PROFILE

OF

Prof. S. Arumugam Ph.D., D.Sc.

Vice Chancellor

Tamil Nadu Open University
Anna Salai,Saidapet,Chennai
India - 600 015

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Curriculum Vitae of Sonachalam. Arumugam

1. PERSONAL DETAILS

Name	:	Dr. S. ARUMUGAM
Qualification	:	M.Sc., M. Phil., Ph.D. D.Sc
Designation	:	Vice Chancellor Tamil Nadu Open University
Pay scale per month	:	Level 14 (Rs.144200-218200)
Nationality	:	Indian
Sex	:	Male
Date of Birth & Age	:	19.03.1963, 59 years
Birth Place	:	Sorakolathur Village, Tiruvannamalai,
Name of the Institution	:	Bharathidasan University
Present Address and address for	:	Prof. S. Arumugam
Communication	:	Vice Chancellor Tamil Nadu Open University Saidapet, Chennai – 600 015 Ph: (044) 2430 0633 Email: vc@tnou.ac.in

2. ACADEMIC & ADMINISTRATIVE EXPERIENCE

2.1.Academic Qualification:

Name of the college and Institution Place	Year of passing	Degree obtained	Discipline	Percentage of Marks/ Grade
Madurai kamaraj University, Madurai	2022	D.Sc	Physics	---
Anna University, Chennai.	1994	Ph. D	Physics	---
Bharathidasan University, Tiruchirappalli.	1988	M. Phil	Physics	75%
Sri Pushpam College (Bharathidasan University), Poondi, Thanjavur.	1986	M. Sc	Physics	75%
Voorhees College (University of Madras), Vellore.	1983	B. Sc	Physics	70%

2.2. Title of the Thesis for the Research Degree(s):

Degree	Title	University / Institution	Awarded - Year
D.Sc	*Investigation on Physical Properties of Strongly Correlated Materials under Extreme Conditions of High Pressure, Low Temperature and High Magnetic Field*	Madurai Kamaraj University Madurai	2022
Ph. D	*Synthesis, Characterization and High Pressure Studies on some High T_c superconductors and Nb transition metal alloys*	Anna University, Chennai	1994
M.Phil	*Quasi Crystals*	Department of Physics, Bharathidasan University, Tiruchirappalli	1987

2.3.Professional and Administrative Experiences:

S. No.	Institution	Position	Teaching & Research	
			From	To
1.	Tamil Nadu Open University, Saidapet, Chennai	Vice Chancellor	09.01.2023	Till date
2.	International Relations Centre Bharathidasan University, Tiruchirappalli, India	Coordinator	31.12.2019	03.01.2023
3.	Physics Forum School of Physics Bharathidasan University, Tiruchirappalli, India	Chairman	01.02.2019	08.01.2023
4.	School of Physics Bharathidasan University, Tiruchirappalli, India	Chair	06.06.2019	16.06.2022
5.	Centre for High Pressure Research Bharathidasan University, Tiruchirappalli, India	Director	18.03.2019 25.04.2008	08.01.2023 08.09.2008
6.	Centre for Distance Education, Bharathidasan University, Tiruchirappalli, India	Director	13.12.2017	12.12.2018
7.	Department of Physics, Bharathidasan University, Tiruchirappalli, India	Head of the Department	09.08.2017	12.12.2017
8.	Institute for Solid State Physics, Univ. of Tokyo	Visiting Professor	23.08.2016	23.11.2016
9.	MRSI Trichy Chapter	Founder Chairman & Secretary	12.11. 2015	08.01.2023
10.	Central Instrumentation Facility, Bharathidasan University, Tiruchirappalli, India	Director i/c.	19.08.2015	04.03.2018
11.	UGC XII plan ENCORE.	Coordinator	06.03.2014	30.09.2017
12.	Department of Physics, Bharathidasan University, Tiruchirappalli, India	Professor of Physics	23.03.2008	08.01.2023
13.	Centre for High Pressure Research Bharathidasan University, Tiruchirappalli, India	Coordinator	09.09.2008	17.03.2019
14.	Osaka city University, Osaka Japan	Visiting Professor	03.10.2006	10.10.2007

15.	School of Physics Bharathidasan University, Tiruchirappalli, India	Associate Professor	01.01.2006	22.03.2008
16.	School of Physics Bharathidasan University Tiruchirappalli, India	Reader	22.03.2000	31.12.2005
17.	Institute for Solid State Physics, University of Tokyo, Japan	JSPS Post Doc Fellow	09.05.1998	20.03.2000
18.	Department of Physics Indian Institute of Science Bangalore, India	Young Scientist Fellow	17.04.1997	28.10.1997
19.	NIT(REC), Tiruchirappalli	Lecturer in Physics	29.10.1997	06.05.1998
			16.09.1994	16.04.1997
20.	VIT (VEC), Vellore	Lecturer in Physics	15.11.1993	15.09.1994

2.4. Full-time Academic/Teaching Experience:

S. No.	Position	Organisation/ University	Duration	
			From	To
1	Professor of Physics	School of Physics Bharathidasan University Tiruchirappalli, India	23.03.2008	08.01.2023
2	Associate Professor	School of Physics Bharathidasan University Tiruchirappalli, India	01.01.2006	22.03.2008
3	Reader	School of Physics Bharathidasan University Tiruchirappalli, India	22.03.2000	31.12.2005
5	NIT(REC), Tiruchirappalli	Lecturer in Physics	29.10.1997	06.05.1998
			16.09.1994	16.04.1997
6	VIT (VEC), Vellore	Lecturer in Physics	15.11.1993	15.09.1994

2.5. Fellow in Academy:

1. Fellow in Academy of Sciences, Chennai (2017)
2. Fellow in APAM Associate Academician, Asia Pacific Academy of Materials, China (2019).
3. NAAC Peer Team Visit Expert Member (2020- onwards)
4. Expert Committee Member in Elettra-Sinchrotrone, Trieste, Italy, (2021- onwards)
5. Mentor in National Institute of Technical Teachers Training and Research (NITTTR) (2021- onwards)
6. Executive Council Member in Indian Spectrophysics Association (ISPA), (2021 – onwards)

2.6. Membership in Professional/Scientific Societies:

1. Indian Society for Technical Education (1994)
2. Indian Association for Physics Teachers (1995)
3. Indian Ceramic Society (1994)
4. Materials Research Society of India (2013)
5. Indian Society for Non-Destructive Testing (1995)
6. Magnetic Society of India
7. Indian Physics Association (2017)
8. Physical Society of Japan (1999 - 2000)
9. Materials Research Society, USA (2016-17)
10. The Indian Science Congress Association (2018)

2.7. Prizes, Awards, Fellowships received:

1. Felicitation received from the Academy of Sciences, Chennai (2023).
2. High h-index: web of physics from Bharathidasan University (2022).
3. Recognized for securing TANSA physical sciences From Bharathidasan University (2014).
4. Senior Scientist Award 2021, Dr.V. Devanathan Award for Physical Sciences, The academy of Sciences, Chennai (2022)
5. Dr. APJ Abdul Kalam Lifetime Achievement National Award, NISED, Bengaluru (2021).
6. Distinguished Researcher in physics, VISTA, Chennai (2020)
7. Life Time Achievement Award, Indian Spectrophysics Association, India (2020)
8. Best Poster Presentation award, Indian Academy of Science, India (2018)
9. MRSI Medal Lectures Award, Materials Research Society of India, India (2018).
10. Tamil Nadu Scientist Award in Physical Sciences, Tamil Nadu State Council for Science and Technology, India (2014).
11. Visiting Professorship, Institute of Solid State Physics, University of Tokyo, Japan (2016).
12. GCOE Fellowship, Institute of Solid State Physics, University of Tokyo, Japan (2008).
13. TWAS-UNESCO Associate Scheme at Centres of Excellence in South Third World Academy of Sciences, C/O ICTP, Italy (2009-2012).
14. OCU fellowship, Osaka city university, Japan (2006).
15. INSA Exchange Fellowship, DFG, Germany (2005).
16. Post-Doctoral Fellowship, JSPS, Japan (2002-2003).
17. Prof. M. A. Ittyachen Award, CTMS 2001, Mahatma Gandhi University, Kottayam, India (2001).
18. Post-Doctoral Fellowship, JSPS, Japan (1998-2000).
19. Young Scientist Fellowship, TNSCST, Chennai, Tamil Nadu, India (1996-1997).
20. Proficiency Prize award, A.V.V.M Sri Pushpam College, Thanjavur, India (1986).

2.8. Involvement with a formulation of academic programmes in the Centre for Distance Education, Bharathidasan University

I am glad to mention that I served as the Director, of the Centre for Distance Education (CDE), Bharathidasan University, Tiruchirappalli-620024, from 13.12.2017 till 12.12.2018, when I introduced several administrative reforms. In addition to the programs that were being offered through CDE, I **introduced 10 new UG, 03 new PG and 03 new PG Diploma programs** in disciplines that are much sought after by students. My significant contributions as Director, CDE, include the establishment of **48 new Learner Support Centres and 06 PCP Centres in Tamil Nadu** as per UGC directive, to address the needs of the CDE students. During my tenure as Director, I conducted the Board of studies for the approval of syllabi for the new courses, and I am pleased to state that the Syndicate Committee has approved the various changes recommended by the Board. Intending to increase admission in distance education programmes, I initiated a new system of **collecting 50% of tuition fees at the time of admission and the remaining 50% two months before the commencement of examinations**. A special **fee concession** of 10% for PG students who have studied UG in Bharathidasan University (affiliated colleges or CDE) and another 10% for SC/ST students has been implemented to encourage students to enrol for Programmes offered by CDE.

During my tenure as Director of CDE, I introduced the novel scheme of **concurrent Diploma programs**, which enables candidates studying the UG Degree Program to pursue a Diploma, and candidates studying the PG Degree Program to enrol for a PG Diploma simultaneously. Students have been provided with e-learning materials on the CDE website in addition to the usual printed learning materials. **Instant Examinations** have been re-introduced for the CDE students from the academic year 2018-19 to give a chance to those who have a single arrear in the final semester. This would help them complete the programme of study during the same academic year.

The CDE web portal has been modified to enable students to take **self-online admission (temporary**), make online fee payments for **40 different purposes** (tuition fees, exam fees, etc.), download (payment statements, hall tickets, results, etc.), access online e-resources and make online enquiries. **Changes have been made in the SBI online payment portal** so that the CDE students as well as Coordinators of PCP and Learner Support Centres can easily make online payments to CDE. **A new Admission Cell / Grievance Cell** has been established for the benefit of CDE students, which has resulted in a quick and effective grievance redressal mechanism. A Nodal Centre has been set up at the Khajamalai Campus of the University with facilities for online admissions, providing learning materials and offering information on CDE programmes. Syllabi, question bank and **e-learning materials have been made available to the students**, and the BDU library resources and free online web link resources have been extended to the students of CDE. **Resource persons were invited online** which helped us identifies the right person near the PCP/LSC of BDU.

As a result of the steps taken to initiate automation **of SLM books using free KOHA software** in the CDE, old books have been handed over to the constituent colleges of the University. In my capacity as Director of CDE, I took **proactive measures to collect the fees pending for the last 10 years, amounting to ~2.2 crores**, from the study centres. The Computer Centre in the exam wing of the CDE has been upgraded with new computers, and suitable **changes** have been made to the **history sheets** of students for the issue of marks statements, provisional certificates and degree certificates. In order to strengthen the functioning of the CDE, a Deputy Director and Deputy COE were appointed. I wish to submit that **student enrollment increased from 8000 to more than 12,500 for the first time in the academic year 2018-19 due to the various administrative efforts initiated**. Further, I have successfully completed all the sanctioned visits to various BDU faculties under the UGC-ENCORE program. Also, a **new Independent building** was envisaged and was recently completed during my period as a Director i/c for **Central Instrumentation Facility** established at Bharathidasan University.

2.9. New courses introduced: Centre for Distance Education, Bharathidasan University:

S. No.	Name of Innovative Academic Programmes (UG/PG Level) formulated	Organisation / University implemented	Date of approval by Academic Council / Implementation
1.	Bank Management (UG)	University (CDE)	July 2018
2.	Political Science (UG)	University (CDE)	July 2018
3.	Public Administration (UG)	University (CDE)	July 2018
4.	Geography (PG)	University (CDE)	July 2018
5.	Geography (UG)	University (CDE)	July 2018
6.	Physics (UG)	University (CDE)	July 2018
7.	Botany (UG)	University (CDE)	July 2018

8.	Zoology (UG)	University (CDE)	July 2018
9.	Chemistry (UG)	University (CDE)	July 2018
10.	Computer Science (UG)	University (CDE)	July 2018
11.	Information Technology (UG)	University (CDE)	July 2018
12.	Political Science (PG)	University (CDE)	July 2018

2.10. Member, Board of Studies in other Institutions:

Organization /University	**Duration**		**Experience (in years&months)**
	From	To	
Department of Physics, Madurai Kamaraj University, Madurai	2022	08.01.2023	Two Month
Department of Physics, PeriyarManiyammai Institute of Technology, Thanjaur (UG &PG)	2020	08.01.2023	Two Years
Department of Physics, Bishop Heber College, Tiruchirappalli -17. (UG & PG)	2020	08.01.2023	Two Years
Department of Physics, Holy cross College, Tiruchirappalli -. (UG & PG)	2020	08.01.2023	Two Years
IFET college of Engineering, Viluppuram . (UG & PG)	2019	2020	One Year
National College, Tiruchirappalli. . (UG & PG)	2019	2020	One Year
Department of Physics, Alagappa University, Karaikudi	2017	2020	Three Years
Department of Physics (UG), Alagappa University, Karaikudi	2017	2020	Three Years
Government Arts College for Women (Autonomous), Pudukottai	2017	2020	Three Years
SFR College For Women, Sivakasi, Tamil Nadu, India.	2017	2020	Three Years
Nehru Memorial College (PG), Puthanampatti	2015	2017	Two Years
Rathinam College of Arts and Science	2016	2017	One Year
Holy Cross College, Trichy	2012	2015	Three years
School of physical sciences Alagappa University, Karaikudi	2015	2018	Three years

Alagappa University (PG)-Affiliated college, Karaikudi, Tamil Nadu, India.	2015	2016	One Year
Academic Council Member			
Veera Vandayar Memorial Sri Pushpam College, Poondi	2019	2020	One Year
Government Arts college for Women, Pudukkottai	2017	2019	Two Years
Senate Member			
Bharathidasan UniversityTiruchirappalli	09.09.2017	12.12.2017	Four Months

2.11. Supervision of Candidates for Research

2.11.1. Ph.D. Guidance (Completed)

S. No	Name of the Scholar	Title of the Thesis	Submitted/ Awarded	Name of the University	Month & Year
1.	Mr. M. Sathiskumar	*Hydrostatic pressure effect on transport, magnetic and superconducting properties of non-centrosymmetric Re_6Hf, $Re_{5.5}Ta$, $(HfNb)_{0.10}(MoReRu)_{0.90}$, and LaPtGe compounds*	Submitted	Bharathidasan University, Tiruchirappalli	Mar. 2023
2.	Mr. L. Govindaraj	*Investigation of structural and transport properties of charge density wave and novel superconductors under extreme conditions*	Submitted	Bharathidasan University, Tiruchirappalli	Mar. 2023
3.	Dr. M. Kannan	*Pressure effect on transport and magnetic properties of layered chalcogenides and non-centro symmetric superconducting materials.*	Awarded	Bharathidasan University, Tiruchirappalli	Aug 2022
4.	Dr. C. Saravanan	*Investigation of magneto- and baro- caloric effects on RE and Mn-site doped perovskite manganites under extreme conditions of high pressure, low temperature and high magnetic field*	Awarded	Bharathidasan University, Tiruchirappalli	Aug. 2021
5.	Dr. K. Manikandan	*Influence of pressure on the transport, magnetic, superconducting and flux pinning properties of $Sr_{0.1}Bi_2Se_3$, M_xNbSe_2 (Fe, Cr, Zn and V) and $Fe_{1.09}Se_{0.55}Te_{0.45}$ single crystals*	Awarded	Bharathidasan University, Tiruchirappalli	Apr. 2021
6.	Dr. P. Sivaprakash	*Investigation on Ni-Mn based Heusler alloy materials for magnetocaloric and transition metal difluorides for supercapacitor applications.*	Awarded	Bharathidasan University, Tiruchirappalli	Mar. 2021

7.	Dr. N. Subbulakshmi	*Effect Of High Pressure on Transport and Magnetic Properties Of Fe, Bis2 and Non-Centrosymmetric Based Superconductors Under Low Temperature and High Magnetic Field*	Awarded	Bharathidasan University, Tiruchirappalli	July 2020
8.	Dr. G. Kalai Selvan	*External Pressure effect on magnetic and transport properties of Fe-based and BiS_2-based superconducting materials*	Awarded	Bharathidasan University, Tiruchirappalli	Mar. 2017
9.	Dr. U. Devarajan	*Investigation of structural, transport, magnetic and thermal properties of Heusler alloys under extreme conditions*	Awarded	Bharathidasan University, Tiruchirappalli	Aug. 2016
10.	Dr. M. Kanagaraj	*Pressure effect on iron-based superconducting materials*	Awarded	Bharathidasan University, Tiruchirappalli	Mar. 2015
11.	Dr. R. Thiyagarajan	*Investigation on magnetic, transport and critical behaviour of perovskite and bilayer manganites under extreme conditions of high pressure, low temperature and high magnetic field*	Awarded	Bharathidasan University, Tiruchirappalli	Sep. 2014
12.	Dr. D. Mohan Radheep	*Uniaxial and hydrostatic pressure effects on transport and magnetic properties of few Spin Ladders and perovskite Manganite single crystals*	Awarded	Bharathidasan University, Tiruchirappalli	Apr. 2014
13.	Dr. S. Esakki Muthu	*Investigation on structural, magnetic, magnetocaloric and transport properties of Ni-Mn-based Heusler alloys under high pressure, low temperature and high magnetic field*	Awarded	Bharathidasan University, Tiruchirappalli	Sep. 2013
14.	Dr. A. Murugeswari	*Investigation of transport properties of manganites under high pressure, low temperature and high magnetic field*	Awarded	Bharathidasan University, Tiruchirappalli	Aug. 2010
15.	Dr. K. Mydeen	*Effect of uniaxial and hydrostatic pressure on transport and magnetic properties of some colossal magneto-resistive single crystals*	Awarded	Bharathidasan University, Tiruchirappalli	Aug. 2008
16.	Dr. N. Manivannan	*Development of dc SQUID vibrating coil magnetometer (SVCM) for dc-susceptibility and uniaxial pressure device for ac susceptibility measurements*	Awarded	Bharathidasan University, Tiruchirappalli	2007
17.	Dr. T. K. Madhubala	*Fuzzy and Neuro-Fuzzy control techniques for the control Liquid level in a conical tank*	Awarded	Bharathidasan University, Tiruchirappalli	2005

Co-Guide

S. No	Name of the Scholar	Title of the Thesis	Submitted / Awarded	Name of the University	Month & Year
1.	Dr. Tamilmani	*Density Functional Theory Studies on Zeolite Encapsulated Transition Metal Complexes*	Awarded	Bharathidasan University, Tiruchirappalli	2019

2	Dr. T. Jayakumar	*Synthesis, structural, spectra and magnetic synthesis of some ferrite nano particles*	Awarded	Bharathidasan University, Tiruchirappalli	2021
3.	Mrs. P. Lalitha	*Synthesis and characterization of organic Moieties for Non-Linear Optical application*	Submitted	Bharathidasan University, Tiruchirappalli	2022

2.11.2. Ph.D. Guidance (Pursuing)

S. No	Name of the Scholar	Title of the Thesis	Submitted/ Awarded	Name of the University
1.	Mr. S. Muthukumaran	*Investigation of structural, Raman and transport properties of quasi-skutterudite superconductors under extreme conditions*	Pursuing	Bharathidasan University, Tiruchirappalli
2.	Mr. S. Rajkumar	*Synthesis and characterization of novel high Tc superconductors under extreme conditions of High pressure, high magnetic field and low temperature*	Pursuing	Bharathidasan University, Tiruchirappalli
3.	Mr. D.R. Giri	*Pressure effect on superconductors*	Pursuing	Bharathidasan University, Tiruchirappalli
4.	Mr. S. Surendhar	*Synthesis and characterization of new superconductors and investigation of structural, transport and magnetic properties under the extreme conditions of High pressure, high magnetic field and low temperature*	Pursuing	Bharathidasan University, Tiruchirappalli
5.	Ms. J. Jerries Infanta	*Investigation on oxide and non-oxide transition metal fluride materials for supercapacitor application*	Pursuing	Bharathidasan University, Tiruchirappalli
6.	Mr. R. Jagadeesh	*New approaches on two dimensional materials based super capacitor for energy store devices*	Pursuing	Bharathidasan University, Tiruchirappalli
7.	Mr. M. Thiagarajan	*Shock wave effects on properties of strongly correlated materials*	Pursuing	Bharathidasan University, Tiruchirappalli
8.	Ms. M. N. Sathea suweatha	*Pressure effect on physical properties of strongly correlated materials*	Pursuing	Bharathidasan University, Tiruchirappalli

Ph.D. Co-Guide

S. No	Name of the Scholar	Guide	Name of the Institution	Submitted/ Awarded	Name of the University
1.	Mr. S. Mohanraj	Dr. A. Sinthiya	SrimadAndavan Arts and Science College-Trichy	Pursuing	Bharathidasan University, Tiruchirappalli

2.11.3. M.Phil. Guidance

S. No	Name	Title of the project	Name of the Institution	Submitted / Awarded	Year
1.	Gayathri S	*Magnetic and Transport Properties of $FeTe_{0.46}Se_{0.54}$ Superconductor under Pressure*	Bharathidasan University, Tiruchirappalli	Awarded	2021
2.	Dhivya S	*Effect Of Ultrasound On L-Glycine Single Crystals And X-Ray Powder Diffraction Pattern Of Ultra-Sonicated Zwitterions L-Glycine Single Crystals*	SrimadAndavar College, Tiruchirappalli	Awarded	2018
3.	Umamaheswari.S	*Powder X-Ray Diffraction pattern and FTIR Spectrum of Acetamide Potassium Hydrogen Phthalate*	SrimadAndavar College, Tiruchirappalli	Awarded	2018
4.	Akila R	*Single crystal X-ray diffraction pattern and Hirshfeld Surface Analysis of Potassium Hydrogen Phthalate crystals*	SrimadAndavar College, Tiruchirappalli	Awarded	2018
5.	S. Rajendraprasath	*Effect of hydrostatic pressure on the superconducting transition in Sr $(Fe_{0.88}Co_{0.12})_2As_2$ single crystal*	Devanga Arts college (Autonomous), Aruppukottai	Awarded	2018
6.	V. Sowmiya	*Synthesis and Characterization on ladder type compounds $Sr_4Fe_6O_{13}$ and $Sr_3Ca_{11}Cu_{24}O_{41}$*	Bharathidasan University, Tiruchirappalli	Awarded	2018
7.	R. Suresh	*Synthesis and characterization on Mn doped Zinc ferrite nano particles synthesized by solid state reaction method*	Devanga Arts college (Autonomous), Aruppukkottai	Awarded	2017
8.	J. Lawrence	*Synthesis, Characterization, Structural and morphological studies of La doped bismuth*	Devanga Arts college (Autonomous), Aruppukkottai	Awarded	2017
9.	R. Vinoth Kumar	*Effect of Hydrostatic pressure on Magnetic exchange bias and magnetocaloric properties of $Ni_{45.5}Co_2Mn_{37.5}Sn_{15}$ Heusler alloys*	Bharathidasan University, Tiruchirappalli	Awarded	2016
10.	J. Celestine Reena	*Investigation of upper critical field and activation energy in new $Ce_{1-x}Y_xO_{0.5}F_{0.5}BiS_2$ (x=0.1 & 0.2) superconductors*	Bharathidasan University, Tiruchirappalli	Awarded	2015
11.	I. Phebe Kokila,	*Structural and magnetic properties of $CuFe_2O_4$ as-prepared and thermally treated spinel nanoferrites*	Bharathidasan University, Tiruchirappalli	Awarded	2014
12.	P. Sathishkumar	*Synthesis, Characterization and Magnetic Properties $CuFe_2O_4$ (Cuprospinel) Nano particles.*	Bharathidasan University, Tiruchirappalli	Awarded	2012

13.	R. MuthuGanesh	*Effect of Hydrostatic Pressure on $La_{0.54}Sr_{0.46}MnO_3$*	Bharathidasan University, Tiruchirappalli	Awarded	2010
14.	R. Vijayakumar	*Pressure Effects on Magnetic Property of $CeFe_{1-x}Co_xAsO$(X=0.1) Optimal Doped new oxypnictide Superconductor*	Bharathidasan University, Tiruchirappalli	Awarded	2010
15.	K. Balakrishnan	*Investigation of Sm-Sr-Mn-O manganites*	Bharathidasan University, Tiruchirappalli	Awarded	2008
16.	A. Murugeswari	*Electrical and magnetic properties of La substituted Nickel Ferrites*	Bharathidasan University, Tiruchirappalli	Awarded	2007
17.	N.R. Tamilselvan	*Development of Uniaxial Pressure device for electrical resistivity Measurements at high temperature*	Bharathidasan University, Tiruchirappalli	Awarded	2006
18.	C.Balamurugan	*Development of experimental setup for hydrostatic pressure effects on resistivity at room temperature*	Bharathidasan University, Tiruchirappalli	Awarded	2004
19.	S. Bhuvaneswari	*Development of experimental setup for hydrostatic pressure effects on resistivity at room temperature*	Bharathidasan University, Tiruchirappalli	Awarded	2004
20.	C.Rosepriya	*Study of the Y-Ba-Ru pressure effects on resistivity at room temperature*	Bharathidasan University, Tiruchirappalli	Awarded	2004
21.	N. Raghavan	*Development of quasi hydrostatic pressure device for resistivity measurements at room temperature*	Bharathidasan University, Tiruchirappalli	Awarded	2004

2.12. Research Projects

2.12.1. List of ongoing projects

Principal Investigator: Prof. S. Arumugam

S. No	Title of the project	Grant sanctioned in Rs.	Funding agency
1.	*Pressure-Induced Quantum Phase Transition in Novel Magnetic Materials* ***(2021-2024)***	47 Lakhs	DAE-BRNS
2.	*Tuning of magnetocaloric properties of Heusler alloys for room temperature magnetic refrigeration applications* ***(2021-2024)***	46 Lakhs	TANSCHE Tamil Nadu

2.12.2 List of projects completed

Principal Investigator: Prof. S. Arumugam

S. No.	Title of the Project	Grant sanctioned in Rs.	Funding agency
1.	*Study of Colossal Magnetoresistance Materials under Pressure for Sensor Applications.* ***(2001 – 2004)***	14 Lakhs	AICTE, New Delhi.
2.	*Study of Colossal Magnetoresistance Materials under Hydrostatic and Uniaxial Pressure. (2001 -2004)*	~4.1 Lakhs	ICTP-TWAS, Italy.
3.	*Development of DAC-SQUID Vibrating Coil Magnetometer for High Pressure Investigation.* ***(2001 – 2005)***	12.34 Lakhs	BRNS, DAE, Mumbai.
4.	*Development of Experimental Setup for Uniaxial Pressure Effects on AC Susceptibility measurements at Low Temperature. (2004 – 2007)*	9.0 Lakhs	CSIR, New Delhi.
5.	*Structural Effects on Charge and Orbital Order Probed by Hydrostatic and Uniaxial Pressure Studies.* ***(2006- 2007)***	2.94 Lakhs	DST-DAAD PPP, New Delhi.
6.	*Pressure Effects on Manganites under Low Temperature and High Magnetic Field.*	11.1 lakhs	UGC, New Delhi.
7.	*Development of Cryogen-free Low Temperature, High Magnetic Field and High Pressure Facilities for Transport and Magnetic Measurements.* ***(2008 - 2011)***	2.35 Crores	DST, New Delhi.
8.	*Transport and Magnetic Properties of Strongly Correlated Systems at Extreme Conditions of Pressure, Low Temperature and High Magnetic Field.* ***(2009 - 2012)***	27 lakhs	Indo-Swiss, New Delhi.
9.	*Investigation of Organic Conductors under Extreme Conditions of High Pressure, Low Temperature and High Magnetic Field.* ***(2010 - 2012)***	3.4 lakhs	DST-JSPS, New Delhi.
10.	*Electronic Transport and Magnetic Studies in Heusler type Co-Fe-Si Alloy thin films at Low Temperature and High Magnetic Field.* ***(2012 - 2013)***	10 lakhs	DMRL-CARS, Hyderabad.
11.	*Hydrostatic Pressure Effect on Manganites Single Crystals under High Pressure Low Temperature.* ***(2011 - 2014)***	3.5 lakhs	UGC, New Delhi.
12.	*Development of Uniaxial Pressure and Modified Bridgman Anvil Devices for Transport and Magnetic Measurements.* ***(2012 - 2014)***	60 Lakhs	DST-IDP New Delhi.
13.	*Pressure Effect on the Properties of Organic Conductors and Pnictides Superconductors.* ***(2013 - 2014)***	5.74 Lakhs	DST-JSPS, New Delhi.

14.	*Development of Bridgman Anvil Pressure Cell for Electrical Resistivity and Thermoelectric Power Measurement and Investigation of Half Heusler Alloys.* ***(2012 – 2015)***	30 lakhs	DAE-BRNS, Mumbai.
15.	*Synthesis, Characterization and Investigation of Heusler Alloys Based Magnetocaloric Materials at Extreme Conditions of Pressure, Temperature and Magnetic Field.* ***(2013 – 2016)***	54 lakhs	DRDO, New Delhi.
16.	*Transport properties of Fe-based Superconductors under Extreme Conditions of High Pressure, Low Temperature and High Magnetic Field.* ***(2013 – 2016)***	21.8 lakhs	DST-SERB, New Delhi.
17.	*Studies of Spin Ladder and Heavy Fermion Systems in Extreme Conditions of Hydrostatic Pressure and Low Temperature.* ***(2013- 2016)***	101 Lakhs	Indo-French, New Delhi.
18.	*Pressure Effect on Magnetic and Transport Properties of Highly Anisotropic Systems Spin Ladder and Decagonal Quasicrystalline Single Crystals.* ***(2014- 2016)***	12 lakhs	DST - Indo-Russia, New Delhi.
19.	*Synthesis and physical properties of new superconductors using high-pressure technique.* ***(2018-2020)***	6.2 lakhs	DST-JSPS, New Delhi.
20.	*Synthesis, Characterization, Application and Pressure Effect on Atom-Thin 2D Superconductors* ***(2019-2021)***	21 lakhs	DST-ASEAN
21.	*Investigation of transport and magnetic properties of novel Fe- and* BiS_2*- based superconductors under extreme conditions of high pressure, low temperature and high magnetic field* ***(2019-2022)***	213 lakhs	DST-SERB
22.	*Sustainable Energy Technologies –Efficient Renewable Energy power generation with energy storage for sustainable smart grid* ***(2021-2023)***	50 lakhs	MHRD-RUSA (1.0) Common Project
23.	*Synthesis, Characterization and Magnetocaloric studies on Heusler alloys at extreme conditions of Pressure, Temperature and Magnetic field.* ***(2018-2021)***	7 lakhs	UGC-DAE-CSR, Indore
24.	*Synthesis and characterization of new oxide/non-oxide materials for Supercapacitor applications* ***(2021-2023)***	20 lakhs	MHRD-RUSA (2.0) Common Project
25.	*Structural and transport properties of chalcogenide superconductors under extreme conditions of HP (50 GPa) low temperature (2K) and high magnetic field (9T)* ***(2020-2023)***	~7 Lakhs	UGC- IUC-CRS-ISUM

Co- Principal Investigator: Prof. S. Arumugam

S. No	Title of the project	Grant sanctioned in Rs.	Funding agency
1.	*Integrated Self Powered Energy Storage Systems* ***(2019-22)***	9.4 lakhs	DST-TMD-MES
2.	*Investigation of Transport, Magnetic and Electrochemical properties of Nanostructured Conductive Diamond films for Superconductivity and Pesticides sensing applications* ***(2020-2023)***	3 lakhs	DST-Indo-Poland

2.13. List of Patents

S. No.	Details of inventions	Authors	Patents No.	Date & Country
1.	High Pressure Hybrid clamp type Piston – Cylinder pressure cell	N.Manivannan, **S.Arumugam,** Seidigheh Dadras	CBR No. 4369	2010, India

2.14. Details of research or academic events conducted at the international level

S. No.	Title of event	Organization/ University	Date	Role
1.	User Awareness Workshop For Utilization Of Indo-Italian High-Pressure Diffraction Beamline (Xpress) At Elettra Sincrotrone	Centre for High Pressure Research, Bharathidasan University, Tiruchirappalli, India	Dec. 29 – 30, 2022	Convener
2.	International workshop on Functional materials FM-SEA 2022	Materials society of India – Trichy Chapter and Alagappa University, Karaikudi-03	Nov. 10 – 11, 2022	Convener
3.	International conference on “Physiological Diseases” ICPD-2020	International Relations Centre, Bharathidasan University, Tiruchirappalli-24.	Oct. 14-15, 2020	Convener
4.	International Virtual conference on Supercapacitors and Batteries for Future Avenues (ICSBFA 2020)	International Relations Centre, Centre for High Pressure Research, Bharathidasan University, Trichy, University of Malaysia, Malaysia associated with Materials society of India - Trichy Chapter	Sep. 08-09, 2020	Convener
5.	Advanced materials for energy and environmental applications (ICAMEEA-2020)	International Relations Centre, Centre for High Pressure Research, Bharathidasan University, Trichy, University of Malaysia, Malaysia associated with Materials society of India -	June 26-27, 2020	Convener

		Trichy Chapter		
6.	International Workshop on Functional Materials	Materials society of India – Trichy Chapter and St. Joseph's College, Thiruchirapalli	Mar. 4, 2020	Co-convener
7.	National seminar on Advance techniques in material science	Dhanalakshmi Srinivasan college of arts and science for women & MRSI Trichy chapter	Mar. 14, 2019	Co-organizer
8.	Crystal Growth of Functional and Exotic Materials	Centre for High Pressure Research, Bharathidasan University, Trichy	Aug. 6-10, 2018	Convener
9.	Asia Pacific Academy of Materials-Lecture Series (APAM)	Centre for High Pressure Research, Bharathidasan University, Trichy	Feb. 13, 2018	Convener
10.	29^{th} annual general meeting of Materials Research Society of India and National Symposium on "Advances in functional and exotic materials"	MRSI Trichy chapter & Centre for High Pressure Research, Bharathidasan University, Trichy	Feb. 14-16, 2018	Convener
11.	Indo-French International Workshop - Pressure Effects on Strongly Correlated Materials	Centre for High Pressure Research, Bharathidasan University, Trichy	Jan. 9-12, 2017	Convener
12.	Asia Pacific Academy of Materials-Lecture Series	Centre for High Pressure Research, Bharathidasan University, Trichy	Feb. 13, 2018	Convenor
13.	Materials Under Extreme Conditions – Enabling Technologies and Applications	Centre for High Pressure Research, Bharathidasan University, Trichy	Dec. 26-30, 2016	Convener
14.	Physics of Strongly Correlated Electron Systems	Centre for High Pressure Research, Bharathidasan University, Trichy	July 18-24, 2016	Convener
15.	International Workshop on Strongly Correlated Materials	Centre for High Pressure Research, Bharathidasan University, Trichy	Jan. 20, 2015	Convener
16.	Special Seminar on Recent trends in novel materials	Centre for High Pressure Research, Bharathidasan University, Trichy	Feb. 20, 2013	Convener
17.	Awareness workshop on the facilities of UGC-DAE-Consortium for Scientific Research	Centre for High Pressure Research, Bharathidasan University, Trichy	Sep. 16-17, 2009	convener
18.	Instrumentation and Measurement Techniques	Centre for High Pressure Research, Bharathidasan University, Trichy	Mar. 14-15, 2005	convener

2.15. Reviewer in International Journals:

- Nature Scientific Reports
- Physica B
- Journal of Magnetism and Magnetic Materials
- Journal of Alloys compounds
- Journal of Materials Science
- Journal of Cogent Physics
- Journal of Superconductivity and Novel Magnetism
- Journal of Intermetallic
- RSC Advances
- Materials chemistry and Physics
- Journal of Intermetallics
- Journal of Solid State and Science and Technology

3. Research Contribution:

3.1 Establishment of Centre for High Pressure Research:

Prof S. Arumugam established the **"Centre for High Pressure Research" (CHPR)** in **2008** with world-class excellent low-temperature, high-magnetic and high-pressure facilities and obtained financial support through individual projects from various National and International funding agencies. It is a unique Centre in India. Prof S. Arumugam has successfully completed *27 Major Research Projects* as a Principal Investigator (PI) including 17 projects from National funding agencies [AICTE, BRNS (2), CSIR, UGC (2), DST, DMRL-CARS, DST-IDP, DRDO, DST-SERB (2), UGC-DAE-CSR-Indore, MHRD-RUSA (2), UGC- IUC-CRS-ISUM, DST-TMD-MES] and 10 international collaborative exchange projects [ICTP-TWAS, DST-DAAD, Indo-Swiss, DST-JSPS (3), Indo-French, DST -Indo-Russia, DST-ASEAN and DST-Indo-Poland]. Prof S. Arumugam currently has 02 ongoing major research projects[TANSCHE, DAE-BRNS] as a PI. The CHPR has been funded more than 10.3 crore from various sources. The primary mission of CHPR is to conduct basic research in frontier areas of condensed matter physics and study various strongly correlated and exotic materials such as High T_c and Fe-based Superconductors, Manganites, Heusler alloys, Topological Insulators, Superconductors & Semimetals, Organic & Inorganic Spin ladders, Heavy Fermions, Dirac metals and Nano-materials under extreme conditions of high pressure (~ 20 GPa), low temperature (2K) and high magnetic field (9T). The CHPR is to promote exchange and collaborative activities among those who are professionally engaged in scientific research with National and International laboratories.

The major focus of this Centre is to study the transport, magnetic, thermal, structural and dielectric properties under extreme conditions to find new colossal magnetoresistance, giant magnetocaloric, ferroelectric, dielectric and new room-temperature superconducting materials. Further, it helps to understand the basic mechanism behind the phenomenon and these discoveries opened up new horizons and various applications in materials science for the benefit of our day-to-day life.

3.2. Vision

Centre for High Pressure Research (CHPR) is striving to achieve a world-class institution by producing professionals with high technical knowledge, professional skills and ethical values by providing high quality manpower through equipping students with core competency and technical skills in the area of high pressure research and elevate as an International Centre for High Pressure Research.

3.3. Objectives

- ✓ To establish high pressure, low temperature and high magnetic field facility to carry out electrical resistivity, magnetization, thermopower and specific heat measurements under low temperature (100 mK), high magnetic field (18 T) and hydrostatic pressure (8 GPa).
- ✓ To develop palm type cubic anvil system with a dilution refrigerator and integration of the 18T cryogen-free superconducting magnet to do electrical resistivity and specific heat measurements down to 100 mK and up to 8 GPa.
- ✓ To develop a magnetization measurements facility under hydrostatic pressure of 50 GPa using ultra diamond anvil cell down to 2 K.
- ✓ To establish a Traveling Solvent Floating Zone Crystal growth facility and train youngsters to grow various single crystals such as iron-based superconductors, colossal magnetoresistance materials, diluted magnetic semiconductors, multiferroics, magnetocaloric effect materials and various strongly correlated low dimensional systems.
- ✓ To establish a wide range of user facilities and services for high pressure related research at the frontier areas of science. These facilities are open to all researchers and provide a vibrant academic ambience towards high pressure and low temperature physics.
- ✓ The Centre for High Pressure Research is expected to act as a focal point for Research & Development with periodic training in the area of High Pressure and Low Temperature

Physics in the field of Cryogenics, low-temperature instrumentation, high pressure experimental techniques, magnetic and transport measurements.

- ✓ New phase diagrams will be developed upto 0-50 GPa for various recent complex materials such as manganites, multiferroics, superconductors, diluted semiconductors, organic conductors, conducting polymers, Topological Superconductors, Dirac materials, etc.
- ✓ Remarkable scientific results obtained and published in international high impact factor scientific journals and at the same time our technologies have been filed for patent, which is the result of our approach to combining basic and applied research
- ✓ To organize international Workshops and Seminars to showcase the importance of High pressure research for young researchers and to inspire them to work on recent trends and to explore the unravelled facts in the Science & Technology
- ✓ **To form a core group and establish International Centre for High Pressure Research and to provide state-of-the-art facilities in High Pressure Research and develop as an International Centre in India.**

3.4. Research Collaborations

3.4.1. International Level:

- ✓ Oxford University, UK
- ✓ Paul Scherrer Institute, Switzerland
- ✓ University of Geneva, Switzerland
- ✓ EPFL, Switzerland
- ✓ ISSP, University of Tokyo, Japan
- ✓ CAS-Beijing, China
- ✓ CBPF, Rio de Janeiro, Brazil
- ✓ Osaka City University, Japan
- ✓ Osaka Prefecture University, Japan
- ✓ IFW-Dresden, Germany
- ✓ University of Nevada, Las Vegas, USA
- ✓ National University of Singapore, Singapore
- ✓ University of Johannesburg, South Africa
- ✓ CEA, Grenoble, France
- ✓ University of Barcelona, Spain
- ✓ National Taiwan University, Taiwan
- ✓ Moscow State University, Russia
- ✓ National University of Science and Technology, Moscow, Russia
- ✓ University of Alabama at Birmingham, USA

- ✓ Elettra sincrotrone Trieste, Italy
- ✓ University of Oslo, Norway

3.4.2. National Level: 

- ✓ Indian Institute of Technology, Kanpur
- ✓ Indian Institute of Technology, Indore
- ✓ Indian Institute of Technology, Kharagpur
- ✓ Indian Institute of Technology, Hyderabad
- ✓ Indian Institute of Technology, Varanasi
- ✓ Indian Institute of Technology, New Delhi
- ✓ Indian Institute of Technology, Chennai
- ✓ Indian Institute of Technology, Jodhpur
- ✓ Indian Institute of Technology, Mandi
- ✓ Indian Institute of Science Education and Research, Pune
- ✓ Indian Institute of Science Education and Research, Thiruvananthapuram
- ✓ National Physical Laboratory, New Delhi
- ✓ Bhabha Atomic Research Centre, Mumbai
- ✓ Tata Institute of Fundamental Research, Mumbai
- ✓ SN Bose National Centre for Basic Sciences, Kolkata
- ✓ Saha Institute of Nuclear Physics, Kolkatta
- ✓ Department of Nuclear Physics, University of Madras, Chennai
- ✓ Department of Physics, Anna University, Chennai
- ✓ Nano Research Centre, SRM University, Chennai
- ✓ Department of Organic Chemistry, Madras University, Chennai
- ✓ Centre for Nanoscience & Nanotechnology, Madras University, Chennai
- ✓ UGC-DAE Consortium for Scientific Research, Indore and Kolkata
- ✓ Defence Metallurgical Research Laboratory, Hyderabad
- ✓ Department of Physics, Pondicherry University, Pondicherry
- ✓ Department of Physics, Pondicherry Engineering College, Pondicherry
- ✓ Materials Science Division, IGCAR, Kalpakkam
- ✓ Vellore Institute of Technology, Vellore
- ✓ Department of Physics, Bharathiyar University, Coimbatore
- ✓ Department of Physics, Madurai Kamarajar University, Madurai
- ✓ Department of Chemistry, Madurai Kamarajar University, Madurai
- ✓ Thiagaraja College of Engineering, Madurai
- ✓ Department of Physics, Yadava Womens College, Madurai
- ✓ Centre for Nanoscience & Nanotechnology, Bharathidasan University, Tiruchirappalli
- ✓ School of Chemistry, Bharathidasan University, Tiruchirappalli
- ✓ National Institute of Technology, Tiruchirappalli
- ✓ Department of Bioelectronics & Sensors, Alagappa University, Karaikudi
- ✓ Department of Physics, Periyar University, Salem

3.5. Expertise of the Vice-Chancellor in Instruments and Devices:

- ✓ Hydrostatic piston-cylinder pressure cell (3.5 GPa)
- ✓ Hybrid hydrostatic piston-cylinder pressure cell (4.5 GPa)
- ✓ Quasi-hydrostatic Bridgman anvil pressure cell (8 GPa)
- ✓ Miniature piston-cylinder hydrostatic pressure cell MPMS-VSM (1 GPa)
- ✓ Cubic anvil (hydrostatic pressure)- 5T CF magnet system (8 GPa)
- ✓ Modified Bridgman-anvil cell under hydrostatic pressure calibrated (8 GPa)
- ✓ Continuous pressure uniaxial pressure devices for resistivity and ac-susceptibility
- ✓ Measurements suitable for Closed Cycle Refrigerator system (CCR-VTI)- (1 GPa)
- ✓ Uniaxial pressure cell (1.3GPa) Suitable for MPMS and VSM
- ✓ Mao-Bell diamond anvil cell for structural analysis (6 GPa)
- ✓ Diamond Anvil Pressure Cell (clamp type)- electrical resistivity
- ✓ DAC-SQUID VCM setup
- ✓ Metal-Anvil Bridgman clamp cell for X-ray diffraction @ RT
- ✓ Crystal growth of superconductors using Floating-zone furnace
- ✓ Orientation of single crystals

3.6. Indigenous equipment and Pressure devices developed at CHPR and the technical details are as follows:

High pressure physics has been an emerging field in recent years with the combination of high pressure devices with advancement in the probing techniques for the investigation of new materials. In the above context, we developed the following pressure cells and devices to explore the mechanism of various exotic phenomena such as superconductivity, Charge Density Wave (CDW), magnetocaloric effect, magnetoresistance effect, etc., in the light of high pressure physics. Hence, Prof. S. Arumugam has developed various indigenous instruments such as: **1)** Uniaxial pressure device for electrical resistivity measurements suitable for closed cycle refrigerator system; **2)** Uniaxial pressure device for ac-susceptibility measurements suitable for closed cycle refrigerator system; **3)** Uniaxial pressure device for magnetization measurements suitable for PPMS-VSM; **4)** A DC-SQUID vibrating coil magnetometer for the magnetic measurements of extremely small volume of samples; 5) Hydrostatic pressure cell (~ 3.5 GPa) for electrical resistivity measurements suitable for CCR-VTI and PPMS; 6) Bridgman anvil quasi-hydrostatic pressure cell (~8 GPa) for electrical resistivity measurements suitable for CCR-VTI and PPMS;7) Modified Bridgman anvil hydrostatic pressure cell (~8 GPa) for electrical resistivity measurements suitable for CCR-VTI; 8) Diamond Anvil Pressure cell (~20 GPa) for electrical resistivity measurements suitable for CCR-VTI and PPMS (under optimization); 9) Uniaxial pressure device for electrical resistivity measurements suitable for 17 Tesla superconducting magnet system.

3.6.1. Hydrostatic pressure techniques:

Piston-cylinder hydrostatic pressure cell ~1 GPa: magnetic measurements suitable for PPMS – VSM System: (M-cell and indigenously designed & fabricated at CHPR).

The body of the pressure cell is made of specially heat-treated nonmagnetic Cu- Be alloy. To perform the temperature dependence of magnetization measurements under various fixed pressures, the sample of ~ 10 mg and calibrant (Sn) are kept inside a Teflon capsule. The liquid pressure-transmitting medium of Fluorinert #70: Fluorinert #77 in a 1:1 ratio is filled in the Teflon capsule and closed with a Teflon cap.

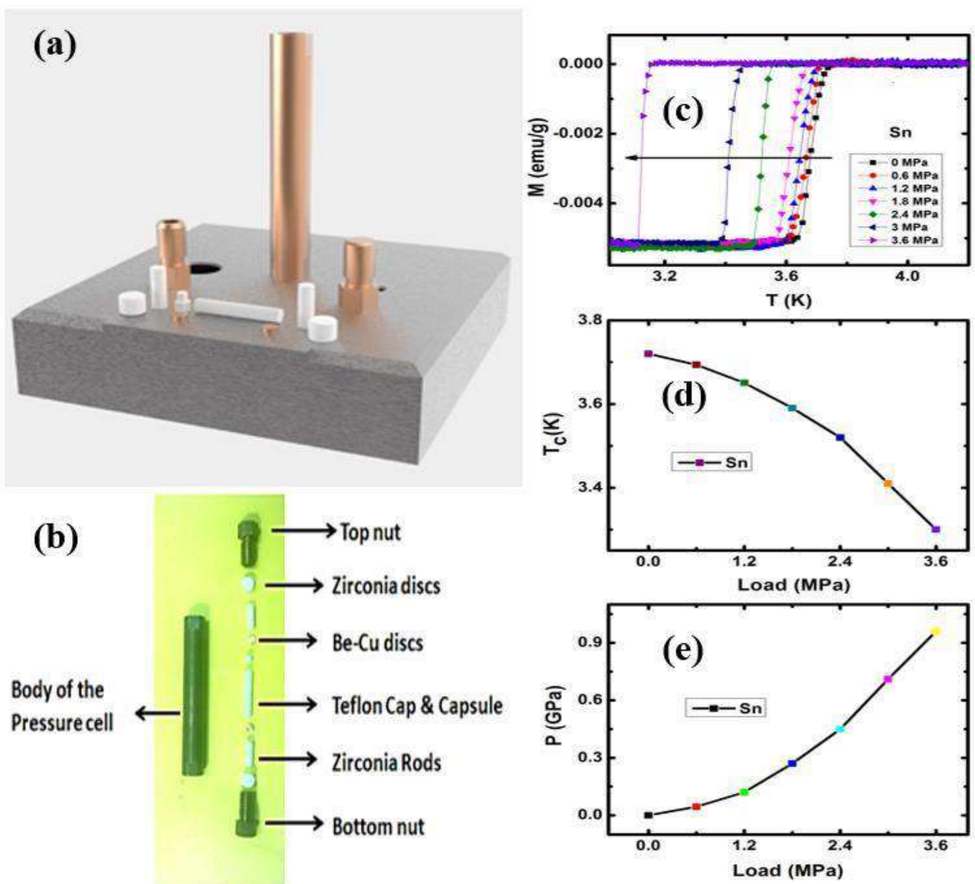

Figure:1. (a) Photograph of a hydrostatic pressure cell (1 GPa) (Mcell-10, Easy Lab, UK) with its components; (b): Photograph of an assembly of pressure cell components developed at CHPR; (c-e) Pressure cell calibration data.

The capsule and other components are assembled in the pressure cell. Required pressure is applied and clamped using a 20-ton hydraulic press (M/s Reiken Kiki Co Ltd, Japan). In-situ pressure calibration is carried out with the change of TC of Sn which is kept along with the sample in the Teflon capsule. The pressure cell is then inserted into the PPMS dewar through the VSM linear motor. We have investigated temperature and field dependence of magnetization measurements at various fixed pressures for various materials such as superconductors, heavy fermions, Heusler alloys, manganites, Dirac metals etc. using this hydrostatic pressure cell up to 1 GPa, temperature 2- 400 K and 9 T magnetic field. Figure 1 shows (a) a Photograph of a hydrostatic pressure cell (1 GPa) (Mcell-10, EasyLab, UK) with its components; (b) a Photograph of an assembly of pressure cell components developed at CHPR; (c-e) a Pressure cell calibration data.

3.6.2. Piston-cylinder hydrostatic pressure cell (3 GPa): Suitable for Closed Cycle Refrigerator – Variable Temperature Insert (CCR-VTI) and PPMS system.

This pressure cell can generate pressure up to a maximum limit of 3 GPa. The outer cylinder (body of the cell) and the inner cylinder is made of Be (2%)-Cu alloy and hardened stainless steel alloy respectively.

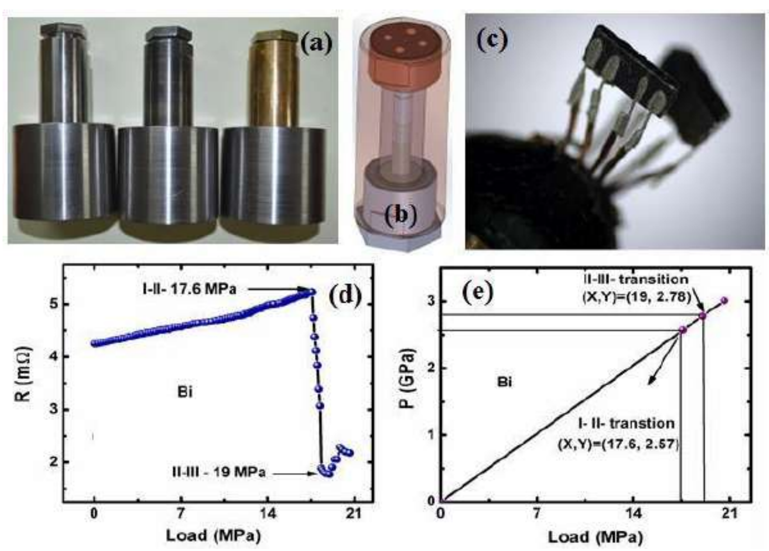

Figure 2. Photograph of (a) a piston-cylinder hydrostatic pressure cell (~3 GPa): Suitable for Closed Cycle Refrigerator System - Variable Temperature Insert module and PPMS; (b) 3D view of piston-cylinder hydrostatic pressure cell; (c) Photograph of two samples mounted in the obturator; (d) Resistance vs applied load (MPa); (e) Pressure calibration curve: actual pressure (GPa) vs applied Load (MPa) of the Bi at room temperature.

The sample is kept inside a Teflon capsule (obturator) which is filled with pressure transmitting medium (Daphne # 7474). The pressure cell is calibrated with structural phase transitions of Bi (I-II at 2.55 GPa and II-III at 2.77 GPa) at room temperature using a 20-ton hydraulic press (M/s Reiken Kiki Co Ltd, Japan). The required pressure is clamped in the pressure cell at room temperature and transferred to the PPMS puck for electrical resistivity measurements. Figure 2 shows Photograph of (a) a piston-cylinder hydrostatic pressure cell (~3 GPa): Suitable for CCR -VTI and PPMS; (b) 3D view of piston-cylinder hydrostatic pressure cell; (c) Photograph of two samples mounted in the obturator; (d) Resistance vs applied load (MPa); (e) Pressure calibration curve: actual pressure (GPa) vs applied Load (MPa) of the Bi at room temperature.

3.6.3. High pressure hybrid clamp type piston - cylinder pressure cell (3.5 GPa): Suitable for Closed Cycle Refrigerator – Variable Temperature Insert (CCR-VTI) and PPMS system.

The pressure cell is designed and fabricated suitable for the commercially available both CCR-VTI and PPMS systems. Both the outer (body of the cell) and inner cylinders are made of hardened stainless steel alloys.

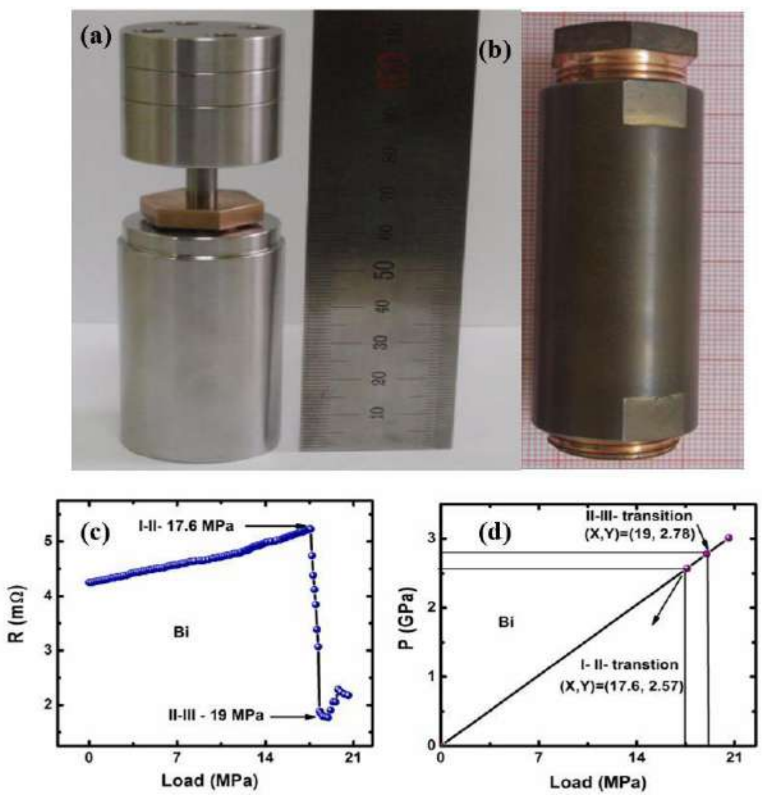

Figure 3: Photograph of (a) High pressure hybrid clamp type piston-cylinder pressure cell (3.5 GPa) with pressure push rod assembly: Suitable for Closed Cycle Refrigerator – Variable Temperature Insert (CCR-VTI) and PPMS system; (b) P cell developed at CHPR on different materials; (c) Resistance vs applied load (MPa); (d) Pressure calibration curve: actual pressure (GPa) vs applied Load (MPa) of the Bi at room temperature

The sample is kept inside a Teflon cap (obturator) which is filled with pressure transmitting medium (Daphne # 7474). The pressure cell is calibrated with structural phase transitions of Bi (I-II at 2.55 GPa and II- III at 2.77 GPa) at room temperature using a 20-ton hydraulic press (M/s Reiken Kiki Co Ltd, Japan). The required pressure is clamped at room temperature and transferred to CCR-VTI/PPMS system for electrical resistivity measurements. This pressure cell can generate pressure up to a maximum limit of ~ 3.5 GPa.

Figure 3. shows the photograph of (a) High pressure hybrid clamp type piston-cylinder pressure cell (3.5 GPa) with the pressure push rod assembly: Suitable for both CCR-VTI and PPMS systems; (b) P cell developed at CHPR on different materials; (b) Resistance vs applied load (MPa); (d) Pressure calibration curve: actual pressure (GPa) vs applied Load (MPa) of the Bi at room temperature. Furthermore, Figure 4 indicates the photographs of two samples mounted in the obturator used for the ρ(T) measurements.

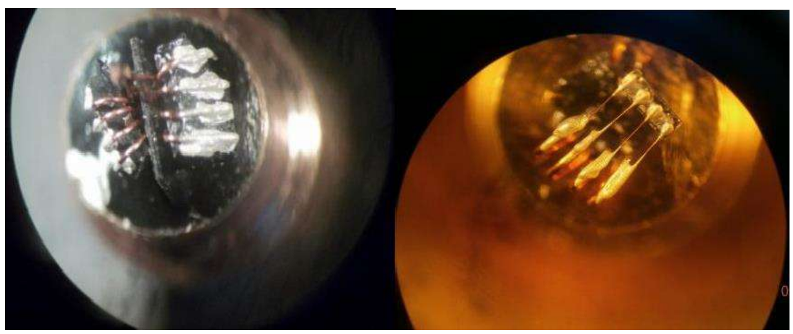

Figure 4: Photograph of two samples mounted in the obturator.

3.6.4. Modified Bridgman anvil hydrostatic pressure cell (~ 8 GPa): Suitable for CCR-VTI

Recently, we have developed the modified Bridgman anvil hydrostatic pressure cell, which is equivalent to a cubic press system to do electrical resistivity measurements and calibrated at room temperature up to 8 GPa and this pressure cell is suitable for the CCR-VTI system. It has been developed in collaboration with Prof. Y. Uwatoko, Institute for Solid State Physics, University of Tokyo, Japan. The description of the MB anvil is as follows. The most important feature of this pressure cell is its compact body and its size is slightly larger than conventional clamp-type hybrid piston cylinder hydrostatic P cell.

The body of the cell is made of specially heat-treated CuBe with an outer diameter of 38 mm. The required load is applied to the anvils via the WC piston by a 100-ton hydraulic press at room temperature and clamped by the CuBe top nut. The sample is set in the Teflon capsule and filled with daphne # 7474 as a pressure-transmitting medium in order to generate a nearly hydrostatic condition. Au foil thickness of 20 µm and the Au wires (10 µm) are used to connect the sample electrically to each stainless steel plate with thicknesses of 0.15 mm. The dimensions of the sample are 0.7 X 0.4 X 0.1mm^3. Figure 5 shows (a) a Photograph of assembled MB-Anvil pressure cell with holder; (b) a 3D view of the MB-Anvil pressure cell; (c) a Cross-sectional and bottom view of the MB anvil pressure cell and its components; (d) a Photograph of the sample assembly; (e) Electrical resistivity under various P up to 8 GPa for $BiSbTe_{1.25}Se_{1.75}$.

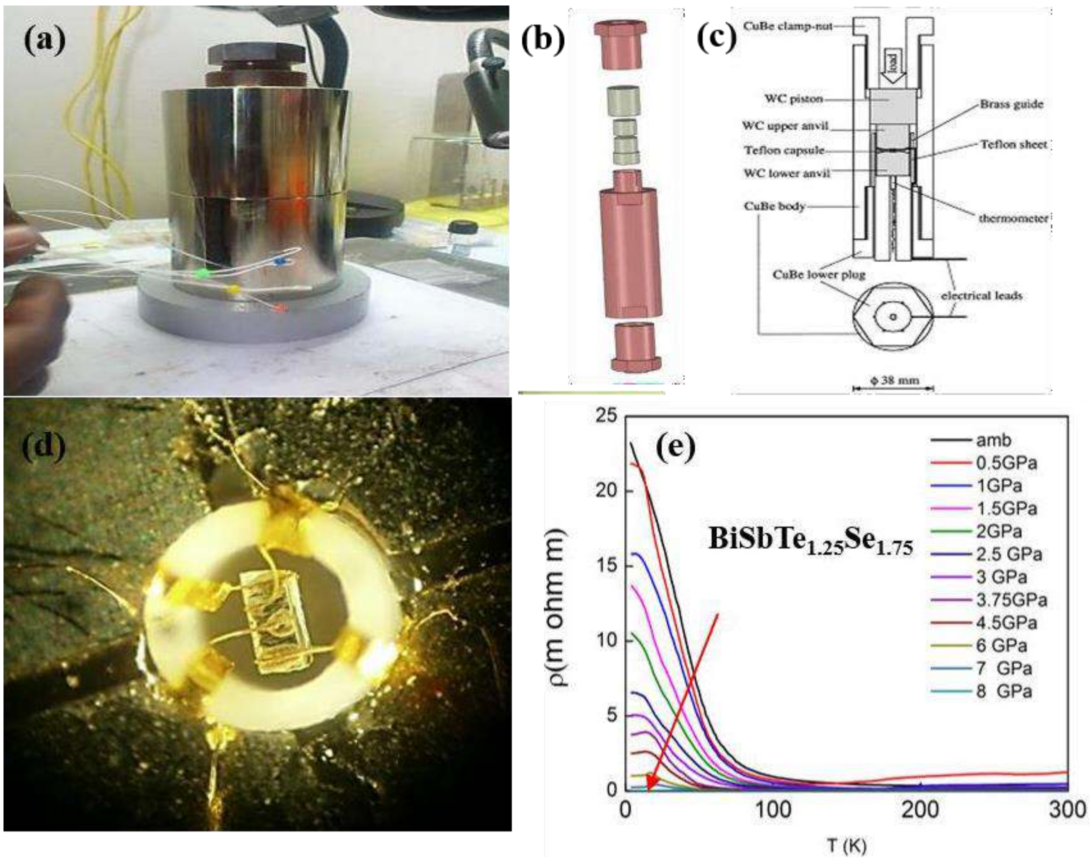

Figure 5: (a) Photograph of assembled MB-Anvil Pressure cell with holder; (b) 3D view of MB-Anvil pressure cell; (c) Cross-sectional and bottom view of the MB anvil pressure cell and its components; (d) Photograph of the sample assembly; (e) Electrical resistivity under various P up to 8 GPa for $BiSbTe_{1.25}Se_{1.75}$.

The applied pressure is calibrated with Bi using a 100-ton hydraulic press and it is similar to pressure calibration in cubic anvil press at room temperature up to ~ 8 GPa, shown in figure 6 (a, b). The structural phase transitions of Bi-I-II at 2.55 GPa, II-III at 2.77 GPa and III-IV at ~7.68 GPa were observed in the P versus Load curve.

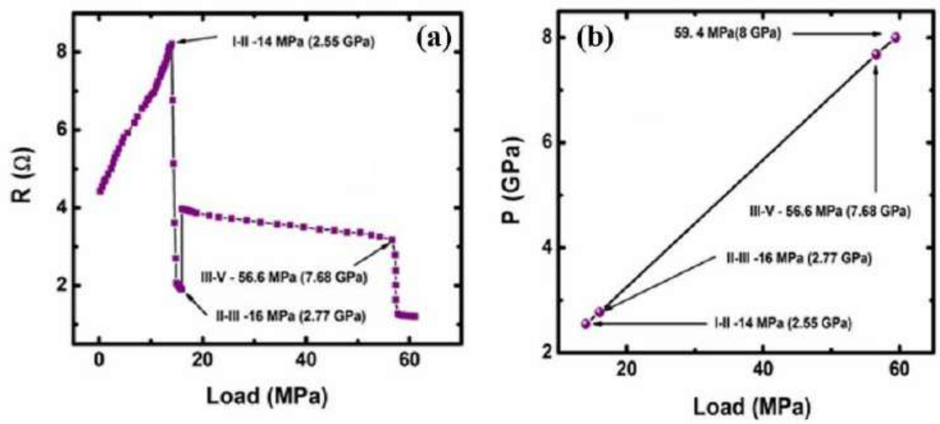

Figure 6: (a) Resistance (R) vs Load (MPa) of Bismuth (Bi) at room temperature. (b) The structural phase transitions of Bi-I-II at 2.55 GPa, II-III at 2.77 GPa and III-IV at ~7.68 GPa were observed in the P versus Load curve.

3.6.5. Quasi-Hydrostatic pressure techniques

Quasi-Hydrostatic Bridgman Anvil pressure cell (~ 8 GPa): Suitable for CCR-VTI

We designed and fabricated two different sizes (35 mm ϕ and 45 mm ϕ) of clamp-type Bridgman Anvil Pressure cells suitable for existing CCR-VTI to do electrical resistivity measurements up to 8 GPa for metallic and alloy samples only. The pressure cells with the 35 mm ϕ and 45 mm ϕ are expected to reach ~ 8 GPa and ~ 9 GPa respectively.

The pressure cell is integrated with the CCR-VTI and resistivity measurements are optimized at room temperature for various fixed pressures. The pressure cells are made of hardened SS alloys (outer cylinder, top nut, bottom nut and supporting ring) except the Tungsten Carbide anvil. The hardened SS alloys are specially heat treated in different atmospheres and optimized with the measurement of grain size and hardness to suit a pressure cell. We used tungsten carbide as an anvil with a 6 mm face diameter, pyrophyllite as the gaskets and Aluminium Magnesium silicate ($AlMgO_3Si$) as a pressure-transmitting medium. We used four-probe methods to carry out the electrical resistivity measurements and calibrated them at RT temperatures. Figure 7 shows (a) a Photograph of the Bridgman Anvil Pressure cell; (b) a 3D view of the Bridgman-Anvil P cell with bottom holder and pressure application rod; (c) a 3D view of the Bridgman Anvil P cell (d) Resistance (R) vs Load (PSI) of Bismuth (Bi) at RT; (e) The structural phase transitions of Bi-I-II at 2.55 GPa, II-III at 2.77 GPa and III-IV at ~7.68 GPa were observed at RT in the P versus Load (PSI) curve.

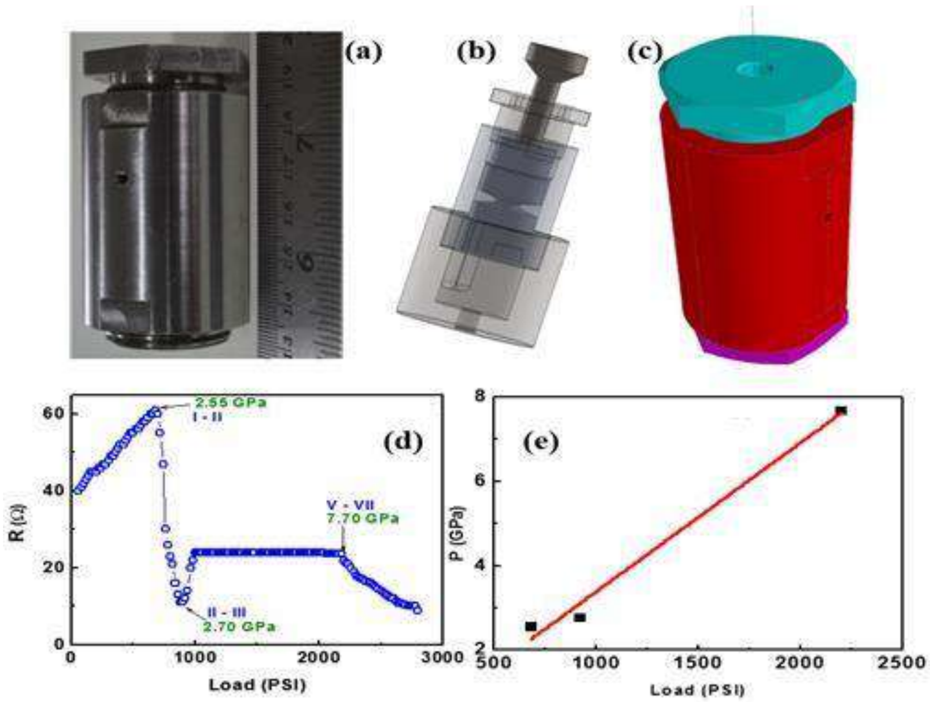

Figure 7: (a) Photograph of the Bridgman Anvil Pressure cell; (b) 3D view of Bridgman-Anvil P cell with bottom holder and top pressure application rod; (c) 3D view of Bridgman Anvil P cell (d) Resistance (R) vs Load (PSI) of Bismuth (Bi) at RT; (e) The structural phase transitions of Bi-I-II at 2.55 GPa, II-III at 2.77 GPa and III-IV at ~7.68 GPa were observed at RT in the P versus Load (PSI) curve.

3.6.6. Diamond Anvil cell (20GPa): Suitable for PPMS and CCR-VTI System:

Diamond Anvil pressure cell is designed and fabricated for doing electrical resistivity measurements down to 2 K. The pressure cell is made of hardened SS alloys (Figure 8a). The hardened SS alloy is specially heat treated in a specific atmosphere and optimized with the measurement of grain size and hardness. We used diamond as an anvil with 0.5mm/1 mm size culet diameter and 3.5mm diameter table size and 300 µm thick stainless steel (SS) gasket. The pressure cell (DAC) suits for existing 9 T PPMS and CCR –VTI and R(T) measurements under optimization including calibration of pressure at RT. Figure 8 shows (a) Photographs of the Diamond Anvil cell with components suitable for the CCR-VTI System and PPMS; (b) a 2D diagram of the Diamond Anvil Cell; (c) Ruby fluorescence calibrated data; (d) R(T) under various P up to 16.4 GPa for $Ba_2BiFe_2Se_5$.

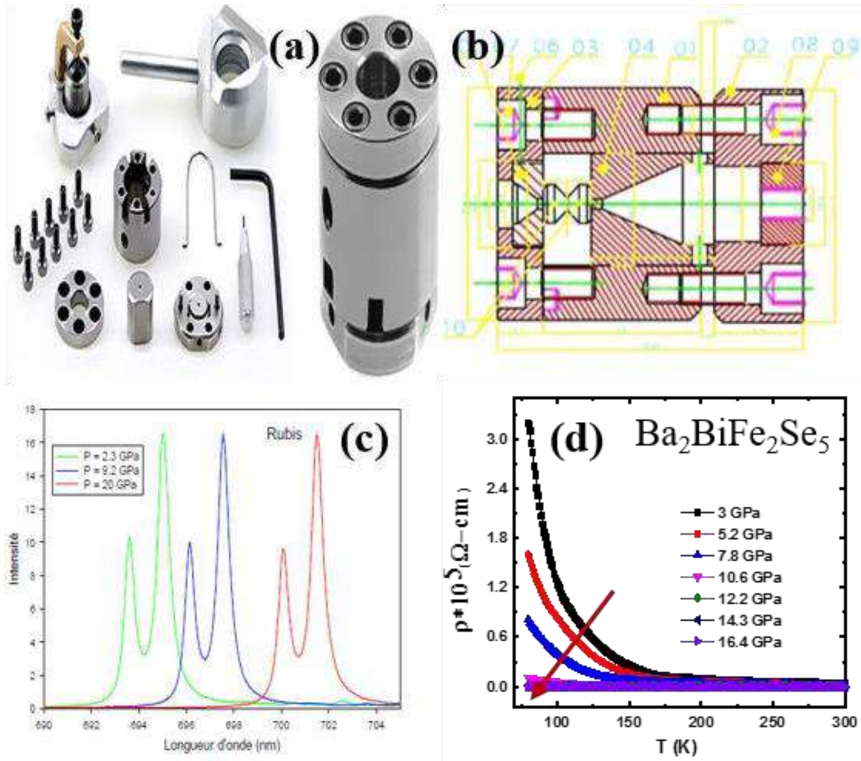

Figure 8: (a) Photographs of Diamond Anvil cell with components suitable for PPMS and CCR-VTI System; (b) 2D diagram of Diamond Anvil Cell; (c) Ruby fluorescence calibrated data; (d) ρ(T) under various P up to 16.4 GPa for $Ba_2BiFe_2Se_5$.

Figure 9: (a) shows the photograph of a micro drilling machine and it is based on the principle of Electrical discharge (ED) which can drill BeCu and SS gasket from 200 μm ϕ to 1000 μm ϕ with a thickness of 500 μm in a perfect round shape. The Ruby pressure calibration setup includes a recent Olympus industrial microscope, high resolution and highly stable CCD spectrometer (range: 690-870 nm) and Ruby pressure calibration software with a laptop as shown in Figure 9 (b).

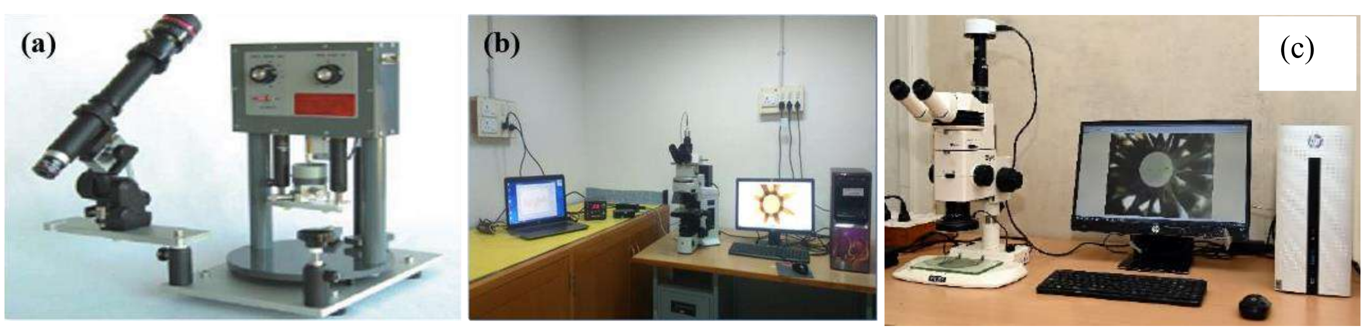

Figure 9: Photograph of (a) micro drilling machine; (b) Ruby fluorescence P calibration setup; (c) Stereo zoom microscope for sample assembly.

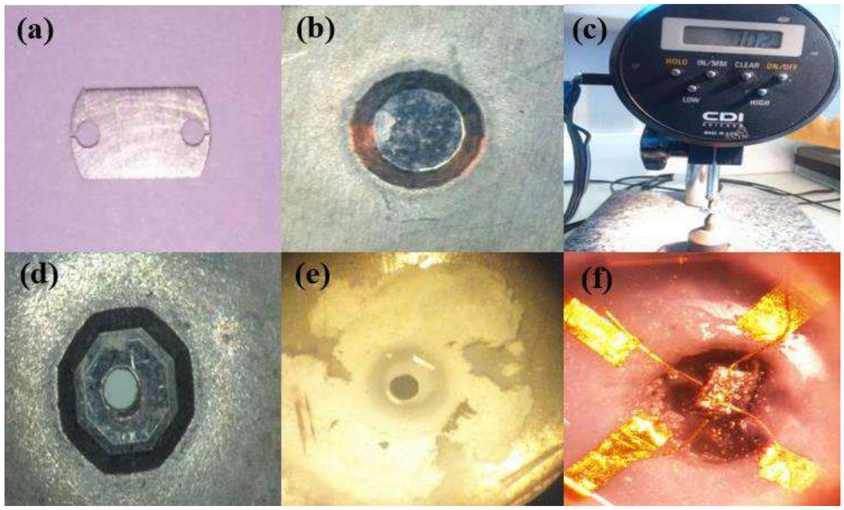

Figure10: A photograph of (a) a 300µm SS gasket; (b) A indented SS gasket; (c) A micrometre; (d) A drilled SS gasket; (e) Photograph of the insulated gasket; (f) A sample assembly in DAC gasket

3.6.7. Uniaxial Pressure Techniques:

A simple uniaxial pressure device for electrical resistivity measurements: Suitable for closed cycle refrigerator system – Cold Head model.

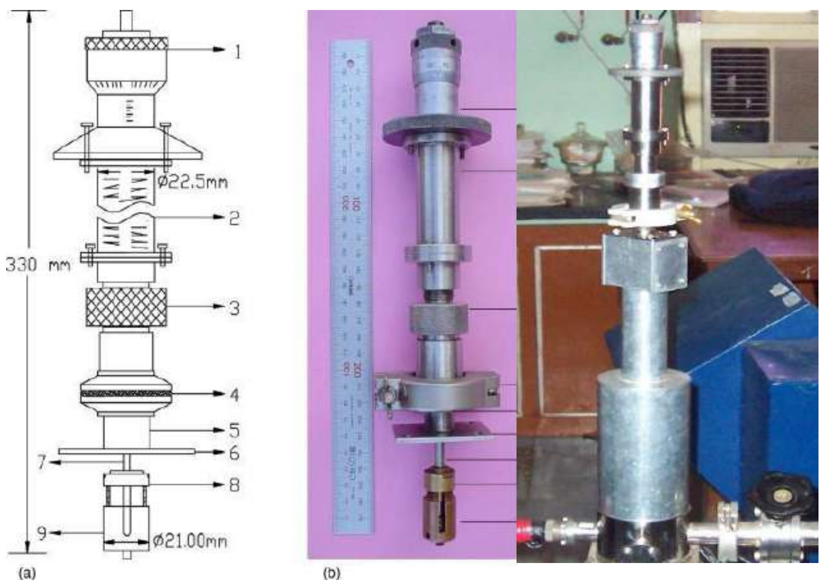

Figure 11: (a) Mechanical diagram (front view) of the uniaxial pressure device; (b) Photograph of a uniaxial pressure device (front view); (c) Cold Head with uniaxial pressure device.

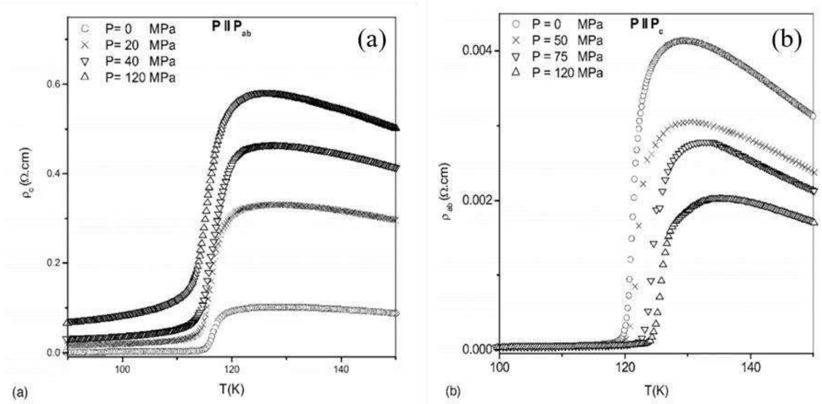

Figure 12: Temperature dependence of resistivity at various pressures (a) || to ab plane of (b) || to the c axis, LSMO single crystal

A simple uniaxial pressure device suitable for a closed-cycle refrigerator system (CCRS) has been built (Figure 11). This device in principle is applicable to any crystal. In this device, the pressure can be varied smoothly and continuously to any desired temperature using a disc-micrometre and a spring–holder attachment, which are kept on the demountable top flange of the vacuum shroud of CCRS at room temperature.

This device is not dependent on pressure calibration and the pressure calculation is obtained directly from the surface area of the crystal, the rotations of the disc- micrometre and the spring–constant value of the spring. Piezoresistance measurements were made on n-type Si to check the quality of data from the uniaxial pressure device.

The performance of the uniaxial pressure device is illustrated by investigating the uniaxial pressure dependence of various strongly correlated materials such as $La_{1.48}Nd_{0.4}Sr_{0.12}CuO_4$, $La_{1.4}5Nd_{0.4}Sr_{0.15}CuO_4$, $La_{1.85}Sr_{0.15}CuO_4$, $Sm_{1-x}Sr_xMnO_3$ (x=0.45), and $La_{1.25}Sr_{1.75}Mn_2O_7$ single crystals along the ab -plane and c-axis using electrical resistivity measurements down to 15 K.

3.6.8. Modified uniaxial pressure device for electrical resistivity measurements: Suitable for CCR-VTI

The uniaxial pressure cell and the anvils are made of hardened high-purity Be (2%) -Cu alloy. Two slots are provided on the opposite side with 3.2 mm width and 24 mm length from the top of the pressure cell to the top of the bottom anvil. A hole of 2.5 mm ϕ is provided at the bottom of the pressure cell for the easy mounting and demounting of the anvil into the pressure cell. The electrical resistivity was measured using a continuous variation uniaxial pressure experimental device as shown in figure 2.18. It is a direct uniaxial pressure method. The uniaxial pressure device consists of 1) a disc- micrometre 2) an SS spring holder and SS spring (3), SS extended guiding tube (4) a rubber O-ring (5) a uniaxial pressure cell holder & uniaxial pressure cell. The disc-micrometre (Mitutoyo, Japan), high-strength steel spring with known spring constant and the SS spring holder comprise the force generator.

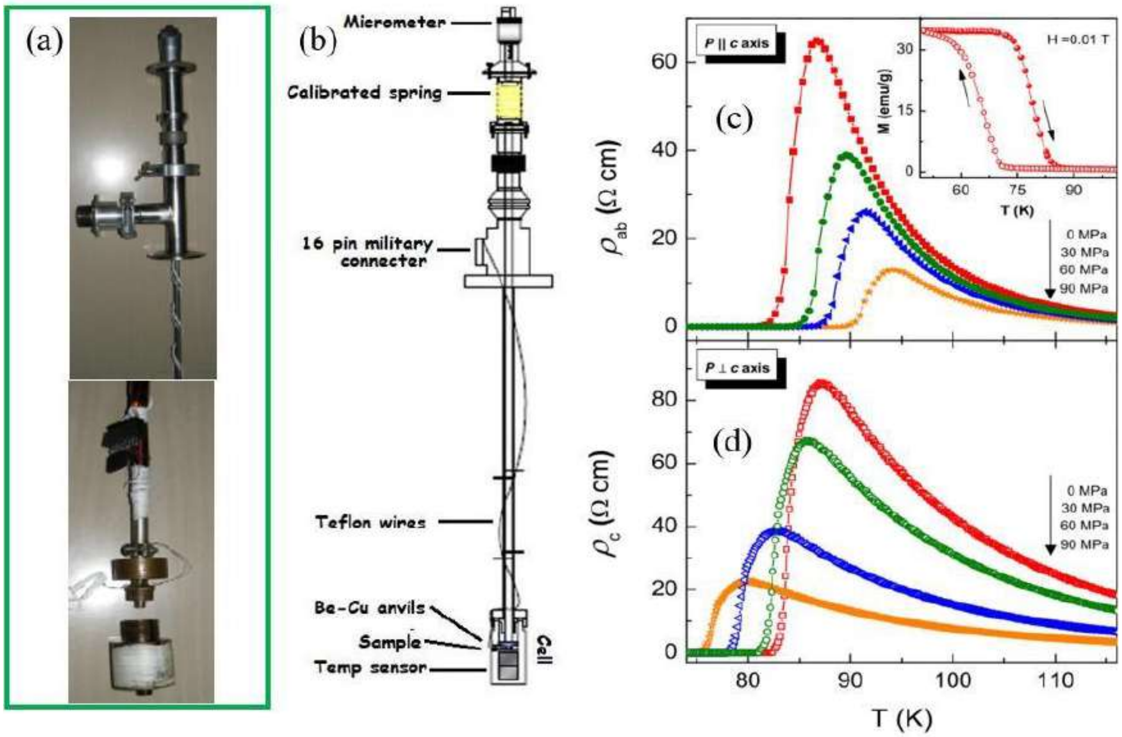

Figure 13: (a) Modified uniaxial pressure device suitable for CCR-VTI for electrical resistivity measurements (b) Schematic diagram of a Modified uniaxial pressure device; Temperature dependence of (c) ab-plane resistivity (ρ_{ab}) of $Sm_{0.55}(Sr_{0.5}Ca_{0.50})_{0.45}MnO_3$ single crystal measured under various uniaxial pressures parallel to c axis (P‖c); (d) c- axis resistivity (ρ_c) measured for various pressures, applied perpendicular to the c axis (P⊥c) [Inset shows M (T) of both in heating and cooling cycles].

The spring is kept inside the SS spring holder and the maximum pressure generation may be varied by choosing a different spring – constant value of the spring. The pressure is applied through a force generator at room temperature by rotating the disc-micrometre for a specific value of pressure and transferred to the sample in the pressure cell of CCR-VTI. Pressure is calculated directly by knowing the spring–constant value of the spring, the displacement in terms of micrometre rotations and the surface area of the single crystal on which pressure is applied. The normalized resistivity as a function of pressure for n-type Si along (100) planes at 300 K to cross-check the pressure calibration. The applied pressure is maintained by the force generator at all temperatures ranging from 300 K to 4 K. The pressure cell is cooled more effectively through the exchange of helium gas in the cryostat chamber of CCR-VTI. In the present setup, it is possible to vary the pressure at room temperature after every set of ρ (T) without removing the insert from the CCR-VTI.

3.6.9. A simple uniaxial pressure device for ac- susceptibility measurements: Suitable for CCR system (Cold Head model).

A simple design of a uniaxial pressure device utilized for measurement of ac- susceptibility at low temperatures for the first time using a closed cycle refrigerator system (CCRS) is developed and calibrated (Figure 13). This device mainly consists of a disc-micrometer, spring–holder attachment, uniaxial pressure cell and the ac-susceptibility coil wounded on stycast former. The present device has many features: simple in design, failure of the coil is remote, inexpensive and no need for pressure calibrant. Also, it is easy to change the sample, calculation of pressure, pressure generation, perform experiments and be comfortable with small samples.

Figure 14: (a) Photograph of a uniaxial pressure device for ac-susceptibility measurements (front view); (b) Photograph of the pressure cell and coil. (c) Temperature dependence of ac susceptibility of $La_{0.85}Ba_{0.15}MnO_3$ single crystals at various uniaxial pressures (P∥c) axis near the metal-insulator transition.

It can be used under pressure up to 0.5 GPa and at temperatures from 30K to 300K. The system performance at ambient pressure is tested with calibration of standard paramagnetic salts (Gd_2O_3, Er_2O_3 and $Fe(NH_4SO_4)_2$ $6H_2O$), Fe_3O_4, Gd-metal, Dy-metal, superconductor

($YBa_2Cu_3O_7$), manganite ($La_{1.85}Ba_{0.15}MnO_3$) and spin glass material ($Pr_{0.8}Sr_{0.2}MnO_3$). The performance of the uniaxial pressure device is demonstrated by investigating the uniaxial pressure dependence of $La_{1.85}Ba_{0.15}MnO_3$ single crystal is shown in Figure 14 (c).

3.6.10. Micro uniaxial Pressure cell for magnetization measurements:

We have fabricated a new clamp-type micro-uniaxial pressure cell for DC susceptibility measurements as shown in Figure 15 (a,b). The pressure cell can be used in the temperature range of 1.8 K to 400 K and is suitable for Magnetic Property Measurement System (9T MPMS / PPMS-VSM, Quantum Design, USA). The pressure cell consists of a top clamping bolt, bottom clamping bolt, body of the cell, spring, spring backup, spacer, push piston and piston backup. The body of the cell, lower and upper-pressure clamping bolt, supporting cylinder and spring are made of non-magnetic Be (2%)-Cu alloy and made suitable for annealing to get maximum hardness with the lowest magnetic moment at low temperature. The spring is kept at the top portion of the pressure cell with the spring backups. The push pistons are made of zirconia (Kyocera, Japan).

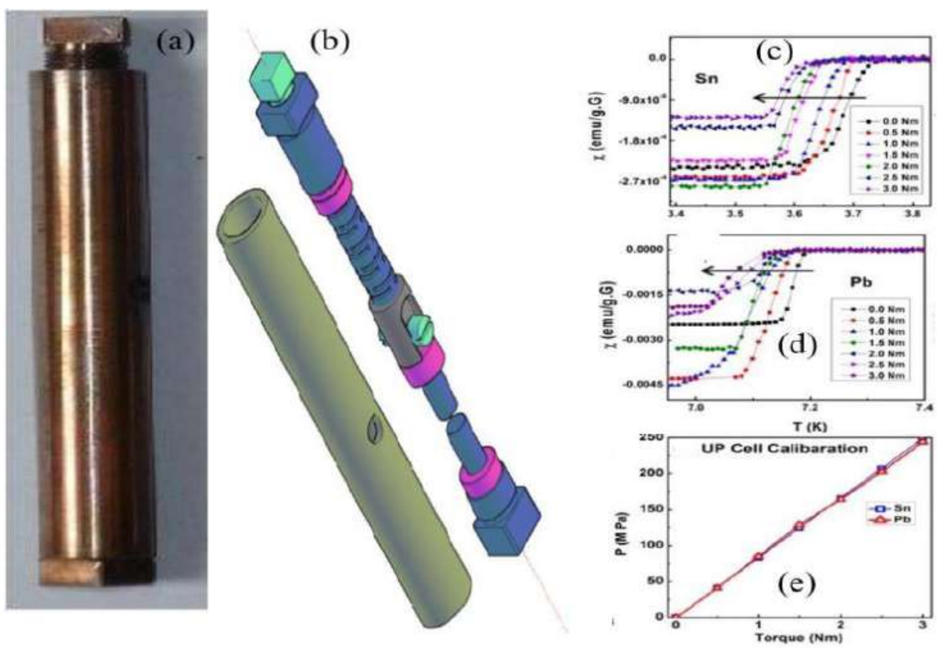

Figure 15: (a) Photograph of a micro uniaxial Pressure cell for magnetization measurements (1GPa): Suitable for MPMS and PPMS - VSM – system; (b) 3D view of the micro uniaxial Pressure cell; (c-e) Sn and Pb pressure calibration curves.

The pressure is applied and locked through a top clamping bolt of the pressure cell with a known fixed force. The maximum pressure can be applied up to 1.0 GPa and the maximum pressure can be varied based on the strength of the spring. The pressure is applied by a digital torque wrench at room temperature, clamped and hangs into the holder of the MPMS to do M (T) measurements at low temperatures.

The pressure is calculated from the known applied force and the area of the sample kept in the pressure cell. Also, the pressure is calibrated by studying the pressure dependence of the superconducting transition temperature (T_c) of Sn. The capability of our device is from 0 to 1.0 GPa. The performance of this device was tested on various anisotropy spin ladder systems such as $Sr_3Ca_{11}Cu_2 4O_{41}$, $SrCa_{13}Cu_{24}O_{41}$, $Sr_{1.8}$ $Ca_{12.2}Cu_{24}O_{41}$, and $Sr_3Fe_2O_{6.75}$.

3.6.11. A SQUID vibrating coil magnetometer for the magnetic measurements of extremely small volumes of samples

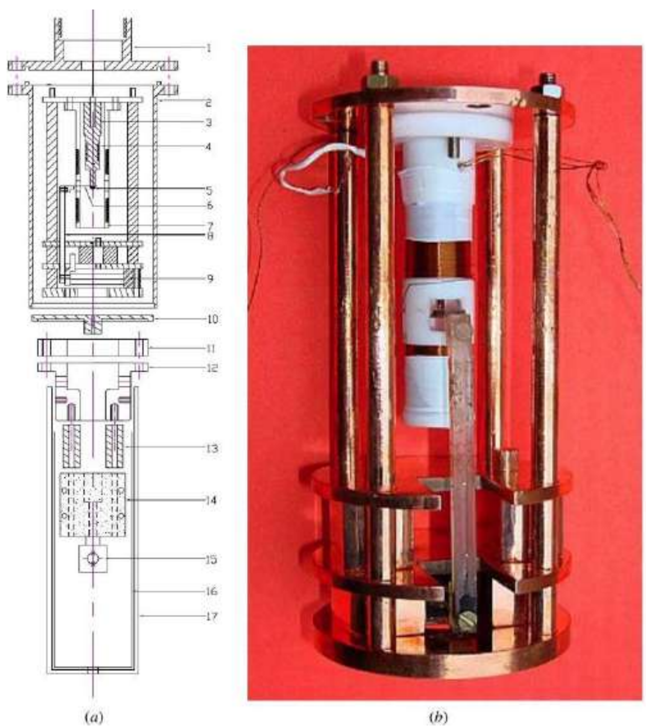

Figure 16: (a) Schematic diagram of the SQUID vibrating coil magnetometer. Experimental setup: (1) top flange of exchange gas chamber to fit the cryostat insert, (2) exchange gas chamber, (3) sample holder, (4) heater coil, (5) sample, (6) superconducting (Nb–Ti) pick-up coil, (7) split-coil-type solenoid, (8) transmitting rod, (9) bimorph PZT actuator, (10) OFHC copper bottom, (11) brass ring, (12) SQUID assembly holder (material: phenolic resin bonded cotton fabric), (13) OFHC copper tube, (14) SQUID electronics board holder (material phenolic resin bonded cotton fabric), (15) SQUID device, (16) Pb shield—1.5 mm thick and (17) cryoperm shield—2.5 mm thick.

Superconducting Quantum Interference Device (SQUID) is the world's most sensitive detector of weak magnetic signals and it has an ability to monitor extremely small changes in magnetic fields even in the presence of relatively large dc magnetic fields. We have developed a highly sensitive magnetic measurement technique suitable for extremely small volumes of samples using SQUID vibrating coil magnetometer (SVCM) and tested it successfully. Such high-sensitivity SVCM equipment was developed in collaboration with the Materials Science Division, IGCAR, Kalpakkam and Centre for Cryogenic Technology, Indian Institute of Science, Bangalore. In this setup position differentiating detection (PDD) of magnetic flux from the sample is combined with the use of SQUID magnetometer. The sensitivity of the setup depends on the vibrational amplitude of the pick-up coil.

3.7. Establishment of low temperature, and high magnetic field facilities: Suits for transport and magnetic measurements.

We established the following equipment at the Centre for High pressure Research, School of Physics, Bharathidasan University, Tiruchirappalli-620 024 and various pressure devices/ cells that suits very well for to do transport and magnetic \measurements at ambient and high pressures.

3.7.1. The Physical Property Measurements System (PPMS) - Vibrating sample Magnetometer:

PPMS - VSM (2K-400K 9T)

Figure 17. Photograph of a Physical Property Measurement System - Vibrating Sample Magnetometer (Quantum Design, USA) setup.

The Physical Property Measurements System (PPMS) is a special equipment with variable temperature (2 – 400 K) and field (upto 9 T) that is optimized to do R(T) measurements at ambient and high pressure upto 3 GPa with the combination of 9T magnetic field. The developed hybrid hydrostatic piston-cylinder pressure cell suits to PPMS.

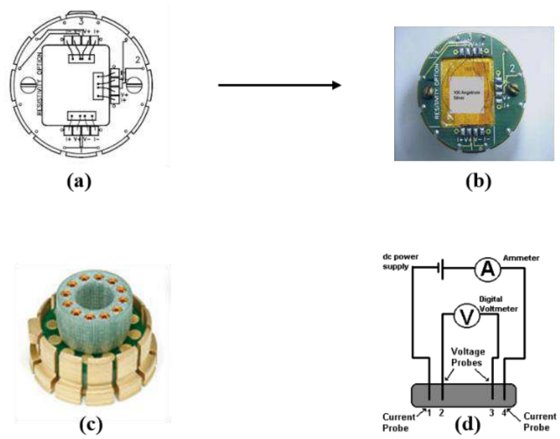

Figure. 18. a) Resistivity sample puck, b) Front view of resistivity sample puck, c) Rear view of the sample puck, and d) Schematic representation of a four-probe method.

The VSM option for the PPMS consists primarily of a VSM linear motor transport (head) for vibrating the sample and a pickup coil for detection. For magnetization measurements at ambient pressure, the small bore is used, whereas the large bore coil is used for the temperature dependence of magnetization at various clamped pressures using a 1 GPa pressure cell. It is also possible to heat capacity measurements at ambient pressure.

3.7.2. 9T cryogen-free superconducting magnet with an Integrated Variable Temperature Insert (IVTI).

The Cryogen-Free Measurement System (CFMS) from Cryogenic Ltd is a modular research platform designed to enable the user to perform a wide range of material characterisation experiments in variable field and variable temperature environments. The base system of every CFMS is made up of a 9T cryogen-free superconducting magnet with an Integrated Variable Temperature Insert (IVTI). An automatic needle valve is available for ease of system control. Complementing this is a range of specifically designed measurement modules with associated electronics for magnetic, electrical, thermal property and ultra-low temperature measurements. Magnet configurations up to ±9 Tesla are available with a standard temperature range of 1.8 K – 400 K. Active shielding is available for magnets of 9 T and higher. The IVTI is made in such a way as to suit for Hybrid hydrostatic piston-cylinder pressure cell (3 GPa), Modified Bridgman Anvil pressure cell (8GPa) and Diamond Anvil Pressure Cell (20 GPa) for electrical resistivity measurements.

Figure 19. 9T cryogen free superconducting magnet with an Integrated Variable Temperature Insert (IVTI) (Cryogenics, UK) with measuring instruments and power supply for a magnet.

<u>3.7.3.Cryogen free Closed Cycle Refrigerator – Variable Temperature Insert (CCR-VTI) system</u>

Electrical resistance measurements are rather straightforward to carry out and provide much useful information about the electrical properties of the sample. The measurements of electrical resistance as a function of temperature give information about the various temperature-dependent electronic phase transitions.

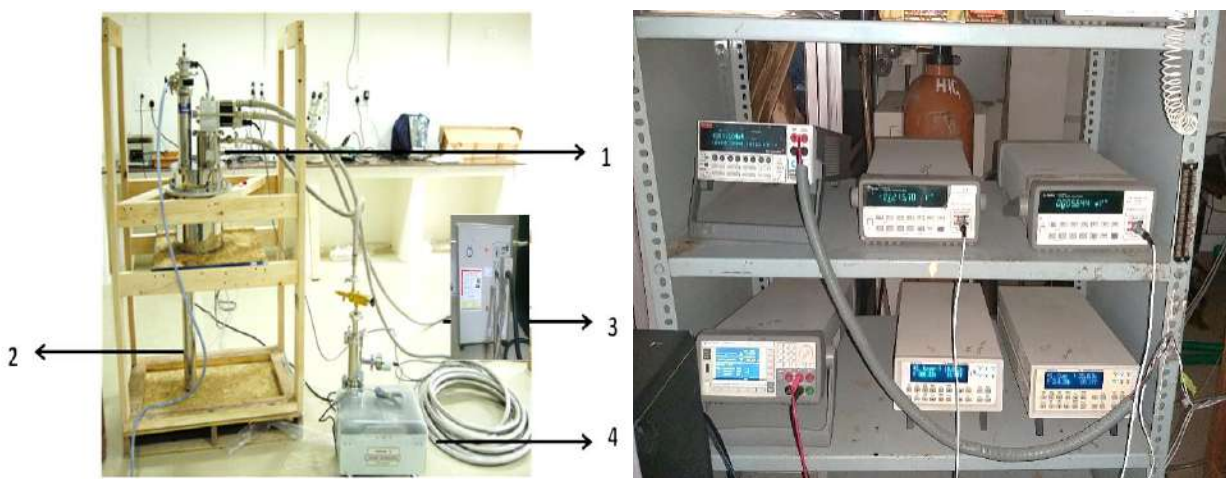

Figure. 20 Photograph of a Closed Cycle Refrigerator System - Variable Temperature Insert (Sumitomo, Japan) setup.Parts are noted in numerical order (1) cryostat chamber, (2) VTI, (3) compressor, (4) Turbo Molecular Pump.

The temperature dependence of electrical resistivity was measured using the resistivity option and Cryogen-free Closed Cycle Refrigerator – Variable Temperature Insert (CCR-VTI) system. The CCR-VTI is a cryogen-free equipment to measure physical properties at low temperature down to 4 K. The CCR-VTI system consists of four major parts such as 1) a cryostat chamber (Cryo Industries, USA), 2) VTI, 3) compressor (Sumitomo, Japan) and 4) Turbo Molecular Pump (Varian Industries, USA). The electricity resistivity measurements were performed under ambient and hydrostatic pressure in the temperature range of 4 – 300 K using CCR-VTI. The data collection is indigenously automated with Lab View Software with a temperature controller, nanovoltmeter, constant current source, temperature sensors and personal computer.

DAC for High Pressure XRD

Figure. 21 Photographs of MDAC for High pressure XRD and Raman measurements up to 20 GPa.

3.8. Materials Synthesis facility:

The materials synthesis facility (solid-state reaction method and sol-gel method) is established and synthesized various materials such as five-element alloys, eight-element alloys, doped hexa ferrites, manganites, superconductors, Sensor and supercapacitor materials by using muffle and tubular furnaces. The facilities are shown below:

Vacuum Tubular furnace (Technicho, Chennai)

Muffle Furnace (Sandy Scientific, Chennai) up to 1500^0C

Muffle Furnace (Technico, Chennai) up to 1200^0C

TubularFurnace (Technico, Chennai) up to 1000^0C

100 Ton (LYXN, Lawrence & Mayo) and 20 Ton (Riken Kiki, Japan), hydraulic press

<u>**Other Established Facilities @ CHPR**</u>

POWDER XRD

CNC Lathe (Tutor)

B2901A Sourcemeter

34420A Nano-voltmeter

2401 Sourcemeter

4263B LCR

SR860DSP

Lakeshore 331

3.9. Research Contribution: Investigation of Strongly correlated materials under High Pressure:

3.9.1 Pressure effect on superconducting materials (Fe, BiS_2, Noncentrosymmetic and Topological Insulators)

Recently, we were working more sincerely to understand the 100 years question (relation between magnetism and superconductivity) of high T_c superconductors from a few Fe, BiS_2 and Topological insulators based superconducting materials with respect to high pressure, high magnetic field and low-temperature studies. We are to be near the answer but not exactly to say; but from the obtained results will give the clues for realising this critical phenomenon. However, we have obtained some interesting data by application of pressure as well as low temperature. First, the $CeFe_{0.9}Co_{0.1}FeAsO$ shows the enhancement of T_c from 11.4 to 12.3 K with a small increase in pressure up to 0.4 GPa and it is the first time observed in an electron-doped Ce-1111 system. The anisotropic compression of c - axis we observed also may play an important role in determining the T_c in these layered superconducting compounds. A pressure-induced structural change to a collapsed tetragonal structure is observed above 10 GPa at RT **(App. Phys. Lett. 2011)**. The application of external pressure increases the T_c to 31 K with a positive pressure coefficient of ~1 K/GPa and low temperature X-ray diffraction studies performed at 7.8 K at high pressures show no pressure-induced structural changes were observed in Thorium doped $La_{1-x}Th_xFeAsO$ (x = 0.2) superconductor **(Phys. Status Solidi RRL. 2011)**. Pressure effects on $Ce_{0.6}Y_{0.4}FeAsO_{0.8}F_{0.2}$ show the application of external pressure initially enhances the transition temperature (T_c) up to 1 GPa at a rate of 0.28 K/GPa. However, a further increase of pressure above 4 GPa leads to a complete suppression of superconductivity where the change in compressibility of the tetragonal phase is observed with a transition to a collapsed tetragonal phase **(App. Phys. Lett., 2012)**. The drastic suppression of T_c at ~ 3 GPa may be either due to a pressure-induced structural distortion, change of valence of Ce^{3+} or strong hybridization of Ce (4f) and Fe (3d) localized electrons, which is speculated to induce the Kondo screening effect. The Effect of pressure on the superconducting transition temperature (T_c) of Yb-doped $Ce_{0.6}Yb_{0.4}FeAsO_{0.9}F_{0.1}$ has been investigated for the first time using resistivity and magnetization studies. Enhancement in T_c with external pressure has been observed for this compound up to a maximum value of T_c = 48.7 K at 1 GPa, beyond which T_c starts decreasing monotonously **(Phys. Status Solidi RRL., 2012)**. In addition, the effect of external pressure on T_c of as grown and annealed single crystals of iron chalcogenide $Rb_{0.85}Fe_{1.9}Se_2$ has been studied. The grown sample T_c of 27 K was found at ambient pressure, whereas it is found to increase up to 33.2 K in the sample annealed at 215 ^{o}C in a vacuum for 3 h. Thereafter, the T_c of the as grown sample increases up to 28 K at a pressure of 0.83 GPa **(Phys. Status Solidi RRL., 2013)**. We have investigated the effect of applied pressure (P) on the magnetic and superconducting transitions of $GdFe_{1-x}Co_xAsO$ (x = 0, 0.1, 1) compounds by measuring the temperature dependence of resistivity. For the $GdFe_{0.9}Co_{0.1}AsO$ sample, the superconducting onset temperature T_c^{on} decreases monotonically from 19 to 17.1 K, and the temperature T_c^{zero} at which the resistivity disappears decreases from 16.7 to 10.5 K as pressure increases from 0 to 2.9 GPa. The strength of electron–electron correlation also decreases with increasing pressure. Both these effects arise due to the increase of bandwidth with pressure **(Supercond. Sci. Technol., 2015).** We have investigated the effect of pressure up to 8 GPa on both superconducting and normal state properties of optimally doped oxygen-deficient $PrFeAsO_{0.6}F_{0.12}$ sample in which sharp superconducting transition and large superconducting volume fraction are observed. With the increase in pressure, T_c initially increases for pressure up to 1.3 GPa and then decreases. The Meissner signal shows a systematic increase with pressure up to 1.1 GPa. On the other hand, both T_c and Meissner signals are observed to decrease with pressure for over doped $PrFeAsO_{0.6}F_{0.14}$ sample. **(NatureScientific Reports Feb, 2017).**

Further, we are investigating recently discovered BiS_2-based superconductors with external hydrostatic pressure up to ~3 GPa for resistivity and ~ 1 GPa for magnetic measurements. The T_c is found to have a moderate decrease from 4.8 K to 4.3 K (–0.28 K/GPa) for the $Bi_4O_4S_3$ superconductor and the same increases from 4.6 K to 5 K (0.44 K/GPa) up to 1.31 GPa followed by a sudden decrease from 5 K to 4.7 K up to 1.75 GPa for $NdO_{0.5}F_{0.5}BiS_2$ superconductor. The variation of Tc in these systems might be correlated to an increase or decrease of the charge carriers in the density of states under externally applied pressure (**Phys. Status Solidi RRL. 2013)**. At ambient conditions, Critical current density (J_c), thermal activation energy (U_0), and upper critical field (H_{c2}) of $La_{1-x}Sm_xO_{0.5}F_{0.5}BiS_2$ (x = 0.2, 0.8) superconductors are investigated from magnetic field dependent ρ (T) studies. Our studies show that on substitution of smaller rare earth metal (Sm) in place of La in $LaO_{0.5}F_{0.5}BiS_2$ successfully improves and enhances magnetic flux pinning forces making this superconductor a potential candidate for superconducting applications **(J.Phys.Soc., 2015)**. At External pressure conditions, the T_c in $La_{0.8}Sm_{0.2}O_{0.5}F_{0.5}BiS_2$ is increased from 3.2 K to above 10.3 K under pressure just above ~1.5 GPa for the under-doped compound. This is a dramatic (more than threefold) enhancement of T_c. The quality of the superconducting transition is also significantly improved under high pressure. In addition, there is a concomitant improvement in the normal-state resistance and a suppression of the semimetallic behaviour of the material. While there is virtually no effect of pressure on the T_c of the x = 0.8 materials, there occurs a transformation from semiconductor to metallic behaviour in the normal state just as in the sample with x = 0.2 **(J. Phys. D: App. Phys., 2016).** The bulk superconducting properties of polycrystalline $TaRh_2B_2$ under pressure are investigated with transport resistivity [ρ (T)], and dc magnetization [M (T) and M (H)] measurements up to ~3 GPa, and 1 GPa respectively. The application of hydrostatic pressure leads to a decrease in Tc for both magnetic [$dTc/dP$is -0.4 K/GPa (0 $\leq P \leq$1 GPa)] and transport [(dTc/dP) is -0.02 K/GPa (0 $\leq \Delta P$ $\leq$1 GPa) and -0.06 K/GPa (1 $\leq \Delta P \leq$2.5 GPa)] measurements **(PHYSC-2019).**

The $Sr_xBi_2Se_3$ has been recently reported to be a superconductor derived from Bi_2Se_3 topological insulator. It shows a maximum superconducting transition temperature (T_c) of 3.25 K at ambient pressure. The T_c is found at 2.67 K at 0 GPa and it decreased up to 1.96 K (0.81 GPa) observed from magnetic measurements. Band structure analysis involving external pressure to $Sr_{0.1}Bi_2Se_3$ shows a decrease in DOS at the Fermi level with the application of pressure. The suppression of T_c with increasing normal state resistivity and increasing electronic correlation is well accounted for by decreasing N (E_F) as evidenced in conventional low T_c superconductors (**EPL-2017).** Temperature and field dependence of magnetic measurements under hydrostatic pressure is carried out on a noncentrosymmetric superconductor α-BiPd up to 1 GPa, and a 3D (temperature—magnetic field—pressure) phase diagram is reported for the first time. The experimental results are analyzed using various theoretical approaches, such as the Ginzburg–Landau formula, Bean's critical state model, Dew–Hughes model, and collective pinning theory, and several superconducting parameters are also estimated. The critical temperature, critical current density, and pinning force are decreased with the application of both pressure and magnetic field. It is observed that pressure diminishes the superconductivity moderately and changes the mean free path, which leads to a crossover from the δTc pinning mechanism to δl type in α-BiPd (**Phys. Status Solidi RRL 2019)**

The impact of hydrostatic pressure (P) up to 1GPa on Tc, $Jc$and the nature of the pinning mechanism in Fe_xNbSe_2 single crystals have been investigated within the framework of the collective theory. We found that the pressure can induce a transition from the regime where pinning is controlled by spatial variation in the critical transition temperature (δTc) to the regime controlled by spatial variation in the mean free path ($\delta\ell$) (**Scientific Reports (2018)**). Superconducting properties of $Cr_{0.0005}NbSe_2$ (Tc~6.64 K) single crystals have been investigated through temperature-dependent resistivity (~8GPa) and DC magnetization (~1GPa) measurements. Further, the critical current density (J_c) as a function of the applied magnetic field has been studied from magnetic isotherms. The vortex pinning mechanisms have also been systematically analyzed using weak collective pinning theory as a function of pressure. The J_c corresponds to the flux flow enhanced by the application of pressure due to the increase of T_c and vortex changes (**Scientific Reports (2019))**. We investigated the superconducting critical current density (J_c), transition temperature (T_c), and flux pinning properties under hydrostatic pressure (P) for $Cr_{0.0009}NbSe_2$ single crystal. The application of P enhances T_c in both electrical resistivity (0.38 K GPa1: 0 # P # 2.5 GPa) and magnetization (0.98 K/GPa) measurements, which leads to a monotonic increase in J_c and flux pinning properties (**RSC Adv., 2020**). The effect of the weak point disorder on the vortex matter phase diagram is studied by incorporation of V atoms through magnetic and magnetoresistance measurement in layered $NbSe_2$ single crystal. We observed that the point disorder introduces the fishtail effect and the second magnetization peak (SMP) in the M-H curve of $V_{0.0015}NbSe_2$ at a magnetic field far below the upper critical field (H_{c2}) (**Journal of Magnetism and Magnetic Materials 507 (2020)).**

The structural modulation is observed at ~83 K in $LaAuSb_2$ and the CDW transition was completely suppressed at 3.6 GPa, where the CDW transition temperature vs pressure relation is found to be linear. DFT indicates an anomaly in the pressure dependence of c/a ratio within the pressure range of 10 GPa. The calculated electronic structure indicated minor changes in the band structure in this pressure range. DFT analysis further indicates that the P4/nmm structure is stable up to 150 GPa **(PRB 2021).** The T_c reveals a modest decrease as pressure (P) increases with a slope of − 0.046 K/GPa (− 0.065 K/GPa) estimated from resistivity measurements up to 8 GPa (magnetization measurement∼ 1.1 GPa). Structural analysis up to∼ 18 GPa reveals monotonic decreases of lattice constant without undergoing any structural transition and a high value of bulk modulus $B_0 \approx 333.63$ GPa, indicating the stability of the structure in Re_6Hf **(PRB 2022).** Ambient pressure XRD confirms our grown $Sc_5Rh_6Sn_{18}$single crystal is single phase and with no impurity phases. Application of hydrostatic pressure is found to enhance the superconducting transition temperature, which reached to 5.24 K at 2.5 GPa. Ambient pressure Raman spectroscopy investigations revealed the presence of three weak modes at 165.97, 219.86 and 230.35 cm−1, mostly related to the rattling atom Sc. The improvement of superconductivity is attributed to an increase in electronic density of states at the Fermi level. We found a linear decrease of lattice parameters, and volume in high pressure XRD measurement and a linear decrease in the phonon mode frequencies from Raman measurements, all indicating no evidence for any structural phase transition or any other structural anomalies in the studied pressure range **(JPCM 2022).** The T_c reveals a modest decrease of∼ 0.52 K as the external pressure is raised to 8 GPa in $Re_{5.5}Ta$. We found the Maki parameter, both at ambient and high pressures, suggesting the significant role of the Pauli pair-breaking effect **(SUST 2022).**

3.9.2. Pressure Effect on Manganites

Manganites offers a great degree of chemical flexibility allowing not only the substitution of different cations over a wide range of composition but also the introduction of vacancies or substitutions on the anion sublattice, which permits the relation between the structure, electronic and magnetic properties to be examined in a systematic way. An exciting physics is underlying not only in the ground state of manganites but also in some of the excited states under different external parameters such as pressure, magnetic field and temperature. The most fundamental property of these materials is the strong interplay between lattices, charge and spin degrees of freedom. As a result of coupling between them, interesting physical effects take place when thermodynamic parameters such as pressure, magnetic field and temperature are varied. In manganites, pressure influences the electrical conducting properties as well as the interaction responsible for FM. Thus investigation under pressure may give further information about the delicate balance between structure, magnetism, and electron mobility. So, based on these phenomena, we have interested to carry out experiments to study the influence of hydrostatic and uniaxial pressure on various perovskite and bilayer manganites are summarized as follows:

We have carried out a systematic investigation on magnetic and transport properties under extreme conditions of high pressure, low temperature and high magnetic field of bilayer manganites such as $Pr(Sr_{0.6}Ca_{0.4})_2Mn_2O_7$,$(L_{0.4}Pr_{0.6})_{1.2}Sr_{1.8}Mn_2O_7$, and Perovskite manganite such as $Sm_{0.55}(Sr_{0.5}Ca_{0.5})_{0.45}MnO_3$, $La_{0.4}Bi_{0.3}Sr_{0.3}MnO_3$, $Pr_{0.6}Ca_{0.4}Mn_{0.96}B_{0.04}O_3$ (B=Co and Cr). Analysis of magnetization data on $Pr(Sr_{0.6}Ca_{0.4})_2Mn_2O_7$ reveals only one charge-orbital ordering (CO-OO) transition occurs which decreases very slowly with pressure, while the antiferromagnetic ordering transition shifts towards higher temperature with the increase of pressure**.** A huge negative piezoresistance in the low temperature region with an insulator-to-metal transition at moderate pressures is observed in $(L_{0.4}Pr_{0.6})_{1.2}Sr_{1.8}Mn_2O_7$ and $Sm_{0.55}(Sr_{0.5}Ca_{0.5})_{0.45}MnO_3$ samples. Moreover, a first to second-order phase transition is observed in $La_{0.4}Bi_{0.3}Sr_{0.3}MnO_3$ at 0.91 GPa in M (T), and $Pr_{0.6}Ca_{0.4}Mn_{0.96}B_{0.04}O_3$ (B=Co and Cr) at 2.02, 2.40 GPa in ρ(T). The critical behaviour of second-order phase transition under pressure of the samples is analyzed. Recently, have studied the pressure effect on spin re-orientation transition on La-doped $Sm_{0.7-x}La_xSr_{0.3}MnO_3$manganties, and observed the suppression of spin reorientation only on La-doped system along metal-insulator transition. In one more well-known manganite system, $NdMnO_3$ shows a re-entrant of first-order transition the suppression of the temperature spin glass transition the doping of Cd at the Nd site for 0.3 compositions. To date, we have published 24 International peer-reviewed journals.

3.9.3. Pressure effects on Ni-Mn-based Heusler alloys

The pressure plays a crucial role in modifying the Mn-Mn bond length which is responsible for the observed magnetic behaviour in the $Ni_{50-x}Mn_{37-x}Sn_{13}$ alloys. The effects of Cu substitution on structure, magnetic, martensitic, and inter-martensitic transformation in $Ni_{49-x}Cu_xMn_{38}Sn_{13}$ Heusler alloys are investigated. The substitution of Cu for Ni results in a decrease in lattice parameters due to the smaller atomic radii of Cu. The substitution of Cu introduces an inter-martensitic transformation, which vanishes for high content of Cu. The observed inter-martensitic transformation vanishes with the application of both an external magnetic field and hydrostatic pressure. The magnetization of both the austenite and martensite phases decreases with the increase of pressure. The increase in the Ms Value toward room temperature and the nominal decrease in ΔS_m with pressure make the x =2 alloy a potential candidate for magnetic refrigeration applications. The hydrostatic pressure effects on martensitic, magnetic and magnetocaloric effects in the $Ni_{48}Mn_{39}Sn_{13-x}Si_x$ (x = 1 and 4) alloys are investigated. We inferred that the structural transition temperature increases linearly with respect to external pressure and decreases with the application of the magnetic field. A large increase in ΔS_m has been observed for x = 1 alloy, whereas it decreases for x = 4 alloys. However, the peak temperature of ΔS_m is shifted towards a higher temperature with the application of pressure for both x = 1 and 4 alloys. The observed pressure effects on refrigeration capacity are found to increase for x = 1 alloy and decrease for x = 4 alloys. The advantage of having a high ΔS_mandRC$_{eff}$value concerning pressure, makes the $Ni_{48}Mn_{39}Sn_{13-x}Si_x$ (x = 1) alloy a potential candidate for the application of magnetic refrigeration.

We report here on the temperature- and field-dependence of resistivity measurements of $Nd_{1-x}Cd_xMnO_3$ (x = 0 and 0.1) polycrystals and compare them with the magnetization measurements on the same set of samples reported earlier. A transition from an anti-ferromagnetic insulator to a ferromagnetic insulator is observed for x = 0.1. Magnetic entropy change of both the samples around semiconducting to insulating transitions have been estimated using magnetization and resistivity measurements for the first time. The values for x = 0 and 0.1 samples are 45 $J.kg^{-1}.K^{-1}$ and 63 $J.kg^{-1}.K^{-1}$ respectively for a magnetic field difference of 5 T indicating an enhancement as increases from x = 0 to 0.1. The activation energy (E_a) and density of states at the

Fermi level[N(E_F)] are estimated for both the samples using small polaron hopping and two-dimensional variable range hopping models respectively (**JMMM-MAGMA -2018**).

We report the effect of Fe on the martensitic transitions in $Ni_{47}Mn_{40-x}Fe_xIn_{13}$ (x = 1 and 2) alloys and the associated magnetocaloric effect. Structural and magnetic transitions are observed in x = 1 and 2 alloys. The martensitic transition shifts to low temperature with the increase of Fe concentration. The maximum positive entropy change (ΔS_M) with quite a large magnitude of 22 $Jkg^{-1}K^{-1}$ (x = 1) and 51.2 $Jkg^{-1}K^{-1}$ (x = 2) are observed for a field change of 50 kOe. Substitution of Fe enhances the magnetization as well as increases the Δ_{SM} more than twice in the x = 2 system (**JMMM (2018)**).

3.9.4. Non-oxide NiF_2 and MnF_2system as the best supercapacitor Materials:

We report here on the complex magnetic structure and magnetocapacitance in NiF_2, a non-oxide multifunctional system. It undergoes an anti-ferromagnetic transition near 68.5 K, superimposed with canted Ni spin-driven weak ferromagnetic ordering, followed by a metastable ferromagnetic phase at or below 10 K. Our density functional calculations account for the complex magnetic structureofNiF_2 deduced from the temperature and the field dependent measurements. Near room temperature, NiF_2 exhibits a relatively large dielectric response reaching $>10^3$ with a low dielectric loss of <0.5 at frequencies >20 Hz. This is attributed to the intrinsic grain contribution in contrast to the grain boundary contribution in most of the known dielectric materials. The response time is 10 μs or more at 280 K. The activation energy for such temperature-dependent relaxation is ~500 meV and is the main source for grain contribution. Further, a large negative magneto capacitance >90% is noticed in the 1T magnetic field. We proposed that our findings provide a new non-oxide multifunctional NiF_2, useful for dielectric applications (**Scientific Reports -2019, Materials Letters 2020 and J.Electro Analytical Chemistry 2020**)

4. Research Publications

4.1. List of Chapters Published in International Book

1. Jagadeesh. R., and **Arumugam. S.,** 2023. *Electrolytes for Energy storage applications: Fundamentals and Advances.* Cat. No: 9781032452630 (In press)

2. Uthiran, D. and **Sonachalam, A.,** 2022. *Tunable Multifunctionality in Heusler Alloys by Extreme Conditions.* In Recent Advances in Multifunctional Perovskite Materials. IntechOpen. https://doi.org/10.5772/intechopen.104960

3. Sankaran, E.M. and **Sonachalam, A.,** 2020. *Exchange Bias Effect in Ni-Mn Heusler Alloys*. Metastable, Spintronics Materials and Mechanics of Deformable Bodies-Recent Progress, p.133. http://doi.org/10.5772/intechopen.91473

4. **Arumguam Sonachalam., 2018,** *Proceedings of 29^{th} Annual General Meeting of Materials Research Society of India and National Symposium on Advances in Functional and Exotic Materials*, **eInk Solutions,** ISBN 978-93-87526-16-7.

5. Moorthi Kanagaraj, **Sonachalam Arumugam** and Andrei Mourachkine., 2014, *Pressure Effect on Novel Iron-Based Superconductors,* Horizons in World Physics. Volume 282, ISBN: 978-1-63321-300-5 **Nova Science Publishers, USA.**

4.2. List of Publications in the International Journals

1. Sundaramoorthy, M., Joseph, B., Lingannan, G., Mondal, P.K., Kuo, C.N., Lue, C.S. and **Arumugam, S.,** 2023. *Pressure effects on superconducting quasi-skutterudite Sr3Rh4Sn13 compared to the ambient pressure properties of $Ca_3Rh_4Sn_{13}$ and $La_3Rh_4Sn_{13}$ compounds.* Physica Status Solidi (RRL)–Rapid Research Letters, p.2300078 https://doi.org/10.1002/pssr.202300078

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6. Kumar, K.A., Subalakshmi, K., Sekar, S., Sivaprakash, P., Kim, I., Kumar, S.A., Lee, S. and **Arumugam, S.,** 2023. *Hexagonal cage like structured reduced graphene Oxide-$NiCo_2S_4$ nanocomposite for high performance hydrogen evolution reaction.* International Journal of Hydrogen Energy (*In Press*). https://doi.org/10.1016/j.ijhydene.2023.03.175

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8. Kalaiselvan Ganesan, **Arumugam S**, Ponniah Vajeeston, Jiyong Yao and Yogesh K.Vohra "*Pressure Induced Semiconductor to metal transition in orthorhombic $Ba_2BiFeSe_5$ single crystal in designer diamond anvil cell*", **Conference on Science at Extreme Conditions (CSEC-2021),** Edinburgh, UK, July 26-30 (2021)

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10. Kawamura, Y., Mikage, H., Hayashi, J., Gotou, H., Gouchi, J., Uwatoko, Y., Kannan, M., Govindaraj, L., **Arumugam, S.** and Sekine, C., 2020. *Pressure and Field Dependence of Critical Temperature on Superconductivity of Filled Skutterudite YRu_4P_{12}.* JPS Conference Proceedings, 30, p. 011054. https://doi.org/10.7566/JPSCP.30.011054

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16. G. Kalai Selvan, N. Subbulakshmi, Luminita Harnagea, Giri Mani, Surjeet Singh and **S. Arumugam,** **"***Investigation of magnetic and transport properties of $Sr(Fe_{1-x}Co_x)_2As_2$(x=14 %) and $Sr(Fe_{1-x-y}Co_xMn_y)_2As_2$ (x=14%, y=1.5%) superconductors under magnetic field and external pressure",* **Conference on Emerging Materials (CEMAT-2016),** IISc Bangalore, July 18 - 19 (2016).

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18. K. Manikandan, G. Kalai Selvan, L. Govindaraj, K. Matsubayashi, YoshiyaUwatoko, P. Mandal, **S. Arumugam**, "*Magnetic properties of the Ising spin-chain system α-CoV_2O_6 under Hydrostatic Pressure",* **DAE-BRNS Symposium on Condensed Matter Physics under Extreme Conditions (CoMPEC-2016)**, Bhabha Atomic Research Centre, Mumbai, April 13-16 (2016).

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38. **S. Arumugam,** S.P.Sivakuamr, Sheela. T.Verkey and P.Neelamegam*, "Automatic calibration of energy meters, "***National Symposium on Instrumentation**, Osmania University, Hyderabad, Sep. 25-28, 1995.

39. **S. Arumugam** and S.Natarajan, "*High pressure X-Ray diffraction studies on Y-Pr-Ba-Ca-Cu-O (Pr=0.2) system",* **Solid State Physics Symposium**, Sri Venkateswara University, Tirupati, India, Dec. 28, 1992.

40. **S. Arumugam,** S.Natarajan, V.S.Sastry, T.Geethakumary, T.S.Radhakrishnan, C.K.Subramanian, V.Sankaranarayanan and R.Srinivasan, "*Superconductivity in a new Nd-Ba-Ca-Sr-Cu-O system",* **Solid State Physics Symposium**, Sri Venkateswara University, Tirupati, India, Dec. 28, 1992.

41. **S. Arumugam,** S.Natarajan, V.S . Sastry, T. Geethakumary, T.S. Radhakrishna, C.K.Subramaniam, V.Sankaranarayanan, V.Ganesan and R.Srinivasan, "*DC Magnetisation studies on the new superconducting Nd-Ba-Ca-Sr-Cu-O system",* **Solid State Physics Symposium**, Sri Venkateswara University, Tirupathi, India, Dec. 28, 1992 – Jan. 1, 1993.

42. **S. Arumugam,** V.Sankara Sastry, S.Kalavathi, Y.Hariharan T.S. Radhakrishnan and S.*Natarajan, "Pressure dependence of* T_c *in Nb-Ti upto 6 GPa",* **Solid State Physics Symposium**, Banaras Hindu University, Varanasi, India, Dec. 21-24, 1992.

43. T.S. Sampath Kumar, **S. Arumugam** and S.Natarajan, "*High pressure resistivity of Pr-Gd-Ba-Cu-O superconductors",* **Discussion Meeting on Materials Under High Pressure**, IGCAR, Kalpakkam, India, Dec.23 – 24, 1989.

44. T.S. Sampath Kumar, **S. Arumugam** and S. Natarajan, "*Possible Transition of La-Ba-Cu-O under Pressure",* **Solid State Physics Symposium**, Bhopal University, Bhopal, India, Dec. 20-23, 1988.

45. **S. Arumugam,** T.S.Sampath Kumar and S.Natarajan. , *"High Pressure resistivity studies of Superconductors RE-Ba-Cu-O with RE=Gd& Ho",* **Solid State Physics Symposium**, Bhopal University, Bhopal, India, Dec. 20-23, 1988.

46. T.S. Sampath Kumar, **S. Arumugam,** M.D.Shaji Kumar and S.Natarajan, "*High Pressure study of Dy-Ba-Cu-O Superconductor",* **Proc. of National Workshop on High Temp superconductivity,** Banaras Hindu University, Varanasi, India, Dec. 14-15, 1988.

47. **S. Arumugam,** S.Natarajan and T.S.Sampath*Kumar, "Structural Transition in Y-Ba-Cu-Fe-O Superconductor under Pressure",* **National Workshop on High Temp Superconductivity,** Banaras Hindu University, Varanasi, India, Dec. 14-15, 1988.

48. **S. Arumugam,** N.Victor Jaya, T.S.Sampath Kumar and S.Natarajan, "*Possible structural phase transition in Pr-Ba-Cu-O under pressure",* **National Seminar on Superconductivity,** Trivandrum, India, Dec. 1988.

4.6. Countries visited for academic interaction, conference, part of delegation etc.,

S. No.	Name of the Country & City	Organisation/ University Visited	Nature of duty	Duration of the visit
1.	Poland	Gdank University of Technology, Gdansk, Poland	Indo- Poland project	July 11 – 25, 2022
2.	Italy	XPRESS Beam line, Elettra, Italy	Experiment	May 23 – 30, 2022
3.	Singapore	School of Material Science and Engineering, Nanyang Technological University	Indo-ASEAN project	Jan 07 - 20, 2020
4.	France	ICMMO Université Paris-Sud	Lab Visit	Sep. 22-23, 2019
5.	Italy	Xpress-High pressure powder diffraction beam line, ElettraSincrotrone, Trieste	Experiment	Sep. 14-20, 2019
6.	Malaysia	Universiti Putra Malaysia, Department of Physics	Invited Speaker	Oct 03, 2019
7.	Malaysia	University of Malaysia,	Indo-ASEAN Project, Invited Speaker	(Sep 25, Oct 02) Sep. 21-Oct. 05 5(2019)
8.	USA	Ohio State University	Leadership for Academicians Programme	Sep. 8- 15 (2019)

			(LEAP),	
9.	Japan	ISSP, University of Tokyo	Indo-JSPS Project	Jan. 28- Feb. 02, 2019
10.	Japan	Muroran Institute of Technology, Muroran	Indo-JSPS Project	Jan. 20-27, 2019.
11.	Korea	Hanyang university, HYU-HPSTAR-CIS High Pressure Research Center, Seoul	Invited Lecture	Nov 19-21, 2018
12.	Singapore	Nanyang Technological University	Oral Presentation	Sep. 22-25 (2018)
13.	Japan	Muroran Institute of Technology, Muroran, Hokkaido	Visiting Professor, Invited Lecture	Mar. 9-22 (2017)
14.	Japan	ISSP, University of Tokyo	Visiting Professor	Aug. 23- Nov. 23 2016.
15.	Russia	National University of Science & Technology (MISIS), Moscow	Indo- Russia Project	July 30 – Aug. 13 (2016)
16.	USA	University of Alabama, Birmingham	Lab Visit	Dec. 3-5 (2015).
17.	USA	Materials Research Society Conference, Boston	Invited Lecture	Nov 29 – Dec 3 (2015).
18.	Japan	Muroran Institute of Technology	Invited Lecture, DST-JSPS Exploratory visit program	Oct. 10-13 (2015).
19.	Japan	Graduate School of Science and Engineering, Kagoshima university	Invited Lecture, DST-JSPS, Exploratory visit program	Oct. 15-18 (2015)
20.	Japan	ISSP, University of Tokyo	Invited Lecture, DST-JSPS Exploratory visit program	Oct. 19-25 (2015).
21.	France	CEA, Grenoble	Lab Visit, Indo-French Project	July 19 –Aug. 03 (2015).
22.	China	Centre for Strongly Correlated Matter Zhejiang University	Series of lectures	Jun. 05-12 (2015).
23.	China	HPSTAR, Shanghai.	Invited Lecture	June 13-15 (2015).
24.	Russia	National University of Science & Technology (MISIS), Moscow,	Indo Russia Project	Sep. 22 – Oct. 6 (2014).
25.	Japan	Osaka City University	Indo-JSPS Project	Oct. 17 – Nov. 3 (2014)
26.	Japan	Nippon University	Indo-JSPS Project	Nov. 4 (2014).
27.	Japan	ISSP, University of Tokyo	Indo-JSPS Project	Nov. 5- 12 (2014)

28.	Switzerland	LDM Lab, PSI.	Lab Visit	Mar. 07-08 (2014)
29.	Spain	University of Barcelona	Invited Lecture	Mar. 04-06 (2014)
30.	France	CEA ,Grenoble,	Lab Visit, Indo-French Project	Feb. 17 – Mar. 03 (2014).
31.	Japan	Osaka City University, Osaka	Indo-JSPS project	Nov. 07-08 (2013).
32.	Japan	Kanazawa University, Kanazawa,	Lab visit and training for high pressure instrumentation, Indo-JSPS project	Nov. 09-23 (2013)
33.	Japan	Institute of Solid State Physics, University of Tokyo	Lab Visit, Indo-JSPS project	Nov. 24-27 (2013).
34.	Singapore	National University of Singapore	Delivered Seminar	Mar. 15 (2013).
35.	Taiwan	Condensed Matter Sciences, National Taiwan University, Taipei.	Lab Visit	Mar. 01-14 (2013).
36.	Japan	Osaka City University Osaka.	Lab Visit, Indo-JSPS project	Mar. 14 – Apr. 01 (2012).
37.	Switzerland	Paul Scherrer Institute & EPFL	Special Invitation	Dec. 01-21 (2011).
38.	Switzerland	Paul Scherrer Institute	Indo-Swiss Project	Sep. 25- Oct 25 (2011).
39.	Singapore	National University of Singapore	Presentation - Research Paper, ICMAT Conference	June 26 – July 1 (2011).
40.	Japan	Institute of Solid State Physics, The University of Tokyo,	Lab visit	Nov. 26 – Dec. 11 (2010).
41.	Japan	Osaka City University Osaka	Lab Visit	Nov. 06 – 26 (2010).
42.	USA	University of California, Kick-off Conference on Pressure Effects on Materials, Santa Barbara	Invited Lecture	Aug. 22-31 (2010).
43.	Switzerland	Paul Scherrer Institute	Indo-Swiss Project	July 18 – Sep. 12 (2010).
44.	Sweden	University of Uppsala, European High Pressure Research Conference	Presentation - Research Paper	July 25 - 29 (2010).
45.	Switzerland	Paul Scherrer Institute	Lab Visit	Sep. 29 - Oct 31 (2009).
46.	Japan	The Institute for Solid State Physics University of Tokyo	Lab Visit	Jul. 31 – Aug. 10 (2009).
47.	Japan	International Conference on High Pressure Science and Technology (AIRAPT-22 & HPCJ-50) Tokyo,	Presentation - Research Paper	July 26-31 (2009)

48.	USA	Quantum Design, San Diego	Training Program	Dec. 8-12 (2008).
49.	USA	Centre for High Pressure Science and Technology, University of Nevada, Las Vegas.	Delivered Lecture	Dec. 13-19 (2008).
50.	South Korea	Department of Physics and Astronomy, National University of Seoul	Delivered lecture	Nov. 21-25 (2008).
51.	Japan.	ISSP, University of Tokyo.	GCOE Fellowship	Oct. 2 – Dec. 2 (2008).
52.	Taiwan	Department of Condensed Matter Physics, National Taiwan University, Taipei.	Delivered Lecture	Apr. 26-27 (2007).
53.	Japan	Osaka City University, Osaka	OCU fellowship	Oct. 3 (2006) – Oct. 10 (2007).
54.	Germany	Institute for Solid State Research, Dresden	DST-DAAD-PPP Project	July 20 – Aug. 20 (2006).
55.	Germany	Institute for Solid State Research, Dresden, (INSA program)	Short term visit	Sep. 14 – Dec. 13 (2005).
56.	Germany	Institute for Solid State Research Dresden	Delivered Lecture	June 5-9 (2004).
57.	Brazil	Centre for Brazilian Physical Research, Rio de Janeiro.	Delivered lecture	Apr 05-June 4 (2004)
58.	Italy	International Centre for Theoretical Physics, Trieste,	Winter School	June 1-18 (2003).
59.	Japan	Department of Superconductivity, University of Tokyo, Tokyo.	Short-Term Visit – JSPS	May 01 –Jun. 29 (2002).
60.	Japan	National Institute of Materials Science, Tsukuba.	Delivered Lecture	Oct. 9 (2001).
61.	Japan	Department of Superconductivity, University of Tokyo, Tokyo	Discussion and Lab Visit	Oct. 4-6 (2001).
62.	Japan	Research Centre for Extreme Materials, Osaka University, Osaka	Lab Visit and Discussion	Oct. 2-3 (2001).
63.	Japan	Department of Physics and Electronics, Osaka Prefecture University, Sakai, Osaka.	Delivered Lecture	Sep. 29-30 (2001).
64.	Japan	International Symposium on Superconductivity, Kobe.	Research paper Presentation	Sep. 25-27 (2001).
65.	Japan	Institute for Solid State Physics, University of Tokyo, Kashiwanoha.	Attended Conference	Nov. 6-13 (2000).
66.	Korea	School of Physics and Condensed Matter Research Institute, Seoul National University, Seoul.	Delivered Lecture	Nov. 2-4 (2000).
67.	Italy	University of Rome, International Conference on High Temperature Superconductivity and Stripes, Rome.	Research Paper Presentation	Sep. 25-30 (2000).

68.	USA	Texas Centre for Superconductivity, University of Houston, Texas.	Discussion and Lab Visit	Feb. 25 (2000)
69.	USA	6th International conference on Materials and Mechanism of High Temperature Superconductivity, Houston.	Research Paper Presentation	Feb. 25-30 (2000).
70.	USA	High Pressure Research Laboratory, Hawaii Institute of Geophysics and Planetology Honolulu, Hawaii.	Discussion and Lab Visit	Aug. 2-3 (1999).
71.	USA	International conference on High pressure Science and Technology, Hawaii	Research Paper Presentation	July 25-30 (1999).
72.	Japan	Japan Physical Society Meeting, Hiroshima University, Hiroshima.	Research Paper Presentation	Mar. 28 - 31, (1999).
73.	Japan	National High Pressure conference, Gifu,	Research Paper Presentation	Nov. 10-13 (1998).
74.	Japan	Japan Physical Society Meeting, Okinawa International University, Okinawa.	Attended Conference	Sep. 25-28 (1998)
75.	Japan	Tokyo Institute of Technology	Delivered Lecture	Sep. 3 (1997).
76.	Japan	High Pressure Laboratory, The Institute for Solid State Physics, The University of Tokyo, Tokyo	Discussion and Lab Visit	Sep. 1-2 (1997)
77.	Japan	. SPRING, Workshop on High Pressure Studies using Synchrotron Radiation – 8, Aioi.	Lab Visit	Aug. 30 (1997).
78.	Japan	International Conference on High Pressure Science and Technology Doshisha University, Kyoto.	Research Paper Presentation	Aug. 25-29 (1997).
79.	Belgium	IEEE Instrumentation and Measurement Technology Conference Brussels Belgium.	Research Paper Presentation	Jun. 4-6 (1996).

4.7. International /National Conferences attended in India

1. **Participated in ICAMIT-2022,** Milliya Arts, Science and management Science College BEED (MS), Department of Physics, India, Jan. 11, 2022.
2. **Participated in MRSI-AGM 2021,** Indian Institute of Technology, Madras, Chennai, India
3. **Participated in EFiTON-2021,** Saurashtra University, Rajkot, Gujarat, India, Oct. 28-29, 2021
4. **Participated in UGC HRDC 2021,** University of Madras, Guindy campus Chennai, Oct. 13-15, 2021
5. **Participated in Virtual International Conference on Functional Materials and its Applications ASPECTS (ICFMAA)-2021,** Saveetha School of Engineering Chennai, Oct. 29-30, 2021.

6. **Delivered lecture** on **refresher Course (RAP-2020),** Madurai Kamarajar University, Madurai, Tamil Nadu, India, Dec. 12, 2021.
7. **Delivered Key note Address** in **IWFM 2021, St.Joseph's College**, Department of Physics, Trichy, Tamil Nadu, Mar. 4, 2020
8. **Participated in the University Distinguished Lecture titled "Creating Vibrant Knowledge Society - An Indian Strategy for 21st Century",** SRM University-AP, in association with India's national newspaper, "The Hindu", July 24, 2021.
9. **National Workshop on "Emerging Trends in the Fields of Science and Technology "Inaugural address as Guest of honour,** Dept of Physics, Sathyabama Institute of Science and Technology, Chennai, Aug. 16-28, 2021.
10. **National Conference on advanced material and Applications (NCAMA-2020),** Department of Physics, Urumu Dhanalakshmi College, Trichy during Feb. 27-28, 2020.
11. **Engineering materials and its applications,** Department Of Physics, Sathyabama Institute of Science and Technology, Chennai, India, June 17-19, 2020.
12. **International Virtual Conference on Supercapacitors and Batteries for Future Avenues (ICSBFA 2020),** BDU & NANOCAT, UM and MRSI, Trichy, Sep. 8-9, 2020.
13. **International Virtual Conference on Advanced in Functional Material (AFM 2020) & AFM 2020** International workshop on Ferroelectric & Piezoelectric nonmaterial's and devices for young researchers, Department of Physics, School of Applied Sciences, KIIT Deemed university, Bhubaneswar, Odisha, India, Aug. 26-28, 2020.
14. **TEQIP-III sponsored (one week long) online Short-Term Course on "Emerging Materials: Properties, Applications and Characterization",** Department of Metallurgical and Materials Engineering, Malaviya National Institute of Technology Jaipur, Aug. 27 - 31, 2020.
15. **International webinar on "Scientific Advancements on Solutions and Testings in Industry,** Department of Science and Humanities - Physics, University College of Engineering Nagercoil, Aug. 10, 2020.
16. **Advanced materials for energy and environmental applications (ICAMEEA-2020),** IRC, BDU & NANOCAT, UM and MRSI, Trichy, June 26-27, 2020.
17. **International Webinar series on Astronomy and Astrophysics,** Karunya institute of technology and science, Coimbatore, July 08, 2020.
18. **Indo-Korea Virtual conference on Development of advanced materials for future technologies (DAMFT-2020),** Jeonbuk National University, South Korea & Vellore Institute of Technology, Chennai, India, July 9-10, 2020.
19. **International Webinar on Sample Preparation for TEM and Data Analysis**, Department of Material Science, School of Chemistry, Madurai Kamraj University, Madurai, Tamil Nadu, India, June 30, 2020.
20. **National Conference on Advanced Materials and Applications (NCAMA-2020)** Indian SpectroPhysics Association (ISPA), Feb. 27-28, 2020.
21. **Recent trends in Materials by International Reputes Scholars,** Department of Physics, SSDM College, Kovilpatti, Feb 24, 2020.
22. **National Conference on seminar Recent trends in Materials,** Department of Physics, DevangaArts College, Aruppukottai, Feb 22, 2020.

23. **DST & ACS Workshop,** Department of Chemistry, Bharathidasan University, Dec 9, 2019.
24. **Leadership for Academicians Programme (LEAP), Ohio State University, USA,** Sep. 8-15, 2019.
25. **Leadership for Academicians Programme (LEAP),** UGC Human Resource Development Centre A.M.U., Aligarh, UP, August 22- Sep. 04, 2019.
26. **Four-Day Training Programme on Academic Leadership,** Centre for Leadership & Educational Management, UGC-HRDC, Bharathidasan University, Apr. 24-27, 2019.
27. **11th Annual Research Congress** organized by KarpagamAcadamy of Higher Education (KAHEARC), Dec. 14, 2019.
28. DST sponsored **INSPIRE** Internship Science Camp, **SASTRA University,** Thanjavur, Tamilnadu, Dec. 26-30, 2019.
29. **Mentor** for the **DST INSPIRE** program, Rathinam Technical Campus, Coimbatore, Aug. 21 - 25, 2018**.**
30. **Workshop on Paper Publications (WPP) 2018,** Department of Physics, Annamalai University, Aug. 24-25, 2018.
31. **DST – INSPIRE Internship Science Camp,** Srimad Andavan Arts & Science College, Nov.2018.
32. **UGC Sponsored the National Workshop on Recent Advances and Applications of Material Science,** Department of Physics, Gandhigram Rural Institute Deemed University Gandhigram, Dindigul, Nov. 2, 2017.
33. **National Conference on Recent Advances in Physics,** Namakkal Kavignar Ramalingam Government Arts College for Women, Namakkal, Sep. 20, 2017.
34. **State Level Technical Seminar on Advanced Materials and its Applications,** Voorhees College, Vellore, Mar. 6, 2017.
35. **International Workshop on Novel Materials**, Devanga Arts College, Aruppukottai, Jan. 24, 2015.
36. I**nternational Conference on Advances in New materials**, University of Madras, Chennai, June 20-21, 2014.
37. **International Conference on Magnetic Materials and Applications**, Pondicherry University, India, Sep. 15-17, 2014.
38. **International Conference on Recent Trends in Materials,** Devanga Arts College, Aruppukottai, India, Dec. 22-23, 2014.
39. **59th DAE-Solid State Physics Symposium,** VIT University, Vellore, Dec. 16–20, 2014.
40. **Recent Trends in Materials Science (**Conference Organized and Lecture), Bharathidasan University, Tiruchirappalli, Feb. 3-4, 2014.
41. **Science Academics Lecture Workshop on Recent Development in Physics**, Melur, Madurai, Jan. 30-31, 2013.
42. **International Workshop and National Seminar on Crystal Growth Characterization of Advanced Materials and Devices**, CGC, Anna University, Chennai, Dec. 16-22, 2012.
43. **National Seminar on Recent Trends in Materials Science,** Thalavapalayam, Karur, Nov. 9, 2012.
44. **23rd AIRAPT internal Conference on High Pressure Science and Technology**, BARC, Mumbai, Sep. 25-30, 2011.

45. **55th DAE- Solid State Physics Symposium,** Manipal University Manipal, Dec. 26-30, 2010.
46. **National Symposium in Instrumentation**, Cummins College of Engineering for Women, Karvenagar, Pune, Jan. 21-23, 2010.
47. **Awareness Workshop on Low Temperature and High Magnetic Field Facilities**, Indore, Mar. 6-7, 2009.
48. **International Conference on Active/ Smart Materials,** Thiagarajar College of Engineering, Madurai, Jan. 7-9, 2009.
49. **National Workshop on Recent Advancements in Materials Science,** Alagappa University, Karaikudi, Mar. 7, 2008.
50. **International Conference on Magnetic Materials,** Saha Institute of Nuclear Physics, Kolkatta, Dec. 12 -16, 2007.
51. **Awareness Workshop on Low Temperature and High Magnetic Field Facilities,** UGC-DAE-CSR, Indore, Dec. 10-12, 2007.
52. **Discussion meeting on High Pressure Research,** IGCAR, Kalpakkam, Nov. 12-13, 2007.
53. **Indo-Japan Joint Seminar on Novel Giant Magneto Resistive Materials and their Electronic Structures,** Bangalore, India, Jan. 30 – Feb. 01, 2006.
54. **National Seminar on Applied Research on Solid State Chemistry and Nanotechnology,** Annamalai University, Feb. 25-26, 2005.
55. **Indo-Japan Conference on Recent Materials,** Crystal Growth Centre, Anna University, Chennai, Dec. 7-11, 2004.
56. **Refresher Course on Experimental Physics,** Goa University, Goa, India, Nov.28 – Dec. 10, 2003.
57. **National Seminar on Recent Advances in Materials Science,** (Chairing Session and invited lecture), Nehru Memorial College, Puthanampatti, Tiruchirappalli, Dec.11-12, 2002.
58. **National Seminar on Recent Trends in Optoelectronic Materials,** Department of Physics, Sri Venkateswara University, Tirupati, Nov. 20-21, 2002.
59. **Advanced Materials Workshop,** JNCASR, Jakkur, Bangalore, Nov. 3-4, 2001.
60. **National Conference on Current Trends in Materials Science-2001** Mahatma Gandhi University, Kottayam, Kerala, Mar. 3, 2001.
61. **National Conference on Instrumentation,** National Physical Laboratory, New Delhi, Oct.22-25, 1997.
62. **4th National Conference on High Pressure Science and Technology,** Indira Gandhi Centre for Atomic Research, Kalpakkam, Sep. 11-13, 1997.
63. **Laser Applications,** Regional Engineering College, Tiruchirappalli, India, Mar. 15, 1997.
64. **Winter School on Performance,** Appraisal and Development System, Regional Engg.College, Tiruchirappalli, India, Jan. 20-25, 1997.
65. **International Workshop on Sol-Gel Process on Advanced Ceramic Materials,** Anna University, Madras, India, Jan. 8-9, 1996.
66. **Trends in Industrial Measurements and Automation Madras,** India, Jan. 3-7, 1996.
67. **National Symposium on Instrumentation,** IETE, Hyderabad, Sep. 25-28, 1995.
68. **Performance, Appraisal and Development System**, Regional Engineering College, Tiruchirappalli, India, May 5-7, 1995.

69. **Workshop on Instrumentation and Experimental Techniques,** IUC-DAE, Indore, India, Oct. 4-22, 1993.
70. **Solid State Physics Symposium,** Sri Venkateswara University, Tirupathi, India, Dec. 28, 1992 – Jan. 01, 1993.
71. **International Workshop on Electronic Structure Calculations and Properties of Materials**, Anna University, Madras, India, Nov. 16-21, 1992.
72. **13th AIRAPT International Conference on High Pressure Science and Technology,** Bangalore, India, Oct. 7-1, 1991.
73. **5th SERC School on Condensed Matter Physics - Superconductivity,** Indian Institute of Technology, Bombay, India, Dec. 3-21, 1990.
74. **National Symposium on Band Structure and its Applications to the Study of Properties of Materials,** Anna University, Madras, India, Feb. 13-15, 1990.
75. **International Conference on Superconductivity,** Bangalore, India, Jan. 10-14 1990.
76. **Discussion Meeting on Materials Under High Pressure,** Indira Gandhi Centre for Atomic Research, Kalpakkam, India, Dec.23-24, 1989.
77. **Solid State Physics Symposium,** Indian Institute of Technology, Madras, India, Dec. 1989.
78. **Solid State Physics Symposium,** Bhopal University, Bhopal, India, Dec. 20-23 1988.
79. **Workshop on High Temperature Superconductivity,** Bhopal University, Bhopal, India, Dec. 18-19, 1988.
80. **National Workshop on High Temperature Superconductivity,** Banaras, Hindu University, Varanasi, India, Dec. 14-15, 1988.
81. **Workshop on Low Temperature Physics and Cryogenic Techniques,** IACS, Calcutta, Aug 30- Sep. 2, 1988.
82. **International Conference on High Temperature Superconductivity,** University of Rajasthan, Jaipur, India, July 8, 1988.

4.8. Popular Science Lectures Delivered In India

1. **4th Refresher course in materials science: recombinant memetics**, UGC-HRDC, University of Calicut, Kerala, December 7th – 12th, 2021.
2. **DST-INSPIRE Internship Science Camp** 2019, Mar Ephraem College of Engineering and Technology, Elavuvilai, July 19, 2019.
3. **Recent Trends in Materials,** National Seminar on Advanced Techniques in Materials Science, Department of Physics, Dhanalakshmi Srinivasan College of Arts and Science for Women, Perambalur, Mar. 14, 2019.
4. **Superconductivity and its Applications,** National Conference on Recent Trends in Nano& Bulk Superconducting and Magnetic Materials (RTNBSMM- 2018), Department of Physics, SrimadAndavan Arts & Science College, Tiruchirappalli, Dec. 20-21, 2018.
5. **DST-INSPIRE Internship Science Camp,** Department of Biochemistry, SrimadAndavan Arts & Science College, Tiruchirappalli, Nov. 17, 2018.
6. **Manuscript types and Preparation,** Workshop on paper publications, Department of Physics, Annamalai University, Aug. 24, 2018.

7. **Developments in Superconductivity,** *National Workshop on Recent Advances Applications of Material Science*, Department of Physics, Gandhigram Rural Institute, Deemed University, Dindigul, Nov. 2, 2017.
8. **Indian Science Academics sponsored Lecture Workshop on Emerging Trends in Applied Physics,** Department of Physics, Devanga Arts College, Aruppukottai, Sep. 22, 2017.
9. **Materials Science Research of Societal Relevance,** Savitribai Phule Pune University, Pune, May 25, 2017.
10. **Student level Technical Symposium,** Electronics and Communication Engineering, Anjalai Ammal – Mahalingam Engineering College, Kovilvenni, Thiruvarur, Jan. 09, 2017.
11. **Recent Developments in Energy Materials,** Department of Physics, Shri Sakthikailash Women's College, Salem, Sep. 12, 2016.
12. **Experimental Facilities of the Centre for High Pressure Research and recent in Superconductivity,** B. S. Abdur Rahman University, Chennai, June 15, 2016.
13. **4th National Conference on Hierarchically Structured Material,** SRM University, Ramapuram, Chennai, Mar. 4-5, 2016.
14. **Superconductivity and High Pressure with Low temperature Techniques,** UGC-Human Resource Development Centre, Bharathidasan University, Mar. 2, 2016.
15. **IInd International workshop on Novel Materials,** Department of Chemistry, Devanga Arts College, Aruppukottai, Feb. 22, 2016.
16. **Recent Trends in Materials,** 2nd International Conference, Department of Physics, Devanga Arts College, Aruppukottai,
17. **DST-INSPIR-Science Camp,** Yadava College, Madurai, Dec. 26, 2015.
18. **Recent trends in Super Conductivity and its Applications,** Department of Physics, SASTRA University, Sep. 14, 2015.
19. **Frontiers Research in Applied Sciences,** Department Of Chemistry, BIT Campus, Anna University, Tiruchirappalli, June 3, 2015.
20. **Pressure in Physics-Young Students Scientists Programme,** Thanthai Hans Rover College, May 21, 2015.
21. **Noble Thoughts in Physics,** ChidambarampillaiWomens College, Mannachanallur, Dec.12, 2014.
22. **DST-INSPIRE Internship Lecture,** Department of Chemistry, Devanga Arts College, Aruppukottai, Oct. 12, 2014.
23. **Special lecture on Superconductors,** Department of Physics, SASTRA University, Sep. 08, 2014.
24. **DST-INSPIRE Internship Lecture,** VHNSN College, Virudhunagar, Aug. 8, 2014.
25. **DST-INSPIRE Internship Lecture,** VikramaSimhapuri University, Nellore, July 31, 2014.
26. **Resources for Research Grant,** Alagappa University, Karaikudi, Apr. 23, 2014.
27. **2nd National Conference on Hierarchically Structured Materials,** SRM University, Ramapuram, Chennai, Mar. 24, 2014.
28. **Recent Trends in Superconductivity,** Bharathidasan University, Tiruchirappalli, Feb. 3, 2014.

29. **Superconductivity and its Applications,** ChidambarambillaiWomens College, Mannachanallur, Aug. 21, 2013.
30. **DST-INSPIRE Internship Lecture,** Devanga Arts College, Aruppukkottai, Aug. 3, 2013.
31. **Basic Science is not Inferior to Engineering Science,** SURPHY 2013, Bishop Heber College, Trichy, Feb. 12, 2013.
32. C**ontact Science Motivation Programme for the Talented School Students,** Mandapam RegionalCentre of Central Marine Fisheries Research, Jan. 21, 2013.
33. **Pressure Effect on Semiconducting Materials,** Lecture Workshop on Recent Developments in Physics, Melur, Jan. 30, 2013.
34. **DST-INSPIRE Internship Lecture,** Cardamom Planters Association College, Bodinayakanur, Dec. 28, 2012.
35. **DST-INSPIRE Internship Lecture,** Selvam Arts and Science College, Namakkal, Nov.5, 2013.
36. **DST-INSPIRE Internship Lecture,** VHNSN College, Virudhunagar, Sep. 2, 2012.
37. **DST-INSPIRE Internship Programme – II,** Devanga Arts College, Aruppukottai, Nov. 26, 2012.
38. **DST-INSPIRE Internship Lecture,** Satyabama University, July 31, 2012.
39. **DST-INSPIRE Internship Lecture,** PKR Arts College for Women, Gobi, July 25, 2012.
40. **DST-INSPIRE Internship Lecture,** VikramaSimhapuri University, Nellore, June 18, 2012.
41. **TNSCST orientation program for School Science Teachers, Emerging Materials for S & T,** Mahendra Engineering College, Mallasamudram, Tiruchengode, June 22, 2012.
42. **Recent Trends in Superconductivity**, Periyar University, Salem, Feb. 10, 2012.
43. **DST-INSPIRE Internship Lecture**, Noorul Islam University, Kanyakumari, Feb.2, 2012.
44. **Recent Development in Advanced Materials and its Applications,** Mahendra Engineering College, Namakkal, Aug. 12, 2011.
45. **DST-INSPIRE Internship Lecture,** PKR Arts College for Women, Gobi, Dec. 28, 2011.
46. **DST-INSPIRE Internship Lecture,** Devanga Arts College, Aruppukkottai, Nov. 28, 2011.
47. **Inter Collegiate Seminar on Development in Superconducting Materials,** Devanga Arts and Science College, Aruppukkotti, Feb.15, 2011.
48. **Critical behaviour at ferromagnetic to the paramagnetic transition of nearly half doped Manganites,** 55th DAE – Solid State Physics Symposium, Manipal University, Manipal, Dec. 26-30, 2010.
49. **Role of Pressure in Physical Parameters of Strongly Correlated Systems,** Thiagarajara College of Engineering, Madurai, Jan 20, 2010.
50. **Special Lecture on carbon materials,** Jamal Mohamed College, Tiruchirappalli, July 23, 2008.
51. **Lecture on Carbon Nanotubes,** Alagappa University, Karaikudi, Mar. 7, 2008.
52. **Recent Trends in Spintronic Materials,** Cauvery College for Women, Tiruchirappalli, Feb. 15, 2008.
53. **Awareness Workshop on Low Temperature and High Magnetic Field,** UGC-DAE CSR, Indore, Dec. 10, 2007.

54. **Recent Trends in Superconductivity**, PGP College of Arts and Science, Namakkal, Jan. 7, 2005.
55. **The Wondrous world of carbon Nano-tubes and C-60,** Dhanalakshmi Srinivasan College of Arts and Science for Women, Feb. 28, 2005.
56. **Nanotechnology and its Applications,** Department of Biotechnology, Bharathidasan University, Feb. 25, 2005.
57. **Recent Advances in Superconducting Materials,** Muthayammal College of Arts and Science, Rasipuram, Dec. 31, 2003.
58. **Recent Advances in Superconductivity,** AVVM Sri Pushpam College, Poondi, Mar. 28, 2001.
59. **Superconductivity,** Kandasamy Kandar's College, Velur, Namakkal, Oct. 13, 2001.
60. **Superconductivity,** School of Engineering and Technology, Bharathidasan University, Tiruchirappalli, Nov.2, 2001.
61. **Instrumentation on High Pressure Low temperature Techniques,** Regional Engineering College, Tiruchirappalli, Aug. 22, 1996.
62. **Instrumentation on High Pressure Low temperature techniques,** TBML College, Porayar, Aug. 20, 1996.
63. **High Pressure Effect on Materials,** the Institution of Engineers, Tiruchirappalli, June 18, 1996.

2.9. Foreign Scientists/Professors Visited to CHPR

- **Prof. Robert Bogdanowicz** and his group, Gdansk University, Poland- Nov 11, 2022
- **Dr. Nalin Prasanna,** Sri Lanka sabaragamuwa university, Nov 22 - Feb 22, 2020
- **Dr. OluwaseunAdedokun**, University of Technology, Nigeria, Oct 20, 2019–Mar 13, 2020
- **Prof. Chihiro Sekine,** Muroran Institute of Technology, Japan, Mar 4-10, 2019
- **Prof. R. Suryanarayanan**, University of Paris, France, Feb 12-13, 2019
- **Dr. Y. Kawamura,** Muroran Institute of Technology, Japan, Dec. 24, 2018 – Jan. 04, 2019
- **Dr.Raman Sankar,** National Taiwan University, Taiwan, Sep. 24-26.2018
- **Prof. Geetha Balakrishnan,** University of Warwick, UK, Aug. 6-10, 2018
- **Prof. R. Suryanarayanan**, University of Paris, France, Feb 14-16, 2018.
- **Prof. Y. Uwatoko,** ISSP, University of Tokyo, Japan, Feb 14-16, 2018.
- **Prof. Ram Seshadri,** University of California, Santa Barbara, USA, Feb 14-16, 2018.
- **Prof. BVR Chowdari,** Nanyang Technological University, Singapore, Feb 14-16, 2018.
- **Dr. Fabrice Wilhelm,** ESRF, Grenoble, France, Jan. 9-12, 2017.
- **Dr. Ilya Sheikin,** LNCMI, CNRS, Grenoble, France, Jan. 9-12, 2017.
- **Dr. William Knafo,** LNCMI, CNRS, Grenoble, France, Jan. 9-12, 2017.
- **Prof. Daniel Braithwaite,** CEA, Grenoble, France, Jan. 9-12, 2017.
- **Prof. Yogesh K. Vohra,** University of Alabama, USA, Dec. 26-30, 2016.
- **Prof. Chihiro Sekine,** Muroran Institute of Technology, Japan, Dec. 19-23, 2016.
- **Prof. R. Suryanarayanan**, University of Paris, France, Feb.22-25, 2016.
- **Prof.Daniel Braithwaite,** CEA, Grenoble, France, Jan.18-26, 2016
- **Prof. R. Suryanarayanan**, University of Paris, France, Mar 2015.
- **Prof.K. Murata,** Osaka City University, Osaka, Jan. 19-Feb.3, 2015.

- **Prof.Y.Uwatoko,** ISSP, Univ. of Tokyo, Japan, Jan.19-24, 2015.
- **Prof. Huiqiu Yuan**, Zhejiang University, China, Dec. 19-23, 2014.
- **Dr. Dmitry A. Shulyatev,** National University of Science & Technology, MISIS, Moscow, Russia, Dec. 16-23, 2014.
- **Prof. A. Jayaraman,** AT & T Bell Lab (retired), Oct. 6 - 7, 2014.
- **Prof. Daniel Braithwaite,** CEA, Grenoble, Mar. 18 –Apr. 2, 2014.
- **Prof. Y. Uwatoko,** ISSP, University of Tokyo, Japan, Mar. 12-16, 2014.
- **Dr. Boby Joseph,** University of Rome, Italy, Feb. 13-14, 2014.
- **Prof. R. Suryanarayanan**, University of Paris, France, Feb. 3-5, 2014.
- **Prof. R. Suryanarayanan**, University of Paris, France, Feb. 15, 2012.
- **Prof. K. Murata**, Osaka City University, Japan, Dec. 19 - 26, 2011.
- **Prof. Y. Uwatoko**, ISSP, University of Tokyo, Japan, Sep. 30-Oct.1, 2011.
- **Dr. K. Conder**, Paul Scherrer Institute, Switzerland, Sep. 30-Oct. 4, 2011.
- **Prof. R. Mahendiran**, National University of Singapore, Singapore, Aug. 1-3, 2011.
- **Prof. A. M.Strydom**, University of Johannesburg, South Africa, Mar. 17-31, 2011.
- **Prof. K. Murata**, Osaka City University, Japan, Mar. 11-15, 2011.
- **Prof. Y. Uwatoko**, ISSP, University of Tokyo, Japan, Mar. 2-5, 2011.
- **Dr. K. Conder**, Paul Scherrer Institute, Switzerland, Jan. 12-20, 2010.
- **Dr. Deng Guochu**, Paul Scherrer Institute, Switzerland, Jan. 12-20, 2010.
- **Dr. Ravhi S. Kumar**, University of Las Vegas, Nevada, USA, Dec. 2008.
- **Prof. K. Murata**, Osaka City University, Japan, Mar 2005.
- **Prof. R. Suryanarayana**, University of Paris, France, June 2002.
- **Prof. N. Mori**, Institute of Solid State Physics, University of Tokyo, Japan, Dec.2001.

5.0. CHPR Student's Visited foreign Labs: International Exchange Program/Conferences/other visits

- ✓ **Mr. S. Muthukumaran,** Elettra, Italy, TRIL Fellowship, Oct.15, 2022- Sep. 14, 2023.
- ✓ **Mr.L.Govindaraj**, Elettra, Italy, Elettra User, November 26-December 06, 2022
- ✓ **Mr.S.Surendhar**, Elettra, Italy, Elettra User, November 26-December 06, 2022
- ✓ **Mr.M.Thiagarajan**, Elettra, Italy, Elettra User, November 26-December 06, 2022
- ✓ **Ms.M.N.Sathea Suweatha**, Elettra, Italy, Elettra User, November 26-December 06, 2022
- ✓ **Mr.L.Govindaraj**, Elettra, Italy, Elettra User, May 23-30, 2022.
- ✓ **Mr.L.Govindaraj**, Elettra, Italy, TRIL Fellowship, Sep. 01, 2021-March 31, 2022.
- ✓ **Mr.M.Sathiskumar**, Institute of Solid State Physics, Japan, DST-OVDF Fellowship, 2019-2021
- ✓ **Mr.P.Sivaprakash,** Universit of Jaffna, Srilanka, Advance materials for cleaning energy Conference programme, Feb. 6-8, 2019.
- ✓ **Mr. M.Kannan,** (CSIR-SRF), ISSP, University of Tokyo, Japan, Indo-JSPS Project, Jan. 28-Feb. 02, 2019
- ✓ **Mr. M.Kannan,** (CSIR-SRF),Muroran Institute of Technology, Muroran, Hokkaido, **Japan,** Indo-JSPS Project, Jan. 20-27, 2019.
- ✓ **Mr.P.Sivaprakash,** Nanang technological university(NTU), Singapore, ACHPR conference programme 30 September -03 October 2018

- ✓ **Mr. L.Govindaraj,** (Research Scholar), Muroran Institute of Technology, Muroran, Hokkaido, **Japan,** Internship Programme, Feb. 8–Mar. 31, 2017.
- ✓ **Mr.L.Govindaraj,** (Project Fellow), CEA Grenoble, France, Indo-French Project, Nov. 25 to Dec. 19 2016.
- ✓ **Mr.P.Sivaprakash,** Moscow state University, Moscow, Russia, Visiting Fellow, 09th August 2016.
- ✓ **Mr.P.Sivaprakash**, National Institute of Science and Technology (MISIS), Moscow, Russia, Visiting Fellow, 30th July – 13th August 2016.
- ✓ **Mr. G. Kalai Selvan,** (BSR – RFSMS - SRF), **Joint AIRAPT-25 & EHPRG,** University of Complutense, Madrid, Spain, Aug.30 – Sep. 4, 2015.
- ✓ **Mr. G. Kalai Selvan,** (BSR – RFSMS - SRF), Osaka City University, **Japan,** Indo-JSPS Project, Oct 17 – Nov. 3, 2014.
- ✓ **Mr. G. Kalai Selvan,** (BSR – RFSMS - SRF), Nippon University, **Tokyo, Japan,** Indo-JSPS Project, Nov. 4, 2014**.**
- ✓ **Mr. G. Kalai Selvan,** (BSR – RFSMS - SRF), ISSP, University of Tokyo, Japan, Indo-JSPS Project, Nov.5- 12, 2014.
- ✓ **Mr. U. Devarajan,** (BSR-SRF), National Institute of Science& Technology, Moscow, Indo-Russia Project, Sep. 22 - Oct 6, 2014.
- ✓ **Mr. K. Manikandan,** (Project Fellow), University of Tokyo, Japan, Indo-JSPS Project, Nov. 23 – 27, 2014.
- ✓ **Mr. K. Manikandan,** (Project Fellow), Kanazawa University, Japan, Indo-JSPS Project, Nov. 9 – 22, 2014.
- ✓ **Mr. K. Manikandan,** (Project Fellow), Osaka City University, Japan, Indo-JSPS Project, Nov. 7–8, 2014.
- ✓ **Mr. G. Kalai Selvan,** (Project Fellow) Osaka City University, Osaka, Japan, Indo-JSPS Project, Mar. 14–Apr. 1, 2012.
- ✓ **Mr. D. Mohan Radheep**, (JRF), Paul Scherrer Institute, Switzerland Indo-Swiss project, Nov. 17 - Dec 22 2011.
- ✓ **Mr. R. Thiyagarajan**, (JRF), Paul Scherrer Institute, Switzerland Indo-Swiss Project, Jul. 25 –Sep.25, 2011.
- ✓ **Mr. S. Esakki Muthu,** (CSIR-SRF), Institute for Solid State Physics, University of Tokyo, Japan, DST-JSPS Project, Feb. 2 – 28, 2011.
- ✓ **Mr. S. Esakki Muthu,** (CSIR-SRF), Osaka City University, Osaka, Japan, Nov 06 - 26 2010.
- ✓ **Mr. D. Mohan Radheep**, (JRF, Indo-Swiss Project) Paul Scherrer Institute, Switzerland, Indo-Swiss project, Jul. 13 –Sep. 13, 2010.
- ✓ **Mr. R. Thiyagarajan**, (JRF) Paul Scherrer Institute, Switzerland, Indo-Swiss project, Oct. 22 – Dec. 22, 2009.

5.1. Programmes attended after assumption of charges as Vice Chancellor, TNOU

Date	Event	Venue	Organizer(s)
04.06.2023 to 06.06.2023	Ooty Conference 2023-with all State Universities and Private Universities organized by the Hon'ble Governor-Chancellor, Governor's Secretariat, Raj Bhavan, Chennai-22.	Raj Bhavan, Ooty	Governor's Secretariat, Raj Bhavan, Chennai
	Coimbatore Regional Centre and Learning Support Centre Meeting – Kothagiri Construction	Coimbatore Regional Centre	TNOU, Chennai
	KPR Institute of Technology for Endowment and building to Regional Centres	Coimbatore Regional Centre	TNOU, Chennai
	Chief Guest in the Graduation Day of The Institute of Company Secretaries of India	Convocation Hall, TNOU, Chennai	Host Institute
21.06.2023	Participated and grace the International Yoga Day	Library, Academic Block, TNOU, Chennai	School of Continuing Education, TNOU
29.06.2023	Participated as Chief Guest – St.Annie Community College, Melapudhur, Tiruchirappalli	St.Annie Community College, Melapudhur, Tiruchirappalli	Host Institute
30.05.2023	Programme Co-ordinators Course Writers Meeting	Thiruvalluar Mini Hall	MPDD, Chennai
18.05.2023	Interaction Session with Governor's Secretariat along with Researcher/Mentor/Guides w.r.t. Special Research Projects on Unsung Freedom Fighters	Governor's Secretariat	School of Tamil and Cultural Studies, TNOU, Chennai
16.05.2023	கருத்தரங்கு-உலகளாவிய நிலையில் கற்றல் கற்பித்தலில் தமிழாசிரியர்கள் எதிர்நோக்கும் சிக்கல்கள் ஆசரியர் திறன் மேம்பாடு குறித்து	திருவள்ளுவர் சிற்றரங்கம், கல்வி வளாகம், தமிழ்நாடு திறந்தநிலைப் பல்கலைக்கழகம்	School of Tamil and Cultural Studies, TNOU, Chennai
15.05.2023	Inauguration of UDL Studio "Accessible Multimedia Learning Materials for All"	II Floor, Academic Block	School of Special Education and Rehabilitation Studies, TNOU, Chennai

09.05.2023 to 11.05.2023	Interaction Meeting with Dr. Babasaheb AmbedkarOpen University Ahmedabad, Gujarat – Regarding NAAC Accreditation	Dr.Babasaheb AmbedkarOpen University Ahmedabad, Gujarat	CIQA, TNOU, Chennai
06.05.2023	Participated as Chief Guest in the College Day of St.Christopher's College of Education [Autonomous], Vepery, Chennai	St.Christopher's College of Education [Autonomous], Vepery, Chennai	Host Institution
02.05.2023	TNOU CY 2022-Induction Programme	TNOU, Chennai [Virtual Mode]	SSSD, TNOU, Chennai
02.05.2023	Participated as Chief Guest in the Annual Day Function of CHOLAN Matriculation Hr.Sec.School, Kancheepuram	Kancheepuram	Host Institution
03.04.2023	Participated as Chief Guest to the 36th Convocation of IGNOU	Vepery, Chennai	Host Institution
06.04.2023 to 08.04.2023	Visit to Sivagangai Regional Centre and other allied LSCs for admission promotional activities	Sivagangai Regional Centre	TNOU, Chennai
21.04.2023	ASMA Higher Education Summit & Awards 2023 – Speaker	IIT, Chennai	ASMA Higher Education Studies, Mumbai
23.04.2023	All India Open University Vice-Chancellors' Conference	Jaipur	Vardhamaan Mahaveer Open University [VMOU], Kota
28.04.2023	B.Ed., Special Education-Induction Progamme	TNOU, Chennai (Virtual Mode)	School of Special Education & Rehabilitation Studies, TNOU, Chennai
28.04.2023	World Theatres Day	Convocation Hall, TNOU, Chennai	School of Journalism and New Media Studies, TNOU, Chennai
01.03.2023	Endowment Programme-Shree Jaiganesh Natarajan Memorial Endowment Lecture	Department of Adult and Continuing Education, University of Madras, Chennai	Host Institution

02.03.2023	National Conference – Participated as Chief Guest in the National Conference on "Recent Trends in Material Sciences"	Arignar Anna Government Arts College, Namakkal	Host Institution
06.03.2023	Doctoral Committee Meeting @ 3:00 p.m.- w.r.t. Mr. Satish Kumar, Research Scholar, CHPR, Bharathidasan University, Tiruchirappalli	Seminar Hall-II, Bharathidasan University, Tiruchirappalli	Host Institution
08.03.2023	International Women's Day Celebration	Thiruvalluar Mini Auditorium, TNOU, Chennai	TNOU, Chennai
10.03.2023	Annual Day at Palanivel ITI, Villupuram	Palanivel ITI, Villupuram	Host Institution
12.03.2023	Sri Bharathi Women's Arts & Science College, Arani – 11^{th} Convocation- Participated as Chief Guest	Arani	Host Institution
15.03.2023	National Science Day- National Seminar on Global Science for Global Well-Being	St.Peter's Institute of Higher Education and Research, Avadi, Chennai	Host Institution
07.02.2023	Meeting conducted by the Hon'ble Governor-Chancellor- Special Research Projects on unsung freedom fighters of Tamil Nadu	Online Meeting	Governor's Secretariat, Raj Bhavan, Chennai
12.02.2023	Attended 46^{th} Graduation Day - AVVM Sri Pushpam College-Thanjavur	AVVM Sri Pushpam College-Thanjavur	Host Institution
16.02.2023	KPR College, Coimbatore- Viva-Voce	KPR College, Coimbatore/RC, Coimbatore	KPR College, Coimbatore
17.02.2023	Special Lecture by Prof.R.Suryanarayanan, Retired Prof. University of Parrys-"How Raman Won the Nobel Price"	Thiruvalluar Mini Auditorium, VI Floor, Academic Block, TNOU, Chennai	TNOU, Chenn
17.02.2023 (from 2:00 p.m.) 18.02.2023 & 19.02.2023	Selection Committee Meeting at Anna University – for recruitment of Faculty Members	Anna University Campus, Guindy, Chennai	Anna University, Chennai

22.02.2023	26th State Level Industries Convention STICON 2023	Chennai Trade Centre, Nandambakkam, Chennai	Tamilnadu Small and Tiny Industries Association, Chennai
24.02.2023	International Conference on Emerging Trends in Online Teaching, Assessment and Learning	Convocation Hall, Auditorium, TNOU, Chennai-15.	RUSA, State Project Directorate, DOTE Campus, Chennai
28.02.2023	Inter-Institutions IDEATHON 2023 – An Innovative Idea Contest – Participated as Chief Guest	AMET University	AMET University, Chennai
28.02.2023	National Science Day-Chief Guest	Anna University, Chennai	Anna University
21.01.2023	36ஆம் ஆண்டு மலர் வெளியீடு, இளைஞர்களுக்கான அறிவுக்களஞ்சியம் பரிசுகள் மற்றும் விருதுகள் வழங்கும் விழா	பாரதிய வித்யாபவன், மயிலாப்பூர், சென்னை-4.	மயிலைத் திருவள்ளுவர் தமிழ்ச் சங்கத்தின் எம்.டி.எஸ் அகாடெமி, இந்திய அரசின் இளைஞர் நலன் மற்றும் விளையாட்டு அமைச்சகத்தின் நேருயுவகேந்திரா சங்கதன், தமிழ்நாடு திறந்தநிலைப்பல்கலைக்கழக திருவள்ளுவர் இருக்கை மற்றும் பாரதிய வித்யாபவன்
25.01.2023	High Level Committee to discuss on State Education Policy	Anna Centenary Library, Kotturpuram, Chennai	Higher Education Department, Secretariat, Chennai
	Felicitation from the Academy of Sciences, Fellows of the Academy: Honoured to Dr.S.Arumugam, VC, Tamil Nadu Open University among others	University of Madras Guindy Campus Chennai-25.	The Academy of Sciences, Chennai
30.01.2023	G20 Curtain-Raiser Workshop on "Role of Digital Technology in Education"	IITM, Research Park, Chennai	Indian Institute of Technology, Chennai.
31.01.2023	The First G20 Education Working Group Meeting "Role of Digital Technology in Education"	IITM, Research Park, Chennai	Indian Institute of Technology, Chennai.

Various Initiatives taken since the assumption of Vice Chancellor, Tamil Nadu Open University:

As directed by the Hon'ble Governor-Chancellor, Five Researchers have been engaged for Special Research Projects of Unsung Heroes of the National Freedom Movement and details in this regard submitted to the Governor's Secretariat. Meetings organized by the Governor's Secretariat were attended from time to time since February 2023, both Online/Offline. In this regard, the University has nominated the Nodal Officer and Coordinator in order to monitor the project.

Internal Academic and Administrative Committee constituted for the purpose of obtaining NAAC Accreditation.

To accomplish the works related to SSR and DVV Submission, various Internal and External Committees have been formed for successful completion of the same and awaiting for NAAC Peer Team Visit during 19-21 July 2023.

Special Lecture on the Topic "How Raman won the Nobel Prize"- by Prof.R.Suryanarayanan, Retired Professor/Scientist of the University of Parrys organized at the Thiruvalluar Mini Auditorium, Academic Block, TNOU, Chennai.

Space Committee has been constituted to reorganize/renovate the structure in the Administrative Building and Academic Building for accommodating Centres, Cells and divisions, in view of NAAC PTV. The work has been entrusted to the Public Works Department and is in the stage of completion.

The University conducted Spot Admission Campaign at R.G.Modern College organized by the Thiruvannamalai Regional Centre and admitted students in various programmes.

The University celebrated International Women's Day on 8th March 2023 at the Thiruvalluar Mini Hall, Academic Block, TNOU, Chennai, in which, Mrs.Kayalvizhi, IPS, and Mrs.S.Vijayalakshmi, Director, RUSA have joined as Chief Guests to deliver the Lectures.

Inauguration of UDL Studio, the First of its kind in India to promote Inclusive Education for Persons with Disabilities. The University is also proposed to name the Studio in the name of "Dr.Kalaignar Studio" the former Chief Minister of Tamil Nadu, with the approval of the competent authorities.

For offering of the Vocational Diploma Programmes through Community Colleges, MoUs were entered between Tamil Nadu Open University and 16 Community Colleges in Tamil Nadu for offering various Vocational Diploma Programmes.

As a part of the UGC Regulations 2021, the University has engaged 26 Core Faculty Members, Assistant Professors on Contract Basis in order to fulfil the teacher-student ratio.

Induction Programmes for the Calendar Year 2023 admitted candidates of UG, PG, Diploma and Certificates including Vocational Diploma Programmes and B.Ed., Special Education have been conducted through a Virtual Platform successfully.

The School of Journalism and New Media Studies of the TNOU has organized World Theatre Day on 28th April 2023 in commemoration of various Artists.

Participated in the Ooty Conference 2023, organized by the Hon'ble Governor-Chancellor on 5th June 2023.

The University has celebrated International Yoga Day as stipulated by the University Grants Commission, Government of India on 21st June 2023 in the Library Hall, Academic Block, TNOU, by inviting Yoga Experts from MV Diabetic Clinic, Chennai

The University is having 12 Regional Centres at prime locations in Tamil Nadu. At present, the Villupuram Regional Centre is having own building. As regards to Nilgiris (Kothagiri) Regional Centre, the land has been allotted by the Government of Tamil Nadu and for the construction of own buildings for Nilgirs (Kothagiri) Regional Centre, Estimates have been received from the PWD, Kothagiri and the University is taking steps to construct the Building with the approval of the Competent authorities.

6. Academic Referees 

Prof. M. Selvam Vice Chancellor Bharathidasan University Tiruchirappalli 620024 Tamil Nadu, India Tel: +91-94866 71606 Email: vc@bdu.ac.in	**Prof. G. Baskaran** Emeritus Institute of Mathematical Sciences C I T Campus, Tharamani, Chennai 600 113, India Tel.: +91-9940219203 Email:*baskaran@imsc.res.in*
Prof. V. Ganesan Former Director and Emeritus UGC-DAE Consortium for Scientific Research Indore, Madhya Pradesh. Tel : +91 9893342597 Email: vganesancsr@gmail.com	**Prof. YoshiyaUwatoko** Materials Design and Characterization Laboratory The Institute of Solid State Physics The University of Tokyo 5-1-5 Kashiwanoha, Kashiwa Chiba Japan 277-8581 Tel. : +81-4-7136 Fax : +81-4-7136 E-mail:uwatoko@issp.u-tokyo.ac.jp
Prof. R. Suryanarayanan Professor (Retd.) Institution of the French LEMHE - ICMMO - Bât 410 University Paris-Sud 11 15, rue Georges Clemenceau 91405 Orsay Cedex France Tel: +33 6 78 83 19 41 Email:sury39@gmail.com	**Prof. B.V.R. Chowdari** School of Materials Science and Engineering Blk N4.1 # 01-02a Nanyang Technological University 50 Nanyang Avenue Singapore 639798. Tel: +65 65927812 Email:chowdari@mrs.org.sg

CHPR GALLERY

CHPR Inauguration Function Dr. T. Ramasami with Dr. M. Ponnavikko (2008)

Prof. Chihiro Sekine, Muroran Institute of Technology, Japan, Dec. 19-23, 2016

Prof. Yogesh K. Vohra, University of Alabama, USA, Dec. 26-30, 2016.

Prof. GeethaBalakrishnan, University of Warwick, UK, Aug. 6-10, 2018

LEAP Programme -2019

APAM Lecture Series -2018

TANSA Award -2018 Function

MRSI - Trichy Chapter Inauguration February 2018

Foreigners Visit to CHPR

Prof. C. Sekine visit to CHPR - 2020

Prof. R. Jayaraman visit to CHPR

Dr.Kawamura Visit to CHPR - 2019

Prof. GeethaBalakrishnan Visit to CHPR -2018

Prof. Survanaravanan&Prof S. Baskaran Visit to CHPR

Prof. Yarub Al Douri honoroured by Vc,BDU -2019

Prof. Daniel Braithwaite Visit to CHPR - 2014

Prof. C. Sekine Honored by VC BDU -2020

Prof. Robert Bogdanowicz and his group members visit to CHPR- 2022

Prof. S. Arumugam's visits to foreign labs

JSPS Project visit to ISSP, U-Tokyo- 2014

Prof. SA Visit to Chou Lab, Taiwan - 2013

Prof.SA Visit to MIT, Japan -2015

Prof.SA Visit to ISSP, U-Tokyo -2016

JSPS Project visit, MIT,Japan–January, 2019

Prof.SA Lab visit to Ohio State University, USA 2019

Prof.SA visit to University of Paris -2020

SERB-OVDF Visit 2019 – 2021

MIT, Japan, Internship Programme, 2017.

AIRAPT-25 &EHPRG, Spain, 2015

U-Tokyo, Japan, Indo-JSPS Project, 2014

NIST, Moscow, Indo-Russia Project, 2014

AIRAPT-25 & EHPRG, Spain, 2015.

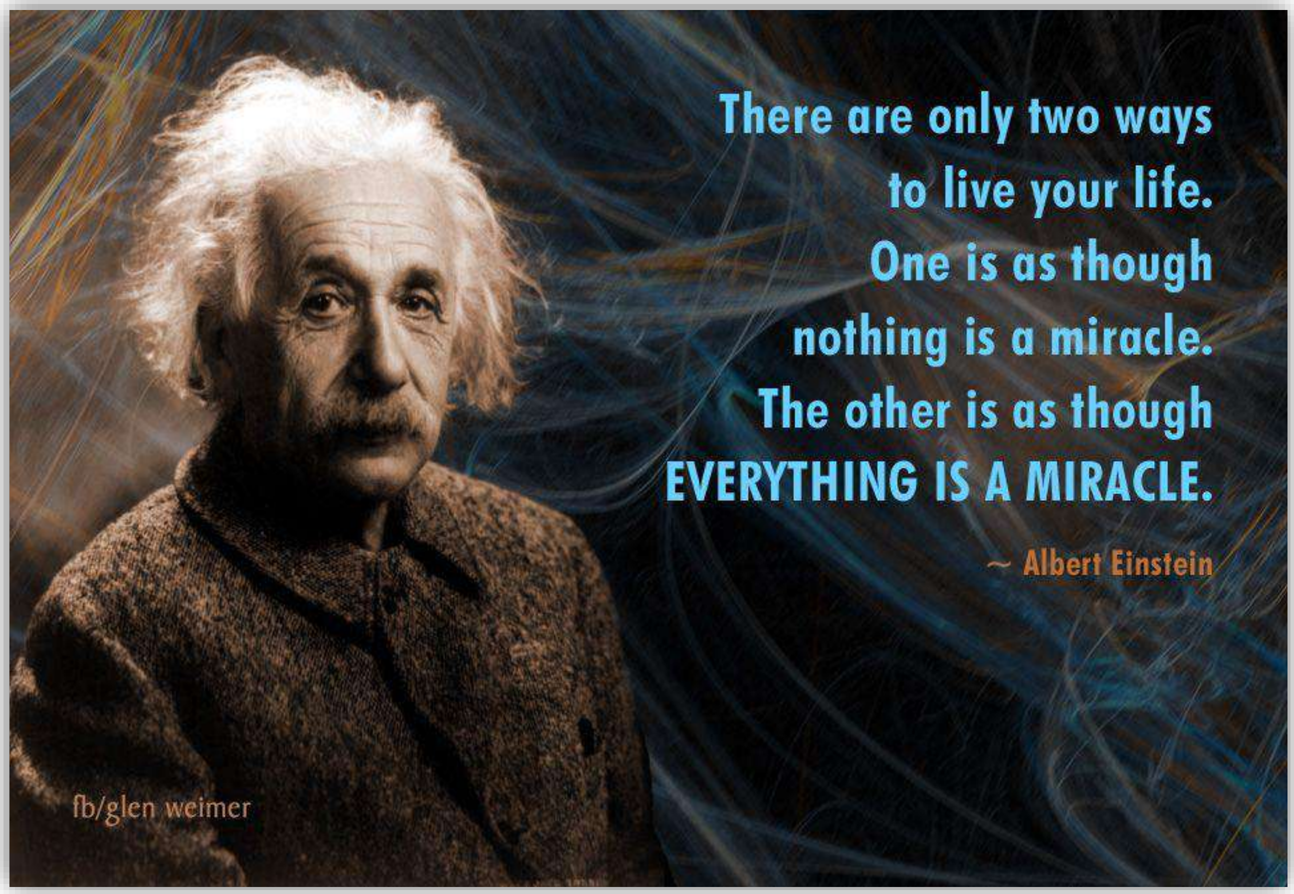
CEA Grenoble, Indo-French Project 2016.

Prof. SA visit Geneva 2009

Prof. SA and Prof. KIM at ACHPR 2018

Senior Scientist Award 2021
Physical Sciences
(Dr.V.Devanathan Award in Physical Sciences)

Senior Scientist Award 2021
Physical Sciences
(Dr.V.Devanathan Award in Physical Sciences)


There are only two ways
to live your life.
One is as though
nothing is a miracle.
The other is as though
EVERYTHING IS A MIRACLE.
~ Albert Einstein
fb/glen weimer

Education for All and Ever