

## Academic Qualification and Experience of the Coordinator

Name : PROF. S. ARUMUGAM  
Qualification : M.Sc. M.Phil. Ph.D  
Designation : Professor & Coordinator  
Date of Birth : 19.03.1963  
Age : 49 years  
Address for Correspondence : Centre for High Pressure Research,  
School of Physics, Bharathidasan University,  
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### Educational Qualification:

**Ph.D.** - Anna University, Chennai (1988 -1993)

*"Synthesis, Characterization and High Pressure Studies on Some High Temperature Superconductors and Nb-Transition Metal Alloys"*

**M.Phil (Physics)**, 75% - Bharathidasan University, Tiruchirappalli (1986 - 1987)

**M.Sc. (Physics)**, 75% - Bharathidasan University, Tiruchirappalli (1984 - 1986)

**Teaching Experience:** Under graduate (15.11.93- 21.03.2000)  
Postgraduate (16.09.94-Tilldate)

### National Workshop /Conferences organized at Bharathidasan University:

1. Awareness workshop on the facilities of UGC - DAE Consortium, September 15-16, 2009
2. Refresher Course on Advanced Materials, January 18- February 07, 2006
3. Instrumentation and Measurement Techniques, March 14-15, 2005

### Life member in National Scientific /Technical bodies :

1. Indian Society for Technical Education
2. Magnetic Society of India
3. Indian Association for Physics Teachers
4. Indian Ceramic Society
5. Materials Research Society of India
6. Indian Society for Non-Destructive Testing
7. Physical Society of Japan (1999 - 2000)

**EMPLOYMENT DETAILS:**

<b>Position</b>	<b>Date of Joining</b>	<b>Date of Leaving</b>	<b>Place</b>
Professor and Coordinator	1.10.2008	Till date	Center for High Pressure Research, Bharathidasan University, Tiruchirappalli
Coordinator	20.2.2008	31.09.2008	Center for High Pressure Research, Bharathidasan University, Tiruchirappalli
Reader	10.10.2007	19.02.2008	School of Physics, Bharathidasan University, Trichy-24.
Visiting Scientist	03.10.2006	10.10.2007	Osaka City University, Japan.
Reader	13.12.2005	01.10.2006	HPLT Lab, School of Physics, Bharathidasan University, Tiruchirappalli, India.
Visiting Scientist	15.09.2005	12.12.2005	Institute of Solid State Research, Dresden.
Reader	05.06.2004	14.09.2005	HPLT Lab, School of Physics, Bharathidasan University, Tiruchirappalli, India.
Visiting Scientist	05.04.2004	04.06.2004	CBPF, Rio de Janeiro, Brazil
Reader	01.07.2002	04.04.2004	School of Physics, Bharathidasan University, Trichy-24.
JSPS Post Doc. Fellow	01.05.2002	30.06.2002	Dept. of Superconductivity, Univ. of Tokyo, Tokyo, Japan.
Reader	22.03.2002	30.04.2002	Department of Physics, Bharathidasan University, Trichy-24.
JSPS Post Doc. Fellow	09.05.1998	20.03.2002	ISSP, Univ. of Tokyo, Japan.
Lecturer in Physics	29.10.1997	06.05.1998	NIT, Tiruchirappalli, India.
Visiting Fellow	17.04.1997	28.10.1997	IISC, Bangalore, India.
Lecturer in Physics	16.09.1994	16.04.1994	NIT, Tiruchirappalli, India
Lecturer in Physics	15.11.1993	15.09.1994	VIT, Vellore, India.
Senior Research Fellow	30.11.1992	12.11.1993	IUC-DAEF, Indore, India.

### 3. PROJECTS

#### 3.1. COMPLETED PROJECTS (PI: S. Arumugam)

1. Study of Colossal Magnetoresistance Materials under Pressure for Sensor Applications.  
**AICTE, New Delhi, Rs.14.00 Lakhs, (2001-2004)**  
(“A” Grade Excellent-AICTE 2004)
2. Study of Colossal Magnetoresistance Materials under Hydrostatic and Uniaxial Pressure.  
**ICTP-TWAS, Italy. US\$6000 (2001-2004)**
3. Development of DAC-SQUID Vibrating Coil Magnetometer for High Pressure Investigation.  
**BRNS, DAE, Mumbai - Rs. 12.34 Lakhs (2001- Dec. 2005)**
4. Development of Experimental Setup for Uniaxial Pressure Effects on AC-Susceptibility measurements at Low Temperature.  
**CSIR, New Delhi, Rs. 9.0 Lakhs (2004-2007)**
5. Structural effects on charge and orbital order probed by hydrostatic and uniaxial pressure studies.  
**DST DAAD PPP, New Delhi, Rs. 97,198 (2006 - 2007)**
6. Development of cryogen free low temperature, high magnetic field and high pressure facilities for transport and magnetic measurements.  
**DST, New Delhi, Rs.2.35 Crores (2008 - 2011)**
7. Pressure effects on manganites under low Temperature and high magnetic field.  
**UGC, New Delhi, 11.1 lakhs (2008 - 2011)**
8. Transport and Magnetic properties of strongly correlated systems at extreme conditions of pressure, low temperature and high magnetic field.  
**Indo-Swiss, DST, New Delhi, Rs.27 lakhs (2009 - 2012).**
9. Investigation of Organic conductors under extreme conditions of High Pressure, Low Temperature and High magnetic field  
**DST-JSPS Project, DST, New Delhi, Rs. 4.5 lakhs (2010-2012)**

#### 3.2. ON-GOING PROJECTS (PI: S. Arumugam)

1. Hydrostatic pressure effect on Manganites single crystals under high pressure low temperature  
**UGC, New Delhi, 3.5 lakhs (2011 - 2014)**
2. Development of Uniaxial Pressure and Modified Bridgman Anvil Devices for Transport and Magnetic Measurements  
**DST, New Delhi ~ 60 Lakhs (2012-2014)**
3. Development of Bridgman Anvil Pressure Cell for Electrical Resistivity and Thermoelectric Power Measurement and Investigation of Half Heusler Alloy  
**DAE-BRNS, Mumbai, ~ Rs.25 lakhs (2012-15)**
4. Electronic transport and magnetic studies in Heusler type Co-Fe-Si alloy thin films at low temperature and high magnetic field  
**DMRL-CARS, Hyderabad, ~ Rs.10 lakhs (2012-13)**

### 3.3. LIST OF PUBLICATIONS

#### 9.1 List of papers submitted in International journals :

1. Balaji Sambandam, R Jude Vimal Michael, Nalliyan Rajendran, Sonachalam **Arumugam**, and Periakaruppan T Manoharan *Manganous ion Dictated Morphology Change and Ferromagnetism in CdS Nanocrystals*, **J. Nanoparticle Research (accepted July 2012)**
2. P.Sundara Venkatesh, V. Purushothaman, S. Esakki Muthu, **S. Arumugam**, V. Ramakrishnan, K. Jeganathan and K. Ramamurthi, *Role of point defects on the enhancement of room temperature ferromagnetism in ZnO nanorods*, **Cryst. Eng. Commun.**, (Accepted 2012)
3. S. Thakur, J. Prakash, M. Kanagaraj, **S. Arumugam** and A. K. Ganguli, *Enhancement in superconducting transition temperature and critical field in Yb doped  $Ce_{1-x}Yb_xO_{0.9}F_{0.1}FeAs$  superconductors*, **Physica C: superconductivity** (Accepted 2012, in press).
4. Guochu Deng, R. Thiyagarajan, D. Mohan Radheep, Ekaterina Pomjakushina, Marisa Medarde, Anna Krzton-Maziopa, Shuang Wang, **S. Arumugam**, Kazimierz Conder *Floating zone crystal growth and magnetic properties of bilayer manganites  $Pr(Sr_{1-x}Ca_x)_2Mn_2O_7$* , **J. Crystal Growth**, (2012 - In Press)
5. B.Munirathinam, M.Krishnaiah, U.Devarajan, S.Esakki Muthu, **S. Arumugam**, *Synthesis, structural, electrical and Magnetic studies of  $La_{0.5}Ca_{0.45-x}Sr_xBa_{0.05}MnO_3$* , **J. Physics and Chemistry of Solids** 73 (2012) 925
6. **S. Arumugam**, M. Kanagaraj, N. R. Tamil Selvan, S. Esakki Muthu, J. Prakash, G. S. Thakur, A. K. Ganguli, H. Yoshino, K. Murata, K. Matsubayashi and Y. Uwatoko, *Pressure effects on superconducting transition of ytterbium doped  $Ce_{0.6}Yb_{0.4}FeAsO_{0.9}F_{0.1}$* , **Phys. Status Solidi RRL** 1(2012) 3
7. R Thiyagarajan, N Manivannan, **S Arumugam**, S Esakki Muthu, N R Tamilselvan, C Sekar, H Yoshino, K Murata, Apostu Mircea, R Suryanarayanan and A Revcolevschi *Pressure-induced Colossal Piezoresistance Effect and the collapse of the polaronic state in the bilayer manganite  $(La_{0.4}Pr_{0.6})_{1.2}Sr_{1.8}Mn_2O_7$* , **J. Phys. – Condens. Mat.**, 24 (2012) 136002
8. M. Kanagaraj, **S. Arumugam**, Ravhi S. Kumar, N.R. Tamil Selvan, S. Esakki Muthu, J. Prakash, Gohil S. Thakur, H.Yoshino, K. Murata, K. Matsubayashi, Y. Uwatoko, S. Sinogeikin, Andrew Cornelius, A. K. Ganguli and Yusheng Zhao, *Correlation between superconductivity and structural properties under high pressure of iron pnictide superconductor  $Ce_{0.6}Y_{0.4}FeAsO_{0.8}F_{0.2}$* , **Applied Physics Letter**, 100 (2012) 052601

9. S. Esakki muthu, N.V. Rama Rao, M. Manivel Raja, **S. Arumugam**, K. Matsubayashi, and Y. Uwatoko , *Hydrostatic pressure effect on the martensitic transition, magnetic and magnetocaloric properties in  $Ni_{50-x}Mn_{37+x}Sn_{13}$* , **Journal of Applied Physics** 110 (2011) 083902
10. Raj Kumar. D, Manivel Raja. M, Rama Rao. N, Sridhar Rao. D, Srinivas. M, Esakki Muthu. S, **Arumugam. S**, Suresh. K, *Structure magneto-structural transitions and magnetocaloric properties in  $Ni_{50-x}Mn_{37+x}In_{13}$  melt spun ribbons*, **Journal Magnetism and Magnetic materials** 324 (2012) 26
11. C. Sekar, S. Paulraj, G. Krabbes, B. Buechner, M. Kanagaraj, **S. Arumugam**, *Synthesis, Structure and Magnetic Properties of Spin Ladder Compound  $Ca_{1-x}Co_xCu_2O_3$* , **Journal of Magnetism and Magnetic Materials**, 321 (2011) 3033
12. R. Thiyagarajan, Guochu Deng, **S. Arumugam**, D. Mohan Radheep, U. Devarajan, A. Murugeswari, P. Mandal, Ekaterina, Kazimierz Conder, *Effect of magnetic field and pressure on charge- orbital ordering in  $Pr(Sr_{1-x}Ca_x)_2Mn_2O_7$  ( $X= 0.4$  and  $0.9$ ) single crystals*, **Journal of Applied Physics** 110 (2011) 093905
13. V.D.Nithya, R.Kalai Selvan, C.Sanjeeviraja, D.Mohan Radheep, **S. Arumugam**, *Synthesis and Characterization of  $FeVO_4$  Nanoparticles*, **Materials Research Bulletin**, 46 (2011) 1654
14. S. Esakki Muthu, N. V. Rama Rao, D. V. Sridhara Rao, M. Manivel Raja, U.Devarajan, and **S. Arumugam**, *Effect of Ni/Mn concentration on exchange bias properties in bulk  $Ni_{50-x}Mn_{37+x}Sn_{13}$  Heusler alloys*, **Journal of Applied Physics** 110, (2011) 023904
15. Guochu Deng, D. MohanRadheep, R. Thiyagarajan, Ekaterina Pomjakushina, Shuang Wang, Neda Nikseresht, **S. Arumugam**, Kazimierz Conder, *High Oxygen Pressure Single Crystal Growth of Highly Ca Doped Spin ladder Compound  $Sr_{14-x}Ca_xCu_{24}O_{41}$  ( $x>12$ )*, **Journal of Crystal Growth**, 327 ( 2011) 182.
16. Ravhi S. Kumar, Daniel Antonio, M.Kanagaraj, **S. Arumugam**, Andrew L. Cornelius, Stanislav Sinogeikin, J.Prakash, Gohil S. Thakur, A.K. Ganguli, Thomas Hartmann and Yusheng Zhao, *Pressure effect on crystal structure and superconductivity of  $La_{0.8}Th_{0.2}FeAsO$* , **Phys. Status Solidi RRL** 5, No. 5–6, (2011), 208
17. Balaji Sambandam, N. Rajendran, M. Kanagaraj, **S. Arumugam** and Periakaruppan, T. Manoharan, *Switching-on Antiferromagnetic Coupled Superparamagnetism by Annealing Ferromagnetic Mn/CdS Nanoparticles*, **J. Phys. Chem. C**, 115, (2011) 11413

18. Ravhi S. Kumar, Daniel Antonio, M. Kanagaraj, **S. Arumugam**, J. Prakash, Stanislav Sinogeiken, Gohil S. Thakur, A.K Ganguly, Andrew Cornelius and Yusheng Zhao, *Pressure induced structural transition and enhancement of superconductivity in Co doped CeFeAsO*, **App. Phy. Lett.** 98 (2011) 012511.
19. K. Karthik, G. Kalai Selvan, M. Kanagaraj, **S. Arumugam**, and N. Victor Jaya, *Particle size effect on the magnetic properties of NiO nanoparticles prepared by a precipitation method*, **Journal of Alloys and compounds.** 509 (2011) 181.
20. B. Vijaya Kumar, Radha Velchuri, V. Rama Devi, B. Sridhar, G. Prasad, D. Jaya Prakash M. Kanagaraj, **S. Arumugam** and M.Vithal, *Preparation, Characterization, Magnetic susceptibility and XPS studies of  $Ln_2ZrTiO_7$  ( $Ln = La, Eu, Dy, Gd$  and  $Sm$ )*, **Journal of Solid State Chemistry**, 184 (2011) 264.
21. B. Munirathinam, M. Krishnaiah, **S. Arumugam**, M.ManivelRaja, *Electronic transport and magnetic studies of  $La_{1-x}Ca_{x-0.08}Sr_{0.04}Ba_{0.04}MnO_3$* , **Journal of Physics and Chemistry of Solids**, 71 (2010) 1763.
22. B. Munirathinam, M. Krishnaiah, **S. Arumugam**, M.ManivelRaja, K. Porsezian *Effect of low level substitution of Sr-Ba on the electric and magnetic behavior of  $La_{0.67}Ca_{0.33}MnO_3$* , **Bulletin of materials science**, 120 (2011) 1 .
23. K. Karthik, N. Victor Jaya, M. Kanagaraj and **S. Arumugam**, *Temperature dependent magnetic anomalies of CuO nanoparticles*, **Solid State Commun**, 151 (2011) 564.
24. S Esakki Muthu, N V Rama Rao , M Manivel Raja, Dasary M Raj Kumar D Mohan Radheep and **S Arumugam**, *Influence of Ni/Mn concentration on the structural, magnetic and magnetocaloric properties in  $Ni_{50-x}Mn_{37+x}Sn_{13}$  Heusler alloys*, **Journal of Physics D; Appl. Phys.**, 43, (2010) 425002.
25. **S. Arumugam**, P. Sarkar, P. Mandal, A. Murugeswari, Y. Uwatoko, T. Ishida and S. Noguchi, *Effect of hydrostatic pressure on magnetic phase transition and magnetocaloric effect in  $(Sm_{0.7}Nd_{0.2})_{0.52}Sr_{0.48}MnO_3$  single crystal*, **J. Appl. Phys.** 107(2010) 113904.
26. **S. Arumugam**, P Sarkar, P Mandal, A Murugeswari, C Ganguli, K Matsubayshi, R. Thiyagarajan and Y Uwatoko, *Effect of hydrostatic pressure on ferromagnetic phase transition in  $(Sm_{0.7}Nd_{0.3})_{0.52}Sr_{0.48}MnO_3$  single crystal*, **Journal of Physica. C** 215 (2010) 012007.
27. K.Mydeen, **S. Arumugam**, P. Mandal, C. Sekar, G. Krabbes and C.Q.Jin, *Pressure induced spin reorientation in  $La_{1.2}Sr_{1.8}(Mn_{1-y}Ru_y)_2O_7$  ( $y=0$  and  $0.075$ ) single crystal*, **J.App. Phys.** 106 (2009) 103908.

28. P. Sarkar, P. Mandal, K. Mydeen, A. K. Bera, S. M. Yusuf, S. Arumugam, C. Q. Jin, Ishida, T and S. Noguchi, *Role of external and internal perturbations on the ferromagnetic phase transition in  $Sm_{0.52}Sr_{0.48}MnO_3$* , **Phys. Rev. B**, 79, (2009) 144431.
29. P.Sarkar, S. Arumugam, P. Mandal, A. Murugeswari, R. Thiagarajan, S. Esakimuthu, D. Mohan Radheep, Chandryee Ganguli, M. Matsubayshi and Y. Uwatoko, *Pressure induced critical behavior of ferromagnetic phase transition in Sm-Nd-Sr manganites*, **Phy. Rev Lett.**, 103 (2009) 057205.
30. A. Murugeswari, P. Sarkar, S. Arumugam, N.Manivannan and P.Mandal, *Effect of uniaxial pressure on metal insulator transition in  $(Sm_{1-y}Nd_y)_{0.52}Sr_{0.48}MnO_3$  single crystals*, **Appl. Phys. Lett.**, 94, (2009) 252506.
31. B. Ghosh, D. Battacharya, S. Patnaik, A. K. Raychaudhuri, and S. Arumugam, *Frequency dependence of dielectric anomaly around Néel temperature in bilayer manganite Pr  $(Sr_{0.1}Ca_{0.9})_2Mn_2O_7$*  **J. Appl. Phys.**, 105, (2009) 1239714.
32. S. Arumugam, Barnali Ghosh, A.K. Raychaudhuri, N.R. Tamil Selvan, T.Nakanishi, H.Yoshino, K.Murata and Ya.M. Mukovskii, *Hydrostatic pressure induced (P8GPa) induced metallization of ferromagnetic insulating  $La_{0.79}Ca_{0.21}MnO_3$* , **J. App. Phys.** 106 (2009) 023905.
33. K.Mydeen, S. Arumugam and C.Q. Jin, *Hydrostatic and Uniaxial pressure effect on  $La_{1.75}Sr_{1.25}Mn_2O_7$  single crystal*, **Journal of Alloys and Compounds**, 468 (2009) 280.
34. Keizo Murata, Yufeng weng, Yuki seno, Natarajan Rani Tamilselvan, Kensuke Kobayashi, S. Arumugam, Yusaku Takashima, Harukazu Yoshino, Reizo Kato *Fluctuation of the charge density wave in TTF-TCNQ under high pressure*, **Physica B** 404 (2009) 373.
35. N.Manivannan, S. Arumugam, S. Kasthuriengan and N.B.Anand, *A high-resolution, SQUID- based vibrating coil susceptometer*, **Meas. Sci. Technol.** 19 (2008) 7.
36. K. Mydeen, P. Sarkar, P. Mandal, A. Murugeswari, C. Q. Jin, and S. Arumugam *Hydrostatic Pressure Effect on archetypal  $Sm_{0.52}Sr_{0.48}MnO_3$  single crystal* **Appl. Phys. Lett.** 92 (2008) 182510.

37. **S. Arumugam**, N. Manivannan, and A. Murugeswari, *Simple uniaxial pressure device for ac-susceptibility measurements-suitable for closed cycle refrigerator system*. **Rev. Sci. Instrum**, 78 (2007) 1.
38. R. Klingeler, J. Geck, **S. Arumugam**, N. Triston, B. Buchner and A. Revoclevschi, *Pressure induced melting of the orbital polaron lattice in  $La_{2-x}Sr_xMnO_3$* , **Phys. Rev. B** 73 (2006)214432.
39. **S. Arumugam**, K. Mydeen, N. Manivannan, M. Kumaresa Vanji, D.Prabhakaran, A.T. Boothroyd, and R.K.Sharma and P. Mandal, *Effect of uniaxial pressure on charge transport in  $La_{1.25}Sr_{1.75}Mn_2O_7$  layered manganite*, **Phys. Rev. B** 73 (2006) 212412.
40. **S. Arumugam**, M. Kumerasa Vanji, K.Mydeen and Mori, *A simple uniaxial pressure device for electrical Resistivity measurements: Suitable for closed cycle refrigerator system*, **Rev. Sci. Instrum.** 76 (2005) 083904.
41. **S. Arumugam**, K. Mydeen, M. Fontes, N. Manivannan, M. Kumaresa Vanji, R. Scheilla, Elisa Baggio Saitovitch, D.Prabhakaran and A.T. Boothroyd, *Effect of pressure and magnetic field on bilayer  $La_{1.25}Sr_{1.75}Mn_2O_7$  single crystal*, **Solid State Commun.** 136 (2005) 292.
42. **S. Arumugam**, N. Mori, N. Takeshita, H. Takashima, H. Eisaki and S. Uchida, *Effect of hydrostatic pressure on  $T_c$  and stripes of  $La_{1.25}Nd_{0.6}Sr_{0.15}CuO_4$  single crystal*, **Int. J. Modern. Phys. B** 19 (2005) 2045.
43. T.K. Madhubala, T.K Radhakrishnan and **S. Arumugam**, *Development of tuning of fuzzy controller for non-linear process*, **Indian Chem. Engg.** 47 (2005) 13.
44. S. Aripnammal, R. Selva Vennila, S. Radhika and **S. Arumugam**, *High pressure electrical resistivity Study on Nonlinear Bis- Thiourea Cadmium Chloride (BTCC) Single Crystal*, **Crystal Research Technology**, 19 (2005).
45. **S. Arumugam**, N. Mori, N. Takeshita, H. Takashima, T.Noda, H.Eisaki and S.Uchida, *Competition of Static Stripe and Superconducting Phases in  $La_{1.48}Nd_{0.4} Sr_{0.12} CuO_4$  controlled by pressure*, **Phys. Rev.Lett.** 88 (2002) 247001.
46. **S. Arumugam**, K. Mydeen , N.Manivannan, N.Mori, M. Ohashi, N.Takeshita, T. Noda, H.Eisaki and S.Uchida, *Hydrostatic and uniaxial pressure effect on  $La_{1.45}Sr_{0.15}Nd_{0.4}CuO_4$  single Crystal*, *Physica C (Superconductivity)*, 378-381 ( 2002) 164.



47. **S. Arumugam**, N.Mori, M. Ohashi, N.Takeshita, T. Noda, H.Eisaki and S.Uchida, *Study of Phase diagram of La-Nd-Sr-Cu-O single Crystals under hydrostatic pressure*, **Review of High Pressure Science and Technology**, 10 (2000) 90.
48. **S. Arumugam**, N. Mori, M. Ohashi, N. Takeshita, H.Takashima, T.Noda, H.Eisaki and S.Uchida, *Hydrostatic and uniaxial pressure effect on  $La_{1.85}Sr_{0.15}CuO_4$  Single Crystal*, **Int. J. Mod. Phys. B** 14 (2000) 3328.
49. **S.Arumugam**, N.Mori, N.Takeshita, H.Takashima, T.Noda, H.Eisaki and S.Uchida, *Transport Measurements of  $La_{1.48}Nd_{0.4} Sr_{0.12} CuO_4$  Superconductors under hydrostatic and uniaxial pressure*, **Physica C (Superconductivity)** 341 (2000) 1759.
50. **S. Arumugam** and N.Mori, *A simple uniaxial high pressure cell for electrical resistivity measurements*, **Physica C (Superconductivity)** 341 (2000) 1559.
51. **S. Arumugam**, N.Mori, N.Takeshita, H.Takashima, T.Noda, H.Eisaki and S.Uchida, *Transport measurements of La-Nd-Sr-Cu-O superconductors under high pressure and low temperature*, **Review of High Pressure Science and Technology**, 9 (1999) 3D4.
52. K. Jeyabalan, L. K. Kaliyaperumal, A. Sekar, **S. Arumugam** and J.Srinivas, *Synthesis and characterization of  $La_2CaCu_3O_7$  system*, **Mod. Phy. Lett.** 1 (1998) 143.
53. **S. Arumugam**, V. S. Sastry and T. S. Radhakrishnan, *Pressure effect on  $T_c$  in Nb-Zr alloy*, **Review of High Pressure Science and Technology** (1997) 334.
54. **S. Arumugam**, P. Sivakumar and Sheela T. Verkey, *PC based dynamic calibration of energy meters*, **J.I.E.T.E. Technical Review** 1 (1997) 215.
55. **S. Arumugam**, *A new superconductor  $YBa_2Ca_3Cu_4O_{11}$* , **Indian .J Physics** 71A (1997) 511.
56. **S. Arumugam** and V.S.Sastry, *Instrumentation for high pressure low temperature resistivity measurements*, **J. Instrum. Soc. India**, 26 (1996) 165.
57. **S. Arumugam**, *Studies on the New Superconducting system  $REBa_2Ca_3Sr_4Cu_5O_x$  ( $RE = Gd, Ho \& Dy$ )*, **Czechoslovak J. Physics**, S3 46 (1996) 1505.
58. **S .Arumugam**, S. Natarajan, V. S. Sastry, T. Geethakumary, T. S. Radhakrishnan, Manmeeth Kaur, K.Balakrishnan V.Ganesan and R.Srinivasan, *Synthesis and characterization of a new 80 K superconductor  $(Y,Gd)Ba_2Ca_3Cu_4O_{11}$* , **Physica B**, 194-196 (1994) 1611.

59. **S. Arumugam**, V. S. Sastry, T. Geethakumary, T. S. Radhakrishnan, C. K. Subramaniam, Sankaranarayanan, V. Ganesan and R. Srinivasan, *Superconductivity in a new  $NdBa_2Ca_3Sr_4Cu_5O_x$  system*, **Phase Transitions**, 42 (1993) 251.
60. **S. Arumugam** and S.Natarajan, *Synthesis, characterization and high pressure XRD studies on  $GdBa_2Cu_3O_{7-x}$  system*, **Indian J. Physics**, 67A (1993) 257.
61. **S. Arumugam** and S.Natarajan, *High pressure resistivity studies on  $Y_{1-x}Pr_xBa_2Cu_3O_7$  system*, **Indian J. Physics**, 67A (1993) 261.
62. **S. Arumugam** and S.Natarajan, *The effect of annealing on the resistivity of  $Y_{0.9}Pr_{0.1}Ba_2Cu_3O_{7-y}$  under pressure*, **Indian J. Physics**, 67B (1993) 185.
63. S. Natarajan, T. S. Sampath Kumar, **S. Arumugam**, M.D.Shaji Kumar, T.S.Subbaraman and N.Victor Jaya, *High pressure studies on superconducting materials*, **Indian J. Physics**, 66A (1992) 109.
64. **S. Arumugam**, Rajashri, A. Sayeed and S. V. Subramanyam, *Transport Measurements on Highly conducting polypyrrole / PVC blend films under pressure upto 8 GPa*, **Advances in High Pressure Science and Technology** (1997) Ed. M.Yousuf, N.Subramanyan and K.Govindarajan (Univ.Press), 257.
65. **S. Arumugam**, S.Natarajan, V.Ganesan, C.K.Subramaniam and R.Srinivasan. *Superconductivity in (Y, RE)-Ba-Ca-Sr-Cu-O system*, **AIP. Conf. Proc.** 251(1992) 402.
66. **S. Arumugam**, V. S. Sastry and S. Natarajan, *Resistivity studies on Pr doped YBCO under high pressure*, **Recent Trends in High Pressure Research**, Ed.Anil K. Singh, Oxford Publications (1991) 407.
67. **S. Arumugam**, V. S. Sastry, S. Kalavathi, Y. Hariharan, S. Natarajan and T. S. Radhakrishnan, *Investigation of superconductivity in Nb-Ti upto 6 GPa*, **Recent Trends in High Pressure Research**, Ed. Anil K. Singh, Oxford Publications, (1991) 431.

**ABSTRACTS AND PAPERS PUBLISHED IN  
ONFERENCES / WORKSHOPS PROCEEDINGS**

S.No	Title of the paper	Authors	Proceedings
1.	Effect of Sn/Si concentration on exchange anisotropy behaviour in bulk $Ni_{48}Mn_{39-x}Sn_{3-x}Si_x$ (X=1) Heusler Alloy	G. Kalaiselvan, S. Esakki muthu, N.V. Ramrao, M. Manivel raja and <b>S. Arumugam</b>	International Conference on "Recent Trends in Advanced Materials" (ICRM-2012), VIT University, Vellore, Feb. 20-22, 2012
2.	Pressure effect on $Ni_{48}Mn_{39}Sn_{13}$ alloy	S. Esakki Muthu, U. Devarajan, <b>S. Arumugam</b> , N.V. Rama Rao, M. Manivel Raja, K. Matsubayashi, and Y. Uwatoko	AIRAPT-23 Conference, Mumbai, Sep. 25-30, 2011
3.	Pressure induced metallization in $(La_{0.4}Pr_{0.6})_{1.2}Sr_{1.8}Mn_2O_7$	R. Thiyagarajan, N. Manivannan, S. Esakki Muthu, N.R. Tamilselvan, H. Yoshino, K. Murata, D. Prabakaran, A.T. Boothroyd, and <b>S. Arumugam</b>	AIRAPT-23 Conference, Mumbai, Sep. 25-30, 2011
4.	Pressure effect on Iron based superconductors	<b>S. Arumugam</b> , M. Kanagaraj	AIRAPT-23 Conference, Mumbai, Sep. 25-30, 2011
5.	Pressure induced critical behavior of ferromagnetic phase transition in Sm-Nd-Sr manganites	<b>S. Arumugam</b> , P. Mandal	ICMAT Conference, Singapore, Jun. 26-Jul. 1, 2011
6.	Hydrostatic pressure effect on $Ni_{1.84}Mn_{1.17}Ga_{1.01}$ Heusler alloy	U. Devarajan, G. Kalai Selvan, S. Esakki muthu, <b>S. Arumugam</b> , Sanjay Singh, And S.R. Barman	MAGMA 2011 IIT Madras, Chennai, Mar. 12-13, 2011
7.	Synthesis and Characterization of two-leg spin ladder compound $Ca_{1-x}Co_xCu_2O_3$	S. Paulraj, C. Sekar, G. Krabbes, B. Buchner, <b>S. Arumugam</b>	55 <sup>th</sup> DAE – Solid State Physics Symposium, Manipal, Dec. 26 - 30, 2010
8.	Effect of Lithium Co doping on dual acceptor doped ZnO	R. Kannan, S. Rajagopan, K. Udayakumar, <b>S. Arumugam</b> and D. Mohan Radheep	55 <sup>th</sup> DAE – Solid State Physics Symposium, Manipal, Dec. 26 - 30, 2010
9.	Magnetic Relaxation and the nature of energy barriers near ferromagnetic to antiferromagnetic transition in $(Sm_{1-y}Nd_y)_{0.98}MnO_3$ single crystal	C.L. Prajapat, V. Dobe, <b>S. Arumugam</b> , M. R. Singh and G. Ravikumar	55 <sup>th</sup> DAE – Solid State Physics Symposium, Manipal, Dec. 26 - 30, 2010

10.	Critical behavior at ferromagnetic transition of nearly half doped manganites	<b>S. Arumugam</b>	55 <sup>th</sup> DAE – Solid State Physics Symposium, Manipal, Dec. 26 - 30, 2010
11.	Temperature- pressure phase diagram of TSeF-TCNF	<b>S. Arumugam</b> , K.Murata, N.R.Tamil Selvan, Y.Weng, H.Yoshino, R.Kato	5 <sup>th</sup> Asian conference on High pressure Research, Matsue, Nov. 8-12, 2010
12.	Crystal growth of Bilayered Manganite Compounds $\text{PrSr}_{2-x}\text{Ca}_{1+2x}\text{Mn}_2\text{O}_7$ by Optical Floating Zone Technique	<b>S. Arumugam</b> , R.Thiyagarajn, D. Mohan Radheep, S.Esakki Muthu, M.Kanagaraj, K.Conder, Guochu Deng, E.Pomjakushina	14th National Seminar on Crystal Growth, Vellore Institute of Technology, Vellore, Mar. 10 – Mar. 12, 2010
13.	Effect of pressure on magnetic and magnetocaloric properties of $\text{Ni}_{46}\text{Mn}_{41}\text{In}_{13}$ alloy	N.V.Rama Rao, M.Manivel Raja, V.Chandrasekaran, S.Esakki Muthu, <b>S. Arumugam</b>	5 <sup>th</sup> Asian conference on High pressure Research, Matsue, Nov. 8-12, 2010
14.	Pressure Effect on $\text{Ni}_{47}\text{Mn}_{40}\text{Sn}_{13}$ Heusler alloy	S.Esakki Muthu, <b>S. Arumugam</b> , N.V.Rama Rao, M.Manivel Raja	5 <sup>th</sup> Asian conference on High pressure Research, Matsue, Nov. 8-12, 2010
15.	Magnetic properties of Ni-Mn-Sn Heusler Alloys	S.Esakki Muthu, U.Devarajan, <b>S. Arumugam</b> , N.V.Rama Rao, M.Manivel Raja	23 <sup>rd</sup> National Symposium on Cryogenics, Oct. 28-30, 2010
16.	Uniaxial pressure device suitable for closed cycle refrigerator system for transport and magnetic measurements	<b>S.Arumugam</b> , N.Manivannan	International conference on Instrumentation (ICI 2009), Pune, Jan. 21-23, 2010
17.	Development of non-magnetic hybrid pressure cell for transport measurement upto 3.5 Gpa suitable for PPMS	<b>S.Arumugam</b>	International conference on Instrumentation (ICI 2009), Pune, Jan. 21-23, 2010
18.	Shift of ferro magnetic behavior in Sm-Sr-Ca Manganite under Hydrostatic Pressure	<b>S.Arumugam</b> , D.Mohan Radheep	MAGMA 2010 Thiyagaraja college, Madurai, Jan. 18-20, 2010
19.	Pressure effect on orbital ordering in $\text{Pr}(\text{Ca}_{0.9}\text{Sr}_{0.1})_2\text{Mn}_2\text{O}_7$ half doped bilayer manganite single crystal	<b>S.Arumugam</b> and A.Murugeswari	MAGMA 2010 Thiyagaraja college, Madurai, Jan. 18-20, 2010
20.	Effect of Hydrostatic Pressure on Ferromagnetic Phase transition in $(\text{Sm}_{0.7}\text{Nd}_{0.3})_{0.52}\text{Sr}_{0.48}\text{MnO}_3$	<b>S.Arumugam</b> A.Murugeswari and S. Esakki muthu	Winter school on chemistry and physics of materials, JNCASR, Bangalore, Dec. 5, 2009
21.	Effect of Hydrostatic Pressure on Ferromagnetic Phase transition in $(\text{Sm}_{0.7}\text{Nd}_{0.3})_{0.52}\text{Sr}_{0.48}\text{MnO}_3$	<b>S.Arumugam</b> , P. Sarkar, P. Mandal, A.Murugeswari S.Esakki muthu, D.Mohan Radheep, C. Ganguli, Kazujuki, and Yoshiya Uwatoko	International Association for the Advancement of high pressure science and technology, Japan, Jul. 26-31, 2009

22.	Uniaxial pressure effect on (Sm <sub>1-y</sub> Nd <sub>y</sub> ) 0.52 Sr <sub>0.48</sub> Mn O <sub>3</sub> single crystals	A.Murugeswari, <b>S.Arumugam</b> , R.Thiyagarajan, P.Sarkar, P. Mandal, T. Ishida and S.Nuguchi	International Association for the Advancement of high pressure science and technology, Japan, Jul. 26-31, 2009
23.	Role of pressure on the order of ferromagnetic phase transition in Sm- Nd-Sr manganites	<b>S.Arumugam</b> , P.Sarkar, P. Mandal, A.Murugeswari, C.Ganguli, Kazujuki, and Yoshiya Uwatoko	International Association for the Advancement of high pressure science and technology, Japan, Jul. 26-31, 2009
24.	Effect of Magnetic and dielectric properties on La substituted Nickel Ferrite	A.Murugeswari and <b>S.Arumugam</b>	National Workshop on Recent Advances in Materials Science Feb. 4-5, 2008
25.	Effect of pressure and magnetic field on Pr <sub>0.79</sub> Sr <sub>0.21</sub> MnO <sub>3</sub> single crystal	<b>S.Arumugam</b> , N.Manivannan Magda Fontes, Elisa Baggio Saitovitch and Ya.M. Mukovskii	International conference on magnetic materials, 2007, SINP, Kolkata, Dec. 11-16, 2007 (oral)
26.	High Pressure Properties of Tau-Type Conductor up to 8 GPa	T. Nakanishi, <b>S.Arumugam</b> , H.Yoshino, G. C.Anyfantis A, G. C.Papavassiliou A, Keizo Murata	Japan Physical Society meeting, Hokkaido, Japan, Sep. 20-24, 2007
27.	A simple uniaxial pressure device for electrical resistivity measurements at high temperatures	A.Murugeswari, N. Manivannan, N.R.Tamilselvan, and <b>S.Arumugam</b>	Discussion meeting on High Pressure Research, Feb. 15, 2007
28.	A simple multi-purpose uniaxial pressure device for electrical resistivity and ac-susceptibility measurements- Suitable for closed cycle refrigerator system	<b>S. Arumugam</b> , N.Manivannan, A. Murugeswari and P.Anupama	Discussion meeting on High Pressure Research, Feb. 15, 2007
29.	Effect of uniaxial pressure on La-Sr-Mn- O bilayer manganite single crystal	<b>S.Arumugam</b> , K.Mydeen, M.Kumerasa Vanji and R.K. Sharma	ICMAT-2004 Conference, Singapore Jul. 3-7, 2005
30.	Pressure and magnetic field effect on La-Sr-Mn-O single crystals	<b>S.Arumugam</b> , K. Mydeen , M. Kumersa Vanji, N. Manivannan, M. B. Fonte, D.Prabakaran and A.T. Boothroyd	24th International conference on Low Temp Physics (LT 24), Florida, USA, Aug.10-13, 2005
31.	Crystal growth and characterization of La <sub>1.25</sub> Nd <sub>0.4</sub> Sr <sub>0.15</sub> Cu <sub>0.4</sub> Single crystals by TSFZ Method.	<b>S.Arumugam</b> , N.Mori, T.Mori, N.Takeshita, H.Eisaki and S.Uchida	National DAE Solid State Physics Symposium, Bilaspur, India, Dec. 27-30, 2000.
32.	Uniaxial Pressure effect on La-Sr-Cu-O superconductors.	<b>S.Arumugam</b> , N.Mori, N.Takeshita, H.Takashima, H.Eisaki and S.Uchida.	International conference on High pressure Science and Technology, Hawaii, USA, Jul. 25-30, 1999

33.	Uniaxial pressure effect on La-Sr-Cu-O superconductors	<b>S.Arumugam</b> , N.Mori, N.Takeshita, H.Takashima, H.Eisaki and S.Uchida.	Proc. of Japan Physical Soc. Meeting, Hiroshima University, Hiroshima, Japan, Mar. 28-31, 1999. pp. 585.
34.	Temperature controller using Fuzzy Logic	T.K.Madhubala, <b>S.Arumugam</b> and P.Neelamegam	National Symposium on Instrumentation National Physical Laboratory, New Delhi, Oct. 22-25, 1997.
35.	Synthesis and characterization of La-Ca-Cu-O system	K.Jeyabalan, L.K.Kaliyaperumal, A.Sekar, <b>S.Arumugam</b> And J.Srinivas	International symposium on Intrinsic in High Tc superconductors. Tohoku University, Sendai, Japan, Feb. 23-25, 1997.
36.	Synthesis and characterization of RE-Ba-Ca-Sr-Cu-O (RE = La & Pr) Non-superconducting compounds.	<b>S.Arumugam</b>	International symposium on Intrinsic Josephson Effect and THz plasma collisions in High Tc superconductors. Tohoku University, Sendai, Japan, Feb. 23-25, 1997.
37.	Automated Thermo luminescence Measurements using Microcontroller	P.Neelamegam and <b>S.Arumugam</b>	IEEE Instrumentation and Measurement Technology conference Ottawa, Canada, May. 5-11, 1997.
38.	Transport and Magnetic properties of the new superconductor Y-Ba-Ca-Sr-Cu-O	<b>S. Arumugam</b>	XXI International conference on Low Temperature Physics Prague, Czech Republic, Aug. 8-14, 1996.
39.	Studies on the new superconducting system RE-Ba-Ca-Sr-Cu-O (RE = Gd, Ho & Dy).	<b>S.Arumugam</b>	XXI International conference on Low Temperature Physics" Prague, Czech Republic, Aug.8-14, 1996
40.	Synthesis and characterization of new high Tc system RE-Ba-Ca-Sr-Cu-O (RE = Eu, Sm & Yb)	<b>S.Arumugam</b>	Physics and Chemistry of Molecular and Oxide Superconductors, Karlsruhe, Germany, Aug. 2-6, 1996.
41.	Instrumentation for pressure effect on susceptibility	<b>S.Arumugam</b> and V.S.Sastry	IEEE Instrumentation and Measurement Technology Conference Brussels, Belgium, Jun. 4-6, 1996
42.	Ultraviolet flame scanner	<b>S.Arumugam</b> , V. Ambedkar and S.Ramakrishnan	Trends and Industrial Meas. and Automation (TIMA-96) Madras, India, Jan. 3-7, 1996.
43.	Automatic calibration of energy meters	<b>S.Arumugam</b> , S.P.Sivakumar, Sheela T.Verkey and P.Neelamegam	National Symposium on Instrumentation, Osmania University, Hyderabad, India, Sep. 25-28, 1995.
44.	High pressure X-Ray diffraction studies on Y-Pr-Ba-Ca-Cu-O (Pr=0.2) system	<b>S.Arumugam</b> and S.Natarajan	Proc. of Solid State Physics Symposium, Bhabha Atomic Res. Centre, Bombay, India, Dec. 28, 1993 – Jan. 1, 1994.
45.	Superconductivity in a new High Tc System Y-Ba-Ca-Sr-Cu-O	<b>S.Arumugam</b> , S.Natarajan, V.S. Sastry,	International Cryogenic Materials Conference

		T.Geethakumary T.S.Radhakrishnan, V.Ganesan and R.Srinivasan	Albuquerque, USA, Jul. 12-16, 1993.
46.	Synthesis and characterization of a new 80 K superconductor Gd-Ba-Ca-Cu-O	<b>S.Arumugam</b> , S.Natarajan, V.S. Sastry, T.Geethakumary T.S.Radhakrishnan, Manmeeth Kaur, K.Balakrishnan V.Ganesan And R.Srinivasan	XX International Conf. Low Temperature Physics, Eugene, Oregon, USA, Aug. 4-11, 1993.
47.	A new Superconductor Y-Ba-Ca-Cu-O	<b>S.Arumugam</b> , S.Natarajan, V.S. Sastry, T.Geethakumary T.S.Radhakrishnan, V.Ganesan and R.Srinivasan	XX International Conf. Low Temperature Physics , Eugene, Oregon, USA, Aug. 4-11, 1993
48.	Critical Current density studies of a new superconductor Y-Ba-Ca-Sr-Cu-O	<b>S.Arumugam</b> , V.Ganesan and R.Srinivasan	Physics and Chemistry of Molecular & Oxide Superconductors Eugene, Oregon, USA, Jul. 27-31, 1993.
49.	Pressure effects in superconductors	T.S.Radhakrishnan, <b>S.Arumugam</b> and V.S.Sastry	International Workshop on Electronic Structure Calculations and Properties of Materials. Anna University, Madras, India, Nov. 16 -21 , 1992
50.	Superconductivity in a new Nd-Ba-Ca-Sr-Cu-O system	<b>S .Arumugam</b> , S.Natarajan, V.S.Sastry, T.Geethakumary, T.S.Radhakrishnan C.K.Subramanian V.Sankaranarayanan and R.Srinivasan	Proc. of Solid State Physics Symposium, Sri Venkateswara Univ., Tirupati, India, Dec. 28, 1992 – Jan. 1, 1993.
51.	Dc Magnetisation studies on the new superconducting Nd-Ba-Ca-Sr-Cu-O system	<b>S.Arumugam</b> , S.Natarajan, V.S .Sastry, T.Geethakumary, T.S.Radhakrishna C.K.Su bramianiam, V.Sankaranarayanan, V.Ganesan and R.Srinivasan	Proc. Of Solid State Physics Symposium,Sri Venkateswara Univ., Tirupathi, India, Dec. 28, 1992 – Jan. 1, 1993.
52.	Superconductivity in new Y-Ba-Ca-Sr-Cu-O system	<b>S.Arumugam</b> , V.Ganesan, C.K.Subramianiam, S.Natarajan and R.Srinivasan	M2 HTSC - Conference Proceedings, Japan, 1991.
53.	Superconductivity in the new Nd-Ba-Ca-Sr-Cu-O system	S.Arumugam, V.Ganesan, C.K.Subramianiam, S.Natarajan and R.Srinivasan	Fifth Annual Conference on Superconductivity and Applications University of Buffalo, New York, 24-26, 1991.

54.	Superconductivity in (Y,RE)-Ba-Ca-Sr-Cu-O system	<b>S.Arumugam</b> , V.Ganesan, S.Natarajan and R.Srinivasan	ICMAS - 91, Paris, Oct. 7-81991,
55.	Pressure dependence of $T_c$ in Nb-Ti upto 6 GPa	<b>S.Arumugam</b> , V.Sankara Sastry, S.Kalavathi, Y.Hariharan T.S. Radhakrishnan and S.Natarajan	Proc. of Solid State Physics Symposium, Banaras Hindu Univ., Varanasi, India, Dec. 21-24, 1992.
56.	Investigations of superconductivity in Nb-Ti upto 6 GPa	<b>S.Arumugam</b> ,V.Sankara Sastry, S.Kalavathi, Y.Hariharan, T.S.Radhakrishnan and S.Natarajan	Proc. of XIII AIRAPT International Conference on High Pressure Science and Technology, Bangalore, India, Oct. 7-11, 1991.
57.	Resistivity studies on Pr doped YBCO under high pressure	<b>S.Arumugam</b> , V.Sankara Sastry and S.Natarajan	Proc. of XIII AIRAPT International Conference on High Pressure Sci and Techn, India, Oct. 7-11, 1991.
58.	A simple experimental setup of high pressure electrical resistivity and $T_c$ measurements down to 77K	<b>S.Arumugam</b> and S.Natarajan	European High Pressure Research Group - High Pressure, Materials, University of Bordeaux, France. 1991.
59.	The effect of pressure on Ho-Ba-Cu-O	<b>S.Arumugam</b> T.S.Sampath Kumar and S.Natarajan	European Pressure High Research Group - High Pressure Materials, University of Bordeaux, France. 1991.
60.	The effect of annealing on the resistivity of Y-Pr-Ba-Cu-O Under pressure	<b>S.Arumugam</b> and S.Natarajan	European High Pressure Research Group - High Pressure Materials", University of Bordeaux, France, 1991.
61.	Anomalous resistivity behavior of Y-Ba-Cu-Fe-O compound	<b>S.Arumugam</b> , T.S.Sampath Kumar and S.Natarajan	Proc. of International Conference on Superconductivity Bangalore, India, Jan.10-14, 1990.
62.	High pressure resistivity of Pr-Gd-Ba-Cu-O superconductors	T.S. Sampath Kumar, <b>S.Arumugam</b> and S.Natarajan	Discussion Meeting on Materials Under High Pressure, IGCAR, Kalpakkam, , Dec.23 - 24, 1989.
63.	Possible Transition of La-Ba-Cu-O under Pressure	T.S. Sampath Kumar, <b>S.Arumugam</b> and S.Natarajan.	Proc. of Solid State Physics Symposium,Bhopal Univ, Bhopal. India, Dec .20-23, 1988.
64.	High Pressure resistivity studies of Superconductors RE-Ba-Cu-O with RE=Gd & Ho	<b>S.Arumugam</b> , T.S.Sampath Kumar and S.Natarajan.	Proc. of Solid State Physics Symposium , Bhopal University, Bhopal. India, Dec. 20-23, 1988.
65.	High Pressure study of Dy-Ba-Cu-O Superconductor	T.S.Sampath Kumar, <b>S.Arumugam</b> , M.D.Shaji Kumar and S.Natarajan.	Proc. of National Workshop on High Temp superconductivity Banaras Hindu Univ., Varanasi, India, Dec.14-15, 1988.
66.	Structural Transition in Y-Ba-Cu-Fe-O Superconductor under Pressure	<b>S.Arumugam</b> , S.Natarajan and T.S.Sampath Kumar,	Proc. of National Workshop on High Temp Superconductivity Banaras Hindu Univ, Varanasi, Dec. 14-15, 1988.
67.	Possible structural phase transition in Pr-Ba-Cu-O under pressure	<b>S.Arumugam</b> , N.Victor Jaya, T.S.Sampath Kumar and S.Natarajan.	Proc. of National Seminar on Superconductivity Trivandrum, India, Dec. 1988.
68.	High Pressure resistivity measurements on tetragonal Y-Ba-Cu-O	<b>S.Arumugam</b> , T.S.Sampath Kumar,	Proc. of International Conference on High



		M.D.Shajikumar, N.Victor Jaya and S.Natarajan	Temperature Superconductivity, University of Rajasthan, Jaipur, India. Jul. 6, 1988.
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#### AWARDS AND RECOGNITION

1. TWAS-UNESCO Associate Scheme at Centres of Excellence in South Third World Academy of Sciences, C/O ICTP, Italy (2009-2012).
2. INSA Exchange Fellowship, 2005, INSA, New Delhi, India.
3. A- Grade Excellent Award for AICTE Project, 2004.
4. TWAS-UNESCO Associate Scheme at Centres of Excellence in South Third World Academy of Sciences, C/O ICTP, Italy (2002-2005).
5. JSPS Post Doctoral Research Award (Short term) 2002-2003 Japan Society of Promotion of Science, Japan.
6. Prof. M.A. Ittyachen Award CTMS 2001 School of Pure and Applied Physics, MG University, Kottayam, Kerala
7. JSPS Post Doctoral Fellowship Award (1998-2000) Japan Society for the Promotion of Science, Japan.
8. Young Scientist Fellowship Award (1996-97) Tamil Nadu State Council for Science & Technology, Chennai, India.
9. Proficiency Prize award (1986) A.V.V.M Sri Pushpam College, Poondi, Thanjavur, India.

#### 4.4. RESEARCH CONTRIBUTION

##### Manganites:

##### ✓ Crystal growth, characterization, cutting and orientation of manganites:

Single crystals of a bilayer manganite series  $\text{Pr}(\text{Sr}_{1-x}\text{Ca}_x)_2\text{Mn}_2\text{O}_7$  ( $x=0, 0.4, 0.9, 1$ ) have been grown using travelling solvent floating zone technique under various oxygen partial pressure. X-ray Laue diffraction and X-ray powder diffraction have been carried out on the samples for the quality check of the grown crystals. Susceptibility measurements indicate that all samples are antiferromagnetic at low temperature. (J. Cryst. Growth 2012). These crystals were grown and characterized (partly) at Paul Scherrer Institute, Switzerland during short visits (four times) of CHPR students and the remaining characterization and physical properties were measured at CHPR. The single crystals of  $(\text{Sm}_{1-y}\text{Nd}_y)_{0.52}\text{Sr}_{0.48}\text{MnO}_3$  with  $y=0, 0.05, 0.1, 0.2,$  and  $0.3$  have been prepared by floating zone technique. The quality of the crystal was carefully checked by various techniques such as X-ray powder diffraction, Laue diffraction, EPMA, and scanning electron microscope. The magnetization (M) and electrical resistivity measurements were done in a PPMS-VSM system (Quantum Design). These crystals were grown at **Saha Institute of Nuclear Physics, Kolkata and cut and oriented at PSI, Switzerland.**

✓ **Pressure effects on Manganites:**

The magnetic properties of half-doped  $\text{Pr}(\text{Sr}_{1-x}\text{Ca}_x)_2\text{Mn}_2\text{O}_7$   $\text{Pr}(\text{Sr Ca})\text{MnO}$  ( $x = 0.4$  and  $0.9$ ) single crystals have been investigated under magnetic field ( $H$ ) and hydrostatic pressure ( $P$ ). Analysis of magnetization data reveals that, for  $x = 0.4$  sample, only one charge-orbital ordering (CO-OO) transition occurs which decreases very slowly with  $P$ , while the antiferromagnetic ordering transition shifts towards higher temperature with the increase of  $P$  (**JAP 2011**).

The effect of hydrostatic pressure as a function of temperature on the resistivity of a single crystal of the bilayer manganite  $(\text{L}_{0.4}\text{Pr}_{0.6})_{1.2}\text{Sr}_{1.8}\text{Mn}_2\text{O}_7$  was investigated. A huge negative piezoresistance in the low temperature region at moderate pressures is observed. When the pressure is increased further ( $5.5$  GPa), the high temperature polaronic state disappears and a metallic behaviour is observed. The insulator to metal transition temperature exponentially increases with pressure and the distinct peak in the resistivity that is observed at  $1.0$  GPa almost vanishes for  $P > 7.0$  GPa (**JPCM 2012**).

The effect of hydrostatic pressure ( $P$ ) and external magnetic field on the  $c$ -axis resistivity ( $\rho_c$ ) and in-plane ac susceptibility ( $\chi_{ab}$ ) of  $\text{La}_{1.2}\text{Sr}_{1.8}(\text{Mn}_{1-y}\text{Ru}_y)_2\text{O}_7$  ( $y=0$  and  $0.075$ ) single crystals have been investigated. The ferromagnetic transition temperature ( $T_C$ ) increases, while the conductivity decreases, with Ru doping. The application of pressure strongly decreases  $\rho_c$  and shifts  $T_C$  to higher temperature for both the samples. For the undoped ( $y=0$ ) sample,  $T_C$  increases almost linearly with  $P$  up to  $2$  GPa, while  $T_C$  for the Ru-doped sample starts to saturate above  $1.0$  GPa. In the ferromagnetic state, the nature of  $P$  dependence of  $\chi_{ab}$  of Ru-doped sample changes dramatically around  $1.5$  GPa (**JAP 2009**).

We investigated the effect of magnetic field ( $H$ ), hydrostatic pressure ( $P$ ) and doping dependence of the order of the ferromagnetic (FM) to paramagnetic (PM) phase transition in  $\text{Sm}_{1.52}\text{Sr}_{0.48}\text{MnO}_3$  single crystal. It has been shown that  $H_{cr} = 4$  T and  $T_{cr} = 160$  K are critical points below which FM to PM phase transition is a first-order in nature. These have been explained within the framework of the formation of polarons (PRB 2009). Also, we have investigated the uniaxial pressure ( $P$ ) dependence of resistivity along the  $ab$ -plane and  $c$  axis in single crystals of  $(\text{Sm}_{1-y}\text{Nd}_y)_{0.52}\text{Sr}_{0.48}\text{MnO}_3$  ( $y = 0, 0.05, 0.3$ ). With increasing pressure along the  $c$ -axis, metal insulator transition temperature ( $T_{MI}$ ) shifts towards the lower side while it increases, when  $P$  is applied perpendicular to the  $c$ -axis. The substitution of Nd at Sm site decreases the resistivity and enhances the  $T_C$ . As  $y$  increases  $dT_{MI}/dP$  increases for  $P$  perpendicular to  $c$ , whereas its MI value decreases for  $P \parallel c$  (**APL 2009**).

We investigated the hydrostatic pressure dependence of the order of ferromagnetic (FM) to paramagnetic (PM) phase transition in a  $(\text{Sm}_{0.7}\text{Nd}_{0.3})_{0.52}\text{Sr}_{0.48}\text{MnO}_3$  single crystal. At

ambient pressure, the system undergoes a first-order FM-PM phase transition at 146 K. The application of pressure increases the  $T_C$ , suppresses the hysteresis width, and thus makes the transition to second order. We have analyzed the critical behavior associated with the second-order FM-PM transition in the presence of an external pressure (12.1 kbar) and obtained the critical exponents  $\beta=0.358$ ,  $\gamma= 1.297$ , and  $\delta =4.536$ , which are close to those predicted for the three-dimensional Heisenberg system. **(PRL 2009)**.

We have investigated the effect of hydrostatic pressure (P) on ferromagnetic phase transition and magnetocaloric properties of  $(\text{Sm}_{0.8}\text{Nd}_{0.2})_{0.52}\text{Sr}_{0.48}\text{MnO}_3$  single crystal. The application of pressure increases magnetization, shifts the FM transition to higher temperature, and weakens the metamagnetism. As a result, MCE decreases and its thermal distribution becomes more symmetric as compared to  $P=0$  **(JAP 2010)**.

We have carried out a systematic investigation of the pressure induced metallization of the ferromagnetic insulating state (FMI) state of the manganites  $\text{La}_{0.79}\text{Ca}_{0.21}\text{MnO}_3$ . The external pressure leads to two transitions/crossovers: one is the suppression of the insulating FMI phase at relatively low pressure  $\sim 1$  GPa leading to a ferromagnetic metallic (FMM) state at low temperature and the second is the suppression of the high temperature polaronic state leading to a paramagnetic metal. Importantly, we find that there is no appreciable MR in this metallic phase, which is quite distinct from the FMM phase seen in  $\text{La}_{0.79}\text{Ca}_{0.21}\text{MnO}_3$  and such compositions **(JAP 2009)**.

More work on investigation of manganites, please refer the publications such as **BMS 2011, JPCS 2010, JPC 2010, JAP 2009 and JAP 2009**.

### **Spin ladders:**

#### **✓ Crystal growth, characterization, cutting, orientation of spin ladder single crystals:**

Large size high quality Ca doped  $\text{Sr}_{14-x}\text{Ca}_x\text{Cu}_{24}\text{O}_{41}$  ( $x=12.2, 12.6, 13$  &  $13.2$ ) spin ladder single crystals were grown using a modified mirror floating zone furnace with oxygen pressure up to 35 bar. The qualities of the as-grown single crystals were confirmed by polarized optical microscopy, neutron diffraction and X-ray diffraction methods. The sample compositions and homogeneity were measured using micro X-ray fluorescence spectroscopy. The high oxygen pressure is indispensable for growing highly Ca doped  $\text{Sr}_{14-x}\text{Ca}_x\text{Cu}_{24}\text{O}_{41}$  single crystals **(JCG 2011)**. **These crystals were grown and characterized (partly) at Paul Scherrer Institute, Switzerland during short visits (four times) of CHPR students and the remaining characterization and physical properties were measured at CHPR.**

#### **✓ Pressure Effect on Spin ladders:**

We reported superconductivity in  $\text{Sr}_3\text{Ca}_{11}\text{Cu}_{24}\text{O}_{41}$  single crystals under uniaxial pressure ( $P \parallel a$ - or  $P \parallel c$ -axes) with  $dT_C/dP_C \sim +1130$  K/GPa and crossover in the case of charge transport from one - to two-dimensional (1D to 2D). Uniaxial pressure ( $P \parallel a$ - or  $P \parallel c$ - axes) strongly reduces the Cu-O bond length and the binding energy of the hole

pairs, increases overlap of the Cu3d and O2p orbitals and aids the dissociation of the hole pairs both in chains and ladders which subsequently leads to a charge transfer from CuO<sub>2</sub> chains to Cu<sub>2</sub>O<sub>3</sub> ladders. Uniaxial pressure  $P \parallel b$ -axis tends to increase the Cu-O bond length and decrease the Cu3d and O2p orbitals overlap, leading to an insulating state (**submitted - Nature Physics 2012**).

Measurement of electrical resistivity under uniaxial pressure of Sr<sub>7</sub>Ca<sub>7</sub>Cu<sub>24</sub>O<sub>41</sub> single crystals were measured in  $P \parallel a$ ,  $P \parallel c$  and  $P \parallel b$  axes and does not show superconductivity down to 4K. Measurement of electrical resistivity and magnetization under uniaxial pressure of Sr<sub>11</sub>Ca<sub>3</sub>Cu<sub>24</sub>O<sub>41</sub>, Sr Ca<sub>13</sub>Cu<sub>24</sub>O<sub>41</sub> and another two-leg spin ladder CaCu<sub>2</sub>O<sub>3</sub> single crystals will be carried out soon in  $P \parallel a$ ,  $P \parallel c$  and  $P \parallel b$  axes.

Electrical resistivity and AC susceptibility measurements under highly hydrostatic pressure were performed for a spin-ladder compound SrCa<sub>13</sub>Cu<sub>24</sub>O<sub>41</sub> single crystal up to 8 GPa. Pressure-induced superconducting transition was observed for the electrical resistivity and AC susceptibility parallel to the c axis. The maximum transition temperature  $T_C$  onset measured for the electrical resistivity was 14.7 K at 3 GPa, however the onset pressure of the bulk superconductivity measured for AC susceptibility was 4 GPa. The temperature dependence of the electrical resistivity  $\rho(T)$  in the metallic phase approaches to the Fermi liquid relation  $\rho(T) \sim AT^2$  up to 4 GPa. (**To be submitted to PRL**)

Further, details of investigation of more spin ladder system please refer in JMMM 2011.

### **Iron based superconductors:**

#### ✓ **Synthesis and characterization of Iron based superconductors:**

Polycrystalline samples of iron based Superconductors were synthesized by a two-step solid state method and characterized by powder X-ray diffraction (**Department of Chemistry, IIT, New Delhi**). The transport and magnetic properties were measured at ambient and high pressure in PPMS-VSM at CHPR.

#### ✓ **Pressure Effects on Iron based superconductors:**

The Effect of pressure on the superconducting transition temperature ( $T_c$ ) of Yb doped Ce<sub>0.6</sub>Yb<sub>0.4</sub>FeAsO<sub>0.9</sub>F<sub>0.1</sub> has been investigated for the first time using resistivity and magnetization studies. Increase in chemical pressure by substitution of smaller Yb<sup>3+</sup> ions in place of Ce<sup>3+</sup> ions results in a significant enhancement of  $T_c$  from 38 K (Yb free) to 47 K (40% Yb). 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 (**RRL 2012**).

We reported the pressure dependence of the electrical resistivity and magnetic susceptibility of polycrystalline Ce<sub>0.6</sub>Y<sub>0.4</sub>FeAsO<sub>0.8</sub>F<sub>0.2</sub> superconductor in the temperature

range 4K to 300K up to 8 GPa. In-situ high pressure-low temperature X-ray diffraction was performed at 8K up to 32 GPa using synchrotron X-rays with helium as a pressure medium. The results show that the applied pressure slightly increases the  $T_c$  up to 1 GPa and then it decreases on further increase of pressure. The reduction of superconducting transition temperature ( $T_c$ ) occurs with a transition to a collapsed tetragonal phase and may be associated with a possible valence change of Ce (**APL 2012**).

The superconducting  $\text{CeFe}_{1-x}\text{Co}_x\text{AsO}$  ( $\text{Co}=0.1$ ) oxyarsenide with a transition temperature ( $T_c$ ) 11.4 K has been investigated by *in situ* high pressure synchrotron X-Ray diffraction, magnetization, and resistivity measurements. The experiments performed at 10 K up to 6 GPa and at room temperature (RT) up to 55 GPa indicate large anisotropic lattice compression. A pressure induced structural change to a collapsed tetragonal structure was observed above 10 GPa at RT. We reported the enhancement of  $T_c$  from 11.4 to 12.3 K with a small increase in pressure up to 0.4 GPa and is first observed in an electron doped Ce-1111 system (**APL 2011**).

We have studied the effect of pressure on the superconducting transition temperature ( $T_c$ ) of thorium doped  $\text{La}_{1-x}\text{Th}_x\text{FeAsO}$  ( $x = 0.2$ ) superconductor under hydrostatic pressures up to 1.6 GPa by resistivity and magnetization experiments. Application of pressure increases the  $T_c$  to 31 K with a positive pressure coefficient of  $\sim 1$  K/GPa. Low temperature X-Ray diffraction studies were performed at 7.8 K at various high pressures and show that no pressure induced structural changes and the tetragonal P4/nmm structure is found to persist up to 31 GPa (**RRL 2011**).

Further, details of investigation of more spin ladder system please refer in **Physica C 2012**.

### **Heusler alloys:**

#### ✓ **Synthesis and characterization of Heusler alloys**

The ingots of  $\text{Ni}_{50-x}\text{Mn}_{37+x}\text{Sn}_{13}$  ( $x = 0, 1, 2, 3, 4$ ) alloys were prepared by melting the high purity starting elements (99.9% pure) using an arc melting furnace under argon atmosphere. The samples were re-melted four times to ensure homogeneity. The alloys were annealed under high vacuum at 1175 K for 6 hrs and then quenched in Ar gas. Elemental compositions of the alloys were determined using scanning electron microscopy (SEM, Leo 440i) attached with an X-Ray energy dispersive spectroscopy (EDS) setup and were found to be close to the nominal composition. The structural analysis was carried out using Philips3121 X-ray diffractometer with Cu-K $\alpha$  radiation. The magnetization measurements were performed by means of a PPMS-VSM (QD, USA).

✓ **Magnetic studies of Heusler alloys.**

The effect of Ni/Mn variation on the exchange bias properties in the bulk Mn-rich  $\text{Ni}_{50-x}\text{Mn}_{37+x}\text{Sn}_{13}$  ( $0 \leq x \leq 4$ ) Heusler alloys were studied. The excess Mn content was found to increase the exchange bias field while it decreases the exchange bias blocking temperature ( $T_{\text{EB}}$ ) from 149 to 9 K. A maximum shift in the hysteresis loop of 377 Oe is observed for the  $\text{Ni}_{46}\text{Mn}_{41}\text{Sn}_{13}$  alloy. As compared to Mn/Sn variation, Ni/Mn variation strongly influences the exchange bias properties in Ni-Mn-Sn alloys. We observed that if the Mn content is above 37 at% in Ni-Mn-Sn alloys, the  $T_{\text{EB}}$  value would show a decreasing trend either by varying the Ni or Sn content.

We reported spin-valve like magnetoresistance at room temperature in a bulk ferrimagnetic material that exhibits magnetic shape memory effect. The origin of this unexpected behavior in  $\text{Mn}_2\text{NiGa}$  has been investigated by neutron diffraction, magnetization and ab-initio theoretical calculations. The refinement of the neutron diffraction pattern shows presence of antisite disorder where 13% of the Ga sites are occupied by Mn atoms. On the basis of the magnetic structure obtained from neutron diffraction and theoretical calculations, we establish that these anti-site defects cause formation of ferromagnetic nano-clusters with parallel alignment of Mn spin moments in  $\text{Mn}_2\text{NiGa}$  bulk lattice that has anti-parallel Mn spin moments. Our work opens up the possibility of fabricating deformable room temperature magnetic recording devices that can be brought back to their original shape by applying magnetic field (**PRL 2012 under revision**).

✓ **Pressure effects on Heusler alloys**

The effect of hydrostatic pressure on the martensitic transition, magnetic properties and magnetic entropy change in  $\text{Ni}_{50-x}\text{Mn}_{37+x}\text{Sn}_{13}$  ( $x = 2, 3$ ) Heusler alloys were studied. The application of pressure has significantly shifted the martensitic transition temperature to higher values. A large rate of change of martensitic transition with pressure  $\sim 3.1$  K/kbar has been obtained for the  $x = 2$  alloy, whereas the Curie temperature changes marginally with pressure ( $\sim 0.3$  K/kbar). Magnetization of both austenite and martensite phases decreases with increase of pressure. The maximum magnetic entropy change of  $34 \text{ Jkg}^{-1}\text{K}^{-1}$  at ambient pressure and  $22.5 \text{ Jkg}^{-1}\text{K}^{-1}$  at 8 kbar was observed around martensitic transition temperature for the  $x = 3$  alloy. At high temperature end, field cooled (FC) and field warming (FW) curves for the  $x = 2$  alloy shows a second order transition at  $T_C$ , where the sample transform from paramagnetic to ferromagnetic austenite upon cooling. Below  $T_C$ , the magnetization is nearly constant upto the martensitic start temperature ( $M_s$ ) and further decrease in temperature below  $M_s$  the value of magnetization decreases up to the martensitic finish temperature ( $M_f$ ). The thermal hysteresis observed between FC and FW curves around  $M_s$  and  $M_f$  temperatures indicate the first order structural transition from austenite to martensite phase. Thus these alloys can be used in the magnetic refrigeration. Further, details of investigation of Heusler alloys please be referred in **JMMM 2012, JAP 2011 (2 papers), J. Physics D 2010**.

#### 4.5. Expertise of the Coordinator:

- ✓ Hydrostatic piston-cylinder pressure cell (3 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 (1 GPa)
- ✓ Cubic anvil (hydrostatic pressure)- 5T CF magnet system (8 GPa)
- ✓ Modified Bridgman-anvil cell for hydrostatic pressure calibrated (8 GPa)
- ✓ Continuous pressure uniaxial pressure devices for resistivity and ac-susceptibility
- ✓ Measurements for Closed cycle refrigerator system- (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)- dc-susceptibility
- ✓ 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

#### 4.6. Ph.D., GUIDANCE

##### 1. Dr. A. MURUGESWARI

*“Investigation of transport properties of manganites under high pressure, low temperature and high magnetic field”* (Degree Awarded - Aug.2010). Presently working as a **Asst. Professor in Vellore institute of Technology, Vellore**

##### 2. Dr. K. MYDEEN

*“Effect of uniaxial and hydrostatic pressure on transport and magnetic properties of some colossal magneto resistive single crystals”* (Degree Awarded - Aug.2008). Presently doing **Post Doc. in Max Planks Institute, Dresden, Germany**

##### 3. Dr.N.MANIVANNAN

*“Development of dc SQUID vibrating coil magnetometer (SVCM) for dc-susceptibility and uniaxial pressure device for ac-susceptibility measurements”* (Degree Awarded 2007). Presently working as a **Cryogenic Engineer in Quantum Design, USA**

##### 4. Dr. T.K. MADHUBALA

*“Fuzzy and Neuro-Fuzzy control techniques for the control Liquid level in a conical tank”* (Degree Awarded 2005). **At present working as a Faculty at Scotland**

#### 4.7. M.Phil., GUIDANCE

1. P. Sathish Kumar 2012 Synthesis and Characterization of NiFe<sub>2</sub>O<sub>4</sub> nanoparticles
2. R.MuthuGanesh 2010 Effect of Hydrostatic Pressure on La<sub>0.54</sub>Sr<sub>0.46</sub>MnO<sub>3</sub>
3. R.Vijayakumar 2010 Pressure effect on Magnetic Properties of CeFe<sub>1-x</sub>Co<sub>x</sub>AsO  
Optimal doped new oxypnictide
4. K.Balakrishnan 2008 Investigation of Sm-Sr-Mn-O manganites
5. A.Murugeswari 2007 Electrical and magnetic properties of La substituted Nickel Ferrite
6. N.R.Tamilselvan 2006 Development of Uniaxial Pressure device for electrical resistivity measurements at high temperature
7. C. Balamurugan 2004 Development of experimental setup for hydrostatic pressure effects on resistivity at room temperature
8. S. Bhuvaneshwari 2004 Development of experimental setup for hydrostatic pressure effects on resistivity at room temperature
9. C. Rosepriya 2004 Study of the Y-Ba-Ru pressure effects on resistivity at room temperature
10. N. Raghavan 2003 Development of quasi hydrostatic pressure device for resistivity measurements at room temperature

#### 4.8. POPULAR SCIENCE LECTURES DELIVERED IN INDIA

1. **DST-INSPIRE Internship Lecture**  
Satyabama University, July 31, 2012
2. **DST -INSPIRE Internship Lecture**  
PKR Arts College for Women, Gobi, July 25, 2012
3. **DST -INSPIRE Internship Lecture**  
Vikrama Simhapuri University, Nellore, June 18, 2012.
4. **TNSCST orientation program for School Science Teachers, Emerging Materials for S & T,**  
Mahendra Engineering College, Mallasamudram, Tiruchengode, June 22, 2012
5. **Special lecture program, Recent Trends in Superconductivity**  
Periyar University, Salem, Feb. 10.2.2012,
6. **DST INSPIRE Internship Lecture**  
Noorul Islam University, Kanyakumari, Feb 2-6 , 2012
7. **DST INSPIRE Programme - Invited Lecture**  
PKR Arts College for Women, Gobi, December 28, 2011
8. **DST INSPIRE Programme - Invited Lecture**  
Devanga Arts College, Aruppukkottai, November 28, 2011



9. **Inter Collegiate Seminar on Development in Superconducting Materials”**  
Devanga Arts and Science College, Aruppukkotti Feb. 15, 2011
10. **Critical behavior at ferromagnetic to paramagnetic transition of nearly half doped manganites** 55<sup>th</sup> DAE – Solid State Physics Symposium, Manipal University, Manipal, Dec 26 -30, 2010
11. **Role of pressure in physical parameters of strongly correlated systems**  
January 20-21, 2010, Thiagarajara College of Engineering, Madurai
12. **Special Lecture on carbon materials**  
Jamal Mohamed College, Tiruchirappalli, July 23, 2008
13. **Lecture on Carbon nanotubes**  
Alagappa University, Karaikudi, March 7, 2008
14. **Recent Trends in Spintronic Materials**  
Cauvery College for Women, Tiruchirappalli, Feb 15, 2008
15. **Awareness Workshop on Low Temperature and High Magnetic Field**  
UGC-DAE CSR, Indore, Dec. 10-12, 2007
16. **Recent Trends in Superconductivity**  
PGP College of Arts and Science, Namakkal, Jan. 07, 2005
17. **The Wondrous world of carbon Nano-tubes and C-60**  
Dhanalakshmi Srinivasan College of Arts and Science for Women, Feb.28, 2005
18. **Nanotechnology and its Applications**  
Department of Biotechnology, Bharathidasan University, Feb. 25, 2005
19. **Recent Advances in Superconducting Materials**  
Muthayammal College of arts and Science, Rasipuram, Dec. 31, 2003
20. **Recent Advances in Superconductivity**  
AVVM Sri Pushpam College, Poondi, Mar. 28, 2001
21. **Superconductivity**  
Kandasamy Kandar's College, Velur, Namakkal, Oct. 13, 2001
22. **Superconductivity**  
School of Engineering and Tech, Bharathidasan Univ, Tiruchi, Nov. 2, 2001
23. **Instrumentation on High Pressure Low temperature Techniques**  
Regional Engineering College, Tiruchirappalli, Aug. 22, 1996
24. **Instrumentation on High Pressure Low temperature techniques**  
TBML College, Porayar, Aug. 20, 1996
25. **High Pressure Effect on Materials**  
The Institution of Engineers (India), Tiruchirappalli centre Jun. 18, 1996