

**Dr. (Mrs.) Vijaylakshmi Dayal**  
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Department of Physics,  
Maharaja Institute of Technology Mysore  
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#### GOOGLE SCHOLAR CITATION:

Citations	h-Index	i 10 Index
<b>109</b>	<b>7</b>	<b>4</b>

#### RESEARCH INTERESTS:

- ✓ Study of Multiferroic Perovskite oxide in bulk (micro and nano scale) and thin films for fundamental science and functional device applications, like Solar cells, thermoelectric power generators, dielectric resonator antenna, etc.
- ✓ Study of high k dielectric material in bulk (micro and nano scale) and thin films for CMOS technology and memory device applications
- ✓ Dilute Magnetic semiconductors and its application towards spin transistors.
- ✓ Synthesis of Perovskite Oxides core shell structure and composites for sensors applications.
- ✓ Study of High Temperature Superconductor Perovskite oxides and its application as magnets.
- ✓ Hetrostructure of ferromagnetic Perovskite oxides thin films and piezoelectric thin films on Quartz, silicon and single crystalline oxide substrates and Influence of process conditions, strain engineering and interface engineering on domains.

#### EDUCATIONAL QUALIFICATION:

Degree	Details
<b>Ph.D.</b>	<b>Physics (Science):</b> Transport and Magnetic Properties of BSCCO High Temperature Super conducting Samples and LCMO Manganites. Birla Institute of Technology, Mesra, Ranchi, Jharkhand (Deemed University) Awarded, 26 <sup>th</sup> Nov 2008.
<b>M.Sc.</b>	<b>Physics, (spl. P.- Electronics)</b> St. Columba's College, VinobaBhave Univ., Hazaribag, Jharkhand <b>University Topper, Ist class Ist , (Goldmedalist), 2001</b>
<b>B.Sc.</b>	<b>Physics Honors, St. Columba's College, Vinoba Bhave Univ., Hazaribag, Jharkhand , Ist class, 1998</b>

**ACADEMIC & RESEARCH EXPERIENCE –**

<b>S. No</b>	<b>Positions held</b>	<b>Name of the Institute</b>	<b>From</b>	<b>To</b>	<b>Pay Scale</b>
9.	Professor & HOD	Department of Physics Maharaja Institute of Technology Mysore	01/08/2016	Till date	PB4 AGP 10000
8.	Associate Prof. & HOD	Department of Physics Maharaja Institute of Technology Mysore	01/08/2013	31/07/2016	PB4 AGP 9000
7.	Associate Prof. & HOD	Department of Physics Maharaja Institute of Technology Mysore	01/08/2011	31/07/2013	PB3 AGP8000
6.	Assistant Prof. & HOD	Department of Physics Maharaja Institute of Technology, Mysore	01/09/2010	31/07/2011	Rs.12000.00- 375-16500.00
5.	Senior Lecturer & HOD	Department of Physics Maharaja Institute of Technology Mysore	29/07/2008	31/08/2010	Rs.10000.00- 325- 15200.00
4.	Lecturer	Department of Physics, VidyaVardhaka College of Engineering, Mysore	01/09/2007	30/07/2008	Rs. 8000.00
3.	Senior Research Fellow	Department of Applied Physics, Birla Institute of Technology, Mesra, Ranchi	01/04/2005	30/06/2006	Rs. 7000.00
2.	Project Fellow	Department of Applied Physics Birla Institute of Technology, Mesra, Ranchi ( <b>UGC Major Research Project</b> )	08/11/2002	31/03/2005	Rs. 6000.00
1.	Lecturer	Physics Department S. R. S. College, Nawada, Bihar	01/07/2001	31/10/2002	Honorarium

## MAJOR RESEARCH PROJECT: AWARDED

S. No.	Title	Grant Period	Cost (Rs. In lakhs)	Funding Agency
1.	Investigation of ferroelectric, ferromagnetic and magnetoelectric properties in some novel multiferroic Perovskites-oxide” <b>Young Scientist Research Award (YSRA)</b> Sctn. No: 2011/20/37P/01/BRNS/0075 dated: 13.04.2011	2011-2015 (Completed )	1280000.00 (APPROVED) ~ 400000.00 (ADDITIONAL GRANT RECEIVED)	BRNS DAE
2.	Magnetic And Transport Studies In Ferromagnetic Metallic/Insulating Manganite Nanocomposite, <b>Collaborative Research Scheme (CRS)</b> CRS APPROVAL NO.: CSR-IC/CRS-89/2014-2015/596 dt: 18.09.2014	2014-2018 (ongoing)	238000.00 (1 <sup>st</sup> Year)  238000.00 (2 <sup>nd</sup> year) 238000.00 (3 <sup>rd</sup> year)	UGC-DAE- CSR Indore Centre
3.	<b>"Study of Strain Mediated Electrical Control over Magnetism in Ferromagnetic / Ferroelectric Hetrostructure"</b> .	2017-2020	Approved	DST-SERB New Delhi

No of Ph. D Students: **04**

Sl. No.	Name of the Student	Topic	Status	
1.	Mr. Punith Kumar V.	Electrical and Magnetic Properties of Bismuth Based Manganites	Awarded March 2017	Postdoc: IISC Bangalore
2.	Mr. Manju M. R.	Structural, Optical and Magnetic Properties of Doped BaSnO <sub>3</sub>	Registered Part Time	
3.	Ms. Rashmi P.	Fe-Based Superconductor	Registered Part Time	
4.	Mr. Ajay Kumar Saw.	Magnetic And Transport Studies In Ferromagnetic Metallic/Insulating Manganite Nanocomposite	To be registered (in Process)	

**RESEARCH FACILITY AVAILABLE:** Material preparation facilities using solid state route and Chemical wet method:

**(At work Place, Maharaja Institute of Technology-Mysore)**

- High Temperature Furnace (upto 1600 Deg C) (Naskar & Company)
- **Two Zone : High Temperature Furnace (upto 1200 Deg C)~ Under Process**
- Hydraulic Press (10 Tone): Technosearch Instruments
- Analytical Balance (sensitivity: 0.1 mg): Denver.
- Hot Plate With Magnetic stirrer
- Microwave Influx
- Dry Box
- **Low temperature Resistivity Set up to be established Shortly.**

**RESEARCH IN COLLOBORATION/USER:**

- ✓ Ames Laboratory Associate, US Dept. of Energy, Dept. of Electrical and Computer Engineering, Iowa State University, USA (also, XRD & SEM )
- ✓ Department of Mechanical and Nuclear Engineering, Virginia Commonwealth University, Richmond, VA, United.
- ✓ UGC-DAE Consortium for Scientific Research, Indore, Kolkata and Mumbai Centre.
- ✓ Indian Institute of Technology (IIT), Kharagpur, West Bengal.
- ✓ Department of Physics, Pondicherry University, Pondicherry

**PUBLICATIONS (LIST OF PAPERS PUBLISHED IN SCI JOURNALS, IN YEAR WISE DESCENDING ORDER).**

**Publications list (Title of paper, authors, Journal details, pages, year etc.)**

SL. NO	AUTHORS/ TITLE/ VOLUME/PAGE NO/ JOURNAL NAME/PUBLISHER YEAR	Year	IF
<b>INTERNATIONAL</b>			
1.	Manju. M.R., Punith Kumar V., <b>Vijaylakshmi Dayal</b> , “Investigation of Ferromagnetic properties in Fe/Co substituted BaSnO <sub>3</sub> Perovskite stannates”, 500, 14-19 <b>Physica B: Condensed Matter, Elsevier publications, December 2015.</b>	2016	1.352
2.	Punith Kumar V., R. L. Hadimani, D. Paladhi, T. K. Nath, D. C. Jiles and <b>Vijaylakshmi Dayal</b> ; Investigation of Magnetic Interactions, Electrical and Magneto-Transport Properties in Ga-Substituted La <sub>0.4</sub> Bi <sub>0.6</sub> MnO <sub>3</sub> Perovskite Manganites, <b>209</b> , 75-86, <b>Journal of Materials Science and Engineering B</b> , Elsevier publications	2016	2.169

3.	Punith Kumar V., R. L. Hadimani, D. Paladhi, T. K. Nath, D. C. Jiles and <b>Vijaylakshmi Dayal</b> , Investigation of magnetic interactions and Transport Mechanism in Al-substituted $\text{La}_{0.4}\text{Bi}_{0.6}\text{MnO}_3$ Manganites, 681 , 212-224, <b>Journal of Alloys and Compounds, Elsevier publications</b>	2016	2.999
4.	<b>Vijaylakshmi Dayal</b> , Punith K. V., R. L. Hadimani. And D. C. Jiles Investigation of Critical behavior in $\text{La}_{0.4}\text{Bi}_{0.6}\text{Mn}_{1-x}\text{Ti}_x\text{O}_3$ ( $x=0.05-0.1$ ) perovskite manganite, <b>15</b> , 1245–1250 <b>Current Applied Physics</b> [Elsevier Publications, ISSN:15671739.	2015	2.030
5.	<b>Vijaylakshmi Dayal</b> , Punith Kumar V., R. L. Hadimani, E. A. Balfour, H. Fu and D. C. Jiles; Magnetic Interaction and Electronic Transport in $\text{La}_{0.4}\text{Bi}_{0.6}\text{Mn}_{0.5}\text{Ti}_{0.5}\text{O}_3$ Manganite, <b>IEEE Transactions on Magnetics, 51 (11)</b> , 1-4, DOI 10.1109/TMAG.2015.2433394,	2015	1.010
6.	V. Punith Kumar, <b>Vijaylakshmi Dayal</b> , R. L. Hadimani , R. N. Bhowmik • D. C. Jiles, Magnetic and electrical properties of Ti-substituted lanthanum bismuth manganites; <b>Journal of Material Science 50 10 3562-3575</b> , [Springer], ISSN 0022-2461, DOI 10.1007/s10853-015-8916-1	2015	2.305
7.	Punith Kumar V. And <b>Vijaylakshmi Dayal</b> ; Investigation of Phase Coexistence and Correlation in $\text{La}_{1-x}\text{Bi}_x\text{MnO}_{3+\delta}$ ( $x=0.4$ and $0.6$ ) <b>Material Research Express 2 046105</b> , [IOP Science]ISSN :2053-1591	2015	....
8.	<b>Vijaylakshmi Dayal</b> , Punith Kumar V; Investigation of Complex Magnetic state in $\text{La}_{0.8}\text{Bi}_{0.2}\text{MnO}_3$ , <b>Journal of Magnetism &amp; Magnetic Materials</b> , Vol 361 pp. 212-218 [Elsevier Publications, ISSN: 0304-8853]	2014	2.002
9.	<b>Vijaylakshmi Dayal</b> , Punith Kumar V, R. L. Hadimani and D. C. Jiles, Evolution of Griffith's Phase in $\text{La}_{0.4}\text{Bi}_{0.6}\text{Mn}_{1-x}\text{Ti}_x\text{O}_3$ Perovskite Oxide, <b>Journal of Applied Physics</b> , 115, 17E111 American Institute of Physics Publication (AIP), ISSN: 0021-8979	2014	2.185
10.	<b>Vijaylakshmi Dayal</b> , Punith V. Kumar; Investigation of electrical resistivity and magnetotransport properties of $\text{La}_{0.67}\text{Ca}_{0.33}\text{Mn}_{0.99}\text{Fe}_{0.01}\text{O}_3$ perovskite oxide, <b>Solid State Communications</b> , 158 70–75 [Elsevier Publications ISSN: 0038-1098]	2013	1.698
11.	L. Joshi, S. Keshri, <b>V. Dayal</b> and N. Ramma; Existence of Griffiths phase in $\text{La}_{0.67}\text{Ca}_{0.33}\text{Mn}_{0.99}\text{Fe}_{0.07}\text{O}_3$ <b>J. Alloys and Compounds</b> 479, 1-2, <b>24</b> 879-882 (Elsevier Publication, ISSN No. 0925-8388,	2009	2.999
12.	S. Keshri, <b>Vijaylakshmi Dayal</b> , Leena Joshi Influence of Fe doping on electrical properties of LCMO, <b>Phase Transition</b> <b>81</b> 1 17-28 [Taylor & Francis: ISSN NO. 0141-1594].	2008	1.044

13.	<b>Vijaylakshmi Dayal</b> and S. Keshri Structural and Magnetic properties of $\text{La}_{0.67}\text{Ca}_{0.33}\text{Mn}_{(1-x)}\text{Fe}_x\text{O}_3$ ( $x=0-0.07$ ) <b>Solid State Communication</b> ,142 63-66 (Elsevier Publication, IISN No. 0038-1098]	2007	1.698
14.	S. Keshri and <b>Vijaylakshmi Dayal</b> ; Low Field AC-Susceptibility Study on gamma-irradiated $\text{Bi}_{1.2}\text{Pb}_{0.33}\text{Sr}_{1.54}\text{Ca}_{2.06}\text{Cu}_3\text{O}_{10+\delta}$ Superconductor; <b>Phase Transition</b> 80 3 243-251 [Taylor & Francis: ISSN NO. 0141-1594].	2007	1.044
15.	V. Dayal, S. Keshri, A. Saha and H. Kishan; Effect of gamma-irradiation on the structural and transport properties of polycrystalline $\text{Bi}_{1.2}\text{Pb}_{0.33}\text{Sr}_{1.54}\text{Ca}_{2.06}\text{Cu}_3\text{O}_{10+\delta}$ superconductor; <b>Radiation Effects &amp; Defects in solids</b> 162 5 359-366 [Taylor & Francis: ISSN NO. 1042-0150]	2007	0.500
16.	S. Keshri, <b>V. Dayal</b> , S. Ravi and P. K. Nayak; AC susceptibility study in the single phase Bi-2223 system <b>Czechoslovak J. of Phys.</b> 55, 73-84 [Springer-Verlag, ISSN No. 0011-4626]	2005	0.420
<b>National Journal:</b>			
17.	S. Keshri and <b>V. Dayal</b> ; Structural and electrical transport properties of nanosized $\text{La}_{0.67}\text{Ca}_{0.33}\text{MnO}_3$ sample synthesized by a simple low cost novel route; <b>Pramana</b> 70 4 697-704 (Indian Academy of Science, Issn No. 0304-4289)	2008	0.720
18.	S. Keshri, V. F. Kraidenov, L. Joshi and <b>V. Dayal</b> ; Electrical Properties of under pressure $\text{La}_{0.67}\text{Ca}_{0.33}\text{Mn}_{0.99}\text{Fe}_{0.01}\text{O}_3$ <b>International Journal of material Science</b> 2 191-199 [Research India, ISSN NO. 2226-4531]	2007	----
19.	S. Keshri, <b>Vijaylakshmi Dayal</b> and A. Poddar; Effect of gamma-irradiation on thermoelectric power of $\text{Bi}_{1.2}\text{Pb}_{0.33}\text{Sr}_{1.54}\text{Ca}_{2.06}\text{Cu}_3\text{O}_{10+\delta}$ <b>Indian J Cryogenics</b> 31(1-4), 108-11 [ISSN No. 0379-0479]	2006	----
20.	<b>V. Dayal</b> , S. Keshri, S. Ravi and P. K. Nayak; Transport and thermal properties of superconductor; <b>Indian J. of Cryogenic</b> 28 4 122-126 [ISSN No. 0379-0479]	2003	----
<b>UNDERCOMMUNICATION/ PREPARATION:</b>			
21.	Manju M. R., N. D'Souza, R. L. Hadimani, and <b>Vijaylakshmi Dayal</b> Enhancement of Ferromagnetic Properties of $\text{BaSnO}_3\text{-CoFe}_2\text{O}_4$ composite	2017	
22	<b>Ajay K. S. and Vijaylakshmi Dayal</b> ; Study of Transport and magnetic properties of Half doped $\text{La}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ naocrystal	2017	

23.	First order Magnetic Transition in half doped $\text{Pr}_{0.5}\text{Sr}_{0.5}\text{MnO}_3$ Manganite	2017
24.	Magnetic and Magnetic Transport Properties in and $\text{Pr}_{(1-x)}\text{Sr}_x\text{MnO}_3$ ( $0.2x < 0.45$ )	2017
25.	Thermoelectric Properties in $\text{Bi}_{1.2}\text{Pb}_{0.33}\text{Sr}_{1.54}\text{Ca}_{2.06}\text{Co}_3\text{O}_{10+\delta}$ Cobaltites.	2017
26	Magnetic and Magnetic Transport Properties in and $\text{Pr}_{0.67-x}\text{Nd}_x\text{Sr}_{0.33}\text{MnO}_3$ ( $0.1x < 0.5$ )	2017

### CONFERENCES PRESENTATIONS/PROCEEDINGS:

REFEREED CONFERENCE PROCEEDINGS PUBLISHED/ATTENDED		
INTERNATIONAL (HELD ABROAD)		
1.	Manju M. R., N. D'Souza, R. L. Hadimani and <b>Vijaylakshmi Dayal</b> Enhancement of Ferromagnetic Properties of $\text{BaSnO}_3\text{-CoFe}_2\text{O}_4$ composite; <b>Conference on Magnetism and Magnetic Materials; MMM 2017; 6-10 Nov, 2017 Pittsburgh, PA, US.</b>	Acc.
2.	<b>Vijaylakshmi Dayal</b> , Punith Kumar V., R. L. Hadimani and D. C. Jiles, "Investigation of Low Temperature Non-Linear Magnetization Behavior in Al and Ga- Substituted $\text{La}_{0.4}\text{Bi}_{0.6}\text{MnO}_3$ Manganites" <i>American physical society (APS) March meeting 2016</i> , Monday-Friday, March 14-18, 2016; Baltimore, Maryland, USA.	Conf. Proc.
3.	<b>Vijaylakshmi Dayal</b> , Punith Kumar V., R. L. Haidmani, E. A. Balfour, Hao. Fu and D. C. Jiles, Magnetic interaction and electronic transport in $\text{La}_{0.4}\text{Bi}_{0.6}\text{Mn}_{0.5}\text{Ti}_{0.5}\text{O}_3$ manganite, Abstract Designation: HU-09, Intermag 2015 Beijing, People's Republic of China, May 11 to <b>May 15, 2015</b>	Jour. Pub.
4.	<b>Vijaylakshmi Dayal</b> , Punith Kumar V, R. L. Hadimani and D. C. Jiles, Evolution of Griffith's Phase in $\text{La}_{0.4}\text{Bi}_{0.6}\text{Mn}_{1-x}\text{Ti}_x\text{O}_3$ Perovskite Oxide,); 58th MMM conference Denver, Colorado, USA. November 4-8, 2013	Jour. Pub.
5.	<b>Vijaylakshmi Dayal</b> and Punith K. V.; Electrical Conductivity and Magnetotransport properties of Fe Based Perovskite Manganite Oxide ICYRAM-2012, Material Research Society Singapore. Singapore; July 1 - 6, 2012 (ORAL)	Abs.
6.	S. Keshri and <b>V. Dayal</b> Synthesis and Characterization of Pure Phase Bi-2223 Super conducting Sample IMFP-2005 Kuala Lumpur, Malaysia, July 25-28, 2005.	Conf. proc.
INTERNATIONAL (HELD IN INDIA)		
7.	Punith Kumar V, R. L. Hadimani, D. C. Jiles, A. M. Awasthi and <b>Vijaylakshmi Dayal</b> , Structural, Raman, Magnetic and Dielectric properties of $\text{La}_{0.4}\text{Bi}_{0.6}\text{TiO}_3$ Perovskite Oxide, submitted to ICMagMa 2014 ; Pondicherry University, Pondicherry September 15-17, 2014.	Jour. Pub.
8.	Punith Kumar V. and <b>Vijaylakshmi Dayal</b> , Correlation between Magnetoresistivity	Conf.

	and Magnetism in $\text{La}_{1-x}\text{Bi}_x\text{MnO}_3$ ( $x=0.0, 0.1, 0.3$ & $0.5$ ). <b>Magma 2013, IIT Guwahati. December 05-07, 2013</b>	<b>proc..</b>
9.	Punith K. V , Manju M. R.and <b>Vijaylakshmi Dayal</b> ; Electrical and Magnetic Properties of $\text{La}_{0.5}\text{Bi}_{0.5}\text{MnO}_3$ ; International Conference on Recent Trends in Applied Physics and Materials Science , RAM-2013; Bikaner (Rajasthan) India; <b>1-2 February 2013 , AIP Conf. Proc. (2013), American Institute of Physics Publications</b>	<b>AIP Conf. proc..</b>
10.	Punith K. V.and <b>Vijaylakshmi Dayal</b> ; Study of Magnetotransport Properties of Manganite <b>CONIAPS, XIVSVNIT Surat-India December 22-24, 2011</b>	<b>ABS.</b>
11.	<b>V. Dayal</b> and S. Keshri Transport and Thermal Properties of Single Phase $\text{Bi-2223}$ Composition and Effect of gamma- Irradiation on it <b>ISAMP-2004 IIT, Kharagpur, India, December 6-8, 2004</b>	<b>Conf proc..</b>
<b>NATIONAL</b>		
12.	Punith Kumar V., Vinay P P. and <b>Vijaylakshmi Dayal</b> , Electrical conductivity and Magneto Transport properties in $\text{La}_{0.6}\text{Sr}_{0.4}\text{MnO}_3$ Nanomaterial, National Conference on Scientific, Computational and Informational Research Trends in Engineering (NCSCI-2016) to be held @ GSSS Institute of Engineering and Technology for Women, Mysore, Karnataka on 30 <sup>th</sup> January 2016.	<b>Conf. proc.</b>
13.	Punith Kumar V.,Manju M. R, Meenakshi. G and <b>Vijaylakshmi Dayal</b> , Investigation on Thermal Decomposition of Lanthanum Manganites and its primary constituents using TGA and DTA Techniques, UGC Sponsored National conference on Recent Trends in Physics, Mathematics and Engineering, SaradaVilas College, Mysore, 20-21 Feb 2015, Article will be published in <i>Proceedings of RTPME 2015</i> , ISBN: 978-81-930115-1-5, pp. 93-97	<b>Conf. proc.</b>
14.	Punith Kumar V., Manju. M.R., <b>VijaylakshmiDayal</b> , Critical behavior and Non-universal low-field Magnetic Scaling in $\text{La}_{1-x}\text{Bi}_x\text{MnO}_3$ ( $x=0.4$ & $0.6$ ) Perovskite Manganite Oxide , 59 <sup>th</sup> DAE SSP symposium 2013 at Vellore Institute of Technology, Vellore, December 14-17, 2014, <b>AIP Conf. Proc. (2015), American Institute of Physics Publications.</b>	<b>Conf. proc.</b>
15.	Punith Kumar V., Manju. M.R., <b>VijaylakshmiDayal</b> , Investigation of Magnetic Spin Glass Property in $\text{La}_{0.5}\text{Bi}_{0.5}\text{MnO}_3$ Sample Using Non-Linear AC Susceptibility Measurements. 58 <sup>th</sup> DAE SSP symposium 2013 at Thapar university, Patiala, December 21-25, 2013 <b>AIP Conf. Proc. 1591, 1546 (2014), American Institute of Physics Publications.</b>	<b>Conf. proc.</b>
16.	Punith Kumar V. and <b>VijaylakshmiDayal</b> , “Investigation of Critical exponent in $\text{La}_{0.5}\text{Bi}_{0.5}\text{MnO}_3$ using Non-linear Higher Harmonic AC Susceptibility Measurements” UGC sponsored Two Days National Level Seminar on “Material Science and Engineering” NSMSE-2014, JSS College of Arts, Commerce and science, Mysore – 570025, March 21-22, 2014.	<b>Conf. proc.</b>
17.	<b>VijaylakshmiDayal</b> , Young Scientist Research Awardees Meet (YSRAM-2012),	<b>Conf.</b>



	26-28 November 2012	<b>Proc.</b>
<b>18.</b>	<b>V. Dayal</b> and S. Keshri; Structural and Electrical Transport Properties of nanosized 52 <sup>nd</sup> DAE Solid State Physics Symposium University of Mysore, Karnataka December 27-31, 2007	<b>Conf. proc.</b>
<b>19.</b>	S. Keshri and <b>V. Dayal</b> Thermoelectric power of Bi-2223 super conducting samples NCRAMS Nagpur January 21-22, 2006	<b>Conf. proc.</b>
<b>20.</b>	S. Keshri and <b>V. Dayal</b> Transport, Structural and Thermal Properties of Bi2212 superconductive sample DAE Solid State Physics Symposium Guru Nanak Dev University, Amritsar, December 26-30, 2004	<b>Conf. proc.</b>
<b>21.</b>	S. Keshri, <b>V. Dayal</b> , S. Ravi and P. K. Nayak AC susceptibility study in NSCCFA 2004 Bengal Engineering College, Howrah, West Bengal, March 25-27, 2004	<b>Conf. proc.</b>
<b>22.</b>	<b>V. Dayal</b> , S. Keshri, P. K. Nayak, and S. Ravi Susceptibility of Bulk Bi-2223 Superconductor NCMA-2004 Kurukshetra University March 11-13, 2004	<b>Conf. proc.</b>
<b>23.</b>	<b>V. Dayal</b> and S. Keshri Study of some properties of Bi-2212 sample DAE Solid State Physics Symposium, Jiwaji University, December, 2003.	<b>Conf. proc.</b>

#### **Workshop**

<b>1.</b>	Two weeks main workshop on control system, National Mission on Education through Information and communication Technology, IIT kharagpur (December 2, 2015-12 Dec, 2015) (held at MITM)	<b>2015</b>	
<b>3.</b>	Faculty Development Program on “ <b>SHOCK WAVES AND MATERIALS SCIENCE</b> ” organised by VidyaVikas Institute of Technology, Mysore in association with Physics Association, Mysore held on 23 <sup>rd</sup> August 2014. Held at VidyaVikas Institute of Technology, Mysore.	<b>2014</b>	
<b>3.</b>	<b>ISTE WORKSHOP on <u>Introduction to Research Methodologies</u>, Conducted by Indian Institute of Technology, Bombay on 25<sup>th</sup> June to 04<sup>th</sup> July 2012. The workshop was held under the National Mission on Education through ICT (MHRD) at Maharaja Institute of Technology, Mysore</b>	<b>2012</b>	
<b>4.</b>	ISTE WORKSHOP on <u>AAKASH for Education</u> Conducted by Indian Institute of Technology, Bombay on 10 <sup>th</sup> and 11 <sup>th</sup> November 2012. The workshop was held under the National Mission on Education through ICT (MHRD) at Maharaja Institute of Technology, Mysore.	<b>2012</b>	
<b>5.</b>	Mission 10 X Education: VVIET Mysore (2 days, Dec 2013)	<b>2013</b>	
<b>6.</b>	Mission 10 X(Education): VVCE-Mysore (1 Day, June 2007)	<b>2007</b>	

<b>THESIS AND DISSERTATION:</b>	
Ph.D Thesis	<b>Transport and Magnetic Properties of BSCCO High Temperature Super conducting Samples and LCMO Manganites”:</b>
UGC Major Research Project)	“High Pressure Investigations on Oxide Superconductors to obtain higher Tc”,

**Professional Recognition/ Award/ Prize/ Certificate, Fellowship received by Dr. Vijaylakshmi Dayal:**

<b>item</b>	<b>Details</b>
<b>Award</b>	
Young scientist Research Award	<b>Department of Atomic Energy (DAE), Board of Research of Nuclear Sciences, India [Research Project Award-2011]</b>
Research Award	Rs 1,20,000 from Maharaja Institute of Technology- Mysore on 24/05/2011 in recognition of getting Young scientist Research Award from DAE, Board of Research of Nuclear Sciences, India
Travel Award	To visit CERN, Geneva, Switzerland. 2017
<b>Achievement</b>	
Academic	<b>M.Sc., University Topper[First class first]</b> Vinoba Bhave University- Jharkhand (2001)
Travel Grant	AICTE, BRNS and DST (Young Scientist) for attending International Conference of Young Researcher on Advance Materials [ICYRAM] 2012; Singapore [Claimed from AICTE]
<b>Reviewer</b>	
Journal	Journal of Applied Physics (American Institute of Physics (AIP) publications )
	Journal of Physics: Condensed Matter, [Institute of Physics (IOP), Publications]
	Journal of Magnetism and Magnetic Material (Elsevier Publications)
	Jourral of Physics and Chemistry (Elsevier Publications)
	Phase Transition (Taylor & Francis, USA)
	Blue Ocean Research Journal
Conference Proc.	Department of Atomic Energy - Solid State Physics Symposium ( <b>AIP Conference Proceedings</b> , American Institute of Physics (AIP) publications)
Book	“Engineering Physics”, published by Orient Longman Publications, Hyderabad ,Universities Press, (an associate of Orient Black Swan)
<b>Editor</b>	
Journal Pub.	Journal of Nano Materials, India

Journal Pub.	Blue Ocean Research Journal, India
<b>Research Guide (Approved Research Guide )</b>	
<b>Physics</b>	Vishwaraiya Technological University, Belgaum, Karnataka.
<b>Electronics</b>	University of Mysore, Mysore
<b>Convener</b>	
	State Level Paper presentation Competition 2011 at Maharaja Institute of Technology Mysore, held on 13 April 2011
<b>Interview</b>	
<b>Radio Programme</b>	<b>Interview aired by All india Radio , Mysore</b> on 24/06/2011 in recognition of getting Young scientist Research Award from DAE, Board of Research of Nuclear Sciences, India
<b>Member</b>	
<b>Chairman</b>	Sexual Preventions Harassment Committee, Maharaja Institute of Technology- Mysore, from June 2014-till date
Colloquium	Birla Institute of Technology, Mesra, Ranchi: 2003 & 2004

#### MEMBERSHIP IN SCIENTIFIC AND PROFESSIONAL SOCIETIES:

Sl. No.	Body	Year
1.	Material Research Society Singapore	(2012-2013)
2.	Indian Society of Technical Education	Life Member
3.	<b>International Association Of Advanced Materials</b> ( 771127291987)	5 Years
3.	Magnetic Society of India	Life Member( Applied)

#### LABORATORY EXPERIENCE:

##### SET UP:

- **TEACHING LABORATORIES:** For BE Course 06/10/14/15-PHYL17/27 laboratory, Dept. of Physics, Maharaja Institute of Technology. Mysore, Designed & wrote Laboratory Manual as per VTU Syllabus.
- **RESEARCH LABORATORIES:**
  - a. Advanced Research Centre, Department of Physics, MIT-Mysore (Recognized as research center from VTU-Belgaum in the year 2012)

- b. Installation of Helium Closed Cycle Refrigerator (Oxford Instruments Ltd), controlled by ITC-4 temperature controller (Oxford Instruments Ltd) for Resistivity & AC Susceptibility measurement, Dept. of Applied Physics, Birla Institute of Technology, Mesra, Ranchi, Jharkhand.

➤ **HANDLING DIFFERENT TYPES OF INSTRUMENTS, SYSTEMS, COMPUTERS:**

- (a) XRD: X-ray Diffractometer (Several)
- (b) SEM: Quanta 200 FEG scanning electron microscope
- (c) EDX : JEOL (Model: JSM-6390LV) SEM equipped with Oxford INCA (Model: DCL-7673) EDX spectrometer.
- (d) Helium Closed Cycle Refrigerator (Oxford Instruments Ltd), controlled by ITC-4 temperature controller  
For Resistivity and Ac Susceptibility measurement
- (e) TGA and DTA: Shimadzu thermal analyzer connected to a personal computer.
- (f) TEP apparatus indigenously fabricated at SINP, Kolkatta.
- (g) AC susceptibility: homemade susceptometer at IIT Guwahati, UGC-DAE-CSR, Indore
- (h) VSM: homemade susceptometer at UGC-DAE-CSR, Indore

**SOFTWARE KNOWLEDGE:**

- Working platform : Windows.
- Scientific Tools : Origin 7.0, Matlab 6.1, 7.5, 8.0, Mathcad 8, Mapple 8.
- Languages : C

**COURSES TAUGHT DURING ACEDEMIC PROFESSION:**

**I. VTU Syllabus (MIT- Mysore & VVCE, Mysore; as per VTU Syllabus)**

1. BE/UG: I & II Sem.PHY12/22 Engineering Physics: Modern physics, Quantum mechanics, Electrical conductivity, Dielectric & Magnetic Properties of Materials, Laser, Holography, Superconductivity, Optical Fibers, Crystal Structure, Ultrasonics, Nanomaterials : **Several**
2. B.E/U.G.,I & II Sem 10/06 PHYL17/27 Engineering Physics laboratory: **Several**

**II. Department of Applied Physics, Birla Institute of Technology, Mesra, Ranchi.**

3. BE/B.Tech./UG, I Sem Material Science (Tutorial): 5
4. BE/B.Tech./UG, I Sem : PH Physics Laboratory: 5

### III. Physics Department, S. R. S. College, Nawada, Bihar.

5. B.Sc./Part I/II/III/UG :Mechanics & Properties of Matter & Thermodynamics  
Electromagnetic Theory & Modern Physics Solid state physics& Electronics: 1
6. B. Sc/Part I, II III/UG Physics Laboratory:1

### REFERENCES:

1. **Prof Dr. S. Keshri**, Professor (Ph.D. Supervisor)  
Dept of Applied Physics, Birla Institute of Technology, Mesra, Ranchi, India Phone:  
916512275402 (O),  
Email: [s\\_keshri@bitmesra.ac.in](mailto:s_keshri@bitmesra.ac.in)
2. **Dr. Rajeev Rawat** (Scientist F)  
UGC-DAE-CSR- Indore centre, Khandawa Road, Indore  
Email: [rrawat@gmail.com](mailto:rrawat@gmail.com), [rrawat@csr.res.in](mailto:rrawat@csr.res.in)
3. **Prof Dr. B. G. Naresh Kumar, Principal**  
Maharaja Institute of Technology, Mysore  
Phone: 09620228021 (O), Email: [principal@mitmysore.in](mailto:principal@mitmysore.in)

### PERSONNEL PROFILE:

- Date of Birth : 27/11/1977
- Gender : Female
- Languages Known : English, Hindi and kannada
- Marital Status : Married
- Nationality : Indian
- Hobbies : Reading & Music.

Place: Mysore

Date:

(Dr. VijaylakshmiDayal)

## Research Plan and Accomplishment:

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### My research interests are:

- ✓ Study of Multiferroic Perovskite oxide in bulk (micro and nano scale) and thin films for fundamental science and functional device applications, like Solar cells, thermoelectric power generators, dielectric resonator antenna, etc.
- ✓ Study of high k dielectric material in bulk (micro and nano scale) and thin films for CMOS technology and memory device applications
- ✓ Dilute Magnetic semiconductors and its application towards spin transistors.
- ✓ Synthesis of Perovskite Oxides core shell structure and composites for sensors applications.
- ✓ Study of High Temperature Superconductor Perovskite oxides and its application as magnets.
- ✓ Hetrostructure of ferromagnetic Perovskite oxides thin films and piezoelectric thin films on Quartz, silicon and single crystalline oxide substrates and Influence of process conditions, strain engineering and interface engineering on domains.

Experimental techniques involve solid state and chemical route of synthesis, structural characterization (X-ray diffraction, Scanning Electron Microscopy, Energy dispersive X-ray analysis etc.) and physical property measurements (magnetic, magneto-electrical transport, and dielectric).

### MULTIFERROICS:

Multiferroics are typically perovskite transition metal oxides and present an interesting and potentially very important class of materials with coexisting ferroelectric and magnetic order. Increasing theoretical and experimental effort aims at unravelling the mechanism responsible for the extraordinary effect of multiferroicity and the discovery of novel materials with improved functionality. Multiferroic structures in bulk form are already being explored for high-sensitivity field sensors and electrically tunable microwave devices and oscillators.

Exploring the research interest in the field and to establish a lab for the growth of the samples, I received a Major Research Project supported by Department of Atomic Energy, Board of Research in Nuclear Sciences (BRNS) Government of INDIA; under Young Scientist Research Award via **Project sanction No: 2011/20/37P/01/BRNS**. My important recent works in the area of multiferroics includes the successful establishment of ferromagnetic and dielectric behaviour in Titanium doped Bismuth based lanthanum Manganites and is communicated in Peer Reviewed Journals. (Refer: List of Publications). A well-equipped sample Growth lab is established with

the financial assistance received. **Mr. Punith Kumar V. is carried out his Ph.D working under my Supervision in this area has been awarded Ph.D.**

#### **DILUTE MAGNETIC SEMICONDUCTORS:**

Development of ferromagnetic semiconductors is a key to the development of spintronics (or spin-based electronics). A variety of semiconductor materials, called diluted magnetic semiconductors (DMS) combine the two interesting properties: semiconducting and magnetic. Works on Stannates-ferrites composites is in progress. **Mr. Manju M. R. is carrying out his Ph.D work under my Supervision in this area.**

#### **PERVOSKITE OXIDE TOWARDS SOLAR CELL:**

Development of Perovskite oxide based electron transport layer (ECL) for Perovskite solar cell has opened a novel and distinctive strategy above the current leading technologies such as silicon and GaAs based solar cells. In addition, the devices based on these oxides have potential for low fabrication cost and simple process capability by fine band gap tuning using anion or cation substitution. The realization of higher photovoltaic conversion efficiency is to reduce the light loss reaching the photosensitive materials.

**I am carrying out novel properties of stannate (Sn) based Perovskite oxides in bulk and finite size thin films towards solar cell application.**

#### **METALLIC/INSULATING MANGANITE NANOCOMPOSITE:**

In array to endorse the technological applications of perovskite manganite, a great fundamental interest has been devoted to tailoring and/or enhancing their magneto-transport properties and the fabrication of manganite based nanocomposite which can offer great potential to tailor the magneto-transport properties at low magnetic field. My research program is also directed towards the study of electronic transport and magneto-transport properties of ferromagnetic (FM) manganite Oxide/ Charge ordered (CO) manganite oxide nano-composite. Based on presentation and recommendation of CSR committee financial grants has been sanctioned on project proposal entitled, **“Magnetic and Transport studies in Metallic/Insulating Manganite Nanocomposite”**. **CRS APPROVAL NO.:** CSR-IC/CRS-89/2014-2015/596 dt: 18.09.2014 by UGC DAE Consortium for scientific research, Indore under collaborative research scheme. **DURATION: 2014-2017. Mr: Ajay K. S. carrying out his Ph.D work under my Supervision in this area.**

## **HIGH TEMPERATURE SUPERCONDUCTIVITY:**

My research in the past focused on the properties of various strongly-correlated electronic materials, e.g., high- $T_c$  cuprate superconductors (HTS) and colossal Magnetoresistive manganites (CMR). My Ph.D. thesis was completed in the year 2008 and I executed a detailed investigation of the transport and magnetic properties of these materials. In my work on based on HTS, have grown successfully the single phase Bi-2223 HTS sample. By irradiating the samples with High Energetic Gamma Rays we were report on increase of critical current density with increasing radiation dose anal used using low field AC susceptibility measurements. I have plans to study the effect of Fe-ion implantation on HTS and its effect on Transport properties as recently Fe-based superconductor finds significant interest for the researchers. **For the Proposed Work, Ms. Rashmi P. is carrying out her Ph.D work.**

## **NANO-SCALE CHARGE ORDERED MANGANITES:**

The occurrence of charge ordering (CO) in doped perovskite manganites (where Ln is trivalent rare earth ion and A is divalent alkaline earth ion) is currently most studied phenomenon. The charge ordered state is characterized by a long range ordering of Mn<sup>3+</sup> and Mn<sup>4+</sup> ions, is the result of complicated competition between Coulomb interactions (between charges), exchange interactions (between Mn moments) and electron-lattice coupling through Jahn-Teller distortions of oxygen octahedron surrounding the Mn<sup>3+</sup> ion. It has been shown that the CO phase is unstable to magnetic and electric field, impurity ion doping, disorder and stress. The available literatures show that the CO state can also be destabilized by reduction of size of the particle (or grains) and exhibit some anomalous phenomenon which is in distinction to the bulk. Studies on Nano sized electron-doped manganites could, therefore, further explore the source of anomalous electronic and magnetic phenomena. I have plans to investigate the structural, electrical and magnetic properties of nano-structured electron-doped perovskite manganite, in which CO-AFM characteristic are believed to be stable in bulk form. **Project proposal Submitted.**

## **STUDIES OF HIGH TEMPERATURE THERMOELECTRIC PROPERTIES OF OXIDE SEMICONDUCTORS AND THEIR APPLICATION FOR POWER GENERATOR:**

Providing a sustainable supply of energy is likely to be the foremost scientific challenge in decades to come. The way out to the climate and environmental problems rely on an intensive endeavor to widen our energy resources. Novel and superior functional materials are significant mechanism in efforts to successfully harvest energy from alternative energy resources. One component in the novel energy environment is thermoelectric materials to produce electricity from waste heat, and as efficient solid state refrigerators and heat-pumps. The performance of thermoelectric material towards energy conversion (or generation) rests on intrinsic material



characteristic which is scarcely tunable and hence limited. In order to realize an efficient thermoelectric energy conversion material, it must be a good conductor of electricity, a poor conductor of heat and large Seebeck coefficient. **Work on cobalties oxides in Progress.**

### **STRAIN MEDIATED ELECTRICAL CONTROL OVER MAGNETISM:**

**The** coupling of magnetic and electric order parameters, i.e., the magnetoelectric effect, has been widely studied for its intriguing physical principles and potentially broad industrial applications. The important interactions between ferroic orderings— ferromagnetism, ferroelectricity and ferroelasticity—will enable the manipulation of one order through the other in miniaturized materials, and in so doing stimulate emerging technologies such as spintronics, magnetic sensors information storage etc. The study of ferromagnetic-ferroelectric heterostructures that are able to magnetoelectrically couple via interface elastic strain, the various challenges associated with the lack of single-phase multiferroic materials can be overcome and the magnetoelectric (ME) coupling effect can be substantially enhanced. Compared with magnetic field-controlled electric phenomena (i.e., the direct magnetoelectric coupling effect), the converse magnetoelectric effect (CME), whereby an electric field manipulates magnetization, is more exciting due to easier implementation and handling of electric fields or voltages. The study in this project proposal involves exploring the strain mediated electric field manipulation of magnetization in ferroelectric-ferromagnetic heterostructures, **Project proposal Approved by DST.**