

## Curriculum Vitae

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**Dr. M. BALAJI, M.Sc., M.Phil., Ph.D., P.G.D.C.A.**  
**Assistant Professor**  
**Department of Physics**  
**Sourashtra College**  
**Madurai – 625 004.**

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## EDUCATIONAL QUALIFICATIONS

**Ph.D. in Physics - May 2012 - (Highly Commended)**

Manonmaniam Sundaranar University  
Tirunelveli – 627 012, Tamil Nadu, India

**M. Phil. in Physics – August 2010**

Madurai Kamaraj University  
Madurai – 625 021, Tamil Nadu, India.

**M.Sc. in Physics – April 2006**

N.M.S.S.Vellaichami Nadar College  
Nagamalai, Madurai – 625 019, Tamil Nadu, India.

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## ADDITIONAL RESPONSIBILITIES

- **NSS programme officer for the Unit No. – 31 from 16.06.2016 to till date**

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## EMPLOYMENT BACKGROUND

- ❖ **Assistant Professor** in Department of Physics, Sourashtra College, Madurai – 625 004, Tamil Nadu, India **from 26.06.2013 to till date.**
- ❖ **Temporary Lecturer** at Department of Physics, Manonmaniam Sundaranar University, Tirunelveli – 627 012, Tamil Nadu, India **from 31.08.2012 to 04.04.2013.**
- ❖ **P.G. Assistant** at Sri Aurobindo Mira Mat. Hr.Sec. School, #108, Nehru Nagar, By-Pass road, Madurai – 625010, Tamil Nadu, India **from 26.07.2006 to 13.04.2007.**

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## **TRAINING PROGRAMME**

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- **Faculty Development Programme on “Teaching Methods and Inter-Personal Relationships”** held at Sourashtra College, Madurai on 15.03.2014.
- **“Faculty Training and Motivation Program (FTMP) – International Year of Crystallography”, (IYCR – 2014)** held at Central Electrochemical research institute (CECRI), Karaikudi during 08.09.2014 to 10.09.2014.
- **“UGC sponsored 104<sup>th</sup> Orientation program for Teachers”** held at UGC-Acadamic staff college, Bharathiar University, Coimbatore during 06.11.2014 to 03.12.2014.
- **“One day Orientation Programme to Teachers on Teacher Effectiveness”** held at Sourashtra College, Madurai on 07.03.2015.
- **Summer School – Refresher Course on Physics** held at UGC-Human Resource Development Centre, University of Madras, Chennai – 5 during 23.05.2017 to 12.06.2017
- **“One day faculty development programme on “Management of Self-A Holistic Approach”** held at Sourashtra College, Madurai on 29.08.2017.
- **National Service Scheme (NSS) – Orientation training programme** held at Empanelled Training Institution, Avinashilingam University, Coimbatore during 18.01.2018 to 24.01.2018.

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## **MEMBER OF EDITORIAL BOARD**

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- Editor in the **“International Journal of Current Science Research” (IJCSR)**  
**Dr. BGR Publications, 6/111,B 63,Mahalakshmi Nagar, Mutthaiyapuram,**  
**Tuticorin-628005, Tamil Nadu, India.**  
**ISSN: 2454-5422.**  
<http://www.drbgrpublications.in/physics.php>

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## HONOURS/AWARDS

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- Awarded Project Fellowship from “**Inter University Accelerator Centre, New Delhi**”, India during 16<sup>th</sup> may 2007 - 15<sup>th</sup> may 2010.
- Awarded Senior Research Fellowship from “**DAE-BRNS, New Delhi**”, India during 20<sup>th</sup> July 2010 – 30<sup>th</sup> September 2010.
- “**Materials Research Society of India Prize**” for the **Best Poster Paper** entitled “Influence of electron beam irradiation on cationic migration and structural morphology of CuCoFe<sub>2</sub>O<sub>4</sub> nanoparticles” during the 20<sup>th</sup> AGM of MRSI held on 10<sup>th</sup> February 2009 at Kolkata.
- **Best paper award** for the paper “Transformation of spinel to inverse spinel copper ferrite prepared by co-precipitation technique” presented at the “National Conference on Materials: Nano to Macro dimensionality and their varied Applications held at Department of Chemistry, Manonmaniam Sundaranar University, Tirunelveli during 28-29 January 2010.
- **Best Paper award** for the paper “Structural and optical properties of CuSn, CuZr, SnZr and CuSnZr thin films” presented at the “National conference on preparation and characterization on crystalline materials” (NCPCCM 2017) held at PG & Research department of physics, Government Arts college (Grade I), Tiruvannamalai – 606 603, Tamil Nadu during 5-6 September 2017.

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## PROFESSIONAL ACTIVITIES

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### Seminar organized

- **Convener for the One day National Seminar on “RECENT TRENDS IN PHYSICS (NSRT-2019)”** held on 13<sup>th</sup> February 2019 at Silver Jubilee Hall, Sourashtra College, Madurai-625 004, Tamil Nadu.
- **Co-convener for the One day students seminar on “RECENT TRENDS IN PHYSICS”** held on 26<sup>th</sup> February 2015 at Silver Jubilee Hall, Sourashtra College, Madurai-625 004, Tamil Nadu.
- **Organizing Committee Member** for the “**National seminar on Structural Bioinformatics - 2013**” held on 15<sup>th</sup> March 2013 at Department of Physics, Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu.

### Invited Talk:

- ❖ “**Core-Shell Nanocomposites in Bio-medical applications**”, talk delivered in Physics Association organized by Department of Physics, Sri Sarada College for Women, Tirunelveli-11 on 14<sup>th</sup> September 2012.

- ❖ “The Recent evolution of magnetic nanocomposites” talk delivered in P.G. Department of Physics, Sourashtra College, Madurai – 625 004 on 05<sup>th</sup> October 2013.
- ❖ “Physics in Everyday life” talk delivered in Physics Association organized by Department of Physics, Senthamarai College of Arts and Science, Madurai -21 on 21<sup>st</sup> January 2016.
- ❖ “Nanomagnetism” talk delivered in Physics Association organized by Department of Physics, Senthamarai College of Arts and Science, Madurai -21 on 23<sup>rd</sup> December 2016.

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## MEMBERSHIP OF LEARNED ACCREDITED BODY




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 **Magnetism Society of India**

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## EXTRA CURRICULARS

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-  **Post Graduate Diploma in Computer Application (PGDCA)**
-  **C with Graphics (CWG)**
-  **National service scheme (NSS)**

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## RESEARCH PROJECT

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1. Title : “Effect of SnO<sub>2</sub> addition on magnetic manganese copper ferrite nanoparticles for gas sensor application”  
Source : University Grants Commission – Minor Research Project  
Period : Two years (2014-2016)  
Amount : Rs. 5,00,000/-  
Principal Investigator: Dr. M. Balaji

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## PROJECT GUIDED

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**Number of M.Phil. candidates** - **Four completed**

1. Synthesis and characterization of CaFe<sub>x</sub>Mn<sub>1-x</sub>O<sub>3-δ</sub> & BaFe<sub>x</sub>Mn<sub>1-x</sub>O<sub>3-δ</sub> Perovskite films (Selvi. B. Lalitha Maheswari – 2015)
2. Structural and Magnetic behaviour of Mn<sub>(1-x)</sub>Cu<sub>(x)</sub>Fe<sub>2</sub>O<sub>4</sub> Nanoparticles (Mr. R.A. Jeyaram – 2015)
3. Synthesis and characterization of Ca<sub>x</sub>Ba<sub>1-x</sub>MnO<sub>3-δ</sub> Perovskite materials. (Mr. C. Muthuselvam -2015)

4. Preparation and characterization of CuSn, CuZr, SnZr and CuSnZr thin films deposited by Successive Ionic Layer Adsorption and Reaction method.  
(Selvi. S. Chitra Devi – 2017)

**Number of M.Sc. Candidates** - **Five completed**

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## RESEARCH AREAS

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- 👍 **Surface Sciences**
- 👍 **Magnetic Materials**
- 👍 **Perovskite Materials**
- 👍 **Nanomaterials, Thin films**
- 👍 **Conducting Polymers**
- 👍 **Irradiation Effect**
- 👍 **Antibacterial Studies**

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## PAPERS PUBLISHED IN INTERNATIONAL JOURNALS

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**Research papers published in International journals** - **14 nos.**

- 1) Sensing properties of polyoxomolybdate doped polyaniline nanomaterials for oxidising and reducing volatile organic compounds.  
P.Chitra lekha, **M. Balaji**, S. Subramanian and D. Pathinettam Padiyan  
Current Applied Physics 10 (2010) 457-467 (Impact Factor: 1.740)
- 2) High-energy ion induced physical and surface modifications in antimony sulphide thin films  
S. Subramanian, **M. Balaji**, P. Chithra Lekha, K. Asokan, D. Kanjilal, Indra Sulania, Jai Prakash, D. Pathinettam Padiyan  
Current Applied Physics 10 (2010) 1112-1116 (Impact Factor: 1.740)
- 3) Electron beam induced modifications of Bismuth sulphide (Bi<sub>2</sub>S<sub>3</sub>) thin films : Structural and optical properties  
S.Subramanian, **M. Balaji**, P.Chithralekha, Ganesh Sanjeev, E.Subramanian, D.PathinettamPadiyan  
Radiation Physics and Chemistry 79 (2010) 1127–1131 (Impact Factor: 1.149)
- 4) Electronic structure studies of nanoferrites Cu<sub>x</sub>Co<sub>1-x</sub>Fe<sub>2</sub>O<sub>4</sub> (0.0 ≤ x ≤ 1.0) by X-ray absorption spectroscopy  
Sanjeev Gautam, S. Muthurani, **M.Balaji**, K.H. Chae, D.Pathinettam Padiyan, S.S. Kim, K. Asokan  
Journal of Nanoscience and Nanotechnology 11 (2011) 386–390. (Impact Factor: 1.929)

- 5) Effect of swift heavy ion irradiation on the structural and morphological aspects of copper ferrite nanoparticles  
**M. Balaji**, D. Pathinettam Padiyan, M. Manivel Raja, K. Asokan, D. Kanjilal  
International Journal of Nanoscience 10(1) (2011) 1 – 5.
- 6) Effect of thermal spike energy created in  $\text{CuFe}_2\text{O}_4$  by 150 MeV  $\text{Ni}^{11+}$  swift heavy ion irradiation  
**M. Balaji**, M. Manivel Raja, K. Asokan, D. Kanjilal, T. R. Rajasekaran and D. Pathinettam Padiyan  
Nuclear Instruments and Methods in Physics Research B 269 (2011) 1088–1093.  
(Impact Factor: 1.042)
- 7) Magnetic and Humidity-Sensing Properties of Nanostructured  $\text{Cu}_x\text{Co}_{1-x}\text{Fe}_2\text{O}_4$  Synthesized via Autocombustion  
S. Muthurani, **M. Balaji**, S. Gautam, K. H. Chae, J.-H. Song, D. P. Padiyan, K. Asokan  
Journal of Nanoscience and Nanotechnology 11 (2011) 5850-5855. (Impact Factor: 1.929)
- 8) Influence of 150 MeV  $\text{Ni}^{11+}$  swift heavy ion irradiation on  $\text{CuFe}_2\text{O}_4$  thin films prepared by radio frequency magnetron sputtering: Modification on structure and surface morphology  
**M. Balaji**, K. Asokan, D. Kanjilal, C. Sanjeeviraja, T.R. Rajasekaran, D. Pathinettam - Padiyan  
Thin Solid Films 520 (2011) 204–211 (Impact factor: 1.909)
- 9) Core-shell structure in copper ferrite-polyaniline nanocomposite: Confirmation by laser Raman spectra  
**M. Balaji**, P. Chithra Lekha, D. Pathinettam Padiyan  
Vibrational Spectroscopy 62 (2012) 92– 97 (Impact factor: 2.083)
- 10) Effect of exposure to electron beam irradiation in biopolymer papain and their electrical behaviour  
S. Muthulakshmi, P.Chithralekha, **M. Balaji**, Ganesh Sanjeev, D.PathinettamPadiyan  
Indian Journal of Pure and Applied Physics 51 (2013) 33-38 (Impact factor: 0.763)
- 11) Effect of  $\text{Mn}^{2+}$  substitution on the structural, morphological and magnetic properties of copper ferrite nanoparticles  
**M. Balaji**, R. A. Jeyaram, S. Chandrasekaran, B. Lalitha Maheswari  
Materials Technology : Advanced Performance Materials 32(6) 2017 378-384  
(Impact factor: 1.28)
- 12) Enhanced performance of  $\text{SnO}_2\text{-Mn}_{(1-x)}\text{Cu}_{(x)}\text{Fe}_2\text{O}_4$  gas sensors towards carbon dioxide and oxygen  
**M. Balaji**, R.A. Jeyaram, P. Matheswaran  
Journal of Alloys and Compounds 696 (2017) 435 – 442 (Impact factor: 3.133)

- 13) Structural and antibacterial effect of  $\text{CaFe}_x\text{Mn}_{1-x}\text{O}_{3-\delta}$  &  $\text{BaFe}_x\text{Mn}_{1-x}\text{O}_{3-\delta}$  Perovskite films  
**M. Balaji**, B. Lalitha Maheswari and R.A. Jeyaram  
International Journal of MediPharm Research 03(1) (2017) 178-186.
- 14) Preparation and characterization of CuSn, CuZr, SnZr and CuSnZr thin films deposited by SILAR method.  
**M. Balaji**, S.Chitra Devi, A.K. Balasubramanian and N.R. Senthil Kumar  
Vacuum 161 (2019) 338-346.

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#### BOOK CHAPTER PUBLICATION

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- 1) ENVIRONMENTAL STUDIES (ISBN No. – 978-81-929458-1-1)  
K.M. Poornima, K.P. Gnanesh, G.R. Shyamala, **M. Balaji**, M. Rajasekaran and M. Venkatesan  
Shanlax press, Madurai – 625003. (Page No. 1-22)

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#### RESEARCH PAPER PUBLISHED IN EDITED VOLUME

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- 1) **The 10<sup>th</sup> Tamil Science Association seminar proceedings (ISBN No. – 938062717-3)**  
Characterization of copper ferrite thin films prepared using rf magnetron sputtering  
**M. Balaji** and D. Pathinettam padiyan

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#### PAPERS PRESENTED IN CONFERENCE/ SEMINARS/SYMPOSIA

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Research Papers presented in Conference / Seminars / Symposia : 23

1. B.Sc project “**Simple Transistor Tester**” was displayed and presented in the seminar “At the Interface cutting edge the research” held at Subbalakshmi Lakshmi Pathy College of science, Madurai, Tamil Nadu, India at 8<sup>th</sup> March 2004.
2. **Influence of electron beam irradiation on cationic migration and structural morphology of  $\text{CuCoFe}_2\text{O}_4$  nanoparticles**  
**M. Balaji**, D. Pathinettam Padiyan  
Materials Research Society of India 20<sup>th</sup> AGM held at Saha Institute of Nuclear Physics, Kolkata, West Bengal, India during 10-12, February 2009.
3.  **$\text{CuCoFe}_2\text{O}_4$  ferrite: Morphological aspects and Magnetic properties**  
**M. Balaji**, D. Pathinettam Padiyan  
National Seminar on Advances in Materials Science, held at Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu, India during 16-17, March 2009.

4. **Effect of swift heavy ion irradiation on the structural and magnetic properties of CuFe<sub>2</sub>O<sub>4</sub> nanoparticles**  
**M. Balaji**, M. Manival Raja, K. Asokan, D. Kanjilal, D. Pathinettam Padiyan  
International Conference on Advanced Nanomaterials and Nanotechnology, held at IIT, Guwahati, Assam, India during 9-11, December 2009.
5. **Influence of 150 MeV Ni<sup>11+</sup> swift heavy ion irradiation on the structure and surface topography of CuFe<sub>2</sub>O<sub>4</sub> thin films**  
**M. Balaji**, K. Asokan, D. Kanjilal, C. Sanjeeviraja, T.R. Rajasekaran, D. Pathinettam Padiyan,  
54<sup>th</sup> DAE Solid State Physics Symposium, held at Maharaja Sayajirao University of Baroda, Vadodara, India during 14-18, December 2009.
6. **Transformation of spinel to inverse spinel copper ferrite prepared by co-Precipitation technique**  
**M. Balaji**, C. Sanjeeviraja, D. Pathinettam Padiyan  
National Conference on Materials: Nano to Macro dimensionality and their varied Applications, held at Department of chemistry, Manonmaniam sundaranar University, Tirunelveli, Tamil Nadu, India during 28-29, January 2010.
7. **Effect of 150 MeV Ni<sup>11+</sup> Swift Heavy Ion irradiation in CuFe<sub>2</sub>O<sub>4</sub> thin films prepared by rf magnetron sputtering**  
**M. Balaji**, K. Asokan, D. Kanjilal, C. Sanjeeviraja and D. Pathinettam Padiyan  
National conference on Magnetic Materials and Applications (MAGMA - 2012), held at Thigarajar Engineering College, Madurai, Tamil Nadu, India during 20-21, January 2010.
8. **Understanding electronic structure of (Co, Cu) ferrite by x-ray absorption fine Structure**  
Sanjeev Gautam, S Muthurani, **M. Balaji**, D. Pathinettam Padiyan, K.H. Chae, S.S. Kim, K. Asokan  
The 7<sup>th</sup> International Nanotech Symposium (Nano Korea 2009), held at Seoul, South Korea during 26-28, August 2009.
9. **Characterization of copper ferrite thin films prepared using rf magnetron sputtering**  
**M. Balaji**, D. Pathinettam Padiyan  
The 10<sup>th</sup> Tamil Science Association seminar, held at Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu, India during 21-23, May 2010.
10. **Analysis of core - shell structured copper ferrite – polyaniline nanoparticles using Raman studies**  
**M. Balaji**, D. Pathinettam Padiyan  
XXXIX National Seminar on Crystallography (NSC - 2010), held at University of Jammu, Jammu Tawi, India during 25-27, October 2010.



**11. Synthesis of core-shell structured copper ferrite – polyaniline nanocomposites and its characteristics**

**M. Balaji**, D. Pathinettam Padiyan

National Seminar on Advances in Physics (NSAP-2011), held at Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu, India during 10-11, March 2011.

**12. Synthesis and magnetic properties of copper ferrite-polyaniline nanocomposites**

**M. Balaji**, P. Chithra Lekha, D. Pathinettam Padiyan

National conference on Magnetic Materials and Applications (MAGMA - 2012), held at IIT Madras, Chennai, Tamil Nadu, India during 12-13, March 2012.

**13. Synthesis and characterization of copper ferrite-polyaniline nanocomposites:**

**Dielectric and Thermal properties**

**M. Balaji**, D. Pathinettam Padiyan

International Conference on Materials and Characterization Techniques (ICMCT-2014), held at VIT University, Vellore, India during 10-12, March 2014.

**14. Spider net like structure of MnO decorated MWCNT by facile synthesis**

R. Ramesh Kannan, Sundaram Chandrasekaran, **M. Balaji**, M. Sivabharathy

Nano India (NANO 2015), held at Sastra University, Thanjavur, Tamil Nadu, India during 29-30, January 2015.

**15. Synthesis and structural behavior of  $Mn_{(1-x)}Cu_{(x)}Fe_2O_4$  Nanoparticles**

**M. Balaji**, R.A. Jeyaram, B. Lalitha Maheswari, C. Muthu Selvam

National Conference of Recent Trends and advances in Physics (NCRTAP-2015) held at The M.D.T. Hindu College, Tirunelveli – 10, Tamil Nadu, India during 19-20, February 2015.

**16. Effect of  $Mn^{2+}$  substitution on the structural, morphological and magnetic properties of copper ferrite nanoparticles**

**M. Balaji**, R.A. Jeyaram, B. Lalitha Maheswari, C. Muthu Selvam

International Conference on Nanomaterials for Frontier Applications” (ICNFA 2015) held at Department of Physics, Coimbatore Institute of Technology, Coimbatore, Tamil Nadu, India during 2-4, December 2015.

**17. Structural and Antibacterial effect of  $CaFe_xMn_{1-x}O_{3-\delta}$  and  $BaFe_xMn_{1-x}O_{3-\delta}$  Perovskite films**

**M. Balaji**, B. Lalitha Maheswari, R.A. Jeyaram, C. Muthu Selvam

International Conference on Nanomaterials for Frontier Applications” (ICNFA 2015) held at Department of Physics, Coimbatore Institute of Technology, Coimbatore, Tamil Nadu, India during 2-4, December 2015.

**18. Synthesis and Characterization of  $\text{Ca}_x\text{Ba}_{1-x}\text{MnO}_{3-\delta}$  Perovskite materials**

**M. Balaji**, R. A. Jeyaram and C. Muthuselvam

International conference on Advances in Functional Materials (ICAFM-2017) held at Anna University, Chennai – 600025, Tamil Nadu, India during 6-8 January 2017.

**19. Gas sensing properties of  $\text{SnO}_2$  combined Cu-Mn ferrite nanocomposites**

**M. Balaji**, R. A. Jeyaram, P. Madheswaran and A. K. Balasubramanian

International workshop on Advanced Functional Materials And Devices (IWAfMD-2017) held at Manonmaniam Sundaranar University, Tirunelveli-627 012, Tamil Nadu, India during 8-12, January 2017.

**20. Synthesis and characterization of CuO And Al Doped CuO films Prepared By Sol – Gel Spin coating technique**

**M. Balaji**, A.K. Balasubramanian and S. Chithra Devi

National Conference on Emerging trends in Materials 2017 held at Mary Matha College of Arts and Science, Periyakulam East – 625604, Tamil Nadu, India on 6<sup>th</sup> March 2017.

**21. Effect of  $\text{Al}^{3+}$  Ions on  $\text{SnO}_2$  Materials**

**M. Balaji**, A. K. Balasubramanian and V. Anjali Devi

National Conference on Emerging trends in Materials 2017 held at Mary Matha College of Arts and Science, Periyakulam East – 625604, Tamil Nadu, India on 6<sup>th</sup> March 2017.

**22. Structural and optical properties of CuSn, CuZr, SnZr AND CuSnZr thin films**

**M. Balaji**, S. Chithra Devi, A.K. Balasubramanian and N.R. Senthil kumar

National conference on preparation and characterization on crystalline materials (NCPCCM 2017) held at PG & Research department of physics, Government Arts college (Grade I), Tiruvannamalai – 606 603, Tamil Nadu during 5-6 September 2017.

**23. ‘Heat Trap’ using Carbon nanotubes: Efficient energy transfer**

S.Ramanan, V.L.Vishwa Kiran and **M. Balaji**

State Level Intercollegiate students’ seminar (Energy Fest - 2017) held at Thiagarajar College, Madurai – 625009, Tamil Nadu, India on 09.09.2017.