Society Projects | 0.00 |
| 182494.00 | U K-INDIA EDUCATION RESEARCH FUND | 393281.00 | 500768.50 | U K-INDIA EDUCATION RESEARCH FUND | 786562.00 |
| 0.00 | India -Eu Research project(Pinaki Majumdar) | 1550000.00 | 0.00 | DAE-SRC outstanding Research Investigator Award | 738984.00 |
| 0.00 | DAE-SRC outstanding Research Investigator Award | 1390000.00 | 300000.00 | KVPY Summer Programme Support | 140000.00 |
| 300000.00 | KVPY Summer Programme Support | 140000.00 | 52320.00 | Science Education Prog-Indian National Science Acad | 49020.00 |
| 20000.00 | Infosys Foundation Conference | 2500000.00 | 0.00 | Travel Grant-Mahendra Singh | 50000.00 |
| 854600.00 | Swarn Jayanti Fellowship | 904600.00 | 88982.00 | Infosys Foundation Conference | 2665295.00 |
| 720000.00 | CSIR | 622000.00 | 50000.00 | Swarn Jayanti Fellowship | 1439451.00 |
| | | | 3315.00 | String Theory NAS Ald | 0.00 |
| | | | 0.00 | India -Eu Research project(Pinaki Majumdar) | 61325.00 |
| | Current Liabilities | 175414402.00 | 720000.00 | CSIR | 720000.00 |
| 5852058.00 | Accounts Payable | 7192852.00 | 97239.00 | CPSTIO Project | 0.00 |
| 6281521.00 | Staff Accounts | 9336993.00 | | | |
| 5907158.00 | Duties & Taxes | 10768949.00 | | Current Liabilities | 150646434.00 |
| 142952525.00 | Parties Accounts | 120256651.00 | 5714486.00 | Accounts Payable | 6508694.00 |
| 7000029.00 | Sundry Creditors | 6076904.00 | 6199521.00 | Staff Accounts | 9287208.00 |
| 36094753.00 | Provisions | 21782053.00 | 5309709.00 | Duties & Taxes | 10787939.00 |
| | | | 140730969.00 | Parties Accounts | 120410779.00 |
| | | | 7009112.00 | Sundry Creditors | 3651814.00 |
| | | | 1020920.00 | DAE Grant Non-Recurring Refundable | |
| | Fixed Assets | 0.00 | | Fixed Assets | 24146548.00 |
| 37929247.31 | Fixed Assets(Mach.Equip.Etc.) | 0.00 | 69239608.00 | Fixed Assets(Mach.Equip.Etc.) | 24146548.00 |
| | | | | | |
| | Current Assets | 30301082.00 | | Deferred Revenue Expenses (Power) | 15877526.00 |
| 15028434.00 | Advance for Journals | 18891571.00 | | Composite Works for Power Line | 15877526.00 |
| 6809645.00 | Loans & Advances to Staff | 7025246.00 | | Current Assets | 29363292.00 |
| 122517.00 | Deposits (Asset) | 163651.00 | 18768072.00 | Advance for Journals | 19894057.00 |
| 437470.00 | Claims Receivable | 4126746.00 | 6483118.00 | Loans & Advances to Staff | 6614451.00 |
| 29111.00 | Postage in Hand/Frinking/S) | 93868.00 | 306094.00 | Deposits (Asset) | 2227335.00 |
| 190478310.70 | General Fund | 186644125.50 | 2863729.00 | Claims Receivable | 545449.00 |
| | Xlth Plan Grant Receipts | 90000000.00 | 21200.00 | Postage in Hand/Frinking/S) | 82000.00 |
| 4660000.00 | Grant- Scientific Human Resource Training | 6400000.00 | 132713644.30 | General Fund | 147272653.00 |
| 15000000.00 | Grant-Civil & Infrastructure Development | 10300000.00 | | Xlth Plan Grants Utilisation | 53412409.75 |
| 4117000.00 | Grant-High Performance Scientific Computing | 10500000.00 | 11101135.50 | Scientific Human Resources Training | 3287491.75 |
| 5268000.00 | Grant-Library Development Project | 5500000.00 | 1310448.00 | Infrastructure(Non-Housing) | 12792359.00 |
| 6393000.00 | Grant-RECAPP | 6800000.00 | 40817499.00 | High Performance Scientific Computing | 8778859.00 |
| 5000000.00 | Grant-Scientific Computing & Networking | 26300000.00 | 6109427.00 | Library Development Project | 7658359.00 |
| 2600000.00 | Grant-Special Year in Mathematics | 2600000.00 | 8201022.00 | Regional Center- Accelerator Based Particle Physic | 3588365.50 |
| 15000000.00 | Grant-Housing | 20000000.00 | 7082376.00 | Scientific Computing & Networking | 14446267.50 |
| 0.00 | Grant-Equipping & Furnishing of Conference Centre | 1600000.00 | 2075330.00 | Special Year in Mathematics | 2855608.00 |
| | Receipts | 148535682.00 | 674160.00 | Infrastructure(Housing) | 0.00 |
| 1965725.00 | Other Income | 2842317.00 | 363080.00 | Equip. & Furnishing-Conference Centre | 5100.00 |
| 129700000.00 | Grants-in-Aid | 143200000.00 | 124233.58 | Investments - Interest Accrued on Investments | 102336.00 |
| 2224912.58 | Interest Earned | 2493365.00 | 0.00 | DAE - Recurring Grant | 259221.50 |
| 9571652.00 | DAE - Recurring Grant | 0.00 | 195015051.71 | Expenses - Recurring | 168083591.50 |
| 750817590.18 | Grand Total | 716906498.09 | 750817590.18 | Grand Total | 716906498.09 |

Place:Allahabad
Date:Aug 10th 2010

RAAJ GULATI
ACCOUNTS OFFICER

P.B.CHAKROBORTY
REGISTRAR

A. RAYCHAUDHURI
DIRECTOR

For Balramchandra & Associates
CHARTERED ACCOUNTANTS

Action taken on Auditors Report

1. 60% arrears on 6th CPC was paid on cash basis as per release order issued by Ministry of Finance OM No.F.No.1/1/2008-1C dated 25.08.2009 in Financial Year 2009-10, although the arrears were effective from 1.1.2006.
2. The Institute decided to switch over to new depreciation rate as per O.M. No.HRI/101/973 dated 6.03.10 on the basis of approval of Governing Council.
3. Reconciliation/Confirmation of EMD balances, Security Deposits, Sundry Creditors, Loans & Advances and Claims Recoverable are being done periodically.
4. Quantitative inventory of received journals is being maintained on Library Software. Efforts are being made to provide an inventory having quantity as well as value of journals. Capitalization of current journals was not done as per the advice given by Joint Secretary, R&D, DAE, Mumbai during Governing Council meeting held on 13.08.2009.
5. The Institute is continuously in correspondence with the various departments for realising its expenses incurred on their behalf. The Institute will take permission of the Governing Council to write-off these recoverables, if the efforts fail.
6. Physical verification of assets was done during the financial year and its values are being reconciled with the fixed assets register.
7. For making urgent payments to Institute Visitors, the Institute some times pays cash in excess of Rs.20,000/- towards settlement of their travel bills. However, the observation is noted for future compliance in view of Taxation Laws.