

## Curriculum Vitae

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**Dr. M. BALAJI, M.Sc., M.Phil., Ph.D., P.G.D.C.A.**

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Department of Physics  
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Madurai – 625 004.**

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## EDUCATIONAL QUALIFICATIONS

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

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

**M. Phil.in Physics – November 2009**

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

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- **NSS programme officer for the Unit No. – 31 from 16.06.2016 to 17.06.2019 (Three academic years).**
- **Students Induction Programme (SIP) - Co-ordinator from 09.05.2019 to 17.07.2022 (Three academic Years).**
- **Intellectual Property rights Cell (IPRC) – Director from 05.08.2021 to 19.06.2023 (Two academic years).**
- **National Assessment and Accreditation Council (NAAC) – Criteria III – Convener from 08.03.2021 to till date.**
- **Dean of Research from 18.07.2022 to till date.**
- **Nodal Officer for All India survey on Higher Education (AISHE) and National Institutional Ranking Framework (NIRF) from 19.06.2023 to till date.**

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## **EMPLOYMENT BACKGROUND**

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- ❖ **Recognized as a supervisor to guide Ph.D. registrants in Physics** under Madurai Kamaraj University from 14.06.2016 (**ID No. 1492**)
- ❖ **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 Aurobino 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.
- **Three days workshop – Training of Teachers (TOT) for Students Induction Programme (SIP)** held at IIIT, Gachibowli, Hyderabad from 16.05.2019 to 18.05.2019.
- **Online workshop entitled “Evidence based teaching and Learning Strategies in higher Education”** from 13<sup>th</sup> May 2020 to 15<sup>th</sup> May 2020 organized by CREATES, IISER Bhopal under the **PMMMNTT scheme of MHRD.**

## *Curriculum Vitae*

- **Two weeks faculty development programme on “Managing online classes and Co-creating MOOCS:2.0”** from 18<sup>th</sup> May 2020 to 03<sup>th</sup> June 2020 organized by Teaching Learning Centre, Ramanujan College, University of Delhi under the **PMMMNMTT scheme of MHRD**.
- **One week faculty development programme on “Open Source Tools for Research”** from 8<sup>th</sup> June 2020 to 14<sup>th</sup> June 2020 organized by Teaching Learning Centre, Ramanujan College, University of Delhi under the **PMMMNMTT scheme of MHRD**.
- **Faculty development Programme on “Nanomaterials Characterization Techniques and Results Analysis Methodology: Ideas, Innovation & Initiatives (Physics)” of five days (30 contact hours) duration** from 27.07.2020 to 31.07.2020 conducted by **MHRD’s Faculty Development Centre, UGC-Human Resource Development Centre, Savitribai Phule Pune University, Pune under the PMMMNMTT scheme**.
- **UGC sponsored online Refresher course in Physics** conducted by UGC-HRDC, Gujarat University, Ahmedabad – 380009 during 07.09.2020 to 20.09.2020.
- **Faculty development Programme on “E-Content development”** conducted by Sourashtra college, Madurai on 10.02.2022.
- **Two days “In-Service Teacher Training” programme in Physical sciences** held at Sri Meenakshi Governement Arts college for women (A), Madurai. On 05.05.2022 and 06.05.2022 conducted by Tamilnadu State Council For Higher Education (TANSICHE), Chennai – 600005.
- **UGC sponsored online Refresher course in Physics** conducted by UGC-HRDC, Gujarat University, Ahmedabad – 380009 during 21.06.2022 to 04.07.2022.
- **Two weeks faculty development programme on “Managing online classes and Co-creating MOOCS:32.0”** from 11<sup>th</sup> November 2023 to 25<sup>th</sup> November 2023 organized by Teaching Learning Centre, Ramanujan College, University of Delhi under the **PMMMNMTT scheme of MHRD**.

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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.

## *Curriculum Vitae*

- **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, ManonmaniamSundaranar University, Tirunelveli during 28-29 January 2010.
- **Best Paper award** for the paper “Structural and optical properties of CuSn, CuZr, SnZrand 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.
- **“Professor of the Year”** award received from the Sourashtra College, Madurai for securing maximum attendance in the academic year 2016-2017.
- **Best Paper award** for the paper “The effect of temperature on Magnetic behaviour of copper ferrite nanocomposites” presented at “International conference on Physics of Advanced materials and Molecules (ICPAMM – 2020)” held at Dr. Ambedkar Government Arts college, Vyasarpadi, Chennai on 30 and 31<sup>st</sup> January 2020.

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## **PROFESSIONAL ACTIVITIES**

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### **Seminar organized**

- **CONVENER** for the **ONE DAY NATIONAL SEMINAR ON “INTELLECTUAL PROPERTY RIGHTS”** held on 14<sup>th</sup> October 2022 at Silver Jubilee Hall, Sourashtra College, Madurai-625 004, Tamil Nadu.
- **ONE DAY FACULTY DEVELOPMENT PROGRAMME ON “EXPLORATION OF EFFECTIVE JOURNALS AND FUNDING AGENCIES”** held on 22.03.2022 jointly organized by Intellectual Property rights Cell (IPRC) & Internal Quality Assurance Cell (IQAC), Sourashtra College, Madurai – 625004, Tamil Nadu.
- **CONVENER** for the **ONE DAY INTERNATIONAL WEBINAR ON “RECENT TRENDS IN PHYSICS (IWRT-2020)”** held on 28<sup>th</sup> November 2020 conducted by Department of Physics, Sourashtra College, Madurai – 625004, Tamil Nadu.
- **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.

## *Curriculum Vitae*

- **CO-CONVENER for the STATE LEVEL SEMINAR ON “ROLES AND RESPONSIBILITIES OF NSS IN THE SOCIETY”** held on 15<sup>th</sup> September, 2018 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.

### **Online E-Quiz organized:**

- **CONVENER** for the **NATIONAL LEVEL ONLINE E-QUIZ ON “APPLIED PHYSICS”** conducted by Department of Physics, Sourashtra College, Madurai – 625004, Tamil Nadu **from 3<sup>rd</sup> August 2020 to 5<sup>th</sup> August 2020.**

### **Value added/Certificate course conducted:**

- **VALUE ADDED COURSE** (30 hours) conducted for third year B.Sc. Physics students entitled “**WIRING AND REPAIRING OF DOMESTIC APPLIANCES**” by the Department of Physics, Sourashtra College, Madurai – 625004, Tamil Nadu for the academic year 2021 – 2022, 2022 – 2023 and 2023 – 2024 (three years).
- **CERTIFICATE COURSE** (30 hours) conducted for B.Sc. Physics students entitled “**DATA ANALYSIS AND SCIENTIFIC MODELING**” by the Department of Physics, Sourashtra College, Madurai – 625004, Tamil Nadu in the academic year 2023 - 2024.

### **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.

## *Curriculum Vitae*

- ❖ **“Magnetic Nanocomposites in Gas Sensor Application”** talk delivered in Physics Association organized by Department of Physics (SF), Nadar MahajanaSangam S. VellachamyNadar College, Madurai – 625019 on 25<sup>th</sup> November 2021.
- ❖ **“Selection of effective Journal for research publication”** talk delivered in One day faculty development programme on “Exploration of effective journal publication and funding agencies” was jointly organized by the Intellectual Property Rights Cell (IPRC) and Internal Quality Assurance cell (IQAC), Sourashtra College, Madurai on 22.03.2022.
- ❖ **“Physics in Everyday life”** talk delivered in Physics Association organized by PG & Research Department of Physics, Nadar MahajanaSangamS. VellachamyNadar College, Madurai – 625019 on 29<sup>th</sup> March 2022.
- ❖ **“Enhanced performance of Magnetic-Semiconductor Nanocomposites for Gas Sensor Applications”** talk delivered in “7<sup>th</sup> International Conference on Recent Innovations in Modern Science and Technology (ICRIMST – 2024) organized by Department of Physics, KPR Institute of Engineering and Technology, Coimbatore in association with Elavenil Organization, Indian Association for Crystal Growth (IACG) and Indian Spectroscopic Association (ISPA) on 09 – 11 January 2024.

### **Chair person:**

- Acted as a **Chair Person** in International Conference on “Recent advancement in Material Science and its Applications” – ICRAMSA '23 organized by Research centre and PG department of Physics, Mannar Thirumalai Naicker College (Autonomous), Madurai, Tamil Nadu, India. on 11 and 12<sup>th</sup> January 2023.

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## **MEMBERSHIP OF LEARNED ACCREDITED BODY**

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**Magnetics Society of India**



**Elavenil – Indian Science and Technology Association**

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## **EXTRA CURRICULARS**

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- ↻ **Post Graduate Diploma in Computer Application (PGDCA)**
- ↻ **C with Graphics (CWG)**
- ↻ **Certificate in Gandhian thought (CGT)**
- ↻ **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.Chitralekha, **M.Balaji**, S. Subramanian and D. Pathinettam Padiyan

Current Applied Physics 10 (2010) 457-467 (Impact Factor: 2.48)

## *Curriculum Vitae*

2) High-energy ion induced physical and surface modifications in antimony sulphide thin films

S. Subramanian, **M. Balaji**, P. ChithraLekha, K. Asokan, D. Kanjilal, Indra Sulania, Jai Prakash, D.PathinettamPadiyan

Current Applied Physics 10 (2010) 1112-1116(Impact Factor: 2.48)

3) Electron beam induced modifications of Bismuth sulphide ( $\text{Bi}_2\text{S}_3$ ) thinfilms:Structural and optical properties

S.Subramanian,**M.Balaji**,P.Chithralekha,GaneshSanjeev,E.Subramanian,  
D.PathinettamPadiyan

Radiation Physics and Chemistry 79 (2010) 1127–1131(Impact Factor: 2.858)

4) Electronic structure studies of nanoferrites  $\text{Cu}_x\text{Co}_{1-x}\text{Fe}_2\text{O}_4$  ( $0.0 \leq x \leq 1.0$ ) by X-ray absorption spectroscopy

Sanjeev Gautam, S. Muthurani, **M.Balaji**, K.H. Chae, D.PathinettamPadiyan, S.S. Kim, K. Asokan

Journal of Nanoscience and Nanotechnology 11 (2011) 386–390. (Impact Factor: 1.354)

5) Effect of swift heavy ion irradiation on the structural and morphological aspects of copper ferrite nanoparticles

**M. Balaji**, D. PathinettamPadiyan, M. Manivel Raja, K. Asokan, D. Kanjilal

International Journal of Nanoscience 10(1) (2011) 1 – 5.(Impact Factor: 0.68)

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. PathinettamPadiyan

Nuclear Instruments and Methods in Physics Research B269 (2011) 1088–1093.  
(Impact Factor: 1.377)

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:1.354)

8) Influence of 150 MeV  $\text{Ni}^{11+}$  swift heavy ion irradiation on  $\text{CuFe}_2\text{O}_4$  thin films prepared byradio 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: 2.183)



## *Curriculum Vitae*

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: 2.507)

10) Effect of exposure to electron beam irradiation in biopolymer papain and their electrical behaviour

S. Muthulakshmi, P. Chithralekha, **M. Balaji**, Ganesh Sanjeev, D. Pathinettam Padiyan

Indian Journal of Pure and Applied Physics 51 (2013) 33-38 (Impact factor: 0.923)

11) Effect of  $Mn^{2+}$  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: 3.35)

12) Enhanced performance of  $SnO_2-Mn_{(1-x)}Cu_{(x)}Fe_2O_4$  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: 5.316)

13) Structural and antibacterial effect of  $CaFe_xMn_{1-x}O_{3-\delta}$  &  $BaFe_xMn_{1-x}O_{3-\delta}$  Perovskite films

**M. Balaji**, B. Lalitha Maheswari and R.A. Jeyaram

International Journal of MediPharm Research 03(1) (2017) 178-186.

(Impact factor: 3.158)

14. Preparation and characterization of CuSn, CuZr, SnZr and CuSnZr thin films deposited by sputter method

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

Vacuum, 161 (2019) 338-346 (Impact factor: 3.627)

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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) (2015)

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## **RESEARCH PAPERS PUBLISHED IN EDITED VOLUME**

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1) The 10<sup>th</sup> Tamil Science Association seminar proceedings (ISBN No. – 938062717-3) - 2010

Characterization of copper ferrite thin films prepared using rf magnetron sputtering

**M. Balaji** and D. Pathinettam Padiyan

2) Proceedings on International Conference on Physics of Advanced Materials and Molecules (ISBN No. – 9789389336788) - 2017

The effect of temperature on Magnetic behavior of copper ferrite nanocomposites

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

3) Proceedings on National conference on preparation and characterization on crystalline materials (ISBN No. – 9781641366182)- 2017

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

4) Proceedings on International conference on Physics of Advanced materials and molecules (ISBN No. – 9789389336788) - 2020

The effect of temperature on Magnetic behavior of copper ferrite nanocomposites

**M. Balaji**

5) Proceedings of International conference on Smart Materials and Biomolecules (ISBN No. - 9789392 995378) – 2023.

(i) Synergetic Effect of  $\gamma$  - Glycine – Copper Sulphate Crystal for Enhanced Antibacterial Activity

**M. Balaji** , T.R.K. Priyadarzini , R. Daphine , B. Sona and D.Keerthana

(ii) Correlation between Magnetization and Cell Volume in  $Mn^{2+}$  Substituted Copper Ferrite Nanocomposites

**M. Balaji**

6) Proceedings of “7<sup>th</sup> International Conference on Recent Innovations in Modern Science and Technology (ISBN No. - 9789393518521) – 2024.

(i) Enhanced performance of Magnetic-Semiconductor Nanocomposites for Gas Sensor Applications

**M. Balaji**

(ii) Synthesis and Characterization of Tin Oxide ( $SnO_2$ ) thin films

T.R.K. Priya Darzini, **M. Balaji**, B.Sona and D. Keerthana

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

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Research Papers presented in Conference / Seminars / Symposia : 28