

B3-XIV

**International Centre for
Theoretical Sciences
(ICTS)**



International Centre for Theoretical Sciences

1. Name of the Department :

International Centre for Theoretical Sciences (ICTS)

2. Year of establishment :

2007

3. Is the Department part of a School/Faculty of the university?

It is a TIFR Centre.

4. Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.)

1. Ph.D.
2. Integrated M.Sc.-Ph.D.

Students may avail of an M.Phil. degree as an early exit option provided they have finished a specified set of requirements. However, there is no separate M.Phil. programme.

5. Interdisciplinary programmes and departments involved

There is a joint programme between ICTS and NCBS which involves active interaction between faculty members working in the areas of the interface between Physics and Biology. The programme also involves the participation of graduate students and postdocs and setting up of an experimental lab at ICTS. This programme is at an initial stage.

6. Courses in collaboration with other universities, industries, foreign institutions, etc.

ICTS currently has a small faculty strength (16). In view of this we have an MOU with IISc Physics department, whereby students of ICTS can take courses offered at IISc. Faculty members at ICTS also participate in teaching courses at IISc.

7. Details of programmes discontinued, if any, with reasons

There are no such programmes.

8. Examination System: Annual/Semester/Trimester/Choice Based Credit System

100% Semester system

Students at ICTS are offered a Course work programme based on a mixture of compulsory Core Courses, choice-based Elective Courses and compulsory Project Work, on topics of their choice. The detailed structure is given in the table below.

Programme	Duration (years)		Basic & Core Credits	Elective Credits	Project Credits	Total Credits
	Overall	Coursework				
Ph.D	5	1.5	28	20	12	60
Int. Ph.D	6	2.5	48	20	32	100

The Academic Session is divided into two semesters: Autumn Semester (August – November) and Spring Semester (January - April). In addition students do projects during the summer break (May – July).

In each semester, students are evaluated by a Continuous Evaluation process consisting of

1. Assignments
2. Mid-semester Examination
3. End-semester Examination

Reading courses can be taken by students with any faculty member at ICTS. It is required that the course be graded through regular assignments or through two exams (mid-term and final) or a combination of these. Based on these a final mark and grade is be given.

Projects can be done with any faculty member at ICTS. The student is graded based on

- a project report to be examined by the project guide
- a seminar presentation to be examined by a two member committee.

9. Participation of the department in the courses offered by other departments

NA

10. Number of faculty positions:

	Faculty Designation with DAE Grade	Abbreviation (Item 11)	Number
1.	Professor Emeritus		1
2.	Senior Professor (I)	Sr. Professor (I)	2
3.	Professor (H)	—	1
4.	Associate Professor (G)	Assoc. Professor (G)	1
5.	Reader (F)	—	9
6.	Junior Faculty (non tenured position)	—	2
		Total	16

11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance

	Name	Deg*	Designation	Specialisation	Exp [†]	Stu [‡]
1.	Abhishek Dhar	Ph.D.	Professor H	Statistical physics and condensed matter physics	14	5
2.	Amit Apte	Ph.D.	Reader 'F'	Dynamical Systems and Data Assimilation	9	1
3.	Anupam Kundu	Ph.D.	Reader 'F'	Statistical physics	1	--
4.	Avinash Dhar	Ph.D.	Senior Professor I	High Energy Physics, String Theory	32	--
5.	Loganayagam R	Ph.D.	Reader 'F'	String theory, Black hole physics and Quantum field theory	1	--
6.	Pallab Basu	Ph.D.	Reader 'F'	String Theory, Statistical Physics	3	1
7.	Parameswaran Ajith	Ph.D.	Reader 'F'	Gravitational-wave physics and astrophysics	3	1
8.	Rajesh	Ph.D.	Senior	Theoretical Physics with a	14	4

	Gopakumar		Professor I & Director	focus on Quantum Field Theory and String Theory		
9.	Rukmini Dey	Ph.D.	Associate Professor 'G'	Mathematical Physics and Geometry	15	2
10.	Samriddhi Sankar Ray	Ph.D.	Reader 'F'	Turbulence, Non-equilibrium Statistical Mechanics, and Fluid Dynamics	1	--
11.	Spenta R. Wadia	Ph.D.	Emeritus Professor	High Energy Physics, String Theory, Quantum Gravity	30	--
12.	Subhro Bhattacharjee	Ph.D.	Reader 'F'	Condensed Matter physics: Strongly correlated systems.	1	--
13.	Suvrat Raju	Ph.D.	Reader 'F'	String Theory and Quantum Gravity	3	--
14.	Vijay Kumar Krishnamurthy	Ph.D.	Reader 'F'	Physical biology and soft condensed matter physics	1	--

* Highest degree obtained

† Years of Experience as a regular Faculty Member (TIFR and elsewhere)

‡ Ph.D. students guided within the last 4 years (including those joined and those graduated)

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors

List of Associated Faculty Members

1. Swapna Mahapatra, Utkal University, Bhubaneswar.
2. Badri Krishnan, Max Planck Institute for Gravitational Physics (Albert Einstein Institute) and Institute for Gravitational Physics of the Leibniz Universität Hannover
3. Shravan Hanasoge, Tata Institute of Fundamental Research
4. Mark Hannam, Cardiff University, UK
5. Nivedita Deo, University of Delhi, India
6. Nisheeth Vishnoi, École polytechnique fédérale de Lausanne EPFL
7. Biman Nath, Raman Research Institute
8. Ravi Sheth, International Centre for Theoretical Physics and The University of Pennsylvania
9. Dileep Jatkar, Harish-Chandra Research Institute
10. Sumathi Rao, Harish-Chandra Research Institute
11. Anirvan Sengupta, Rutgers, The State University of New Jersey
12. Kavita Jain, Jawaharlal Nehru Centre for Advanced Scientific Research
13. K. G. Arun, Chennai Mathematical Institute
14. Sanjoy Mitter, Massachusetts Institute of Technology
15. Mythily Ramaswamy, TIFR-CAM & Joint Faculty ICTS-TIFR, Bangalore
16. Mayank Mehta, Department of Physics and Astronomy, UCLA
17. Tarun Souradeep, IUCAA, Pune & Adjunct faculty ICTS-TIFR, Bangalore

18. Madan Rao, Raman Research Institute, Bangalore
19. Shiraz Minwalla, TIFR, Mumbai & Joint Faculty ICTS-TIFR, Bangalore
20. Mukund Thattai, NCBS-TIFR & Joint Faculty ICTS-TIFR, Bangalore
21. Kedar Damle, TIFR, Mumbai & Joint Faculty ICTS-TIFR, Bangalore
22. Sidhartha Goyal, University of Toronto
23. Surjeet Rajendran, University of California, Berkeley, USA
24. Shivani Agarwal, Indian Institute of Science, Bangalore
25. Aninda Sinha, Indian Institute of Science, Bangalore
26. Diptiman Sen, Centre for High Energy Physics, Indian Institute of Science, Bangalore
27. Sandeep Krishna, National Centre for Biological Sciences
28. Gyan Bhanot, Rutgers University, New Jersey, USA
29. Zubin Jacob, University of Alberta
30. Manas Kulkarni, The City University of New York, USA
31. Abhijit Gadde, Institute for Advanced Study, USA
32. Subinoy Das, Indian Institute of Astrophysics, Bangalore
33. Sascha Husa, Universitat de les Illes Balears, Spain
34. Sayantani Bhattacharyya, IIT Kanpur
35. Karthik Gurumoorthy, Amazon Development Centre, Bangalore
36. Sanjib Sabhapandit, Raman Research Institute
37. Sreekar Vadlamani, TIFR-CAM & Joint Faculty ICTS-TIFR, Bangalore
38. Sanjay Jain, Delhi University
39. Sandip Trivedi, TIFR, Mumbai & Joint Faculty ICTS-TIFR, Bangalore
40. Shashi Thutupalli, Joint Faculty - NCBS and ICTS
41. Justin David, Indian Institute of Science, Bangalore

Visiting Scientist

1. Bala Iyer

Emeritus Professor

1. Spenta R Wadia

13. Percentage of classes taken by temporary faculty – programme-wise information

NA

14. Programme-wise Student Teacher Ratio

	Programme	Students (S)	Faculty (F)	Ratio S/F
1.	Ph.D.	10	15	0.67
2.	Integrated M.Sc.-Ph.D.	6	15	0.4

15. Number of academic support staff (technical) and administrative staff:

	Scientific Staff	Technical Staff	Administrative Staff	Auxiliary Staff
Sanctioned	7	0	2 (on loan)	0
Filled	5	0	2 (on loan)	0

16. Research thrust areas as recognized by major funding agencies

- Astrophysical Relativity
- Complex Systems (Non-equilibrium Statistical Physics, Physical Biology, Fluid Dynamics and Turbulence, Correlated Quantum Many-Body Physics)
- Interdisciplinary Mathematics
- String Theory and Quantum Gravity

17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

National

	Agency	Project Title	Total Grant (Rs. lakhs)	Duration	Faculty
1.	Science and Engineering Research Board	Gravitational-wave astronomy using astrophysical black-hole binaries	15	2014-2016	P Ajith
2.	Science and Engineering Research Board	Ramanujan Fellowship	73	2013-2018	
3.	Science and Engineering Research Board	Ramanujan Fellowship	73	2010-2015	Suvrat Raju
4.	Department of Science	INSPIRE Fellowship	35	2015-2019	Sivaram Ambikasaran

	& Technology				
5.	Science and Engineering Research Board	J C Bose Fellowship	68	2011-16	Spenta R Wadia
6.	Science and Engineering Research Board	J C Bose Fellowship	68	2015-2020	Rajesh Gopakumar

International

	Agency	Project Title	Total Grant (Rs. lakhs)	Duration	Faculty
1.	Indo-Israel Grant (Israeli Science Foundation-UGC Project)	Heat conduction in extended 1-dim systems (with Yonatan Dubi, Ben Gurion Univ., Israel)	27	2014-2017,	Abhishek Dhar
2.	Max-Planck-Gesellschaft	Max Planck Institute for Gravitational Physics	~ 45	2015-2018	P Ajith

18. Inter-institutional collaborative projects and associated grants received

NA

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.

	Agency	Project Title	Total Grant (Rs. lakhs)	Duration	Faculty
1	DAE	XII Plan Project – PTMS – ICTS Programmes	3091	2012-2017	All ICTS faculty

20. Research facility / centre with

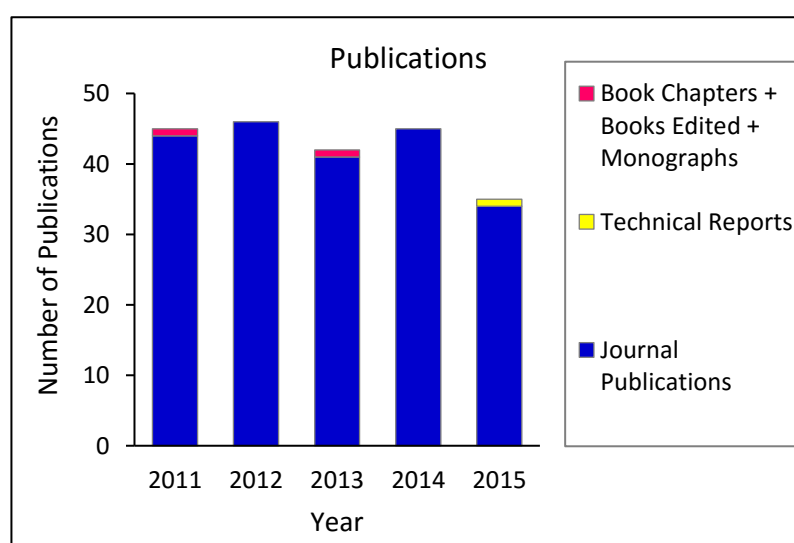
National recognition: ICTS hosts a LIGO Tier-3 grid computing center. This is used by the pan-Indian group in the LIGO Scientific Collaboration to analyze the data produced by the LIGO gravitational-wave observatories

21. Special research laboratories sponsored by / created by industry or corporate bodies

None

22. Publications:

ICTS	Journal Publications (web of science)	Articles in Proceedings	Technical Reports	Web Publications	Book Chapters	Books Edited	Mono graphs
2010-11	44	-	-	-	1	-	-
2011-12	46	-	-	-	-	-	-
2012-13	41	-	-	-	1	-	-
2013-14	45	-	-	-	-	-	-
2014-15	34	-	1	-	-	-	-
Total	210	-	1	-	2	-	-



Citation Index – range / average

- Total number of citations: 15328 (Source: Web of Science)
- Number of citations per faculty: 958

h-index

- Range : 2-41

23. Details of patents and income generated

None

24. Areas of consultancy and income generated

None

25. Faculty selected nationally / internationally to visit other laboratories / institutions / Industries in India and abroad

National

	Name of Faculty member	Place visited	Date (MM/YYYY)
1	Abhishek Dhar	Workshop on Statistical Physics of Soft Matter, The Department of Physics, Banaras Hindu University	Nov 2015
		Statphys VIII,S.N. Bose center, Kolkata	Dec 2014
		NISER, Bhubaneshwar	Sep-Oct 2014
		NESP-NLD Symposium, IACS, Kolkata	Jan 2014
		Calcutta University	Dec 2013
		S. N. Bose Centre, Kolkata	Dec 2013
		TIFR, Mumbai	Sep 2013
		Conference on “Frontiers in Condensed Matter Physics” , Department of Physics and Astrophysics, University of Delhi	Apr 2013
		TIFR, Mumbai	Mar 2013

	Name of Faculty member	Place visited	Date (MM/YYYY)
		IIT ,Guwahati	Feb 2013
		78th Annual Meeting of the Indian Academy of Sciences, Wadia Institute of Himalayan Geology, Dehradun	Nov 2012
		Nehru college, Kanhangad	May 2012
		TIFR, Mumbai	Mar 2012
		TIFR-CAM, Bangalore	Mar 2012
		3rd RRI Statphys School, RRI, Bangalore	Mar-Apr 2012
		6th International conference on unsolved problems on noise and fluctuations, SINP, Kolkata	Feb-2012
		ICTS school on nonequilibrium physics, IISER, Kolkata	Jan-2012
		DST-SERC school on nonlinear dynamics, IISER, Pune	Dec-2011
		Concepts and challenges in astronomy and astrophysics, Sundarban Mahavidyalaya, Kakdwip, West-Bengal	Nov-2011
2.	Amit Apte	IIT BHU, Varanasi, India	Apr-2015
		Conference on Nonlinear Systems and Dynamics, Indian Institute of Science Education and Research (IISER), Mohali	Feb-2015
		Nansen Environmental and Remote Sensing Center, Bergen, Norway	Dec-2014
		Dynamic Days Asia-Pacific, IIT Madras and IMSc, Chennai, India	Jul-2014
		Conference on Emerging Trends in Applied Mathematics, University of Calcutta, Kolkata, India	Feb-2014
		TIFR Centre for Applicable Mathematics, Bangalore, India	Nov-2013
		INCOIS Hyderabad	Oct-2013

	Name of Faculty member	Place visited	Date (MM/YYYY)
		Indian National Centre for Ocean Information Systems, Hyderabad, India	Sep-2013
		Intel India academic forum, Goa, India	Sep-2013
		Indian Institute of Science Education and Research, Mohali, India	Mar-2013
		Workshop on "Advanced dynamical core modeling for atmospheric and oceanic circulations," NARL, Gadanki, India	Feb-2013
		Indian Institute of Technology Bombay, Mumbai India	Oct-2011
		Raman Research Institute, Bangalore India	Apr-2011
		Centre for Development of Advanced Computing (C-DAC), Bangalore India	Feb-2011
3	P Ajith	XXVII IUPAP Conference on Computational Physics, IIT Guwahati, India	Dec-2015
		8th International Conference on Gravitation and Cosmology, IISER Mohali, India	Dec-2015
		Workshop on Statistical Applications to Cosmology and Astrophysics, ISI Kolkata	Feb-2015
		Astronomical Society of India meeting, Pune, India	Feb-2015
		Saha Theory Workshop: Cosmology at the Interface, Saha Institute, Kolkata, India	Jan-2015
		XXI DAE-BRNS High Energy Physics Symposium 2014, Guwahati, India	Dec-2014
		India-China Workshop on Astronomy and Astrophysics, Indian Institute of Astrophysics, Bangalore	Dec-2014
		Institute for Plasma Research, Gandhinagar, India	Nov-2014
		India-UK Frontiers of Science meeting (organized by the Royal Society, UK and the Department of Science and Technology, India), Pune, India	Oct-2014

	Name of Faculty member	Place visited	Date (MM/YYYY)
		Central University of Hyderabad, India	Oct-2014
		National Centre for Radio Astrophysics, Tata Institute of Fundamental Research, Pune, India	Feb-2014
		Gravitational-Wave Physics and Astronomy Workshop 2013, Inter University Centre for Astronomy and Astrophysics, Pune, India.	Dec-2013
		27th Meeting of the Indian Association of General Relativity and Gravitation, Hemwati Nandan Bahuguna Garhwal University, Srinagar (Garhwal), India.	Mar-2013
		Mahatma Gandhi University, Kottayam , India	Feb-2013
4.	Pallab Basu	IACS, Kolkata	2014
		IACS, Kolkata	-
		IIT ,Guwahati	-
5.	Rajesh Gopakumar	Indian Academy of Sciences Meeting, IISER-Pune	Nov-2015
		CMS College, Kottayam	Oct-2015
		TIFR-Mumbai	Sep-2015
		Chennai Mathematics Institute, Chennai	Sep-2015
		Discussion Meeting on String Theory, ICTS-TIFR, Bangalore	Feb-2015
		Indian Mathematical Society Annual Meeting, ISM Dhanbad,	Dec-2014
		HRI, Allahabad	Dec-2014
		I. I. T. Kanpur	Nov-2014
		BITS-Pilani, Goa Campus,	Oct-2014
		Asian Winter School, Puri	Jan-2014
		National String Meeting, IIT-Kharagpur	Dec-2013
		IIT-Kanpur	Nov-2013

	Name of Faculty member	Place visited	Date (MM/YYYY)
		International Conference on Teichmüller theory and interfaces with ergodic theory and group actions, JNU, New Delhi	Oct-2013
		UGC Winter School on High Energy Physics, BHU, Varanasi	Feb-2013
		Indian Strings Meeting 2012, Puri	Dec-2012
		New Trends in Field Theory, Benares Hindu University, Varanasi	Nov-2012
		IRCMS meeting, Bose Institute, Kolkata,	Nov-2012
		Indian String School, Puri	Oct-2012
		Scattering Amplitudes, Gauge Theories and String theories, ICTS-TIFR, Bangalore	Sep-2012
		A. K. Raychaudhuri Memorial Lecture, IACS, Kolkata	May-2012
		National Strings Meeting, Delhi University, New Delhi	Dec-2011
		SINP, Kolkata	Apr-2011
		RKM Vivekananda University, Belur	Mar-2011
		IISER, Pune	Feb-2011
		BHU, Varanasi	Feb-2011
6.	Rukmini Dey	T.I.F.R., Mumbai	Dec-2014
		HRI, Allahabad	Dec-2014
		IISc, Bangalore	Jun-2014
		RRI, Bangalore	May-2014
		IISc, Bangalore	May-2014
		Reva Institute, Bangalore	Jun-2013
		S.N. Bose Center, Kolkata	May-2013
		TIFR-CAM, Bangalore,	Jun-2012

	Name of Faculty member	Place visited	Date (MM/YYYY)
		RRI , Bangalore	Jun-2012
		Lucknow University, Lucknow	Feb-2012
		Institute of Mathematical Sciences, Chennai	Jan-2012
		Institute of Mathematics and Applications, Bhubaneswar	Jan-2011
		Institute of Mathematics and Applications	Jan-2011
7.	Samriddhi Sankar Ray	JNCASR, Bangalore, India	Oct-2015
		Interdisciplinary Programme (IDP) in Climate Studies, Indian Institute of Technology Bombay, Mumbai, India	Aug-2015
		Department of Physics, Indian Institute of Technology Bombay, Mumbai, India	Aug-2015
		CompFlu - 2014, JNCASR, Bangalore, India	Dec-2014
		Soft-matter: Young Investigators Meet, Pondicherry, India	Dec-2014
		Dynamic Days Asia Pacific 08, IIT Chennai and IMSc, Chennai, India	Jul-2014
		Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India	Jul-2014
		Indian Institute of Technology, Kanpur, India	Mar-2014
		Soft-matter: Young Investigators Meet, Pondicherry, India	Jan-2014
		TIFR – Centre for Applicable Mathematics, Bangalore, India	Oct-2013
		Perspectives in Nonlinear Dynamics 2013 (PNLD 2013)	Jul-2013
8.	Spenta R Wadia	St Xavier's College, Mumbai	Feb-2015
		IIT-Bombay	Mar-2014
		JNCASR, Bangalore	Sep-2012

	Name of Faculty member	Place visited	Date (MM/YYYY)
		IISER Pune	Feb-2011
9	Subhro Bhattacharjee	SERC school on topological condensed matter in SNBCS Kolkata.	Dec-2015
		IMSc, Chennai	Nov-2015
10.	Suvrat Raju	TIFR, Mumbai	2014-2015
		Conference on quantum information processing and applications, IISc, Bangalore	Feb-2015
		National Strings Meeting, Indian Institute of Technology, Kharagpur	Dec-2013
		Quantum Information Processing and Applications, HRI, Allahabad	Dec-2013
		Harish Chandra Research Institute, Allahabad	Jul-2013
		Discussion Meeting on Holography, IISC, Bangalore	Jan-2013
		Indian Strings Meeting, International Conference, Puri	Dec-2012
11.	Vijay Kumar Krishnamurthy	Discussion meeting on "New Colloids" , Raman Research Institute, Bangalore	Jul-2015
		Mechanical Manipulations and Responses at the Scale of the Cell and Beyond, Raman Research Institute, Bangalore	Apr-2015
12.	Avinash Dhar	"The 8th Asian Winter School on Strings, Particles and Cosmology", Puri, India	Jan-2014
		"Scientific discovery through intensive data exploration", JNCASR, Bangalore	Feb-2011
13.	Sivaram Ambikasaran	IIT Madras	Dec-2015
		TIFR CAM, Bangalore	Dec-2015
		IIT Madras	Nov-2015
		TIFR CAM, Bangalore	Sep-15
		IISc, Bangalore	Sep-15

International

	Name of faculty member	Place visited	Date (MM/YYYY)
1.	Abhishek Dhar	Workshop on "Frontiers in non-equilibrium physics", YITP, Kyoto	Jul-2015
		LPTMS, Orsay	Jun-2015
		Workshop on "Progress in Nonequilibrium Statistical Mechanics", Nice	Jun-2015
		Rutgers Statistical Mechanics conference, Rutgers University	May-2015
		Keio University, Japan	Oct-2014
		The 6th KIAS Conference on Statistical Physics - "Nonequilibrium Statistical Physics of Complex Systems", KIAS Seoul, Korea	Jul-2014
		GGI Florence	May-June 2014
		International Workshop on Weak Chaos and Weak Turbulence, MPIPKS, Dresden	Feb-2014
		IAS, Princeton	Jan-2014
		Rutgers University	Jan-2014
		First international conference on Phononics and Thermal Energy Science, Tongji University, Shanghai, China	Aug-Sep 2013
		Physics Department, Xiamen University, China	Aug-2013
		University of Leuven, Belgium	Jun-2013
		Keio University, Japan	Jan-2013
		Workshop on Nonequilibrium Statistical Mechanics: Mathematical Understanding and Numerical Simulation, BIRS, Banff, Canada	Nov-2012
		ICTP, Trieste	Oct-2012
Rutgers University, USA	Oct-2011		

	Name of faculty member	Place visited	Date (MM/YYYY)
		Tokyo University, Japan	Oct-2011
		Workshop on foundations and applications of non-equilibrium statistical mechanics, Nordita, Stockholm	Sep-2011
		Workshop on Fourier Law, Field's Institute, Toronto, 4-8 April, 2011.	Apr-2011
2.	Amit Apte	Universidad Nacional de Colombia, Bogota, Colombia	Jun-Jul 2013
		Dynamics Days Europe, University of Exeter, UK	Sep-2015
		XIV Latin American Workshop on Nonlinear Phenomena (LAWNP), Cartagena, Colombia	Sep-2015
		University of Nice, France	Sep-2015
		International Conference on "Stochastic Systems and Applications," Indian Institute of Science, Bangalore, India	Sep-2014
		University of Nice, Nice, France	May-Jun 2013
		Oberwolfach meeting "Mathematical and Algorithmic Aspects of Atmosphere-Ocean Data Assimilation," Oberwolfach, Germany	Dec-2012
		Workshop on "Data assimilation: third workshop on numerical methods for solving the filtering problem and high order methods for solving parabolic PDEs," Oxford-Man Institute of Quantitative Finance, Oxford, UK	Sep-2012
		University of North Carolina, Chapel Hill NC, USA	Oct-Nov 2011
		Workshop on "Generalized Hamiltonian structure of differential equations and dissipative dynamical systems," University of Kent, UK	Jun-2011
		Marquette University, Milwaukee USA	May-Jun 2011

	Name of faculty member	Place visited	Date (MM/YYYY)
		American Institute of Mathematics, Palo Alto CA, USA	Mar-2011
3.	P Ajith	Max Planck Institute for Gravitational Physics, Hannover	Sep-2015
		LIGO Scientific Collaboration Meeting, Budapest, Hungary	Aug-Sep 2015
		Astro-GR 2015 workshop, ICTP South American Institute for Fundamental Research, Sao Paulo, Brazil	Aug-2015
		24th Chris Engelbrecht Summer School 2013 on Gravitational Wave Astronomy, Rhodes University, Grahamstown, South Africa	Jan-2013
4.	Pallab Basu	Bangkok conference in String Theory	2014...
		YITP, Kyoto, Japan	-
5.	Rajesh Gopakumar	Indo-Israeli String theory Meeting, Goa	Dec-2015
		IIT Kanpur, Batch Silver Jubilee	Dec-2015
		NTU, Singapore	Nov-2015
		ETH-Zurich	Nov-2015
		KIAS-YITP Workshop on String Theory, Seoul, Korea	Sep-2015
		National Taiwan University, Taipei.	Jul-2015
		AndyFest (60th Birthday of Andrew Strominger), Harvard University	Jul-2015
		ICTP, Trieste	Apr-2015
		TWAS Prize Lecture, Muscat, Oman	Oct-2014
		Ascona, Switzerland	Jul-2014
		Strings 2014, Princeton	Jun-2014
		Neve Shalom, Israel	May-2014
		Fourth Wits Workshop on Gauge Theory, String theory and Integrability, Univ. Of Witwatersrand, Johannesburg	Sep-2013

	Name of faculty member	Place visited	Date (MM/YYYY)
		Dept. of Mathematics, Univ. of Cape Town	Sep-2013
		Open questions in an Open Universe, Bogazici University, Istanbul	Aug-2013
		Seventh Crete Regional Meeting on String Theory, Kolympari, Greece	Jun-2013
		Conference on Higher Spin Theories, Galileo Galilei Instt., Florence,	May-2013
		Second Solvay Workshop on Higher Spin Theories, Solvay Institutes, Brussels	Feb-2013
		Bangkok Workshop on Gauge Theory, String Theory and Gravity, Chulalongkorn University, Bangkok,	Jan-2013
		Yukawa International Seminar (YKIS), Kyoto University	Oct-2012
		Amsterdam workshop on String Theory, Univ. of Amsterdam	Jul-2012
		Workshop on Strings, Branes and M-theory, Newton Instt., Cambridge, UK	May-2012
		Newton Instt. Silver Jubilee Lecture, Dept. of Maths. Durham University, UK	May-2012
		Workshop on Higher Spin Theory, Schrodinger Institute, Vienna	Apr-2012
		Institute of Geometry and its Applications (IGA), University of Adelaide	Mar-2012
		Dept. of Mathematics, Univ. of Adelaide, Australia	Mar-2012
		CERN, Geneva	Feb-2012
		XVII European Workshop on String Theory, Padua, Italy	Sep-2011
		KIAS-YITP Workshop on String Theory, Holography and Beyond, Seoul	Sep-2011
		Benasque workshop on String Theory, Benasque,	Jul-2011

	Name of faculty member	Place visited	Date (MM/YYYY)
		Spain	
		Strings 2011, Stockholm, Sweden	Jun-2011
		Solvay Workshop on Gauge Theories, Strings and Geometry, Brussels	May-2011
		Isfahan, Iran	May-2011
		Univ. of Chicago, Chicago, USA	Apr-2011
		ICTP Spring School theory on Superstring Theory, ASICTP, Trieste	Mar-2011
6.	Samriddhi Sankar Ray	European Turbulence Conference 15 (ETC15), Delft, The Netherlands	Aug-2015
		University of Rome Tor Vergatta, Rome, France	May-2015
		Observatoire de la Côte d'Azur, CNRS, Nice, France	May-2015
		NORDITA, Stockholm, Sweden	Jun-2014
		Observatoire de la Côte d'Azur, CNRS, Nice, France	Jun-2014
		Dynamics of Particles in Flows, NORDITA, Stockholm, Sweden	Jun-2014
		STATPHYS 25, International Conference on Statistical Physics of the International Union for Pure and Applied Physics (IUPAP), Seoul, South Korea	Jul-2013
		Observatoire de la Côte d'Azur, CNRS, Nice, France	Jun-2013
7.	Spenta R Wadia	Institute of Basic Science, Seoul, S. Korea	Jan-2014
		Great Lakes Meeting, USA	May-2013
		Isaac Newton Institute, University of Cambridge, UK	May-2012
		Harvard University	May 2013, May 2015 and July 2015

	Name of faculty member	Place visited	Date (MM/YYYY)
		Princeton University	June 2014
		Perimeter Institute	July 2014
		KITP Santa Barbara	July 2015
		CERN Geneva	Oct 2014, Nov 2015
		APCTP-S. Korea	Oct 2014, Dec 2015
		IAS at NTU, Singapore	Jan 2016
		Hebrew Univ of Jerusalem	Feb 2016
8.	Subhro Bhattacharjee	MIT, USA	Aug-2015
		Theoretical and Experimental Magnetism Meeting 2015, Cosener's House in Abingdon (near Oxford, UK)	Jul-2015
9.	Suvrat Raju	IAS, Princeton	2014-2015
		Brown University, Providence	2014-2015
		Harvard University, United States	2014-2015
		Columbia University, New York	2014-2015
		Cornell University, New York	2014-2015
		Perimeter Institute, Waterloo, Canada	2014-2015
		CERN Winter School	Feb-2015
		Autumn Symposium in String/ M Theory, Korea Institute of Advanced Study, Seoul	Sep-2014
		International conference, the Kavli Institute of Theoretical Physics, Santa Barbara, USA	Aug-2013
		McGill University, Canada	Jul-2013
		International Conference, Perimeter Institute, Waterloo, Canada	Jul-2013
		Seventh Regional Meeting in String Theory,	Jun-2013

	Name of faculty member	Place visited	Date (MM/YYYY)
		International Conference at Orthodox Academy of Crete, Greece	
		Perimeter Institute, Waterloo, Canada	May-2013
		Simons Symposium, International Conference at Virgin Islands	Feb-2013
		IAS, Princeton	Nov-2012
		University of Pennsylvania, United States	Nov-2012
		Harvard University, United States	Oct-2012
		Princeton University	2014
		Aspen Center for Physics	2014
10	Vijay Kumar Krishnamurthy	BIOTEC, Technical University of Dresden, Dresden, Germany	May-2015
11.	Sivaram Ambikasaran	IAM Linear Algebra Conference, Atlanta, Georgia.	Oct-2015

26. Faculty serving in

(a) National Committees

Name	Name of the conference	Role	Period of Service
Abhishek Dhar	Bangalore School on Statistical Physics, at the ICTS-TIFR, Bangalore, India	Co-organiser	2011-2015
	Indian Statistical Physics Community Meeting at the ICTS-TIFR, Bangalore, India	Co-Organiser	2014 - 2016
	Program on Non-equilibrium statistical physics at the ICTS-TIFR, Bangalore, India	Co-organiser	2015
Amit Apte	Scientific discovery through intensive data exploration,” Jawaharlal Nehru Center for Advanced Scientific	Co-convener	02-11 February 2011

	Research, Bangalore, India		
	“Monsoon school on mathematical and statistical foundations of data assimilation” and “International conference on data assimilation,” TIFR Centre for Applicable Mathematics and the Indian Institute of Science, Bangalore, India	Co-organiser	04-23 July 2011
	“Mathematical Perspectives on Clouds, Climate, and Tropical Meteorology,” Ramanujan lectures by Andrew Majda and a discussion meeting at ICTS-TIFR, Bangalore, India	Co-organiser	21-25 January 2013
	“Advanced dynamical core modeling for atmospheric and oceanic circulations,” ICTS programme as part of MPE-2013 activities, National Atmospheric Research Laboratory (NARL), Gadanki, India	Co-organiser	18-23 February 2013
	“Mathematics of Planet Earth 2013: Mathematics for the billion” an interactive exhibition at the Visvesvaraya Industrial and Technological Museum, Bangalore, India	Co-organiser	22 Nov - 01 Dec 2013 (extended upto first week of Jan 2014)
	“Nonlinear filtering and data assimilation,” A discussion meeting at ICTS-TIFR, Bangalore, India	Co-organiser	08-11 January 2014
	“Geometry of Mechanics and Control Theory,” A workshop as part of the National Mathematics Initiative thematic program “Integrable systems” at Indian Institute of Science, Bangalore, India	Part of organizing committee	02-10 January 2014
	“Dynamic Days Asia-Pacific 08,” A conference at Indian Institute of Technology-Madras, Chennai, India	Part of organizing committee	21-24 July 2014
	“Summer Research Program on Dynamics of Complex Systems,” ICTS-TIFR, Bangalore, India	Co-organizer	23 May - 23 July, 2016

P. Ajith	The Future of Gravitational-Wave Astronomy, ICTS Bangalore	Co-organiser	Monday 04 Apr, 2016 - Friday 08 Apr, 2016,
Rajesh Gopakumar	HRI Workshop on Higher Spin Theories and Holography, HRI	Co-Organiser	2011-11-01
	ICTS Meeting on Random Matrix Theory and its Applications, ICTS, Bangalore	Co-Organiser	Jan 2012
	Discussion Meeting on String Theory, ICTS-TIFR Bangalore	Co-Organiser	Jun 2012
	Indo-UK Frontiers of Science (Royal Society, UK- DST, India	Co-Chair	2014
	Strings 2015, ICTS-TIFR	Member, LOC	2015
	ICTS Discussion Meeting on New Questions in QFT from CMT.	Co-organiser	Dec 2015
	Mini-symposium on Gravitational Waves, Indian Academy of Sciences, mid-year meeting	Co-organiser	Jul 2016
Rukmini Dey	Discussion meet on Analysis and Geometry I, HRI	Co-organiser	Jan 20-Feb 1, 2011
	Discussion meet on Analysis and Geometry II, HRI	Co-organiser	March 12-16, 2012.
	Instructional School for Lecturers on Topology and Geometry, HRI,	Co-organiser	Dec 16-28, 2013
	Symplectic and Contact Topology, HRI	Co-organiser	Dec 1-12th, 2014
	Workshop on Geometry and Topology, HRI	Co-organiser	2-7th Nov, 2015
Samridhhi Sankar Ray	Transport of Particles in Turbulent Flows: Experimental, Computational and Theoretical Investigations, at the ICTS-TIFR, Bangalore, India	Co-Organiser	October 2013
	Indian Statistical Physics Community Meeting at the ICTS-TIFR, Bangalore, India	Co-Organiser	2014-2016
	The Nonlinear Physics of Complex Flows and Amorphous Solids and the	Organiser	April 2015

	associated Chandrasekhar Lectures at the ICTS-TIFR, Bangalore, India		
	Geodynamo Research (GDR) 2015 at the ICTS-TIFR, Bangalore, India	Co-organiser	June 2015
	Soft-matter: Young Investigators Meet in Pondicherry, India	Co-organiser	December 2015
Subhro Bhattacharjee	Discussion Meeting on new questions in quantum Field Theory from Condensed Matter Theory, ICTS, Bangalore	Co-organizer	28/12/2015 - 5/1/2016
Vijay Kumar Krishnamurthy	ICTP-ICTS Winter School on Quantitative Systems Biology, ICTS Bangalore	Organiser	Dec 2015
	Discussion meeting on 'Information Processing in Biological Systems', ICTS, Bangalore	Organiser	January 2016
	ICTS Turing Lectures by Prof William Bialek, ICTS, Bangalore	Organiser	January 2016
Suvrat Raju	Chandrasekhar Lectures on Scattering without Spacetime	Co-organizer	Sep 2012
	ICTS-TIFR Discussion Meeting on the Information Paradox, Entanglement and Black Holes	Co-organizer	Sep 2013
	8th Asian Winter School on Particles, Strings and Cosmology, Puri	Co-organizer	Jan 2014
	HRI Workshop on the Black Hole Information Paradox	Co-organizer	Feb 2014
	Bangalore Area Discussion Meeting, ICTS-TIFR	Co-organizer	Feb 2015
	Strings 2015	Local Organizing Committee	2015

(b) International Committees:

	Name of the Faculty Member	Name of the Committee	Role on the Committee	Term of Service
1	Spenta R Wadia	Annual Strings meetings	Member Advisory Committee	2005-
		Asian Winter Schools on Strings, Particles and Cosmology	Member Steering Committee	2005-
		APCTP, South Korea	Member Science Council	2010-
2	Amit Apte	Cogent Mathematics	Member	2015-
		"Latin American Workshop on Nonlinear Phenomena," Cartagena, Colombia	Part of organizing committee	21-25 September 2015
		"Climate Variability: from Data and Models to Decisions," Lorentz Center, Leiden, Netherlands	Co-organizer	01-05 December 2014
3	Rajesh Gopakumar	Strings 2016 (Tsinghua University, Beijing) - the annual conference in string theory	Member Advisory Committee	2016-
		Strings 2016, Beijing	Member, Local Advisory Committee	2016
		String-Math 2016 (College de France, Paris)	Member Advisory Committee	2016-
		ICTP Spring School on String Theory	Co-Director	2014-2016
		Scientific Director of ICTP-Trieste Spring School on String theory (2014-16)	Co-organizer	2014-2016
		Strings 2014, Princeton	Member, International Advisory committee	2014
		GR20, Warsaw	Session Organiser (String Theory and Branes)	2013

	Name of the Faculty Member	Name of the Committee	Role on the Committee	Term of Service
4	Abhishek Dhar	Advanced Workshop on Energy Transport in Low-Dimensional Systems: Achievements and mysteries, ICTP, Trieste, Italy	Co-organizer	2012
5.	Suvrat Raju	Asian Winter School on Strings 2016	Member, Program Committee	2106

(c) Editorial Boards:

	Name of the Faculty Member	Name of the Journal	Impact Factor	Term of Service
1	Abhishek Dhar	Journal of Statistical Physics	1.202	2009-
		Pramana	0.649	2011-
2	Spenta R Wadia	Asian Journal of Mathematics	0.362	2015-
		European Journal of Physics C	5.084	2012-15
3	Amit Apte	Nonlinear processes in geophysics (http://www.nonlinear-processes-in-geophysics.net/editorial_board.html)	0.987	2015-
4	Rajesh Gopakumar	Physical Review Letters (Divisional Associate Editor in charge of formal theory) published by the American Physical Society	7.512	2014-2016

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

ICTS organises many international programmes that are attended by worldwide experts. Participation in these programmes gives faculty members opportunities to showcase their research and also interact with experts. In addition, national and international collaborative research programmes have frequent exchange of visits of our faculty members and their collaborators. All these activities are catalysts for continuous recharging of our faculty members.

Some of our senior faculty members are invited as instructors in the faculty recharge programmes conducted across the country.

28. Student projects

- percentage of students who have done in-house projects including inter-departmental projects

All students do in-house projects as part of their course-work.

- percentage of students doing projects in collaboration with other universities / industry / institute

None

29. Awards / recognitions received at the national and international level

- Faculty Members:**

	Name of the Awardee	Name of the Award	Year/ Duration
1.	P. Ajith	Head of the Max Planck Partner Group in Astrophysical Relativity and Gravitational-Wave Astronomy at ICTS-TIFR (2015-2018).	2015-2018
		Associateship of the Indian Academy of Sciences (2014-2017).	2014-2017
		Ramanujan Fellowship from the Department of Science and Technology, Govt. Of India (2013-2018).	2013-2018
2.	Spenta R Wadia	J. C. Bose National Fellow, Dept of Science and Technology, Govt of India 2006-2011; 2011-	2015-2020
		AIRBUS Corporate Foundation Teaching and Research Chair: "Mathematics of Complex Systems", at ICTS-TIFR, 2013-2016	2013-2016
		Raja Ramanna Lecture in Physics, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, 2011	2011
		TWAS Physics Prize	2004
		ICTP Prize in honor of Steven Weinberg	1995

	Name of the Awardee	Name of the Award	Year/ Duration
		Distinguished Alumnus St Xavier's College, Mumbai	2009
		Fellow Indian Academy of Sciences	1992
		Fellow Indian National Science Academy	1997
		Fellow New York Academy of Sciences	1997
		Fellow TWAS	2006
		Fellow, National Academy of Sciences, Allahabad, India	elected 2000
3.	Rajesh Gopakumar	J. C. Bose Fellowship of Department of Science and Technology, Govt. of India (2015-2020).	2015-2020
		Elected Fellow of The National Academy of Sciences, India (NASI), Allahabad, Oct. 2014.	2014
		G. D. Birla Award for Scientific Research, 2013.	2013
		TWAS Prize in Physical Sciences, 2013.	2013
		S. S. Bhatnagar Award in Physical Sciences, 2009.	2009
		ICTP Prize for 2006 (in honor of G.C. Wick) awarded by Abdus Salam International Centre for Theoretical Physics, Trieste.	2006
		Swarnajayanti Fellowship 2006, of Dept. of Science and Technology, Govt. of India.	2006
		B. M. Birla Science Prize in Physics, 2004.	2004
4.	Sivaram Ambikasaran	INSPIRE Fellowship by the Department of Science and Technology, Government of India.	2015-2019
5.	Suvrat Raju	Ramanujan Fellowship from Science and Engineering Research Board	2010-2015

	Name of the Awardee	Name of the Award	Year/ Duration
		Cowsik Medal from TIFR Endowment Fund	2015
		INSA Young Scientist Medal	2013
		NASI Young Scientist Platinum Jubilee Award	2013
6.	Abhishek Dhar	Swarnajayanti Fellowship from Department of Science & Technology	2010 - 2014
		S.S. Bhatnagar prize in Physical Sciences	2009
		ICTP Prize	2008
		Ramanujan Fellowship	2008
		B M Birla science prize award	2004
		Fellow of IAS	2005-
7.	Vijay Kumar Krishnamurthy	DBT Ramalingaswami re-entry fellowship	2015
8.	Loganayagam	Ramanujan Fellowship from DST	2016-2021

- **Students, Postdocs, Scientific Staff and Others:**

	Name of the Awardee	Name of the Award	Year/ Duration
1.	Sajini Anand	NBHM Fellowship from the Department of Atomic Energy	May-15
2.	Sk. Sarif Hassan	NBHM Fellowship from the Department of Atomic Energy	Jul-13

30. Seminars/Conferences/Workshops organized and the source of funding (national / international) with details of outstanding participants, if any.

ICTS organizes many long-duration programmes and short-duration discussion meetings throughout the year that bring together worldwide experts from various fields who interact and collaborate. With a few exceptions all programmes are funded by DAE. Details are below:

Long-duration Programmes:**2015**

- Winter School on Quantitative Systems Biology 2015
Organizers: Antonio Celani, Sanjay Jain, Sandeep Krishna, Vijaykumar Krishnamurthy, Pankaj Mehta and Matthew Scott
- Algebraic Surfaces and Related Topics
Organizers: Mario Chan, Jinwon Choi, R.V. Gurjar, DongSeon Hwang, JongHae Keum, Sagar Kolte and Ravi Rao
- Non-equilibrium statistical physics
Organizers: Cedric Bernardin, Abhishek Dhar, Joel Lebowitz, Stefano Olla, Sanjib Sabhapandit, Keiji Saito and Herbert Spohn
- Extragalactic Relativistic Jets: Cause and Effect
Organizers: C. H. Ishwara-Chandra, Ajit Kembhavi, Preeti Kharb (Convener), Dharam Vir Lal, Anthony Readhead and C. S. Stalin
- Bangalore school on statistical Physics - VI
Organizers: Abhishek Dhar, Sanjib Sabhapandit
- Summer School on Gravitational-Wave Astronomy
Organizers: Parameswaran Ajith, K. G. Arun and Bala Iyer
- Advanced Strings School 2015
Organizers: Justin David, Chethan Krishnan and Gautam Mandal
- GdR Dynamo 2015
Organizers: Emmanuel Dormy, Stephan Fauve, Samriddhi Sankar Ray, Binod Sreenivasan and Mahendra Verma
- Mechanical manipulations and responses at the scale of the cell and beyond
Organizers: Aurnab Ghose, Darius Koester, Roop Mallik, Satyajit Mayor, Thomas Pucadyil and Pramod Pullarkat

2014

- School & Discussion Meeting on Frontiers in Light-Matter Interactions
Organizers: Bhanu Pratap Das, Bimalendu Deb, Subhasish Dutta Gupta, Saikat Ghosh and Deb Shankar Ray
- Advances in Mathematical Biology
Organizers: Pranay Goel, Sujatha Ramdorai and LS Shashidhara
- ICTP-ICTS Winter School on Quantitative Systems Biology
Organizers: V. Balasubramanian, A. Celani, N. Chandra, S. Jain, M. Marsili, A. Sengupta, M. Thattai, A. Treves and M. Vendruscolo

-
- Advanced School and Discussion meeting on Symplectic Geometry and Contact Topology
Organizers: Indranil Biswas, Rukmini Dey, Yakov Eliashberg, Rajesh Gopakumar, Mahan Mj and R. Thangadurai (Local)
 - Masterclass in nanoscale physics and devices
Organizers: Mandar Deshmukh, Murali Kota
 - Advanced Instructional School on Theoretical and Numerical Aspects of Inverse Problems
Organizers: Venkateswaran Krishnan, Rakesh Rakesh and M Vanninathan
 - p-adic aspects of modular forms
Organizers: Raghuram A, Baskar Balasubramanyam, Haruzo Hida and Jacques Tilouine
 - Bangalore School on Statistical Physics - V
Organizers: Abhishek Dhar, Sanjib Sabhapandit
 - Automorphisms of Affine Varieties
Organizers: Rajendra Gurjar, A.J. Parameswaran
 - School and Discussion Meeting on Population Genetics and Evolution
Organizers: Deepa Agashe, Kavita Jain
 - The 8th Asian Winter School on Strings, Particles and Cosmology
Organizers: Dileep Jatkar, Nakwoo Kim, Swapna Mahapatra, Anshuman Maharana, Subhabrata Majumdar, Jaemo Park, Suvrat Raju and Sandip Trivedi
 - Strongly correlated systems: From models to materials
Organizers: Kedar Damle, Indra Dasgupta, Manish Jain, H R Krishnamurthy, Tanusri Saha-Dasgupta and N.S. Vidhyadhiraja

2013

- ICTS Winter School on Experimental Gravitational-Wave Physics
Organizers: Rana Adhikari, Parameswaran Ajith, Bala Iyer, Sendhil Raja S and Tarun Souradeep
- Advanced school and Discussion meeting on Knot theory and its applications
Organizers: Krishnendu Gongopadhyay, Rama Mishra and Madeti Prabhakar
- ICTP-ICTS Winter School on Quantitative Systems Biology
Organizers: Vijay Balasubramanian, Nagasuma Chandra, Sidhartha Goyal, Sanjay Jain, Matteo Marsili, Vidyanand Nanjundiah, Anirvan Sengupta, Mukund Thattai and Michele Vendruscolo
- US-India Advanced Studies Institute on Thermalization: From Glasses to Black Holes
Organizers: Aparna Baskaran, Bulbul Chakraborty, Chandan Dasgupta, Matthew Headrick, Albion Lawrence, Gautam Mandal, Sanjib Sabhapandit and Krishnendu Sengupta
- Numerical Relativity

-
- Organizers: P. Ajith, K. G. Arun, Bala Iyer and Luis Lehner
 - NCBS-ICTS Monsoon School: Physics of Life
Organizers: Sandeep Krishna, Mukund Thattai and Madhusudhan Venkadesan
 - Mechanical manipulations and responses at the scale of the cell and beyond
Organizers: Darius Koester, Satyajit Mayor, John Mercer, Madan Rao and GV Shivashankar
 - Advanced Dynamical Core Modeling for Atmospheric and Oceanic Circulations
Organizers: Amit Apte, A Jayaraman, Hann-Ming Juang, Amit Kesarkar, Ramchandra D Nair, Purnendranath Sen and Mahendra Verma
 - CP Violation in Elementary Particles and Composite Systems
Organizers: B. P. Das, A. Dighe, S. Lamoreaux, N. Mahajan, R. Rangarajan, Bijaya Sahoo, Y. Sakemi, A. I. Sanda and A. D. Singh
 - Axonal Transport and Neurodegenerative Disorders
Organizers: Roop Mallik, Dulal Panda, Krishanu Ray and Subhojit Roy
 - Mini Winter School on Quantum Information and Computation
Organizers: Urbasi Sinha, Aninda Sinha

2012

- Recent Trends in Ergodic Theory and Dynamical Systems
Organizers: Tarun Das, Ravi Rao
- Mini Program on Dirac Material and Quantum Computation
Organizers: Arindam Ghosh, Krishnendu Sengupta
- Astronomical Surveys
Organizers: Sudip Bhattacharyya, Subha Majumdar and Bhaswati Mookerjea
- Groups, Geometry and Dynamics (GGD)
Organizers: Hoshiyar Dharmi, Krishnendu Gongopadhyay, Sanjay Pant and Siddhartha Sarkar
- Winter School on Stochastic Analysis and Control of Fluid Flow
Organizers: Sheetal Dharmatti, Raju K. George, Utpal Manna, A.K. Nandakumaran and M.P. Rajan
- Mathematics of the Planet Earth 2013
Organizers: ICTS - TIFR, TIFR Centre for Applicable Mathematics
- Pan Asian Number Theory Workshop and Conference
Organizers: J. Coates, Soumen Maity, A. Raghuram, Anupam Saikia and R. Sujatha
- Individuals and Groups
Organizers: Vidyanand Nanjundiah, Lok Man Singh Palni
- Evolutionary Origins of Compartmentalized Cells
Organizers: Frances Brodsky, Satyajit Mayor and Mukund Thattai
- 'Unifying Concepts in Materials': JA Krumhansl School & Symposium 2012

- Organizers: Madan Rao, Srikanth Sastry, Surajit Sengupta and Subodh R. Shenoy
- Random matrix theory and applications
Organizers: Justin David, Abhishek Dhar, Rajesh Gopakumar, H. R. Krishnamurthy, Manjunath Krishnapur, Satya Majumdar, Govind Menon and Sanjib Sabhapandit
 - School on Mathematical Finance
Organizers: Freddy Delbaen, Srikanth K. Iyer, Sandeep Juneja and Ronnie Sircar
 - School and Workshop on Cocompact Imbeddings, Profile Decompositions, and their Applications to PDE
Organizers: Adimurthi , K. Sandeep, Ian Schindler and Kyril Tintarev
 - Network Science in Electrical Engineering and Computer Science
Organizers: V. Anantharam, Vivek Borkar, Devdatt Dubhashi , Anurag Kumar, Madhav Marathe, G. Rangarajan and Devavrat Shah
 - Workshop on High Energy Physics Phenomenology XII
Organizers: Amol Dighe, Rohini M Godbole and Sreerup Raychaudhuri

2011

- International Nonequilibrium Winter School
Organizers: Sushanta Dattagupta, Yuval Gefen, Amit Ghosal, Ganpathy Murthy, Sanjay Puri, Sriram Ramaswamy, Krishnendu Sengupta, Nayana Shah and Subhasish Sinha
- The ICTS Condensed Matter Programme 2011
Organizers: Ravin Bhatt, Kedar Damle, H.R. Krishnamurthy, Subroto Mukerjee, Mohit Randeria, Vikram Tripathi and N.S. Vidhyadhiraja
- Frontiers of Cosmology and Gravitation
Organizers: Subhabrata Majumdar, B.S. Sathyaprakash, Tejinder Pal Singh and Tarun Souradeep
- Advances in Nuclear Physics (ANUP)
Organizers: V. Nanal, R. Palit and R.G. Pillay
- Radiative Corrections for the LHC: 2. Radcor 2011 Symposium
Organizers: Rahul Basu, D. Indumathi, Prakash Mathews, Andreas Nyffeler and V. Ravindran
- Data Assimilation Research Program
Organizers: Amit Apte, S. M. Deshpande, Christopher K. R. Jones, A. S. V. Murthy, Ravi S. Nanjundiah, Roddam Narasimha, Mythily Ramaswamy and J. Srinivasan
- International School on Topology in Quantum Matter
Organizers: J. K. Jain, H. R. Krishnamurthy, R. Shankar and V. Shenoy
- Radiative Corrections for the LHC: 1. Advanced School

-
- Organizers: Rahul Basu, Prakash Mathews, Andreas Nyffeler and V. Ravindran
 - Asian School on Lattice Field Theory
Organizers: Sourendu Gupta, Kazuyuki Kanaya
 - Scientific discovery through intensive data exploration
Organizers: Amit Apte, Vivek Borkar, Vijay Chandru, Ravi Kannan, Ravi S. Nanjundiah, Roddam Narasimha and J. Srinivasan

Discussion Meetings

2015

- New questions in quantum field theory from condensed matter theory
Organizers: Subhro Bhattacharjee, Rajesh Gopakumar, Subroto Mukerjee and Aninda Sinha
- AEI-ICTS joint workshop on gravitational-wave astronomy
Organizers: Parameswaran Ajith, Bala Iyer and Bruce Allen
- Nonlinear Physics of Disordered Systems: From Amorphous Solids to Complex Flows
Organizers: Samriddhi Sankar Ray
- Bangalore Area String Meeting
Organizers: Suvrat Raju
- Indian Statistical Physics Community Meeting 2015
Organizers: Abhishek Dhar, Kavita Jain, Rahul Pandit, Samriddhi Sankar Ray and Sanjib Sabhapandit
- Quantum entanglement in macroscopic matter
Organizers: Kedar Damle, Subroto Mukerjee

2014

- Entanglement from Gravity
Organizers: Aninda Sinha
- Cosmology Day
Organizers: Subhabrata Majumdar, Spenta Wadia
- Indian Statistical Physics Community Meeting 2014
Organizers: Kavita Jain, Rahul Pandit, Samriddhi Sankar Ray and Sanjib Sabhapandit
- Nonlinear filtering and data assimilation
Organizers: Amit Apte, Christopher Jones and Sreekar Vadlamani

2013

- Transport of Particles in Turbulent Flows: Experimental, Computational and Theoretical Investigations
Organizers: Jeremie Bec, Rahul Pandit and Samriddhi Sankar Ray

- The Information Paradox, Entanglement and Black Holes
Organizers: Pallab Basu, Suvrat Raju and Spenta Wadia
- Challenges in Genomics and Computing: An Inaugural UIUC--Strand--ICTS-TIFR CompGen Discussion Meeting
Organizers: Vijay Chandru, Ravi K. Iyer, Gene Robinson, R.K. Shyamasundar and Spenta Wadia
- PLANCK DAY
Organizers: Parameswaran Ajith, Archisman Ghosh
- Mathematical Perspectives on Clouds, Climate, and Tropical Meteorology
Organizers: Amit Apte, G. S. Bhat, Andrew Majda, Ravi Nanjundiah, Roddam Narasimha, K. R. Sreenivasan, J. Srinivasan and Jai Sukhatme
- Discussion Meeting : String Theory
Organizers: Shiraz Minwalla, Sandip Trivedi

2012

- Discussion Meeting : Advances in Graphene, Majorana Fermions, Quantum Computation
Organizers: Arindam Ghosh, Krishnendu Sengupta
- The Role of Theory in Biology with Prof. Sydney Brenner
Organizers: Mukund Thattai, Spenta Wadia
- Discussion Meeting: Scattering without Space Time
Organizers: Sujay Ashok, Suvrat Raju and Aninda Sinha
- Emerging themes in Plasmonics
Organizers: G. S. Agarwal, Jyotishman Dasgupta, S. Dutta Gupta, P. Anantha Lakshmi, Sushil Mujumdar, S. S. Prabhu, Suneel Singh and Achanta Venu Gopal
- Discussion Meeting on String Theory
Organizers: Justin David, Rajesh Gopakumar and Shiraz Minwalla
- Meeting on Complex Analytic Geometry
Organizers: Indranil Biswas, A.J. Parameswaran
- The Phase diagram of QCD (A Satellite Meeting of the ICTS Program WHEPP XII)
Organizers: Sourendu Gupta, Bedangadas Mohanti

2011

- Defining guidelines for future extreme simulations of three-dimensional fluid and magnetohydrodynamic turbulence
Organizers: Jaywant H Arakeri, Rahul Pandit
- Aspects of Biology
Organizers: Spenta R. Wadia
- Future of Past
Organizers: Mark Kenoyer, Vasant Shinde and Mayank Vahia
- Applied String Theory

- Organizers: Gautam Mandal, Shiraz Minwalla and Sandip Trivedi
- Impact of Quantum Effects on our Classical World View
Organizers: K. Indulekha, E. D. Jemmis and N. V. Unnikrishnan

In addition ICTS has also conducted 47 public lectures.

Seminars and Colloquia -

https://www.icts.res.in/seminar_schedule/1/

31. Code of ethics for research followed by the departments

ICTS follows the TIFR code of ethics.

32. Student profile programme-wise:

Programme	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
Ph.D.	178 #	10	0	100	--
Integrated M.Sc.-Ph.D.	114 #	6	0	100	--

The Ph.D. programme started in 2013 and the Integrated M.Sc-Ph.D. programme started in 2014. Only the top scoring students at the TIFR written test and JEST are allowed to apply.

33. Diversity of students

Based on geography:

Students	Ph.D.		Integrated-Ph.D.		Total
	Male	Female	Male	Female	
From the state where the university is located	0	0	0	0	0
From other states of India	10	0	6	0	16

NRI students	—	—	—	—	—
Foreign students	—	—	—	—	—
Total	10	0	6	0	16

Based on the undergraduate institutions students come from:

	Ph.D.		Integrated M.Sc.-Ph.D.		Total
	Male	Female	Male	Female	
From Universities	3	0	1	0	4
From premier science institutions †	3	0	1	0	4
From premier professional institutions #	4	0	3	0	7
From others*	0	0	1	0	1
Foreign Universities	0	0	0	0	0
Total	10	0	6	0	16

† Science institutions, e.g. CBS, NISER, etc.

IITs, NITs, etc.

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

	Examination	No of students who cleared
1.	UGC NET	9
2.	GRE	4
3.	GATE	2
4.	CAT	1
5.	National Defence Academy	1
6.	AIEEE	1

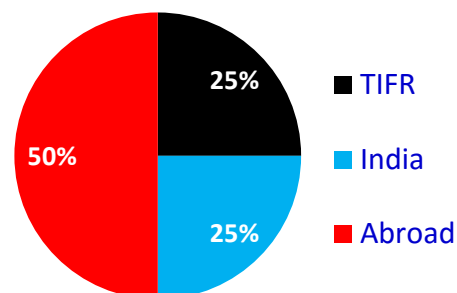
35. Student progression

All the students joined since the beginning of the academic programme are still continuing their work towards a Ph.D. degree.

36. Diversity of staff

Number of faculty who are Ph.D.'s

from TIFR :	4
from other institutions in India :	4
from institutions Abroad :	8
Total No	16

Faculty Ph.D.s

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period

The minimum eligibility criteria for selection as a member of the TIFR faculty is a Ph.D. degree. Thus, this number is not relevant.

38. Present details of departmental infrastructural facilities with regard to

a. Library

The library is still under construction. Right now we have a makeshift library with a total of 227 books in theoretical sciences.

b. Internet facilities for staff and students

The ICTS campus is fully wifi enabled. We have access to online journals through TIFR, Mumbai.

c. Total number of class rooms

We have a 30 seater classroom which has a blackboard and projection facilities with wifi connection

d. Class rooms with ICT facility

Audio-visual/video-conferencing equipment are placed in the ICTS's lecture hall (100 PAX) and seminar hall (50 PAX). These classrooms give the ability to scientists of other premiere institutes of the country to have interactions /e-meetings with ICTS faculty and visitors over Video Conferencing facility. Students and scientists from other institutes are able to attend lectures organized as a part of the Outreach programme (live telecasting).

e. Students' laboratories

ICTS has a small lab which houses around 15 Masters level experiments. There is an on-going effort to design and develop innovative experiments for graduate students

f. Research laboratories

A lab for doing experiments in fluid dynamics and non-linear dynamics is under development.

39. List of doctoral, post-doctoral students and Research Associates

Students (Ph.D) - 16

- Abhirup Ghosh (Ph.D)
- Kasi Jaswin (Ph.D)
- Archak Purkayastha (Ph.D)
- Arita Kundu (Ph.D)
- Soumyadeep Chaudhuri (Ph.D)
- Ajit Kumar Mehta (Ph.D)
- Mukesh Singh Raghav (I-Ph.D)
- Anugu Sumith Reddy (I-Ph.D)
- Chandan Kumar Jana (I-Ph.D)
- Rahul Kumar Singh (I-Ph.D)
- Rajeev Ranjan (I-Ph.D)
- Santhosh Ganapa (I-Ph.D)
- Sudip Ghosh
- Animesh Nanda (Ph.D)
- Avijit Das (Ph.D)
- Pushkal Shrivastava (Ph.D)

Postdoctoral Fellows - 15

- Abhiram Soori
- Amin Ahmad Nizami
- Archisman Ghosh
- Arunava Mukherjee
- Chandrakant Mishra
- Debajit Goswami
- Deepak Bhat
- Divya V
- Nathan Johnson-McDaniel
- Prithvi Narayan
- Sajini Anand P S
- Sambuddha Sanyal
- Suman Acharyya
- Sumit Kumar
- Vijay Prakash S

40. Number of post graduate students getting financial assistance from the university.

All our students are either Ph.D or I-Ph.D and are supported by the university.

41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.

ICTS members were involved, through the respective Subject Boards, in developing the Ph.D. and Integrated M.Sc-Ph.D. programme in Physics, as well as the Ph.D. programme in Maths and tuning it to the strengths and needs of ICTS, with the approval of the Subject Boards.

42. Does the department obtain feedback from

- a. faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?

The curriculum, student progression and evaluation is discussed regularly by the graduate committee and also in the general faculty meetings. The

feedback from these discussions are used to implement changes in the curriculum and students evaluation.

- b. students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?

Presently the coordinator of the student's affairs committee informally collects information from students on course work. We plan to start a formal anonymous feedback process from the next academic year.

- c. alumni and employers on the programmes offered and how does the department utilize the feedback?

Currently no such feedback is collected.

43. List the distinguished alumni of the department (maximum 10)

	Name of the Alumnus	Reason for Distinction
1.	Manjari Bagchi	Faculty, IMSc, Chennai
2.	Karthik Gurumoorthy	Machine Learning Scientist , Amazon Development Centre, Bangalore
3.	Sk. Sarif Hassan	Faculty, University of Petroleum and Energy Studies, Dehradun
4.	Prasant Samantray	Faculty, IIT, Indore
5.	Tapan Mishra	Faculty, Indian Institute of Technology, Guwahati

44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.

- ICTS has so far conducted 58 programmes and 28 discussion meetings. These programmes have brought leading scientists from all over the world leading to immense opportunities for scientific interaction and collaboration. These programmes typically a school component where experts give set of pedagogical lectures in topical areas at the level of MSc and graduate students. All lectures

delivered during ICTS programmes are also available on its website and on YouTube. (See https://www.icts.res.in/seminar_schedule/1/)

- ICTS is the India node for “Mathematics of Planet Earth”, a global initiative for mathematics programs and outreach. As part of this program, ICTS, in collaboration with other scientific institutes in Bangalore, organized a hands-on math exhibition in Bangalore that saw over 32,000 visitors in a span of 10 days, in Nov-Dec 2013, at the Visvesvaraya Industrial & Technological Museum, Kasturba Road, Bangalore (https://www.icts.res.in/additional_page/614/)
- ICTS organizes talks by scientists in schools and colleges.
- ICTS and Observer Research Foundation organized a conclave on science education in Bangalore. The objective was to identify some important reforms that need to be brought in science and engineering education.

45. List the teaching methods adopted by the faculty for different programmes.

Mostly, classes consist of blackboard lectures. Numerical courses use projection based methods with direct interfacing to computers. There is an effort at developing innovative experiments in the MSc lab at ICTS.

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

Courses are evaluated through exams. Students have to pass a comprehensive exam before registering for Ph.D. In addition, students who have registered for Ph.D have an annual assessment where their research progress is evaluated.

47. Highlight the participation of students and faculty in extension activities.

The faculty at ICTS are involved in the organization of many of the programmes and public lectures held at ICTS. The details of these activities are provided under question 30. Students, postdoctoral fellows, faculty members regularly participate in organizing science day activities at ICTS, during which popular expositions of science are exhibited.

48. Give details of “beyond syllabus scholarly activities” of the department.

ICTS is a research institution, where syllabus based learning forms only a small

part of our activity. The faculty, PDFs and Ph.D. students are continuously engaged in research, and the quality of their work is reflected in the publication record of the institute. Students, PDF and faculty give lectures frequently in various national and international fora. There are conferences, schools, and discussion meetings running at ICTS throughout the year, and many distinguished scientists from India and abroad participate in these. This allows the ICTS students to interact with the leading scholars in their discipline.

ICTS also encourages students from other Universities and Institutes to carry out their MSc project at ICTS. In the last two years, about 10 students from IISc, BITS, IISERs, HRI, University of Manchester and Intel have completed their M.Sc. projects at ICTS.

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.

ICTS is a new institution and its programmes have not been separately accredited, apart from the various Subject Boards of TIFR.

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.
- Research at ICTS focuses on the areas of astrophysical relativity: complex systems (including Statistical Physics, Physical Biology, Fluid Dynamics and Turbulence, and Condensed Matter Physics): Interdisciplinary mathematics: String Theory and Quantum Gravity. Around 30-40 research papers are published each year by scientists at ICTS in leading journals in these areas. Some significant contributions in the last few years are:
 - Astrophysical relativity: The group made direct contributions to contributing to the recent discovery of gravitational waves by LIGO. In particular, the group developed and implemented a test of general relativity based on the consistency of the inspiral, merger and ringdown in an observed binary black-hole coalescence. This was one of the five tests used to establish the consistency of the observed signal with a binary black hole merger predicted by general relativity. Additional direct contributions include the inference of the mass and

spin of the remnant black hole, and the radiated energy and peak luminosity of the merger event. The group members' past contributions in the theoretical source modeling, and in the construction of "template banks" have aided the discovery.

- **Complex systems:** Large scale simulations with up to a billion particles embedded in a turbulent fluid were performed towards understanding the process of droplet formation in clouds. Numerical tests were performed to provide the first detailed numerical verification of the predictions of a recent theory of thermal transport in low-dimensional solids. The important issue of how the effect of interactions in symmetry protected topological phases was investigated to show how these phases can arise in concrete lattice systems of condensed matter. Models of biochemical networks and active processes were used to obtain an understanding of pattern formation (e.g embryonic development) in biological systems. A statistical physics "random-resetting" model was studied in the context of developing improved search algorithms.
- **Interdisciplinary mathematics:** Two major results were the concentration of filtering distribution on the unstable subspace of the dynamical system, and the consistency of the Bayesian general linear ill-posed inverse problem in infinite dimensions along with the contraction rates for the posterior distributions. The Uniform Transform Method was extended to accommodate PDE interface problems involving fourth order mixed derivatives. Work on algebraic models of local hypersurfaces and interpolation of curves by constant mean curvature surfaces was carried out. Significant contributions were made in the mathematical understanding of water-waves, in particular, through data from experiments.
- **The string theory group at ICTS-TIFR** works both on pure aspects of quantum gravity, and applied aspects of string theory. A promising approach to quantum gravity is to prove the equivalence of a specific model of quantum gravity to an ordinary quantum field theory, and members of the group have been involved in formulating new examples of such dualities. They have also used such dualities to understand new effects in fluid dynamics and thermalization, by using

techniques from an entirely different area of physics --- gravitation. Other members of the group have recently developed exact results for quantities, called scattering amplitudes, in a specific quantum field theory called a Chern-Simons matter theory. The group at ICTS-TIFR also works on the information paradox, and its members have been involved in articulating some new resolutions to the paradox that also shed light on fundamental non-locality in quantum gravity.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strengths

1. ICTS has been able to attract very good young scientists as its faculty in niche areas of theoretical sciences. In addition ICTS has a large number of associates from around the country and abroad who spend some time (from a week to a month) at ICTS.
2. ICTS has in a very short time emerged as one of the most important centers in the world for scientific programmes with a core teaching component, public engagement and outreach, and cross-fertilization of ideas from different fields.
3. The graduate studies programme and the extensive post-doctoral programme of the ICTS has attracted excellent young scientists who have enriched the in-house research programme and in-turn benefitted enormously from the visitor-driven nature of this Center.
4. The proximity to several research institutes, including RRI, NCBS, JNCASR, and IISc, has yielded fruitful collaborations, teaching exchanges, and pooling of expertise.
5. World-class infrastructure, such as housing, office space, and a dedicated and efficient administrative staff, ensures a vibrant center for research and collaboration.

Weaknesses

1. The limit on the number of faculty (hence the number of students) and administrative staff that we can hire limits the scope and breadth of our in-house teaching and research programme.
2. Space constraints, especially hostel facilities for students and post-doctoral

fellows.

3. Not enough women students, post-doctoral fellows, and faculty members.
4. The distance of the campus from the city center poses challenges in terms of safe, easy and affordable commute from the city.
5. At present, sub-optimal laboratory facilities for graduate studies; hence an over-reliance on other institutes such as IISc for this purpose. This in turn puts a small burden on our colleagues in such institutes.

Opportunities

1. The scientific staff, especially the students and post-doctoral fellows, at ICTS have a tremendous advantage over other institutes, in their exposure to leading scientists from across the world who come and spend long periods of time here (as part of our programmes, schools, and discussion meetings).
2. A vibrant local scientific culture with shared, and diverse, resources between institutes such as IISc, RRI, JNCASR, and NCBS provides a stimulating environment for collaborations across disciplines.
3. The Junior Faculty Programme (5 year non-tenured positions) is a great initiative to encourage young and bright scientists to start early on an independent research career.
4. A strong post-doctoral programme, with attractive packages, attracts excellent young scientists not only from India but abroad.
5. The outreach programme and public lectures are excellent opportunities for us at ICTS to interact with very young students from schools and colleges and inspire the next generation of scientists.

Challenges:

1. To become the premier theoretical science center not only in India but in the world.
2. To develop a fully functional laboratory to cater to the needs of a full-fledged graduate studies programme.
3. Expand the computational resources of the Center.
4. To attract and encourage more women to take up research as a career.
5. To increase housing and hostel space.

52. Future plans of the department

1. We are starting (from the coming academic year) the maths program and increasing the intake of physics students as our faculty grow.
2. In the coming years we plan to diversify the areas of theoretical sciences we are going to cover so as to include computer science, different areas of mathematics apart from theoretical physics itself.
3. We plan to establish a final year research program for the best undergraduate students in the country to work on a research project with our faculty which will also expose them to advanced graduate courses.
4. We also plan to expand our outreach activities: public lectures by eminent scientists, providing an archive (youtube channel) of all our talks and programs, and in the future, programmes on science education for school/college teachers etc.