

हरीश-चन्द्र अनुसंधान संस्थान

**Harish-Chandra Research Institute**

छतनाग मार्ग, झूँसी, इलाहाबाद - 211 019

Chhatnag Road, Jhunsi, Allahabad - 211019

वार्षिक प्रतिवेदन

**Annual Report**

**(2008 – 09)**

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# 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. On Prof. Bhatnagar's demise in October 1976, responsibilities were again taken up by Dr. Sinha. In January 1983, Prof. S. S. Shrikhande of Bombay University joined as the next Director of the Institute. During his tenure the dialogue with 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 Prof. Ashoke Sen, Prof. A. Raychaudhuri, Prof. B. Mukhopadhyaya and Prof. Pinaki Majumdar, all winners of the prestigious S. S. Bhatnagar award. Prof. Ashoke Sen was also awarded the Padmashri, the Fellowship of the Royal Society, S. N. Bose Medal of the Indian National Science Academy (INSA) and the J. C. Bose fellowship of the Department of Science and Technology. Prof. Rajesh Gopakumar won the Swarnajayanti fellowship of Department of Science and Technology and the International Centre for Theoretical Physics (ICTP) prize for 2006.

## **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, 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

2008-09 has been a busy year at the Harish-Chandra Research Institute (HRI). The Institute, situated just outside the city of Allahabad, is known nationally and internationally for its innovative research in the fields of mathematics and theoretical physics. The Institute has taken the initiative to expand into the area of Quantum Information, which straddles areas of physics as diverse as quantum optics and condensed matter physics as well as mathematics. It is expected that the group in this area will add a novel dimension to HRI's oeuvre.

The research activities as well as the pre-Ph. D. teaching programme at HRI have continued to be at the highest level. This has been possible through the sustained efforts of our scientists, post-doctoral fellows, students, and visitors to continuously upgrade themselves to remain at the frontiers of international research. They were assisted in no small measure by the steadfast administrative support from the entire Institute staff. All members of HRI carry a deep sense of belonging and are willing to walk the extra mile to ensure that the Institute steadily progresses towards further national and international recognition. As a prominent member of the Department of Atomic Energy (DAE, Government of India) fraternity, the Institute is a participant in the Department's R&D programme through research and education endeavours. The Ph. D. students of HRI register with the Homi Bhabha National Institute (HBNI), the deemed university under DAE. It also maintains close linkages with a number of the other DAE institutes and units through teaching and research avenues. Under the XIth Five-year Plan, HRI has set up a high performance computer cluster, which provides the major computational backbone for the Institute. Through other Plan projects it is envisaged to expand the library and office space, to create a much needed new hostel, to add some space to the community centre, etc. The structural drawings for these are being finalised now. The number and scope of collaboration meetings, workshops, training school programmes, outreach activities, have all been significantly enhanced through the projects associated with Scientific Human Resources Training, Special Years in Mathematics, and the Regional Centre for Accelerator-Based Particle Physics.

The recommendations of the 6th CPC have been approved for autonomous institutes by the DAE and these have been implemented effective January 2006. 40% of the arrears have already been disbursed and the rest will be completed in 2009-10.

HRI admits students at both the post-B. Sc. and the post-M. Sc. stage. The post-B. Sc. integrated Ph. D. students in physics receive their laboratory training at sister HBNI Constituent Institutes – e.g., RRCAT, Indore and SINP, Kolkata.

In this year more than half a dozen students have completed their Ph.D.s. It is a cause of no small satisfaction that all of them have been picked up by good institutions in India and abroad as post-doctoral fellows. In mathematics, in 2008-09 one student joined the Ph. D. programme through the HRI selection procedure. This is partly a reflection of the very limited number of quality students in mathematics wishing to pursue an academic career. Nine students (post-B. Sc. and post-M. Sc.) joined the Ph. D. programme in physics. The post-B. Sc. students register for an integrated Ph. D. programme and attend an extra year of course work also undertaking laboratory training.

Among intending Ph. D. students in physics HRI holds a very high stature as is borne out from the preferences of the toppers in the JEST examination. There are also many applications from inside as well as outside the country for post-doctoral positions at the Institute. We are working to enhance the number of Ph.D. students in both physics and mathematics and hope to double the intake in the 2009-10 academic year.

The power situation in Allahabad is far from satisfactory with frequent outages. HRI is in the process of obtaining a dedicated 33kV connection from UPPCL. The work is nearing the end and it is our estimate that within the middle of this year the connection will be energized. The number of national and international conferences, workshops, and meetings at HRI have seen a steady increase. Indeed, in almost every area, be it in mathematics or in theoretical physics, there is usually at least one (and often more) scheduled activity every year.

Tirthankar Roy Choudhury is the newest faculty member to join the Institute. His area of expertise is Astrophysics. He is the fourth member of this group. During the past year two HRI faculty—Srubabati Goswami and Manoj Gopalakrishnan — were granted leave to accept positions elsewhere.

In the 3rd HRI Triveni Lecture, Professor C.S. Seshadri, Chennai Mathematical Institute, spoke about ‘Algebraic Geometry and its development in India’. This lecture was held on December 26, 2008. The 6th HRI Girdharilal Mehta Lecture was delivered on February 06, 2009 by Professor Roger Howe, Yale University. His lecture was entitled ‘Symmetry: More than pretty pictures’.

The Institute's faculty are recognised by their peers for their innovative research every year. Some of these for the past year are:

- Professor Pinaki Majumdar was selected for the DAE-SRC Outstanding Research Investigator Award.
- Dr. Srubabati Goswami was selected for the Ramanujan Fellowship of DST.
- The Indian Academy of Sciences elected Professor Rajesh Gopakumar as a Fellow.

The year ahead looks promising for the Harish-Chandra Research Institute.

A. Raychaudhuri  
Director

# Governing Council

1. Prof. M. S. Raghunathan  
(Chairman)  
School of Mathematics  
Tata Institute of Fundamental Research  
Homi Bhabha Road  
Mumbai 400005
2. Prof. R. Balasubramanian  
Institute of Mathematical Sciences  
CIT Campus, Taramani  
Chennai 600113
3. Dr. J. N. De  
BH-135, Sector II  
Salt Lake  
Kolkata 700091
4. Prof. Narendra Kumar  
Raman Research Institute  
Sadashivnagar  
Bengaluru 560080
5. Prof. H. S. Mani  
2 Fourth Cross Street  
Durga Colony, Sembakkam  
Chennai 600073
6. Mr. S. L. Mehta  
4 Clive Row  
Kolkata 700001
7. Mr. Avnish Mehta  
4 Penn Road  
Kolkata 700027
8. Mr. R. K. Mishra  
23/1E P. C. Banerjee Road  
Allen Ganj  
Allahabad 211001
9. Dr. Mian Jan  
Civil Lines  
Allahabad 211001
10. Prof. A. Raychaudhuri  
Harish-Chandra Research Institute  
Chhatnag Road, Jhansi  
Allahabad 211019



11. Mr. V. R. Sadasivan

Joint Secretary (F)  
Govt. of India, DAE  
Ch. Shivaji Maharaj Marg  
Mumbai 400001

12. Dr. P. Mukherjee

Joint Secretary (R& D)  
Govt. of India, DAE  
Ch. Shivaji Maharaj Marg  
Mumbai 400001

# Summary of Research Activities in Mathematics

## Research in Algebra and surrounding areas

Classification problem of the finite dimensional irreducible integrable representations of the Lie Tori  $Sl_{l+1}(C_q)$  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 center 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 problems in the field of nonmetrizable manifolds. The basic question has been to determine the groups of homoeomorphisms 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 spaces 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 viewpoint, 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**

An Interesting question in the subject of combinatorial number theory is to determine a lower bound for the number of lines through the origin that pass through a large but otherwise arbitrary set of integer points in the plane. Optimal results on this problem have been obtained. Also these results are applied to settle a question of A. Sarkozy concerning the gaps between terms of the product sequence of given sequences of integers.

## **Research in Combinatorial 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 L-functions 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 pseudo-eigen values of the Atkin-Lehner  $W$ -operators on new forms 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.

# Activities in Physics

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

## Astrophysics

The astrophysics group at HRI carries out research in the areas of high-energy astrophysics and 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. In the area of high-energy astrophysics and compact objects, behavior of relativistic accretion close to the event horizon has been studied. The possibility that some of the observed recycled pulsars could actually be strange quark stars 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. The possibility of neutrino viscosity and non-minimally coupled scalar fields driving late-time cosmic acceleration have also been examined. In the area of large scale structure formation, N-body simulations have been used for studying galaxy formation. The effect of finite simulation box sizes on moments of density distribution have been quantified. The physical processes related to the cosmological reionization, like star formation, chemical enrichment and feedback, have been modelled. The comparison of these models with different observations has been performed. In the field of inflationary cosmology, deviations from slow roll inflation and features in the primordial spectrum have been investigated. Work has also been done on reheating and its effects on the evolution of perturbations. In the area of black holes, studies have been performed on analytical aspects of black hole astrophysics and analogue gravity phenomena. In addition, quantum aspects of gravitational collapse and black hole physics have also been investigated.

## Condensed Matter Physics

Research in condensed matter physics were performed in four sub-areas: quantum wires, strongly correlated systems, *ab initio* studies of atomic clusters and solid surfaces, and spintronics. In quantum wires, superconducting junctions of quantum wires, point contact line junctions in quantum Hall (QH) systems, and tunneling density of states in Tomonaga-Luttinger liquid wires were studied. Renormalization group flow studies of two-terminal conductance of a superconducting junction of two Luttinger liquid wires produced a non-trivial fixed point. Existence of a  $g \leftrightarrow 1/g$  duality between charge conserving (normal)

and charge non-conserving (superconducting) junctions was also established. Studies of transport across a point contact between two  $\nu = 5/2$  QH states, and analyses of the effects of Coulomb interaction between various edge states produced a fixed point that has a Hall conductance of  $e^2/2h$ . In three wire Tomonaga-Luttinger liquid junctions, some fixed points are found to have enhanced tunneling density of states, which is very unusual. In strongly correlated systems field induced melting of charge order in manganites were studied. Study of B site doping in various manganite phases is also almost complete. Work on cellular DMFT for correlated electron systems has been initiated. Research on clusters motly focussed on designing clusters that can behave as superatoms. Studies of transition metal doped alkali clusters led to the discovery of a simple principle that paved the way to designing magnetic superatoms for the first time. In particular, a  $VCs_s$  cluster was shown to be a superatom analogue of a Mn atom. Efforts are on to theoretically explore possibilities of building materials with tailor-made properties from these superatoms. Other research efforts were aimed towards studies of wire formation and metallization of Si surfaces, and studying novel magnetic materials. Research in spintronics mainly focussed on spin transport in meso- and nano-scale systems. Since spin is not a conserved quantity in presence of spin-orbit coupling, the concept of spin current is inherently ill-defined. These conceptual problems and their effects on spin transport are being studied. Non-equilibrium Green's function method is being developed to study different aspects of spin current.

## String Theory

Members of the string theory group have been working on black holes, gauge-gravity duality, Logarithmic conformal field theories, tachyon dynamics, string cosmology, gauge theory and gravity amplitudes, and membrane dynamics.

- 1) Black holes: Understanding the quantum corrections to black hole entropy using  $AdS_2/CFT_1$  correspondence. Precision counting of number of microstates of black holes in  $N = 8$  and  $N = 4$  superstring theories.
- 2) Gauge gravity duality: Studying hydrodynamics limit of strongly coupled gauge theories using  $AdS /CFT$  correspondence. Non- relativistic limit of gauge gravity duality. Studies of Wilson loops strongly coupled supersymmetric field theories and matrix quantum mechanics. Calculation of heat Kernel in  $AdS_3$  for particles of arbitrary spin.
- 3) Logarithmic conformal field theories: Integral representation for characters of minimal LCFTs.
- 4) Tachyon Dynamics: Dp-brane motion in NS5 brane background.

- 5) String Cosmology: Aspects of brane inflation in flux background as well as tachyonic inflation.
- 6) Gauge theory and Gravity amplitudes: Structure of tree and one-loop S-matrices in non-commutative gauge theories as well as N=1 and N=2 supersymmetric gauge theories. Self-dual N =8 supergravity amplitudes in twistor space.
- 7) Membrane Dynamics: Higher derivative corrections to multi- membrane effective actions defined in terms of 3-algebras.

## **High Energy Physics**

During the past year the activities in the Particle Physics Phenomenology Group remained focused in the broad frontier of the subject, namely, the physics of the Standard Model of particle physics and beyond. The members of the group have been actively involved in studies of several different aspects of this broad area. These include

- Physics of the tiny and extremely weakly interacting fundamental particles called neutrinos. Neutrinos have active origins in the upper atmosphere of the earth, the deep interior of the sun and in other astrophysical entities like the supernovae and their energies range over extreme values
- Grand Unified Theories (GUTs) which attempt to understand the diverse fundamental interactions at the deepest level of matter around us as emerging from some unified framework
- Phenomenological implications (in particular, those at the upcoming Large Hadron Collider or the LHC at CERN, Switzerland) of scenarios with new underlying symmetries in Nature like Supersymmetry (SUSY) or some novel fabric of space-time with extra space dimensions that evade our usual senses
- The role and implications of the strong interaction dynamics (known as perturbative quantum chromodynamics (QCD)) in the search for footprints of one or the other kind of new design in Nature and
- Studying physics of the predicted Higgs boson(s) which explains the origin of mass.

A strong contingent of about 20 people that includes graduate students, visiting scientists, postdoctoral fellows and senior faculty members is devoted to these studies.

Members of the neutrino group are actively involved in the physics and development of the India-based Neutrino Observatory (INO), which is planned as India's largest basic science project. In its first phase, scheduled to start around 2014, INO will provide fundamental information on neutrino properties using signals from atmospheric neutrinos. From recent experiments we now know that the neutrinos have mass and they do mix among themselves. The discovery is hailed as the first ever concrete indication of physics beyond the Standard Model. However, the hierarchy of their masses and the mixing-patterns are not yet entirely understood. In particular, several detailed studies of the mass hierarchy measurement at INO have been performed by the group. The members of the group are also intensively engaged in the study of these properties in long-baseline experiments and are also exploring the prospects of the Iron Calorimeter detector at INO (as an end-detector for such an experiment) in its second phase (post 2016) with the so-called 'beta-beam' source in Europe. The group here has recently established that this set-up has an unmatched sensitivity for probing the unknowns. Rigorous studies have also been carried out to determine the low-energy neutrino mass-matrix from experimental observations as well as to find out consistent frameworks beyond the Standard Model (in particular, SUSY) that could accommodate the same. Studies have currently been taken up to understand the fluxes of Ultra High Energy (UHE) neutrinos in both presence and absence of physics beyond the Standard Model.

The focus of the group is on the systematic signal-based studies at the LHC of physics beyond the Standard Model involving SUSY framework, different extra-dimensional scenarios, scenarios of alternate electroweak symmetry breaking etc. In particular, extensive investigations on the phenomenological consequences of high-scale non-universality in gaugino and scalar masses in a SUSY framework have been carried out. Interesting search criteria have been devised for diverse other situations like possible events with highly energetic top and bottom quarks at the LHC, scenarios with light SUSY neutrino as the lightest SUSY particle and challenges with quasistable charged SUSY particles whose implications are appreciated only very recently. Some of these studies attempt to explore the collider implications of new physics possibilities pertaining to the neutrinos.

The group is also involved in detailed studies aiming at precise estimation of QCD effects in diverse physical situations that include scenarios with 'large' extra dimensions, the so-called universal extra dimensions and those involving the 'scale-invariant' sectors which are rather recent notions in the area. These effects are shown to be extremely crucial for predictions and interpretations of the



outcome at the LHC. All these studies would help understand the nature of the new physics when some signal is observed at the LHC, the biggest ever international experiment in the history of fundamental science which will start running soon. Also, there have been serious attempts to understand some structural features of the Randall-Sundrum model (which is a very popular scenario with extra space dimensions) and their phenomenological consequences. Prospects of different direct experiments for detecting the so-called dark matter particles have also been studied in the group.

Through a collective endeavour of the members of the group the Regional Centre for Accelerator-based Particle Physics (RECAPP) was started at HRI in April, 2007 under the XIth 5 year plan. The mandate of the centre is to provide a collaborative platform to scientists from the region who are involved in physics studies at colliders and to train manpower for years to come. In the same plan-period, a focused project on Neutrino Physics has also been undertaken. These efforts are of particular importance in view of the upcoming LHC and INO.

It is exciting to realise that the group here is working in an extremely significant era when the physics of the microcosm (elementary particle physics) has got entangled with that of the macrocosm (at the astrophysical scale) at an unprecedented level and in an irrefutable way. The projects undertaken by the group-members in recent times clearly reflect this cutting-edge aspect of modern particle physics.

# **Note On Persons With Disabilities**

The Institute, 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.

# Vigilance

There is nothing to report from vigilance point of view for the period up to March 31, 2009.

## **Auditor's Report**

1. We have audited the attached Balance Sheet of Harish-Chandra Research Institute, Allahabad as at 31<sup>st</sup> March 2009 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-14 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 31<sup>st</sup> March 2009.
  - ii) In the 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  
Date: 28-07-2009.

Partner

**HARISH CHANDRA RESEARCH INSTITUTE  
ALLAHABAD-211019**

**SCHEDULE-14      FORMATTING PART OF BALANCE SHEET AND INCOME AND  
EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31<sup>st</sup>  
MARCH 2009.**

**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 in consonance with generally accepted accounting principles except as stated in Sl. No. 11 & 12 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.
5. Depreciation on Fixed Assets has been charged on written down value method at the rates mentioned in the Schedule-5 of the Fixed Assets. Depreciation on purchase of fixed assets during the year has been charged for the whole year in view of the higher depreciation at initial stage.

**Investment**

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

**Plan Funds**

7. Assets purchased from XIth plan funds for Rs. 6,50,20,491.50/- have been capitalized under the appropriate heads of accounts of Fixed Assets.

8. A sum of Rs. 1,61,36,726.00 had been advanced to UPPCL for a new dedicated 33 KVA power line using the funds from plan grant after getting the approved for re-apportionment from DAE in last financial year.

### **Grants-in-aid**

9. Unspent balance of Non-plan grants are shown under the liabilities side of the Balance Sheet.
10. Non-plan grants, which have been utilized for the purchase of capital assets, are transferred to Capital Fund.

### **Expenses**

11. Consumable, stores and stationery are charged to the Income and Expenditure Account in the year of its purchase.
12. 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.
13. Purchase of Books and Current Journals out of Non Plan Grants are charged to the revenue account.
14. Non-Plan grants, which have been utilized for purchasing capital assets of Rs. 2847264.00/- are also charged to other administrative expenses.

### **Provision for retirement benefits**

15. Provision for pension, gratuity, leave encashment etc. has been made on the basis of actuarial valuation.

As per our separate report of even date attached.

Balramchandra & Associates  
Chartered Accountants

For Harish Chandra Research  
Institute

(Balram Chandra) (Raaj Gulati) (P.B. Chakraborty) (Amitava Raychaudhuri)  
Partner Accounts Officer Registrar Director

Place: Allahabad

Date: 28-07-2009.

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

**BALANCE SHEET AS AT 31ST MARCH 2009**

<b>As on 31st March 2008</b>	<b>CAPITAL FUND &amp; LIABILITIES</b>	<b>Sch.</b>	<b>Amount in Rs.</b>	<b>As on 31st March 2009</b>
				<b>Amount - Rs.</b>
152002935.85	CORPUS / CAPITAL FUND	1		148643188.12
64451999.00	PLAN GRANT - Carried over	2	44755521.50	
16136726.00	Add: ADVANCE PAYMENT-WORK-IN-PROGRESS		16136726.00	60892247.50
2969927.43	NON-PLAN GRANT Carried over	3		12541579.43
63107038.60	CURRENT LIABILITIES AND PROVISIONS	4		101649674.10
<b>298668626.88</b>	<b>TOTAL ==&gt;</b>			<b>323726689.15</b>
	<b>ASSETS</b>			
	FIXED ASSETS	5		
446084351.14	GROSS BLOCK		446084351.14	
	ADD: Capitalization of assets- Revenue Grant		2847264.00	
	ADD: Capitalization of assets- Plan Grant		65020491.50	
	LESS: Adjustment of Prev. Years		-209918.10	
-277452075.64	LESS: CUMULATIVE DEPRECIATION		-313799552.35	
168632275.50	W.D.V		199942636.19	
16136726.00	ADD: Work-in-progress (Power)		16136726.00	216079362.19
1918796.00	INVESTMENTS	6		2043029.58
111980829.38	CURRENT ASSETS, LOANS AND ADVANCES ETC.	7		105604297.38
<b>298668626.88</b>	<b>TOTAL ==&gt;</b>			<b>323726689.15</b>
	SIGNIFICANT ACCOUNTING POLICIES & NOTES ON ACCOUNTS	14		

As per our separate  
report of even date  
attached  
**For Balram Chandra &  
Associates**  
CHARTERED  
ACCOUNTANTS

For HARISH-CHANDRA RESEARCH INSTITUTE

Sd/-

RAAJ GULATI

ACCOUNTS  
OFFICER

Sd/-

P.B.CHAKRABORTY

REGISTRAR

Sd/-

A. RAYCHAUDHURI

DIRECTOR

Sd/-

BALRAM CHANDRA

Partner

Place: Allahabad  
Date: July 28th 2009



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

**INCOME AND EXPENDITURE ACCOUNT  
FOR THE YEAR ENDED ON 31ST MARCH 2009**

Amount in Rs. Year 2007-08	<i>INCOME</i>	Sch.	Amount in Rs.	Amount in Rs. Year 2008-09
10000000.00	GRANTS / SUBSIDIES	8		129700000.00
0.00	INCOME ON INVESTMENTS	9		109917.00
891178.00	INTEREST EARNED	10		2124281.58
1764259.92	OTHER INCOME	11		1956439.00
<b>102655437.92</b>	<b>TOTAL (A) ==&gt;</b>			<b>133890637.58</b>
	<i>EXPENDITURE</i>			
35826006.00	ESTABLISHMENT EXPENSES	12	54970201.00	
68348980.53	OTHER ADMINISTRATIVE EXPENSES	13	67212345.00	122182546.00
28444378.04	DEPRECIATION - Current Year (Net total at the year end - corresponding to Schedule 5			36442113.71
7932.00	LOSS ON SALE OF ASSETS			295639.00
1674977.00	PENSION, GRATUITY, ENCASHMENT OF EL- Current Year			36094753.00
<b>134302273.57</b>	<b>TOTAL (B) ==&gt;</b>			<b>195015051.71</b>
-31646835.65	BALANCE BEING EXCESS OF EXPENDITURE OVER INCOME (B-A) Transferred to General Fund			-61124414.13
	SIGNIFICANT ACCOUNTING POLICIES & NOTES ON ACCOUNTS	14		

As per our separate  
report of even date  
attached  
**For Balram Chandra &  
Associates**  
CHARTERED  
ACCOUNTANTS

**For HARISH-CHANDRA RESEARCH INSTITUTE**

RAAJ GULATI  
ACCOUNTS  
OFFICER

P.B.CHAKRABORTY  
REGISTRAR

A. RAYCHAUDHURI  
DIRECTOR

BALRAM CHANDRA  
Partner

Place: Allahabad  
Date: July 28th 2009

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

Amount - Rs.	SCHEDULE - 1 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2009	Amount - Rs.
<b>As on 31st March 2008</b>	<b>CORPUS / CAPITAL FUND</b>	<b>As on 31st March 2009</b>
174177463.89	Balance as at the beginning of the year	152002935.85
3168771.00	Add: Assets purchased out of Non-Plan Grant	2847264.00
6265784.00	Add: Assets purchased out of Plan Grant	65020491.50
		67867755.50
-1481796.00	Less/Add: Adjustments of previous years	-531437.10
-31646835.65	Less: Excess of Expenditure over Income transferred from Income and Expenditure Account	-61124414.13
1519548.61	Less: Unspent Recurring Grant transferred from/to Non-Plan Grant (Recurring) a/c	-9571652.00
<b>152002935.85</b>	<b>BALANCE AS AT THE YEAR END</b>	<b>148643188.12</b>

Amount - Rs.	SCHEDULE -2 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2009	Amount - Rs.
<b>As on 31st March 2008</b>	<b>PLAN GRANT (Non-Recurring)</b>	<b>As on 31st March 2009</b>
83998000.00	OPENING BALANCE (XIth Plan)	83998000.00
	ADD: Received during the year from DAE	58038000.00
	<i>Total Plan Grant Amount</i>	
-7418568.00	LESS: Revenue Utilisation	-23405225.00
-6265784.00	LESS: Capitalization of Assets	-71286275.50
-5861649.00	LESS: Advances & work-in-progress	-2588978.00
	(Detail Chart enclosed at enclosure 1)	-97280478.50
<b>64451999.00</b>	<b>BALANCE Carried over</b>	<b>44755521.50</b>

Amount - Rs.	SCHEDULE - 3 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2009	Amount - Rs.
<b>As on 31st March 2008</b>	<b>NON- PLAN GRANT (Recurring)</b>	<b>As on 31st March 2009</b>
4489476.04	OPENING BALANCE	2969927.43
100000000.00	ADD: Received during the year from DAE	129700000.00
2655437.92	ADD: Other Receipts	2054198.00
		131754198.00
-104174986.53	LESS: Utilisation during the year	-122182546.00
	Balance transferred to/from General Fund	<b>9571652.00</b>
<b>2969927.43</b>	<b>CLOSING BALANCE</b>	<b>12541579.43</b>

**"Executive Summary of XIth Plan Projects"**

XIth Plan Grants	Received	Utilisation					Advance/Work in Progress	Balance Amount
		Total	Revenue	Capital				
				Capitalisati on-upto Last Year	Capitalisati on-Current Year	Capitalised Value (Gross)		
<b>Performance Scientific Computing</b>	<b>43817000.00</b>	<b>42361773.00</b>						<b>1455227.00</b>
Contingency		739870.00	739870.00					
Domestic Travel		100159.00	100159.00					
Machinery & Equipments		37248632.00			37248632.00	37248632.00		
Major Work(Elect. & Civil)		3683535.00			3683535.00	3683535.00		
Office Expenses		233322.00	233322.00					
Salaries		269715.00	269715.00					
Supplies & Materials		86540.00	86540.00					
<b>Infrastructure (Housing)</b>	<b>15000000.00</b>	<b>674160.00</b>						<b>14325840.00</b>
Advance - IIT Mumbai		674160.00					674160.00	
<b>Infrastructure (Non-Housing)</b>	<b>20000000.00</b>	<b>4344362.00</b>						<b>15655638.00</b>
BWC Meetings		172735.00	172735.00					
Civil Works -Infrastructure (Non Housing)		910298.00	910298.00					
Contingencies-Misc. (Non-Housing)		1727492.00	1727492.00					
Power Requirement & Air-Conditioning (Non-Housing)		1533837.00	1533837.00					
<b>Library Development Project</b>	<b>12460000.00</b>	<b>11234102.00</b>						<b>1225898.00</b>
Back Volumes		10973421.00		4885976.00	6087445.00	10973421.00		
Mach.& Equipments		235059.00	200059.00	35000.00		35000.00		
Salaries		25622.00	25622.00					
<b>Regional Center-Accelerator Based Particle Physic</b>	<b>11383000.00</b>	<b>9899608.00</b>						<b>1483392.00</b>
Machinery & Equipments		3438989.00		60900.00	3378089.00	3438989.00		
Supplies & Materials		3354808.00	79480.00		3275328.00	3275328.00		
Major Works (Electrical & AC)		174560.00		149000.00	25560.00	174560.00		
Salaries		1073953.00	1073953.00					
Domestic Travel		272772.00	272772.00					
Foreign Travel		213166.00	213166.00					
Consultancy		308272.00	308272.00					
Contingencies - Advances		335318.00					335318.00	
Contingencies - Collaboration Meetings		727770.00	727770.00					

<b>Scientific Computing &amp; Networking (XIth Plan)</b>	<b>22200000.00</b>	<b>12363868.00</b>						<b>9836132.00</b>
<i>Machinery &amp; Equipment</i>		5558183.00	101794.00	951251.00	4505138.00	5456389.00		
<i>Major Works</i>		80700.00	80700.00					
<i>Books &amp; Softwares</i>		21304.00			21304.00	21304.00		
<i>Office Expenses</i>		144862.00	144862.00					
<i>Salaries</i>		90565.00	90565.00					
<i>Band Width</i>		5063754.00	5063754.00					
<i>Adv.for Broadband-M/S Reliance Communications Ltd.</i>		1404500.00					1404500.00	
<b>Special Year in Mathematics</b>	<b>3840000.00</b>	<b>2886861.00</b>						<b>953139.00</b>
<i>Salaries</i>		44504.00	44504.00					
<i>Domestic Travel</i>		168850.00	168850.00					
<i>Foreign Travel</i>		675995.00	675995.00					
<i>International Discussion Meetings</i>		806939.00	806939.00					
<i>National Discussion Meetings</i>		497253.00	497253.00					
<i>Consultancy / honorariums</i>		123800.00	123800.00					
<i>Contingencies</i>		508375.00	508375.00					
<i>Misc.Expenses</i>		61145.00	245.00		60900.00	60900.00		

XIth Plan Grants	Received	Utilisation					Advance/Work in Progress	Balance Amount
		Total	Revenue	Capital				
				Capitalisati on-upto Last Year	Capitalisati on-Current Year	Capitalised Value (Gross)		
<b>Equipping &amp; Furnishing of Conference Centre</b>	<b>306000.00</b>	<b>363080.00</b>						<b>-57080.00</b>
<i>Machinery &amp; Equipment</i>		363080.00			363080.00	363080.00		
<b>Scientific Human Resources Training Astrophysics Project</b>	<b>1630000.00</b>	<b>1306732.00</b>						<b>323268.00</b>
<i>Machinery &amp; Equipment</i>		411519.00		40919.00	370600.00	411519.00		
<i>Supplies &amp; Materials</i>		45915.00	45915.00					
<i>Salaries</i>		42581.00	42581.00					
<i>Foreign Travel</i>		175514.00	175514.00					
<i>Office Expenses</i>		4189.00	4189.00					
<i>Contingencies-National Meetings</i>		627014.00	627014.00					
<i>Condensed Matter Physics</i>	<b>3520000.00</b>	<b>2733227.00</b>						<b>786773.00</b>
<i>Machinery &amp; Equipment</i>		709750.00			709750.00	709750.00		
<i>Supplies &amp; Materials</i>		73587.00	73587.00					
<i>Office Expenses</i>		34711.00	34711.00					
<i>Foreign Travel</i>		166163.00	166163.00					
<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>Contingencies- Advances</i>		25000.00					25000.00	
<b><i>Neutrino Project</i></b>	<b>5385000.00</b>	<b>6050282.50</b>						<b>-665282.50</b>
<i>Machinery &amp; Equipment</i>		4170279.00		60900	4109379.00	4170279.00		
<i>Supplies &amp; Materials</i>		325699.50	40121.00		285578.50	285578.50		
<i>Salaries</i>		348033.00	348033.00					
<i>Domestic Travel</i>		209095.00	209095.00					
<i>Foreign Travel</i>		687738.00	687738.00					
<i>Contingencies</i>		159438.00	159438.00					
<i>Contingencies- Advance</i>		150000.00					150000.00	
<b><i>String Theory Project</i></b>	<b>2495000.00</b>	<b>3062423.00</b>						<b>-567423.00</b>
<i>Machinery &amp; Equipment</i>		978011.00		81838.00	896173.00	978011.00		
<i>Supplies &amp; Materials</i>		646809.00	646809.00					
<i>Domestic Travel</i>		296986.00	296986.00					
<i>Foreign Travel</i>		411876.00	411876.00					
<i>Salaries</i>		172826.00	172826.00					
<i>Consultancy</i>		555915.00	555915.00					
<b>Grand Total</b>	<b>142036000.00</b>	<b>97280478.50</b>	<b>23405225.00</b>	<b>6265784.00</b>		<b>71286275.50</b>	<b>2588978.00</b>	<b>44755521.50</b>

Amount - Rs.	SCHEDULE - 4 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2009		Amount - Rs.
<b>As on 31st March 2008</b>	<b>CURRENT LIABILITIES AND PROVISIONS</b>		<b>As on 31st March 2009</b>
	<b>A- Current Liabilities</b>		
3196210.90	1. EMD/ Security Deposits Payable		3187235.90
	2. Sundry Creditors		10697692.20
4841826.00	a. Parties - Amount Payable	7960133.00	
513149.80	b. Staff - Amount Payable	595149.80	
957969.00	c. Staff- Terminal Dues transfers	957969.00	
1046868.40	d. Other Recoveries Refundable	1184440.40	
	3. Statutory Liabilities		452545.00
9000.00	a. Income Tax (deducted from staff) Payable	335000.00	
0.00	b. Income Tax (deducted from parties) Payable	106408.00	
0.00	c. Trade Tax / VAT (deducted from parties) Payable	11137.00	
	4. Amounts refundable against completed sponsored Projects/schemes		252839.50
55400.50	Serc Schools	55400.50	
280504.00	NBHM -Annual Foundation School	0.00	
89671.00	NBHM - Projects	197439.00	
1020920.00	Surplus Plan Grant upto Xth plan	0.00	
	5. Receipts against ongoing sponsored projects/schemes		2881682.50
146004.00	CSIR Grants	146004.00	
463284.00	DST Projects	292147.00	
13179.00	Ramanujan Maths Society Projects	0.00	
234277.00	Infosys Foundation	165295.00	
1672521.00	UK-India Research Educational Fund	1354246.50	
109672.00	Science Education Prog. -INSA	57352.00	
38643.00	TPSC Fund	38643.00	
3315.00	String Theory-NAS Aid.	0.00	
120634.00	CPSTIO Project	23395.00	
0.00	Swarnjayanti Fellowship (Rajesh Gopakumar)	804600.00	
210956.00	J.C.Bose Fellowship (Ashoke Sen)	0.00	
<b>15024004.60</b>	<b>Total A</b>		<b>17471995.10</b>
	<b>B- PROVISIONS</b>		
46391404.00	1. Pension, Gratuity, encashment of E.L. (Prior Period)	48066381.00	
1674977.00	Pension, Gratuity, encashment of E.L. (Current Period)	36094753.00	84161134.00
16653.00	2. Audit Fee payable		16545.00
<b>48083034.00</b>	<b>Total B</b>		<b>84177679.00</b>
<b>63107038.60</b>	<b>Total A + B</b>		<b>101649674.10</b>

## Schedule 5 - forming part of Balance Sheet as at 31st March 2009

Column

## Statement of Fixed Assets, Depreciation &amp; Depreciation Fund

Depreciation

SIN o.	Description	Gross Block					Depreciation Reserve				Net Block		Value				
		Gross Block of Assets- (other than Xlth Plan) as on 31.03.08	Gross Block of Assets- (from Xlth Plan Grants) as on 31.03.08	Gross Block of Assets as on 01.04.2008	Additions during the year (Non-Plan Grants)	Deductions/previous year adj. during the year	Gross Block of Assets as on 31.03.2009	Add: Capitalised Assets-from Plan Grant as on 31.03.09	Total Gross Block of Assets as on 31.03.09	Rate %	Dep. Reserve 31.03.2008	Depreciation for the year 2008-09		Adjus- tments	Depreciation Reserve upto 31.03.2009	W.D.V. as on 31.03.08	W.D.V. as on 31.03.09
	<b>Land &amp; Building</b>																
1	Land	1.00	0.00	1.00			1.00			1.00	0.00	0.00	0.00	1.00	1.00	1.00	
2	Building	146821372.85	0.00	146821372.85			146821372.85	2247467.00	149068839.85	10%	77509837.17	7155900.27	0.00	84665737.44	69311535.68	64403102.41	71559002.68
	<b>Furniture &amp; Fixtures</b>																
1	Furniture & Fixture	16899358.81	0.00	16899358.81	76137.00		16975495.81	613818.00	17589313.81	10%	7309173.13	1028014.07	0.00	8337187.20	9590185.68	9252126.61	10280140.68
2	Electrical Fittings	17787011.51	0.00	17787011.51	261583.00		18048594.51	2190.00	18050784.51	10%	10046110.92	800467.36	0.00	10846578.28	7740900.59	7204206.23	8004673.59
	<b>Dead Stocks</b>																
1	A. C. & Stabilizers Bicycles & Trolly	11283039.60	149000.00	11432039.60			11432039.60	1817304.00	13249343.60	10%	5930640.02	731870.36	0.00	6662510.38	5501399.58	65868833.22	7318703.58
2	Rickshaw Trolley	16980.00	0.00	16980.00			22548.00		22548.00	20%	12627.52	-243.10	0.00	12384.42	4352.48	10163.58	-1215.52
3	Car-Maruti Esteem	479417.00	0.00	479417.00			479417.00		479417.00	20%	378875.97	20108.21	0.00	398984.18	100541.03	80432.82	100541.03
4	Coolers Electronic Typewriters	741906.00	0.00	741906.00	4850.00		746756.00		746756.00	10%	423781.64	32297.44	0.00	456079.08	318124.36	290676.92	322974.36
5	Elevator	61451.35	0.00	61451.35			174422.25		174422.25	10%	46272.46	-9779.20	0.00	36493.26	15178.89	137928.99	-97792.01
6	Fax Machine	885000.00	0.00	885000.00			885000.00		885000.00	15%	601289.28	42556.61	0.00	643845.89	283710.72	241154.11	283710.72
7	Fire Alarm System	358408.00	0.00	358408.00			358408.00		358408.00	15%	287846.64	10584.20	0.00	298430.84	70561.36	59977.16	70561.36
8	Fire Extinguishers	219793.00	0.00	219793.00	19238.00		239031.00	33705.00	272736.00	15%	112650.02	24012.90	0.00	136662.92	107142.98	136073.08	160085.98
9	Generator Sets	4372171.30	0.00	4372171.30			4372171.30		4372171.30	10%	2239439.42	213273.19	0.00	2452712.61	2132731.88	1919458.69	2132731.88
10	Geyers	708409.05	0.00	708409.05	47920.00		756329.05		756329.05	10%	415329.94	34099.91	0.00	449429.85	293079.11	306899.20	340999.11
11	Projector	703849.00	0.00	703849.00			703849.00	571205.00	1275054.00	15%	434007.21	126157.02	0.00	560164.23	269841.79	714889.77	841046.79
12	Solar Light	360499.00	0.00	360499.00	172850.00		533349.00		533349.00	10%	150573.71	38277.53	0.00	188851.24	209925.29	344497.76	382775.29
13	Xerox machine	2056089.00	0.00	2056089.00	148000.00		2204089.00	163000.00	2367089.00	15%	1056566.39	196578.39	0.00	1253144.78	999522.61	1113944.22	1310522.61





Amount - Rs.	SCHEDULE - 6 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2009		Amount - Rs.
<b>As on 31st March 2008</b>	<b>Investments</b>		<b>As on 31st March 2009</b>
1637364.00	Fixed Deposit in State Bank Of India	1637364.00	
281432.00	Add: Interest Accrued but not due	405665.58	
<b>1918796.00</b>	<b>Total</b>		<b>2043029.58</b>

Amount - Rs.	SCHEDULE - 7 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2009		Amount - Rs.
<b>As on 31st March 2008</b>	<b>CURRENT ASSETS, LOANS AND ADVANCES ETC.</b>		<b>As on 31st March 2009</b>
	<b>A- Current Assets</b>		
4626.25	1. Cash Balance in hand		71952.25
	2. Bank Balances		
	a. Current Accounts		
6533914.97	SBI (MB) Current A/C		102191.97
	b. Savings Accounts		75289812.37
1122015.89	Bank Of Baroda - 101 A/C	6901377.89	
63937699.00	Bank Of Baroda - 102 A/C	52984442.50	
14926003.63	Bank Of Baroda - 108 A/C	13184895.13	
2074111.85	Bank Of Baroda - 109 A/C	2219096.85	
2013210.00	c. Short Term Deposits with BoB HRI Branch Ald.		2013210.00
20883.12	3. Postage in hand (Franking Machine)		12972.12
<b>90632464.71</b>	<b>Total A</b>		<b>77490138.71</b>

SCHEDULE - 7 FORMING PART OF BALANCE SHEET AS AT 31ST MARCH 2009		
Amount- Rs.	CURRENT ASSETS, LOANS AND ADVANCES ETC.	Amount - Rs.
<b>As on 31st March 2008</b>	<b>B - LOANS, ADVANCES AND OTHER ASSETS</b>	<b>As on 31st March 2009</b>
	<b>1. Loans to Staff</b>	704593.00
11400.00	Festival Advance	10050.00
103509.00	Vehicle Advance	72000.00
170000.00	Medical Advance	73471.00
17325.00	LTC Advance	2429.00
211136.00	Traveling Advance -Within India	244043.00
517750.00	Traveling Advance -Outside India	302600.00
	<b>2. Advances and other amounts recoverable in cash or in kind or for value to be received :</b>	
	a. On Capital Account	20455496.00
15973011.00	Advance to Suppliers for Journals	19712649.00
	Advance to UPPCL for Power Line	742847.00
	b. Deposits	2254536.67
955800.00	With UPSEB	955800.00
262580.67	With Telephone Deptt.	262580.67
39900.00	With Gas Agency	39900.00
812679.00	Securities in Hand -Fixed Deposits of Parties	996256.00
	<b>3. Income Accrued:</b>	548848.00
349210.00	a. On Short Term Deposits with Banks	498973.00
46229.00	b. On Loans and Advances	
	1. Vehicle	49875.00
	<b>4. Claims Receivable</b>	
	a. Amount Recoverable against completed projects/schemes	3191239.00
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
0.00	Grant Receivable-DAE (Recurring Grant)	2354000.00
117300.00	DST - Fellowship ( Peter Brusov)	117300.00
64563.00	Grant Receivable - NBHM	64563.00
83000.00	WHEPP - VII	83000.00
249372.00	INO Conference	308927.00
15787.00	Grant Receivable-CSIR (Dr.Ashok Sethia)	15787.00
178779.00	NBHM Fellowships for two students	185867.00
	b. Others	144705.00
52108.00	Claims Receivables- Parties	69245.00
98256.00	Claims Receivables- Staff	75460.00
	<b>5. Payment against ongoing sponsored projects/schemes</b>	814741.00
30000.00	Deptt.of Physics Berhampur University	0.00
561200.00	C-Dac Pune	561200.00
0.00	JC Bose Fellowship-Ashoke Sen	162541.00
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
<b>21348364.67</b>	<b>Total B</b>	<b>28114158.67</b>
<b>111980829.38</b>	<b>TOTAL A + B</b>	<b>105604297.38</b>

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

**SCHEDULES FORMING PART OF INCOME & EXPENDITURE FOR THE YEAR ENDED ON 31ST MARCH 2009**

Amount in Rs. Year 2007-08	<b>SCHEDULE 8 - GRANTS / SUBSIDIES</b>		Amount in Rs. Year 2008-09
	(Grants & Subsidies Received)		
100000000.00	1. Central Government - DAE	129700000.00	
0.00	2. State Government	0.00	129700000.00
<b>100000000.00</b>	<b>Total</b>		<b>129700000.00</b>

Amount in Rs. Year 2007-08	<b>SCHEDULE 9 - INCOME ON INVESTMENTS</b>		Amount in Rs. Year 2008-09
0.00	1. INTEREST on Securities / Bonds	109917.00	
0.00	2. DIVIDEND on Shares / Mutual Funds	0.00	
0.00	3. OTHERS (Specify) (Misc. Receipts - Pension & Gratuity)	0.00	109917.00
<b>0.00</b>	<b>Total</b>		<b>109917.00</b>

Amount in Rs. Year 2007-08	<b>SCHEDULE 10- INTEREST EARNED</b>		Amount in Rs. Year 2008-09
874837.00	1. On Term Deposits with Scheduled Banks	2026522.58	
0.00	with Scheduled Bank( On A/C 101)	88473.00	2114995.58
16341.00	2. On Loans to Employees /Staff		9286.00
<b>891178.00</b>	<b>Total</b>		<b>2124281.58</b>

Amount in Rs. Year 2007-08	<b>SCHEDULE 11 - OTHER INCOME</b>		Amount in Rs. Year 2008-09
841992.00	1. License Fee & Electricity from Rented Buildings		831643.00
592259.00	2. Guest House Receipts		556441.00
0.00	3. Pantry Receipts		206160.00
32900.00	4. Sale of Tenders		59300.00
136557.00	5. Recovery of Telephone Charges		93107.00
58455.00	6. Recovery of Cable TV Charges		66900.00
55288.00	7. Recovery of Transport Charges		57236.00
17315.00	8. Sale of Scraps		22844.00
29493.92	9. Misc. Income		62808.00
<b>1764259.92</b>	<b>Total</b>		<b>1956439.00</b>

Amount in Rs. Year 2007-08	<b>SCHEDULE 12 - ESTABLISHMENT EXPENSES</b>		Amount in Rs. Year 2008-09
20354619.00	(A) PAY AND ALLOWANCES		37372055.00
10557035.00	(B) FELLOWSHIP & HONORARIUM		11476666.00
657208.00	(C) CONTRIBUTION TO PROVIDENT FUND (CPF & NPS)		1348293.00
1052166.00	(D) PENSION		1203208.00
0.00	(E) RETIREMENT BENEFITS		88709.00
159200.00	(F) OVERTIME ALLOWANCE		162850.00
97579.00	(G) LEAVE TRAVEL CONCESSION		396702.00
2500836.00	(H) MEDICAL AID		2516078.00
447363.00	(I) STAFF WELFARE ACTIVITIES		405640.00
<b>35826006.00</b>	<b>Total</b>		<b>54970201.00</b>

**HARISH-CHANDRA RESEARCH INSTITUTE**

**ALLAHABAD -211 019**

**SCHEDULES FORMING PART OF INCOME & EXPENDITURE FOR THE YEAR ENDED ON 31ST  
MARCH 2009**

Amount in Rs. Year 2007-08	<b>SCHEDULE 13 - OTHER ADMINISTRATIVE EXPENSES ETC.</b>	Amount in Rs. Year 2008-09
	a) Travel Expenses - Academic & Admin. Staff	
1261425.00	Within India	1584258.00
1176396.00	Outside India	1046247.00
443371.00	b) Conference /Symposia	830330.00
1616539.00	c) Furniture & Fixtures - From Non-Plan Grant	76137.00
2452250.00	d) Computers and Computer Service & Maintenance	5447723.00
824930.00	e) Supplies & Materials	608720.00
21259937.00	f) Library & Publications	16221467.00
5607121.78	g) Watch & Ward Services	5857598.00
3864694.00	h) House Keeping Services	4597007.00
	i) Maintenance Expenses	
3220178.00	Civil Maintenance	1637067.00
1188779.00	Lawn Maintenance	1350476.00
765561.00	Electrical Installations	616746.00
1738434.00	Misc. Equipment / Installations	1981068.00
1033400.00	Air Conditioners	1120873.00
14000.00	Gas Bank	0.00
43220.00	Aqua Guards	44080.00
120356.00	Photocopiers	82270.00
	j) Departmental Canteen / Guest House & Hostels	
159981.00	Canteen	0.00
132592.22	Pantry	411547.00
125620.00	City Guest House	126142.00
477835.00	Campus Guest House & Hostels	599217.00
	k) Electricity & Power	
6601298.00	Electricity	8317728.00
7766527.00	Generator Expenses	7527021.00
	l) Vehicle Running & Maintenance	
44475.00	Staff Cars	77870.00
165185.00	Hired Autos	173700.00
2760061.00	Hired Buses	3179186.00
480654.00	Hired Vehicles (Vans etc.)	407499.00
	m) Postage Telephone & Communication Charges	
84125.53	Postage	70154.00
1293611.00	Telephone, Telex, Telegrams Etc.	1506100.00
563377.00	n) Stationery & Printing	491169.00
419236.00	o) Consultancy & Legal Expenses	447997.00
15000.00	p) Auditors Remuneration	16545.00
308394.00	q) Advertisements	473029.00
	r) Others	
16868.00	Bank Charges	54509.00
54850.00	Binding Charges	56685.00
51700.00	HRI Pre-School	51600.00
2684.00	Liveries	5096.00
72884.00	Misc. Expenses	45301.00
39107.00	News Papers & Periodicals	36941.00
82324.00	Office Expenses	35242.00
<b>68348980.53</b>	<b>Total</b>	<b>67212345.00</b>

**Comments on Auditor's report pertaining status of accounts for  
the financial Year  
2008-09**

Institute has paid a sum of Rs. 1,17,43,469/- towards 40% of arrears on account of revision of salaries in terms of recommendations of sixth pay commission. No provision for payment of remaining 60% of arrears and other related benefits has been made in Institute's accounts.

**Reply:** *As per Govt. directives, the balance payment of 60% of arrear of salaries on account of revision of pay as per 6<sup>th</sup> CPC will be done in FY 09-10 and separate orders will be issued to this effect. Institute will make provisions for this liability in FY 09-10 as and when Govt. orders and DAE directives are received. The related benefits like PF contb. etc. will also be done at that time only.*

Library & Publications includes the receipts of current journal during the current year for Rs. 1,49,87,259/- The amount has been derived at by adding advances made during the year to opening `balances of advance as on 01.04.08 and subtracting there from the outstanding of advance as on 31.03.09. The physical inventory of current journals received during the year has not been made available hence could not be verified. The current Journals received have also not been capitalized in Book of Accounts.

**Reply:**

*The library keeps record of all arrivals of periodicals. All arrivals are recorded manually in Kardex entry system and also electronically in the LibSys software systems. The Library records are in ' Quantity format only and do not have monetary values hence instant value information of all journals received during a particular period could not be made available. However as per Audit requirements a complete Inventory report with quantity as well as financial cost values is being prepared and shall be ready very shortly. The methodology for deriving at the financial values of "received journals" is correct.*

*the Library is making efforts to prepare a list of all journals received with their Accession numbers and cost and these will be capitalized very soon.*

Institute needs improvement in internal control procedures commensurate with the size and nature of its activities with regard to annual maintenance contracts and expenses, current Journals, attendance verification, control over submission of bill against advances including domestic and foreign travels advance, receipts and expenditure of guest house and pantry.

**Reply:**

*The Institute could not carry out the necessary internal control procedures commensurate with the nature of its activities due to shortage of manpower,*

*However necessary steps will definitely be taken to improve the internal control system.*

Balance of EMD, Security Deposits, Sundry Creditors, Loan 7 Advances and Claims Recoverable etc. are subject to confirmation, reconciliation and consequential adjustments thereof.

***Reply:***

*This is a routine yearly accounting process and institute takes care to do it.*

Income on accounts of the interest accrued on Security Deposits with UPPCL has not been recognized during the year.

***Reply:***

*The matter has been taken up with UPPCL and due interest on Deposits with them will either be collected by way of cheque or get adjusted in monthly Electricity Bill.*

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. DST Fellowship- Peter Brusov	since 2004	Rs.117300.00
B. CARDMATH DST	since 2004	Rs. 14848.00
C. DST (C S Dalawat)	Since 2005	Rs. 12986.00
D. WHEPP VII	since 2005	Rs. 83000.00
E. CSIR Grant-Ashok Sethia	since 2006	Rs. 15787.00
F. NBHM Grant-K.Gangopadhyay	since 2007	Rs. 47533.00
G. NBHM Grant- Joseph Samuel	since 2007	Rs. 17030.00
H. I & II Com.-Publisher	since 2002	Rs. 37221.00

***Reply:***

*The Institute has made several correspondences with the respective agencies towards recovery of the above amounts ( sl. A. to G ) and is quite hopeful of the recovery of most of the above. For amount outstanding at H. I & II Com (Publisher's) outstanding of RS. 37221, the amount has turned out to be a Bad Debt and procedures for write-off permission is being initiated.*