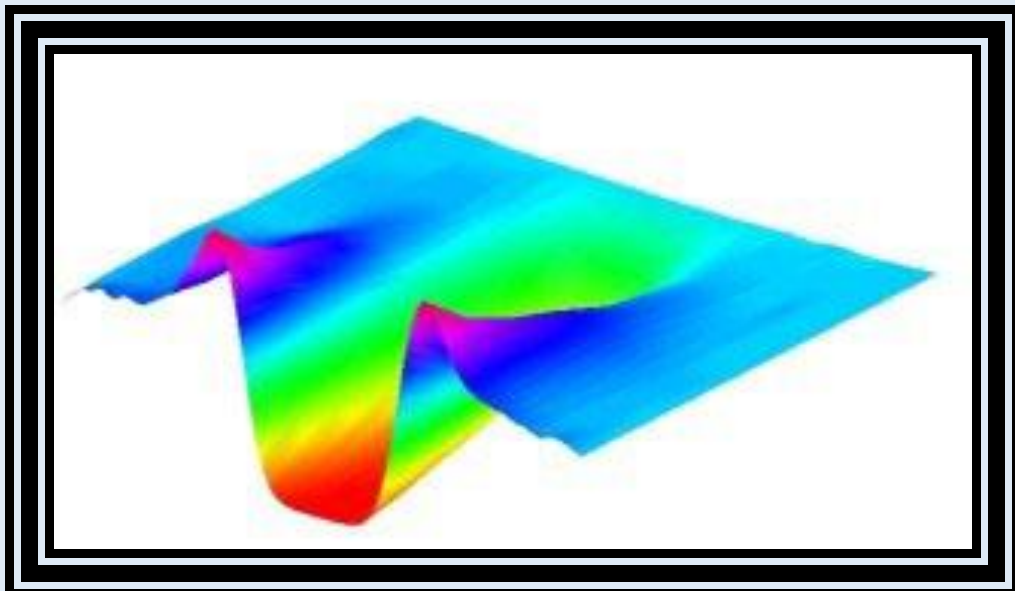


B3-V
Department of
Condensed Matter Physics
and Materials Science
(DCMPMS)



Department of Condensed Matter Physics and Materials Science

1. Name of the Department : Department of Condensed Matter Physics and Materials Science (DCMPMS)
2. Year of establishment : 1945
TIFR was divided into Research Groups in the period 1945 – 1997.
The present Departments were formed on December 12, 1997.
3. Is the Department part of a School/Faculty of the university?
The DCMPMS is a part of the Faculty of Natural Sciences.
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.
 3. M. PhilNo students are admitted purely for an M.Phil programme. However, sometimes students in the Ph.D. and Integrated Ph.D. programmes are permitted to leave with an M.Phil. degree provided they have successfully completed the Course Work and an M.Phil. dissertation.
5. Interdisciplinary programmes and departments involved
The DCMPMS does not offer interdisciplinary programmes. However, there is a lot of research collaboration among the Departments, and the graduate school has Instructors drawn from all the five physics Departments in Colaba.
6. Courses in collaboration with other universities, industries, foreign institutions, etc.
A list of (full one-semester) courses taught by DCMPMS faculty members outside TIFR in the period **2011 – 2015** follows.

	Institution	Course Name	Faculty member	Year
1.	CBS	Short course on Optical Spectroscopy	S. Ghosh	2014
2.	CBS	Solid State Physics 2	A. Bhattacharya P. Raychaudhuri	2012
3.	CBS	Physics Lab	A. Bhattacharya	2011
4.	CBS	Basic Solid State Physics	P. Raychaudhuri	2011
5.	CBS	Basic Solid State Physics	P. Raychaudhuri	2012
6.	CBS	Basic Solid State Physics	P. Raychaudhuri	2013
7.	CBS	Basic Solid State Physics	P. Raychaudhuri	2014
8.	CBS	Condensed Matter Physics	P. Raychaudhuri	2011
9.	CBS	Condensed Matter Physics	P. Raychaudhuri	2012
10.	CBS	Condensed Matter Physics	P. Raychaudhuri	2013
11.	CBS	Condensed Matter Physics	P. Raychaudhuri	2014
12.	CBS	Advanced Solid State Physics	A. Venugopal	2015
13.	CBS	Nanophotonics	A. Venugopal	2014
14.	CBS	Photonics: Basic Concepts, Design, Fabrication and Applications	A. Venugopal	2013

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

No programmes have been discontinued since the inception of the TIFR University.

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

Students of the DCMPMS 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 own 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	16	16	60
Int. M.Sc.-Ph.D. (J)	6	2.5	56	28	16	100

N.B. Integrated M.Sc.-Ph.D. students who join after 4 years B.Sc. or equivalent are required to do only 36 Core Credits, i.e. 80 Credits in total.

The Academic Session is divided into two semesters: the Autumn Semester (August – November) and the Spring Semester (February – May). In addition, there may be

courses run during the Winter break (December – January) and Summer break (May – July). Students who are not doing courses during the breaks are encouraged to participate in research projects with faculty members of their choice.

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

1. Assignments
2. Quizzes
3. Mid-semester Examination
4. End-semester Examination
5. Term paper (optional)

All students are required to do 16 Credits of Project work in their allotted Departments as a part of the Coursework. In Departmental Project I (8 Credits), they are required to study a topic of current interest outside of the textbooks and write a report on the state of art in that subject. In Departmental Project II (8 Credits), they are required to do a small original work, preferably (but not compulsorily) in the same area, or review some highly technical work which is known to be very difficult. Both these Projects are evaluated by a Committee of Faculty Members drawn from the different Departments.

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

TIFR Physics Courses are divided into four levels, as per the table below.

Level	Course Content	Participation
I	Basic Subjects	All 5 Physics Departments jointly
II	Core Subjects	All 5 Physics Departments jointly
III	Review Courses (Basic Elective)	Relevant Department
IV	Topical Courses (Advanced Elective)	Relevant Department

Thus, DCMPMS faculty are involved in teaching the Level I and II courses in sharing with faculty from other Physics departments, and exclusively involved in teaching all Level III and IV courses in Condensed Matter Physics, as well as Superconductivity, Crystal Growth and Material Science.

DCMPMS students are free to choose Electives in other Departments, even outside Physics, in consultation with the Subject Board of Physics.

10. Number of faculty positions:

	Faculty Designation with DAE Grade	Abbreviation (Item 11)	Number
1.	Distinguished Professor (J)	Dist. Professor (J)	2
2.	Senior Professor (I)	Sr. Professor (I)	3
3.	Professor (H)	—	4
4.	Associate Professor (G)	Assoc. Professor (G)	7
5.	Reader (F)	—	1
6.	Fellow (E)	—	—
		Total	17

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

	Name	Designation	Deg*	Specialisation	Exp [†]	Stu [‡]
1.	Sabyasachi Bhattacharya	Dist. Professor (J)	Ph.D.	Soft Condensed Matter	33	3*
2.	E.V. Sampathkumaran	Dist. Professor (J)	Ph.D.	Magnetism, Superconductivity, Intermetallics, Oxides	40	1
3.	Pushan Ayyub	Sr. Professor (I)	Ph.D.	Nanomaterials Physics and Applications	28	3
4.	S. K. Dhar	Sr. Professor (I)	Ph.D.	Magnetism and Superconductivity in Rare Earth Intermetallics	37	1
5.	S. Ramakrishnan	Sr. Professor (I)	Ph.D.	Superconductivity, Magnetism, Vortices, Charge Density Waves and Heavy Fermions	30	3
6.	Kalobaran Maiti	Professor (H)	Ph.D.	Magnetism and Superconductivity, Properties at the Surfaces and Interfaces	15	3
7.	Arun K. Nigam	Professor (H)	Ph.D.	Magnetic and Electrical transport properties of Metallic and Oxide	31	0

	Name	Designation	Deg*	Specialisation	Exp [†]	Stu [‡]
				systems at Low Temperatures and High Magnetic Fields		
8.	P. L. Paulose	Professor (H)	Ph.D.	Magnetism and Superconductivity in Intermetallics	27	0
9.	Pratap Raychaudhuri	Professor (H)	Ph.D.	Point Contact and Tunneling Spectroscopy, Thin films, Colossal Magnetoresistance	13	8
10.	Arnab Bhattacharya	Assoc. Professor (G)	Ph.D.	MOVPE Growth of Quantum Structures	15	4
11.	Mandar Deshmukh	Assoc. Professor (G)	Ph.D.	Nanoelectronic Devices	10	7
12.	Sandip Ghosh	Assoc. Professor (G)	Ph.D.	Optical Spectroscopy of Semiconductors	13	3
13.	Shankar Ghosh	Assoc. Professor (G)	Ph.D.	Soft Condensed Matter	10	3
14.	S.S. Prabhu	Assoc. Professor (G)	Ph.D.	TeraHertz Spectroscopy	17	1
15.	A. Thamizhavel	Assoc. Professor (G)	Ph.D.	Single Crystal Growth, Superconductivity and Magnetism	10	1
16.	A. Venugopal	Assoc. Professor (G)	Ph.D.	Metal-dielectric nanostructured materials for Photonic and Plasmonic studies	11	3
17.	R. Vijayaraghavan	Reader (F)	Ph.D.	Superconducting Quantum Electronics, Quantum Computing and Quantum Simulation	3	3

* 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

There were none appointed during the period 2011 – 2015.

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

DCMPMS does not employ temporary faculty.

14. Programme-wise Student Teacher Ratio

	Programme	Students (S)	Faculty (F)	Ratio S/F
1.	Ph.D.	15	17	0.88
2.	Integrated M.Sc.-Ph.D.	10	17	0.59
3.	M.Sc.	–	–	–
	Total	25	17	1.47

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

	Scientific & Technical Staff	Administrative & Auxiliary Staff	Total
DCMPMS	31	1	32
LTP	1	0	1

16. Research thrust areas as recognized by major funding agencies

- Superconductivity
- Nanostructures
- Properties of materials
- Device fabrication

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.

(a) National

	Agency	Project Title	Duration (years)	Total Grant (Rs. Lakhs)	Faculty member
1.	DST	Swarnajayanti Fellowship	5	141.41	M. Deshmukh

2.	DST	Fabrication Of Spin-Resolved Photoemission Spectrometer	6	135.83	K. Maiti
3.	DAE	Micro Nano Technology And Related Areas - Phase - I	10	77.21	A. Bhattacharya
4.	DST	J.C.Bose Fellowship	10	75.30	E.V.Sampathkumar n
5.	DST	Real Space Imaging Of The Mixed State In Unconventional And Disordered Superconductors Using Low Temperature	3	36.00	P. Raychaudhuri
6.	National Institute Of Communication Technology	Study Of Quantum Information Communication	8	47.00	A. Venugopal
7.	SERB	Ramanujan Fellowship To Dr. Rajamani Vijayaraghavan	5	33.00	R. Vijayaraghavan
8.	DST	J.C. Bose Fellowship	5	13.60	K. Maiti
9.	DST	Gallium Nitride Based Nanostructures For Enhanced Light Emission	4	13.28	A. Bhattacharya
10	DST	Plasmonic Nanostructures With Magnetic & Semiconductor Constituents For Nanophotonics	3	7.97	A. Venugopal
11	DST	Quantum Logic Using Semiconductor Quantum Dots	4	6.00	A. Venu Gopal
12	DST	Plasmonic Heterostructures With Novel Optical Phenomena	4	5.98	A. Venugopal
13	IBM India	Travel & Conference Expenses	3	4.80	M. Deshmukh
14	DDO, DST	Tuning Electron Correlations In Heavy Fermion Compounds By Pressure To Possible Quantum Criticality	2	3.00	A. Thamizhavel
15	DST	Electronic Structure Of Correlated Electron Systems	2	2.35	K. Maiti

16	DST	Structure-Property Relationship In 2d, 1d & O-D Nanomaterials	3	2.32	P. Ayyub
17	DST	Size Effects In Nanostructured Thin Films And Multilayers	4	1.55	P. Ayyub

(b) International

	Agency	Project Title	Duration (years)	Total Grant (Rs. Lakhs)	Faculty member
1.	Asian Office Of Aerospace R&D	Lateral Superlattice Using 2D Materials To Realize Tunable Optical And Electronic Response	1	17.13	M. Deshmukh
2.	Asian Office Of Aerospace R&D	Thermal Transport In 1-D And 2-D Nanostructures	6	13.35	M. Deshmukh
3.	Indo-French Centre For The Promotion Of Advanced Research	Spin Transport In Single Molecular Transistors	3	12.00	M. Deshmukh
4.	IBM	IBM Faculty Award - 2012	4	8.13	M. Deshmukh
5.	IBM	IBM Support For Research On Nanowire Transistors	4	5.00	M. Deshmukh
6.	Royal Society of Chemistry, UK	RSC Chemistry Outreach	2	1.80	A. Bhattacharya
7.	Rigetti Quantum Computing	Broadband parametric amplifiers for multi-qubit measurements	1	6.70	R. Vijayaraghavan
8.	Swedish Research Council	Photonic Crystals: Physics, Technology & Applications	4	35.00	A. Venugopal
9.	Asian Office Of Aerospace	Thermal Transport & Measurement Of Specific Heat	4	32.57	M. Deshmukh

	Agency	Project Title	Duration (years)	Total Grant (Rs. Lakhs)	Faculty member
	R&D	In Artificially Sculpted Nanostructures			
10.	UKIERI	Quantum logic with semiconductor nanodots		30	A.Venugopal

18. Inter-institutional collaborative projects and associated grants received

(a) National

	Collaborating Institutions	Project Title	Duration (years)	Total Grant (Rs. lakhs)	Faculty member
1.	Kanya Maha Vidyalaya	Optical and nonlinear optical properties of nanopatterned novel glasses	3	58.0	A. Venugopal
2.	Mangalore Inst of Technology & Engineering	Design, Fabrication and Characterization of Whispering Gallery Mode (WGM) in a Planar Waveguide for Detection of Bio-Molecules Using Terahertz Radiation	3	49.0	A. Venugopal
3.	Department of Physics, Goa University, Goa	Study of Magneto-elastic coupling in Antiperovskite Materials	3	21.12	A. K. Nigam

(b) International

	Collaborating Institutions	Project Title	Duration (years)	Total Grant (Rs. lakhs)	Faculty member
1.	Vienna University of Technology	Topology and Quantum Criticality in Kondo Insulators	3	47.00	A. Thamizhavel
2.	University of Goettingen	Photoemission spectroscopy in Heavy	2	19.70	K. Maiti

		Fermion Intermetallics			
3.	Niigata University Japan	Tuning electron correlations in heavy fermion compounds by pressure to possible quantum criticality; high pressure resistivity and dHvA studies	2	10.00	A. Thamizhavel
4.	University of Goettingen	Electronic structure of correlated electron systems	2	2.35	K. Maiti

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

	Funding Agency	Project Title	Duration (years)	Total Grant (Rs. lakhs)	Faculty member
1.	DAE	XII Plan Project – DCMPMS (16 projects)	5	5711	All DCMPMS faculty

20. Research facility / centre with
- state recognition :
 - national recognition :
 - international recognition :

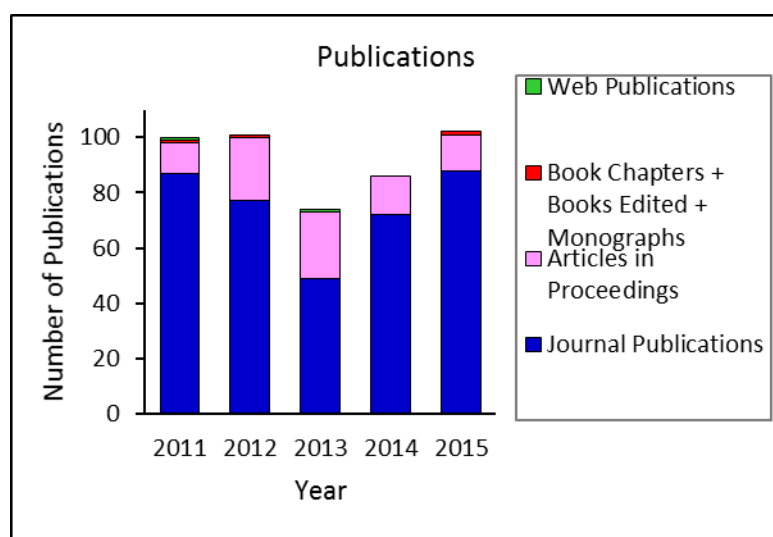
At present, there are none such in the DCMPMS.

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

At present, there are none such in the DCMPMS.

22. Publications:

DCMP MS	Journal Publications	Articles in Proceedings	Technical Reports	Web Publications	Book Chapters	Books Edited	Mono-graphs
2010-11	87	11	—	1	1	—	—
2011-12	77	23	—	—	1	—	—
2012-13	49	24	—	1	—	—	—
2013-14	72	14	—	—	—	—	—
2014-15	88	13	—	—	1	—	—
Total	373	85	—	2	3	—	—



* Books with ISBN with details of publishers: **None**

* Citation Index:

Total number of citations: 42636

Number of citations per faculty: 2508

* h-index : **Range: 11 - 40**

23. Details of patents and income generated

	Patent Holder	Patent Name	Patent No	Date	Income
1.	S. Datta	An apparatus for carrying out	204169	2000	—

	Patent Holder	Patent Name	Patent No	Date	Income
	Sandip Ghosh B. M. Arora	nondestructive measurement of Electroreflectance and Surface Photovoltage spectroscopies on a semiconductor sample in soft contact mode	India		
2.	Sandip Ghosh H.T. Grahn	Polarization-sensitive photo-detector device and method for detecting the polarization	DE10228311B4 Germany	2002	—
3.	A. K. Sood, Shankar Ghosh	Carbon Nanotube Flow Sensor and Energy Conversion Device	466/MAS/2001, US Patent No:6,718,834	2001	—
4.	A. K. Sood, Shankar Ghosh	Gas Flow Sensor and Electric Energy Generation From Gas	Flow86/MAS/2003, PCT/ IN03/00281 India	2003	—
5.	A. Bhattacharya (held by DAE)	A liquid phase epitaxy process for manufacturing separately confined heterostructure devices	195956 India	2002	—
6.	A. Bhattacharya (held by DAE)	Group III semiconducting material and method of manufacturing the same	PCT Application WO/2013/157014/A1	2013	—

24. Areas of consultancy and income generated

	Faculty Member	Project Name	Company Name	Duration	Income
1.	A. Bhattacharya	III-V semiconductor growth on novel substrates	Applied Materials Inc.	2010-2015	USD 27,000/-
2.	A. Bhattacharya	III-N epitaxial growth	DeCore Nanosemi-conductors Ltd.	2010	INR 6,00,000/-

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

National

	Faculty member	Place visited	Date
1.	R. Vijayaraghavan	Quantum Information Processing and Applications, HRI.	12/2015
2.	A. Bhattacharya	3rd International Symposium on Semiconductor Materials and Devices, ISSMD-3, Chennai, India.	02/2015
3.	K. Maiti	CTCMP – 2015, A cluster of topical meetings on current trends in Condensed Matter Physics, NISER Bhubaneswar.	02/2015
4.	M. Deshmukh	Nanodays, S.N. Bose Center, Kolkata.	02/2015
5.	P. Ayyub	International Conference on Nanoscience and Nanotechnology (ICONN 2015), SRM University, Chennai.	02/2015
6.	P. Ayyub	NANODAYS 2015, S N Bose National Centre for Basic Science, Kolkata.	02/2015
7.	A. Bhattacharya	National Conference on Advanced Research Trends in Sciences (NCARTS-2015), G.H. Rasoni College of Engineering, Nagpur, India .	01/2015
8.	P. Ayyub	India-Japan Workshop on Magnetism at the Nanoscale, NISER, Bhubaneswar.	01/2015
9.	P. Ayyub	Nano India 2013, SASTRA University Thanjavur .	01/2015
10.	A. Bhattacharya	2nd IEEE International Conference on Emerging Electronics, ICEE 2014, Bengaluru, India.	12/2014
11.	M. Deshmukh	Indo-US meeting, MRC IISc Bengaluru.	12/2014
12.	M. Deshmukh	ICMEMSS, IIT Madras.	12/2014
13.	S. S. Prabhu	Photonics 2014, IIT-Kharagpur.	12/2014
14.	Shankar Ghosh	STATPHYSKOLKATAVIII, S N Bose Kolkata.	12/2014
15.	A. Venugopal	QANSAS2014, Agra .	11/2014
16.	K. Maiti	DPS Day, IISER-Kolkata.	11/2014
17.	M. Deshmukh	Indo- Japan meeting, JNCASR Bengaluru.	11/2014
18.	R. Vijayaraghavan	ANURAG-DRDO, Hyderabad.	11/2014
19.	R. Vijayaraghavan	Seminar on “Bringing the Nanoworld Together”; Oxford Instruments, Delhi.	11/2014
20.	S. Bhattacharya	International Union of Pure and Applied Physics, New Delhi.	11/2014
21.	P. Ayyub	Tenth Conference on Chemistry of Materials, JNCASR.	10/2014

	Faculty member	Place visited	Date
22.	R. Vijayaraghavan	Discussion Meeting on Quantum Measurement, IISc, Bengaluru.	10/2014
23.	S. S. Prabhu	UFS2014, Manipal, Mangalore.	10/2014
24.	A. Bhattacharya	X'Radiate 2014: Workshop on X-ray diffraction techniques, Saurashtra University, Rajkot, India.	09/2014
25.	E. V. Sampathkumaran	International conference on magnetic materials and applications – 2014; Pondicherry University.	09/2014
26.	S. S. Prabhu	ICOPVS2014, Trivandrum.	07/2014
27.	A. Venugopal	RAOS Conference, Hyderabad, India.	04/2014
28.	M. Deshmukh	CEFIPRA Indo-French meeting, IISc Bengaluru	03/2014
29.	P. Ayyub	6 th International Conference on Nano Science and Technology (ICONSAT 2014), Chandigarh .	03/2014
30.	P. Ayyub	Size Effects in Ferroelectric and Multiferroic Systems; DRDO- IITM Symposium on Advances in Ferro & piezoelectrics (SAFE- 2014)" IIT Madras.	03/2014
31.	S. S. Prabhu	National Symposium on Applied Spectroscopy in Science and Technology (NSASST), SRTM University, Nanded.	03/2014
32.	A K. Grover	PCMCE 14, SN Bose, Kolkata .	02/2014
33.	A. Venugopal	National Laser Symposium (NLS), Manipal.	01/2014
34.	A. Venugopal	Regional Conference on Radio Science (RCRS2013) Pune.	01/2014
35.	A.K. Grover	Workshop on Soft Matter: Self Assembly and Dynamics, University of Hyderabad.	01/2014
36.	K. Maiti	International Conference on Recent Advance in Physics for Interdisciplinary Developments (RAPID 2014), Satyabhama University ,Chennai.	01/2014
37.	M. Deshmukh	GATI – Indo-UK seminar, Kolkata,	01/2014
38.	P. Ayyub	Asia Sweden meeting on understanding functional materials from lattice dynamics (ASMFLD) 2014, IIT Guwahati.	01/2014
39.	A. Bhattacharya	National Workshop on III-Nitride Materials and Devices, SSPL Delhi, India.	12/2013
40.	A. Venugopal	International Union of Materials Research Society (IUMRS), Bengaluru.	12/2013
41.	A. Venugopal	International Conference on Microwave and Photonics (ICMAP2013), Dhanbad.	12/2013
42.	M. Deshmukh	IUMRS conference, Bengaluru.	12/2013

	Faculty member	Place visited	Date
43.	P. Ayyub	Asia- Pacific Center for Theoretical Physics (APCTP) Conference on Novel Oxide Materials and Low Dimensional Systems, IISc Bengaluru.	12/2013
44.	P. Ayyub	58 th DAE Solid State Physics Symposium 2013, Panjab University, Patiala.	12/2013
45.	P. Raychaudhuri	International Union of Materials Research Society - ICA 2013, Indian Institute of Science, Bengaluru.	12/2013
46.	P. Ayyub	Nanoscale Excitation in Emergent Materials (NEEM 2013), Ahmedabad.	11/2013
47.	A. Bhattacharya	International Conference on Thin Films and Applications, ICTFA-2013, SASTRA University, Thanjavur, India.	09/2013
48.	A.K. Nigam	Annual Conference on Frontiers in Physics, University of Hyderabad.	09/2013
49.	A. Bhattacharya	Workshop on X-ray diffraction techniques, Crystal Growth Centre, Anna University, Chennai, India .	08/2013
50.	A. Venugopal	Metamaterials and Photonic Nanostructures, IIT, Kanpur.	08/2013
51.	K. Maiti	Interaction meeting on Photoelectron Spectroscopy, CAT Indore	08/2013
52.	P. Ayyub	Nanotechnology and Advanced Functional Materials (NTAFM-2013), NCL Pune.	07/2013
53.	A. Bhattacharya	National Workshop on Nitride Semiconductors, IIT-Delhi, Delhi, India.	04/2013
54.	R. Vijayaraghavan	National Seminar on Frontiers of Condensed Matter Physics, Delhi University.	04/2013
55.	P. Ayyub	International Symposium on the Science of Clusters, Nanoparticles and Nanoscale-Materials, Central University of Rajasthan, Jaipur.	03/2013
56.	A. Venugopal	1 st National Seminar on Standardization for Nanoscience and Nanotechnology, CSIR-NPL, New Delhi.	02/2013
57.	A.K. Nigam	Indo-Singapore Symposium on Physics of Advanced Materials, IIT, Kharagpur.	02/2013
58.	M. Deshmukh	1st National Seminar on standardization for Nanoscience and Nanotechnology; National Physical Laboratory, New Delhi .	02/2013
59.	P. Ayyub	Nano India 2013, NIIST Thiruvananthapuram	02/2013
60.	P. Ayyub	6th India-Singapore Joint Physics Symposium (ISJPS - 2013) IIT Kharagpur.	02/2013

	Faculty member	Place visited	Date
61.	S. Ramakrishnan	Condensed Matter Workshop, IISER, Pune.	02/2013
62.	A. Venugopal	37 th Optical Symposium of India, Pondicherry University, Pondicherry.	01/2013
63.	A. Venugopal	One Day workshop on Nano-Photonics and Meta-Materials, Pondicherry University, Pondicherry.	01/2013
64.	K. Maiti	National Workshop on electron Dynamics in Magnetic Materials (EDMM-2013), DRDO complex, Chandipur, Odisha.	01/2013
65.	K. Maiti	Electronic structure approaches to Atoms, Molecules, Clusters and Solid, ACRHEM, Central University, Hyderabad.	01/2013
66.	P. Ayyub	Workshop on Nanomaterials and their Applications, G.H. Raison College of Engineering, Nagpur.	01/2013
67.	S. S. Prabhu	37 th Optical Symposium of India, Pondicherry University, Pondicherry.	01/2013
68.	Sandip Ghosh	2 nd Internat. Symp. on Semiconductors Materials and Devices (ISSMD-2), University of Jammu, Jammu.	01/2013
69.	A. Venugopal	QANSAS 2011, Agra, India.	12/2012
70.	E. V. Sampathkumaran	Recent Trends in Materials Research, NIT, Trichy.	12/2012
71.	M. Deshmukh	(Chandrasekhar Lecture 2012); Discussion Meeting (organized by IISc and ICTS).	12/2012
72.	M. Deshmukh	57 th DAE Solid State Physics Symposium, IIT Bombay.	12/2012
73.	S. K. Dhar	Convergence-2012, Recent trends in Materials research, NIIT, Tiruchirappali, Tamil Nadu.	12/2012
74.	Sandip Ghosh	Internat. Conf. on Computers and Devices for communication (CODEC 2012).	12/2012
75.	M. Deshmukh	Indo-Taiwan Workshop on Nano-devices, JNCASR, Bengaluru.	11/2012
76.	E. V. Sampathkumaran	4th International Conference on Advanced Nanomaterials, IIT Chennai.	10/2012
77.	E. V. Sampathkumaran	Indo-Japan Conference on New Functionalities in electronic and magnetic materials, IISc., Bengaluru.	10/2012
78.	K. Maiti	Indo-Japan Conference on New functionalities in electronic and magnetic materials, Indian Institute of Science.	10/2012
79.	P. Ayyub	National Conference on Sustainable development through Innovative Research, Jadavpur University	09/2012
80.	S. Bhattacharya	Milestone Plaque Event honoring the first millimeter wave propagation experiment, Presidency University,	09/2012

	Faculty member	Place visited	Date
		Kolkata.	
81.	S. Ramakrishnan	International Conference on Special Topics of Condensed Matter, University of Goettingen, Germany.	09/2012
82.	S. Ramakrishnan	Special symposium on strongly correlated systems, University of Bayreuth, Germany.	09/2012
83.	S. Ramakrishnan	University of Goettingen, Germany, (Alexander von Humboldt Award).	08/2012
84.	P. Ayyub	National Symposium for Materials Research Scholars (MR-12), IIT Bombay.	05/2012
85.	K. Maiti	Athena 2012, S.N. Bose Center for Basic Sciences, Kolkata.	04/2012
86.	A. Venugopal	Indo-French Workshop on Modern Organic Nonlinear Optics: A multidisciplinary approach from fundamentals to applications, IISc, Bengaluru.	03/2012
87.	A.K. Nigam	National Symposium for Materials Research Scholars, IIT Bombay.	03/2012
88.	S. Ramakrishnan	International DAE-BRNS-Theme Meeting on Neutron Scattering Science and Applications, BARC, India.	03/2012
89.	P. Ayyub	National Symposium on Advances in Materials Science and Technology (AMST-2012), Gujarat University, Ahmedabad.	02/2012
90.	S. Bhattacharya	J.A. Krumhansl Symposium 2012, NCBS, Bengaluru.	02/2012
91.	E. V. Sampathkumaran	Contemporary Issues in Condensed Matter Science, IISc, Bengaluru.	01/2012
92.	P. Ayyub	International Conference on Nanoscience and Technology (ICONSAT 2012), Hyderabad.	01/2012
93.	A. Bhattacharya	International Union of Materials Research Society, International Conference in Asia - 2013 (IUMRS-ICA 2013), Bengaluru, India.	12/2011
94.	A. Venugopal	DAE Solid State Physics symposium, SRM University, Kattankulathur, India.	12/2011
95.	E. V. Sampathkumaran	International conference on Magnetism: Practice and theory, Coorg.	12/2011
96.	K. Maiti	ICTS condensed matter physics conference, IISc, Bengaluru.	12/2011
97.	S. Ramakrishnan	ICTS International workshop on strongly correlated systems, Indian Institute of Science, Bengaluru.	12/2011
98.	S. Ramakrishnan	Annual DAE Solid State Physics Conference, SRM University, Chennai.	12/2011
99.	K. Maiti	3rd IACSAPCTP Conference on Physics of Novel and	11/2011

	Faculty member	Place visited	Date
		Emerging Materials, IACS Kolkata.	
100.	P. Ayyub	International Conference on Nanoscience Engineering & Technology (ICONSET -2011), Sathyabhama University, Chennai	11/2011
101.	K. Maiti	5th Indo-Israeli meeting on Condensed Matter, Kochin.	10/2011
102.	A. Venugopal	National Conference, Terna Engineering College, Nerul.	09/2011
103.	A. Bhattacharya	UGC National Seminar on Recent Advances in Applications of Spectroscopy, Department of Chemistry, Fatima College, Madurai.	08/2011
104.	A. Venugopal	HCU-TIFR Discussion Meeting on Modern Optics, University of Hyderabad, Hyderabad.	08/2011
105.	A. Venugopal	Brain Storming Session on Plasmonics and Applications, NPL, Delhi.	07/2011
106.	P. Ayyub	India-DESY Collaboration Meeting, JNCASR Bengaluru.	07/2011
107.	A. Venugopal	International Conference on Functional Materials, HRI, Allahabad.	04/2011
108.	A. Venugopal	School on Functional Materials, HRI, Allahabad.	04/2011
109.	K. Maiti	National Workshop in Advanced Material and Technology, Institute of Technical Education and Research, Sikhsha O Onusandhan University, Bhubaneswar.	04/2011
110.	A. Bhattacharya	6th International Conference on NanoScience and Technology, ICONSAT 2014, Chandigarh, India.	03/2011
111.	K. Maiti	National Seminar on Recent trends in Condensed Matter Physics, Banaras Hindu University, Banaras.	03/2011
112.	A.K. Grover	ICACNM-2011, Panjab University, Chandigarh.	02/2011
113.	M. Deshmukh	Raman Memorial Conference, University of Pune.	02/2011
114.	P. Ayyub	India-Australia (IISc-DBT-UNSW-UQ) Research Workshop, IISc Bengaluru.	02/2011
115.	P. Ayyub	Nanoscience and Nanotechnology Conference, IIT Delhi.	02/2011
116.	Sandip Ghosh	Winter School on Semiconductor Fabrication and Characterization, Institute of Radio Physics and Electronics, University of Calcutta, Kolkata.	02/2011
117.	A. Bhattacharya	Intl. Symposium on Semiconductor Materials and Devices, ISSMD-2011, , Baroda, India.	01/2011
118.	A. Bhattacharya	Intl. Workshop on Wide Bandgap Semiconductor Nanostructures, Chennai, India.	01/2011
119.	M. Deshmukh	IISMD (International Symposium on Semiconductor	01/2011

	Faculty member	Place visited	Date
		Materials and Devices), Vadodara.	
120.	P. Ayyub	5th DST Advanced School on Nanoscience & Nanotechnology, IISc Bengaluru.	01/2011
121.	Sandip Ghosh	International Symposium on Semiconductor Materials and Devices ISSMD-2011, Maharaja Sayajirao University of Baroda., Vadodara.	01/2011

International

	Faculty member	Place visited	Date
1.	S. S Prabhu	CiDi, Dong-Eui University, Busan, South Korea.	02/2015
2.	M. Deshmukh	6 th Indo-Israeli meeting, Jerusalem, Israel.	12/2014
3.	R. Vijayaraghavan	Indo-Israel Condensed Matter Meeting.	12/2014
4.	R. Vijayaraghavan	Hebrew University of Jerusalem Quantum Optics Discussion Meeting.	12/2014
5.	M. Deshmukh	TWAS Annual meeting, Oman.	10/2014
6.	M. Deshmukh	Recent Progress in Graphene Research, Taipei.	09/2014
7.	A. Venugopal	PIERS 2014, Guangzhou, China.	08/2014
8.	M. Deshmukh	Gordon Research Conference, Nanostructure Fabrication, Biddeford, Maine USA.	07/2014
9.	P. Ayyub	TIFR-Weizmann Interaction Meeting, Weizmann Institute of Science, Israel.	06/2014
10.	A. Venugopal	Russian Quantum Center, Moscow .	05/2014
11.	K. Maiti	CNR, Trieste, Italy.	05/2014
12.	K. Maiti	University of Goettingen, Germany.	04/2014
13.	K. Maiti	University of Clausthal, Germany.	04/2014
14.	A. Bhattacharya	IEEE Annual Mini-symposium on Electron Devices and Photonics, Notre Dame University.	03/2014
15.	M. Deshmukh	Indo- Japan Meeting, Tokyo.	03/2014
16.	P. Raychaudhuri	International Workshop on Strongly Disordered Superconductors and Superconductor- Insulator Transition, 2014, French Alps.	02/2014
17.	S. K. Dhar	7th India-Singapore Symposium on Experimental Condensed Matter Physics, IIT Bombay.	02/2014
18.	S. K. Dhar	7th India-Singapore Symposium on Experimental Condensed Matter Physics, IIT Bombay.	02/2014
19.	A. Venugopal	University of Padova, Padova, Italy.	09/2013
20.	A. Venugopal	Italian National Agency for New Technologies (ENEA), Frascati, Italy.	09/2013

	Faculty member	Place visited	Date
21.	P. L. Paulose	International Conference on Strongly Correlated Electron Systems (SCES 2013), Tokyo, Japan.	08/2013
22.	A. Venugopal	visited SCNU, China and Nanjing University, China .	11/2012
23.	P. Raychaudhuri	MTI Nonconventional Insulators Workshop, 2012, Argonne National Laboratory, Argonne USA.	11/2012
24.	A. Venugopal	Eleventh International Conference on Nanostructured Materials (NANO-2012) Rhodes Island, Greece.	08/2012
25.	P. Raychaudhuri	Phase Separation and Superstripes in High Temperature Superconductors and Related Materials, Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy.	07/2012
26.	K. Maiti	University of Goettingen, Goettingen Germany.	06/2012
27.	S. Bhattacharya	University of Chicago, University of Pennsylvania and New York University.	01/2012
28.	A. Venugopal	CUNY, UNT and NEU in US.	10/2011
29.	M. Deshmukh	Indo-Brazil meeting, Iguassu Falls, Brazil.	08/2011
30.	S. Bhattacharya	Inaugural Abdus Salam-Homi Bhabha Lecture, University of Cambridge, Cavendish Laboratory	05/2011
31.	M. Deshmukh	APS March Meeting, Dallas, TX, USA.	03/2011
32.	S. Bhattacharya	Quantum and nanoscale matter: A Symposium in honor of John Ketterson, Northwestern University, Evanston, Illinois.	03/2011
33.	E.V. Sampathkumaran	Indo-Japan Meeting on Electronic structure of novel magnetic and superconducting materials, University of Tokyo, Tokyo, Japan.	02/2011
34.	K. Maiti	The 4 th Indo-Japan Seminar on Electronic Structure of Novel Magnetic and Superconducting Materials, University of Tokyo, Japan.	02/2011
35.	M. Deshmukh	EPQHS4, Beijing.	01/2011
36.	K. Maiti	University of Tokyo, Tokyo, Japan.	03/2003, 11/2005
37.	K. Maiti	University of Arlington, Arlington, Texas, USA.	03/2011

26. Faculty serving in

(a) National Committees :

	Faculty Member	Name of the Committee	Role in the Committee	Term of Service
1.	S. Ramakrishnan	Scientific Advisory Board, IUC Indore	Member	2015 -
2.	A. Bhattacharya	Program Committee: International Workshop on Physics of Semiconductor Devices	Member	2014-16
3.	P. Ayyub	Council of the Natl. Mission on NanoSc. & Tech.	Member	2014 -
4.	E.V. Sampathkumaran	Sectional Committee for Physics, IAS	Convener	2013-15
5.	S. Bhattacharya	Governing Council, Presidency Univ., Kolkata	Member	2013-14
6.	A. Bhattacharya	Board of Studies, IISST-Trivandrum	Member	2013 -
7.	S. Bhattacharya	Governing Council, IEST, Shibpur, Bengal	Member	2013 -
8.	S. Bhattacharya	Governing Council, IIT-Bombay	Member	2012-15
9.	E.V. Sampathkumaran	Sectional Committee for Physics, INSA	Member	2012-14
10.	E.V. Sampathkumaran	Management Board, TCIS, Hyderabad	Member	2012 -
11.	E.V. Sampathkumaran	Governing Council, NPL, Delhi	Member	2012
12.	A. Bhattacharya	Board of Studies, Mumbai University	Member	2011-16
13.	A. Bhattacharya	Planning and Programming Committee , Nehru Science Centre, Mumbai	Member	2011 -
14.	E.V. Sampathkumaran	Council, CAT Indore	Member	2010-13
15.	E.V. Sampathkumaran	Governing Council of IACS, Kolkata	Member	2010-11
16.	S. Ramakrishnan	Academic Council of HBNI, DAE	Member	2010 -

	Faculty Member	Name of the Committee	Role in the Committee	Term of Service
17.	S. Bhattacharya	IIT-Council, MHRD	Member	2009-12
18.	P. Ayyub	Nanoscience Advisory Group, DST	Member	2007-14
19.	A.K. Nigam	Program Advisory Committee, Condensed matter and materials science, DST	Member	2008-15

(b) International Committees :

	Faculty Member	Name of the Committee	Role in the Committee	Term of Service
1.	A. Venugopal	Organizing Committee of International Conference on Microwave & Photonics Confluence (Equinox)	Member	2015
2.	A. Venugopal	Technical Organizing Committee of International Conference on Engineering	Member	2014
3.	S. Ramakrishnan	IUPAP Commission on Low Temperature Physics (C5)	Member	2012-15
4.	S. Ramakrishnan	IUPAP Commission on Low Temperature Physics (C5)	Vice-Chair	2015--
5.	S. Ramakrishnan	International conferences on Low Temperature physics, LT27 (2014), LT28 (2017)	Member	2014,17
6.	S. Ramakrishnan	International Organizing Committee, SCES-2014, SCES-2016	Member	2014,16
7.	S. Ramakrishnan	High Magnetic fields	Member	2015
8.	P. Ayyub	Advisory Committee of the International Conference on Nano Science & Technology (ICONSAT)	Member	2012, 2014, 2016
9.	E.V. Sampathkumaran	International Organizing Committee, SCES2011	Member	2011
10.	A. Bhattacharya	1. Program Committee: International Conf. on Metalorganic Vapour Phase Epitaxy 2. Academic Committee of International Physics Olympiad	Member Member	2010-- 2015

	Faculty Member	Name of the Committee	Role in the Committee	Term of Service
11.	S. Bhattacharya	Technology Advisory Council, BP (British Petroleum)	Member	2008-15

(c) Editorial Boards :

	Faculty Member	Name of the Journal	Impact Factor	Term of Service
1.	Sabyasachi Bhattacharya	Reports on Progress in Physics (IOPP, UK)	17.06	2010--
2.	E.V. Sampathkumaran	Solid State Communications Scientific Reports (Nature Group) J. Magn. Magn. Mater	1.897 5.58 1.970	2005-- 2015-- 2015--
3.	Sudesh K. Dhar	J. Physics: Condensed Matter (IOPP)	2.346	2011--
4.	Mandar Deshmukh	Scientific Reports (Nature Group)	5.58	2014--
5.	Achanta Venugopal	1. Scientific Reports (Nature Group) 2. Frontiers in Optics and Photonics	5.58	2014-- 2014--
6.	Arnab Bhattacharya	Journal of Crystal Growth	1.70	2010--
7.	A.K. Nigam	Journal of Magnetism and Magnetic Materials	1.97	2010-12

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

As all TIFR faculty members regularly participate in national and international research-oriented symposia, conferences, workshops and schools, often as the organizers or principal lecturers, they are always in touch with the state of the art in their areas of expertise. Therefore, no separate recharging/refresher programmes are needed, nor are any conducted. In fact, TIFR faculty are in great demand as lecturers in such programmes in other institutions, both inside and outside India.

28. Student projects

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

ALL (100%) TIFR students are required to do two Departmental Projects, viz. Departmental Project I and Departmental Project II (see Item 8 above).

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

Almost all TIFR faculty and laboratories have collaborations with scientists in India and abroad. Students of these faculty members and laboratories participate in these projects. Thus the percentage of students involved in such projects may be 95% or more.

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

National Awards/Recognitions

	Awardee	Name of the Award/Honour	Year
1.	K. Maiti	Fellow, Indian National Science Academy	2016
2.	K. Maiti	J.C. Bose Fellowship	2015
3.	P. Ayyub	Fellow, Indian National Science Academy	2015
4.	P. Raychaudhuri	Fellow, Indian Academy of Science	2015
5.	M. Deshmukh	Shanti Swarup Bhatnagar Award	2015
6.	S. Bhattacharya	Doctor of Science, Honoris Causa, University of North Bengal	2015
7.	K. Maiti	DAE Outstanding Investigator award	2014
8.	P. Raychaudhuri	Bhatnagar Prize	2014
9.	R. Vijayaraghavan	Ramanujan Fellowship	2014
10.	K. Maiti	Fellow, National Academy of Science	2013
11.	M. Deshmukh	Swarnajayanti Fellowship	2013
12.	M. Deshmukh	B.M. Birla Science Prize	2012
13.	M. Deshmukh	IBM Faculty Award	2012
14.	K. Maiti	Fellow of the National Science Academy of India	2012
15.	K. Maiti	Bhatnagar Prize	2011
16.	K. Maiti	Fellow of the Indian Academy of Sciences	2010
17.	A. Bhattacharya	Homi Bhabha Award in Science Education	2010

18.	P. Ayyub	National Research Award in Nanoscience and Technology	2010
19.	A. Bhattacharya	Technoshield Award	2009
20.	P. Raychaudhuri	NASI-Scopus Young Scientist Award	2009
21.	K. Maiti	Rajib Goyal Prize for Young Scientist in Physics	2006
22.	K. Maiti	B.M. Birla Science Prize in Physics	2006
23.	K. Maiti	Swarnajayanti Fellowship	2006
24.	P. Raychaudhuri	INSA Anil Kumar Bose Memorial Medal	2006
25.	Shankar Ghosh	INSA Medal for Young Scientists	2006
26.	K. Maiti	Young Achiever's Award, Department of Atomic Energy	2005
27.	P. Ayyub	Materials Research Society of India Medal	2004
28.	P. Raychaudhuri	INSA Medal for Young Scientists	2003
29.	K. Maiti	Young Physicist Award (First prize), Indian Physical Society	2002
30.	K. Maiti	Pratyasa Kumar Basu Memorial Award	2002
31.	S. Ramakrishnan	Fellow of the Indian academy of Sciences	2002
32.	S. Ramakrishnan	International Bessel award given by Humboldt Foundation	2002
33.	S. Bhattacharya	Fellow, National Academy of Sciences, India	2002
34.	Sandip Ghosh	INSA Young Scientist Medal	1999
35.	K. Maiti	Honorary DAAD Advisor for outstanding commitment and leadership in promoting Indo-German relations	2006-09
36.	Shankar Ghosh	Associate Member of Indian Academy of Sciences	2005-10
37.	P. Ayyub	N. S. Satya Murthy Memorial Award	1991
38.	S. Ramakrishnan	N.S. Satyamurthy award	1990
39.	S. Ramakrishnan	Alexander Humboldt fellowship award	1987

International Awards/Recognition

	Awardee	Name of the Award/Honour	Year
1.	S. Ramakrishnan	Vice president, IUPAP C5	2014
2.	E.V. Sampathkumaran	TWAS Fellow	2013
3.	Arnab Bhattacharya	Chevening Rolls-Royce Fellowship for Science and Innovation Leadership	2012
4.	S. Ramakrishnan	Humboldt foundation follow up Bessel Award	2012
5.	S. Ramakrishnan	Japan Society for the Promotion of Science Award	2010
6.	S. Bhattacharya	Inaugural Abdus Salam-Homi Bhabha Lectureship, University of Cambridge, U.K.	2008
7.	S. Bhattacharya	Homi Bhabha Lectureship Award, Institute of Physics	2008

		(U.K.) and Indian Physics Association	
8.	S. Bhattacharya	Elected International Councilor, Governing Council, American Physical Society	2007
9.	S. Bhattacharya	Elected Fellow, American Physical Society	1989

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

National Awards

	Awardee	Name of the Award/Honour	Year
1.	P. V. Shivaprasad	Ramanujan Fellowship	2013

International Awards :

None in the period 2011- 2015

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

	Dates	Name	Funding Agency	Faculty members
1.	Apr 25-26, 2013	DCMPMS Annual Meeting 2013	TIFR	All
2.	Apr 19-20, 2012	DCMPMS Annual Meeting 2012	TIFR	All
3.	Apr 13-15, 2011	DCMPMS Annual Meeting 2011	TIFR	All
4.	Jun 24 - Jul 3, 2012	School on Plasmonics and ICTS Discussion Meeting on Emerging Themes in Plasmonics TCIS, Hyderabad	ICTS-TIFR	A.Venugopal and S. S. Prabhu
5.	Apr 13, 2011	Superconductivity @100: Current Research Issues TIFR	TIFR	All
6.	Oct 8-10, 2014	Forum on Nanoelectronic Manufacturing: From Materials to Systems TIFR	IBM, Tokyo Electron, Applied Materials	Mandar Deshmukh
7.	Feb 3-4, 2013	Indian Laser Association (ILA) course on Photonics TIFR, Mumbai	Indian Laser Association	A.Venugopal
8.	Jan 7-9, 2016	International Workshop on Emergent Phenomena in Quantum Hall Systems, TIFR	Office of Naval Research Global , Penn State University, and TIFR	Mandar Deshmukh

31. Code of ethics for research followed by the departments

See **Annexure B2-B** for a detailed document which is applicable across TIFR Departments and Centres.

32. Student profile programme-wise:

Numbers are **summed over 2011 – 2015** batches.

Programme (c.f. q. no. 4)	Applications received #	Selected		Joined		Pass percentage*	
		Male	Female	Male	Female	Male	Female
Ph.D.	21,370	36	4	12	3	92	66
Int.M.Sc.-Ph.D.		14	2	11	1	82	0
Total		50	6	23	4	100	100

*Applications include numbers for of all 5 Physics departments, viz. DAA, DCMPMS, DHEP, DNAP and DTP.

(a) Diversity of students**by geography**

Students	Ph.D.		Integrated- Ph.D.		M.Sc.		Total
	Male	Female	Male	Female	Male	Female	
From the state where the university is located	0	0	0	0	—	—	0
From other states of India	12	2	11	1	—	—	26
NRI students	—	—	—	—	—	—	0
Foreign Students	—	—	—	—	—	—	0
Total	12	2	11	1	0	0	26

(b) by undergraduate institution

Students	Ph.D.		Integrated M.Sc.-Ph.D.		M.Sc.		Total
	Male	Female	Male	Female	Male	Female	
From Universities	2	1	9	1	—	—	13
From premier science institutions †	—	—	—	—	—	—	—
From premier professional institutions #	10	1	1	—	—	—	12
From others*	0	0	1	—	—	—	1
Total	12	2	11	1	—	—	26

† Science institutions, e.g. CBS, NISER, etc. # IITs, NITs, etc.

33. 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
1.	NET	12
2.	GATE	11
3.	JEST	10
4.	Other	2

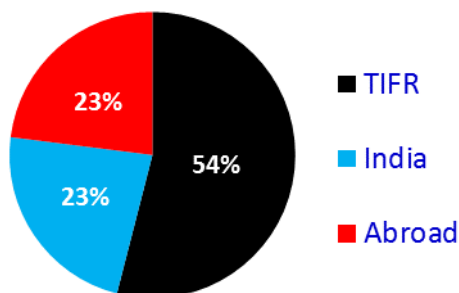
34. Student progression

- Ph.D. programme : Most of the students admitted to the DCMPS go on to complete the course work and get their Ph.D.s. Once in a while (less than one per year), a student may opt out of the programme, for various reasons. Normally, after completing their Ph.D., students have to leave TIFR. The vast majority go elsewhere for postdoctoral research. A small number (< 10%) go for other employment, such as teaching positions or industry.
- Integrated M.Sc.-Ph.D. programme : Most of the students admitted to the DCMPS go on to complete the course work and get their M.Sc.'s and Ph.D.s. Once in a while (less than one per year), a student may opt out of the programme, for various reasons. Normally, after completing their Ph.D., students have to leave TIFR. The vast majority go elsewhere for postdoctoral research. A small number (< 10%) go for other employment, such as teaching positions or industry.

35. Diversity of staff

Faculty Ph.D.s

Number of faculty who are Ph.D.'s	
from TIFR :	9
from other institutions in India :	4
from institutions Abroad:	4
Total :	17



36. 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 question is not relevant.

37. Present details of departmental infrastructural facilities with regard to

- a) Library

DCMPMS, like other Departments of TIFR in the Colaba campus, makes use of the TIFR Library and Scientific Information Resource Centre (SIRC) (see Section B2, Item no 4.2)

- b) Internet facilities for staff and students

DCMPMS, like other Departments of TIFR in the Colaba campus, makes use of the TIFR Computer Centre and Communication Facility (see Section B2, Item no 4.3)

- c) Total number of class rooms

DCMPMS, like other Departments of TIFR in the Colaba campus, makes use of the common class rooms and lecture theatres of TIFR (see Section B1, Item no 12)

- d) Class rooms with ICT facility

All the classrooms above have ICT facilities like overhead projectors, Wi-Fi, etc. Video-conferencing possibilities are also available in most of the lecture rooms.

- e) Students' laboratories

- For the compulsory Experimental Physics courses and for all the Projects, students have access to the well-equipped laboratories of DCMPMS (see Item f) below)
- In addition students of both Ph.D. and Integrated-Ph.D. have one Teaching

Laboratory which has specific experimental setups which are used during the coursework period.

f) Research laboratories

	Name of Laboratory	Fac*	PDF [†]	Stu [‡]	Brief description of research activity
1.	X-Ray Diffraction	12	10	18	Structural characterization of solids using single crystal & powder diffractometer
2.	Electron Microscopy	10	08	15	Microstructural & elemental characterization of solids using scanning & transmission electron microscopes
3.	Magnetization measurement	09	08	16	Study of magnetic properties of solids using SQUID & vibrating sample magnetometers
4.	Electron Spectroscopy	03	02	03	Study of electronic structure as a function of energy, momentum, spin & symmetry
5.	Superconductivity	03	03	04	Magnetic, transport & low temperature scanning tunneling microscope to study interaction & disorder effects
6.	Semiconductor optoelectronics	03	02	04	Growth & optical spectroscopy of semiconductor quantum structures (quantum wells, wires and dots)
7.	Quantum Measurement & Control	01	02	03	Superconducting Quantum circuits, Quantum Computing & measurement
8.	Crystal Growth	06	03	06	Growth of single crystals by: Czochralski, Bridgman, vapour transport, solution growth
9.	Micro / Nano Fabrication	06	04	07	Available instrumentation: optical & electron beam lithography, atomic layer deposition, thermal & electron beam deposition, plasma etching, etc.
10.	Ultra-low temperature	01	01	03	Study of matter at micro-Kelvin temperatures

* no of faculty members using the laboratory

† no of postdoctoral fellows using the laboratory

‡ no of graduate students using the laboratory

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

Doctoral students		Post-doctoral fellows	
1.	Nihit Saigal	1.	Tanmoy Chakrabarty
2.	Arvind Maurya	2.	Chi Nageswara Rao
3.	Om Prakash	3.	Madhavi Chand
4.	Subhrangsu Sarkar	4.	Pramita Mishra
5.	Khadiza Ali	5.	Somnath Karmakar
6.	Somesh Chandra Ganguli	6.	Dilip Misra
7.	Venkata Jayasurya Yallapragada	7.	Harkirat Singh
8.	John Philip Mathew	8.	Sanjay Kumar Upadhyay
9.	Carina B. Maliakkal	9.	Megha Vagadia
10.	Sameer Grover	10.	Arvind Yogi
11.	Ajith Padyana Ravishankar	11.	Md. Matin
12.	Tanay Roy	12.	Nikhil Kumar
13.	Rini Ganguly	13.	Rajib Nath
14.	Suman Kundu	14.	Chandni U
15.	Emroj Hussain		
16.	Biswajit Datta	JRFs	
17.	Sumeru Hazra	1.	A P Merin
18.	Banoj Kumar Nayak	2.	Tanusree Saha
19.	Indranil Roy Pandeya	3.	Aman R. Agrawal
20.	Ram Prakash	4.	Apoorv Jindal
21.	Supriya Mandal		
22.	Vishwas Jindal		
23.	Harsh Jain		
24.	Arindam Pramanik		
25.	Soumen Das		

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

ALL the students of DCMP&MS (13) are in doctoral programmes, and hence they are all given TIFR fellowships.

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

DCMPMS, and TIFR as a whole, has been training students for Ph.D. since its inception in 1945. During the 1990's, a need was felt for a special programme to allow exceptionally bright students an early entry into research, i.e. directly after their B.Sc.'s. This was felt on the basis of the Institute's well-established VSRP programme (see Item 48 below), where it was seen that many of the best students were already prepared for graduate school, even though they were only half-way through their M.Sc. programmes. It was therefore, decided to admit some exceptionally bright B.Sc. students directly to the Ph.D. programme, teach them the basic M.Sc. courses in a period of one year, and then permit them to do advanced electives and project work similar to M.Sc.'s. Based on the success of this move, the Integrated M.Sc.-Ph.D. programme, was formally started in 2012.

41. 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 Subject Board of Physics includes a Course Coordinator, who is constantly in touch with the Instructors of different courses, and collects their feedback at regular intervals. This is used to (a) advise the Instructors, (b) update the Syllabus, and (c) fine-tune the curriculum.

In 2012, an exercise was carried out, in which feedback was requested from all the Instructors of the previous 5 years. Based on their suggestions, the course curriculum was thoroughly revised and rejuvenated.

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

The Course Coordinator (see above) also collects anonymous feedback on every course from the students in a form specifically designed for this purpose. The relevant portions in this are communicated to the Instructors, for modification and rectification in their pedagogic styles. These feedback forms also form an important input in selecting a faculty for the Excellence in Teaching Award of the TIFR Alumni Association.

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

Currently no such feedback is collected on a formal basis.

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

	Name of the Alumnus	Reason for Distinction
1.	Subhendu Guha	Chairman, United Solar Ovonic, Bright Light Award from U.S. DOE
2.	Arun K. Grover	Currently Vice Chancellor of Punjab University
3.	Sabyasachi Bhattacharya	Director TIFR (2002-07), J C Bose Distinguished University Professorship, Presidency University, Kolkata 2014; Inaugural Abdus Salam-Homi Bhabha Lecturer, University of Cambridge, 2011; Homi Bhabha Lectureship, Institute of Physics, UK, 2011
4.	Ramanuja Vijayaraghavan	Distinguished Professor and Dean (Physics Faculty, TIFR). Pioneered research in areas of metal physics, and magnetic resonance in biophysical systems. Winner of Shanti Swarup Bhatnagar Award (1976), UGC Raman Award in Physical Sciences (1983). Fellow of several science academies. Twice elected as a member of the International Union of Pure and Applied Physics commission on magnetism.
5.	S.S. Dharmatti	After having worked with Prof. Felix Bloch (who had discovered NMR) at Stanford, he joined TIFR in 1953 and pioneered research on several areas of solid state NMR
6.	B.V. Thosar	Pioneering work on positron annihilation spectroscopy and Mossbauer spectroscopy

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

As Item No 30 shows, the DCMPMS regularly conducts conferences etc. which are attended by all the doctoral students, and these provide the required introduction to the state of the art in the subjects of their research. In addition, TIFR has a vibrant programme of seminars, colloquia and public lectures which the students are encouraged to attend and absorb as much information as they can.

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

The DCMPMS generally adopts the conventional blackboard teaching methods. Often slides are shown to illustrate experimental or numerical facts. For project work, students are required to work hands-on in a laboratory.

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

The DCMPMS Chairperson and another member of the DCMPMS faculty are members of the Subject Board of Physics, which constantly monitors the progress of the students and obtains feedback from faculty and students alike.

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

DCMPMS faculty, postdocs and students regularly participate in the Outreach Activities of TIFR (see Appendix ?)

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

The DCMPMS conducts and participates in the following activities on a regular basis.

- DCMPMS Seminar
- NSF Colloquium
- VSRP Programme

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

The doctoral programmes in the DCMPMS are conducted under the TIFR University, which was recognized as a Deemed University by UGC in 2002.

49. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

This department has made fundamental contributions in several important aspects of condensed matter physics, certain specific and significant instances are provided below.

- In the early 1950s, Prof. S.S. Dharmatti first introduced the concept of “chemical shift” in nuclear magnetic resonance (NMR). This pioneering work opened up the field of NMR in organic chemistry.
- In the area of magnetism, a variety of exotic magnetic phenomena have been observed in rare earth-based intermetallic solids, involving Kondo insulators, charge density waves, heavy fermions, mixed valence and giant magnetoresistance.
- Superconductivity was discovered (in the mid-90s) by our researchers in a new family of intermetallic alloys known as Borocarbides, leading to a spurt of research in this field. More recently, studies of the effect of grain size and disorder on superconductivity have led to a clearer understanding of the underlying mechanism.
- Research on nanostructured materials was initiated here as early as 1980 and led to important observations regarding size-structure-property correlations.
- Work on organic semiconductors has resulted in electroluminescent light emitting devices. Strained quantum well diode lasers have been fabricated to operate at 0.98mm and 1.55mm wavelengths.
- Recently initiated activities in exciting new areas such as Nano-electromechanical systems, Nanophotonic materials and soft matter have already produced several novel results published in high impact journals.

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

Strengths

- A very wide area of experimental condensed matter physics is covered
- Members have been able to continually enter frontier areas of research, building on the available expertise and infrastructure
- Availability of state of the art instruments and infrastructure
- Frequent intra-department as well as inter-department collaboration between researchers, leading to higher quality of research output
- A healthy age profile due to a steady level of high quality inductions over

the past 15 years, more than 50% of current members having joined during this period

Weaknesses

- Acute shortage of manpower at the Ph.D. student and Post doctoral Fellow levels
- General academic level of the Post doctoral Fellow needs to improve
- Shortage of both laboratory and office space at the TIFR Colaba Campus
- Urgent need to augment both student and PDF/visitor housing on and off campus
- Need to augment the theoretical condensed matter activity within TIFR

Opportunities

- We should engage more with industry (both within and outside India) and encourage sponsored research programs of mutual interest.

Challenges

- Need to attract at least five young researchers with expertise in emerging areas of solid state science during the next five years
- Develop a more vibrant visitors' program at both the pre- and post-doc levels

51. Future plans of the department

We envisage building up our strengths in some recently developed areas and open up new directions of research in the near future. Our current research involves studying complex phenomena in a range of systems – colloidal systems, porous media and surfactant systems – using experimental probes like micro-rheology and several optical techniques such as optical tweezers, advanced video-microscopy, and dynamic light scattering. This area is witnessing rapid growth by bringing traditional disciplines such as chemical or mechanical engineering and chemistry into its fold. We would like to explore fields such as nature inspired locomotion, microfluidics, smart materials etc. with the aim to uncover basic physics related to

hydrodynamics, both linear and nonlinear, and statistical mechanics, in situations - that are far removed from equilibrium.

Our studies on quantum condensed matter encompasses a wide variety of phenomena starting from superconductivity and magnetism to more esoteric areas such as heavy fermions, quantum phase transitions and topological phases. Our department has a rich history in the physics of correlated electron systems and we expect that this will remain our strong focus of research. We look to strengthen this area by recruiting outstanding candidates with newer expertise, such as in local measurements of electronic states to visualize novel quantum states of matter using optical probes, scanning probe microscopy etc. We also anticipate enhancing our work in the quantum information processing and devices area by looking at complementary approaches such as engineered defects in diamond (NV centers), combining quantum optics with magnetic resonance, allowing high-fidelity quantum sensing and metrology. Our capabilities for nanofabrication should allow us to attract researchers working on designer materials such hyperbolic metamaterials that allow unprecedented manipulation of the near-field of a light emitter, the study of surface plasmon polaritons and other nanoscale light-matter interactions.