



Department : Pure & Applied Physics		
Academic Year : 2021-2022		
Sr. No.	Programme Code	Name of the Programme
01.	M.Sc. (Physics)	Dissertation/ Project work followed by seminar (PS/PHY/PD)

Following students have carried out their Project work/ Internship/ Field Project/Industrial Training for the academic session 2021-22

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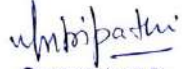
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Signature and Seal of the Head

**“Structural and Optical Characterization of
Cadmium Sulfide Nanoparticles”**

**Submitted in partial fulfillment of the requirements of the
degree of**

Master of Science (Hons) Physics

Presented by:

AAKANKSHA

M.SC.(Physics) 4th semester

ROLL NO- 20408001

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Supervisor:

**Dr. P.K. Bajpai
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**Department of Pure and applied Physics,
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September 2022

DECLARATION

I hereby declare that the thesis titled "Structural and optical characterization of Cadmium Sulfide nanoparticles" is submitted to department of Pure and Applied Physics in partial fulfilment of BACHELOR OF SCIENCE IN PHYSICS. This is only data analysis of provided data from other experimental work.

Prof. P. K. Bajpai
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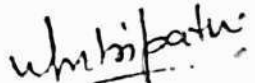
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APPROVAL

The project report on "Structural and optical characterization of Cadmium Sulfide nanoparticles" submitted by Aakanksha, ROLL NO- 20408001, Enroll no. – GGV/20/07801 of the Department of Pure and Applied Physics, Central University Bilaspur has been accepted as satisfactory for the partial fulfilment of the requirement for the degree of BACHELOR OF SCIENCE IN PHYSICS and approved as to its style and contents.


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Synthesis of Barium Stannate ($BaSn_4$) by combustion method




A

Project dissertation submitted

In partial fulfilment of the requirement for the

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(Associate professor)

Submitted by:
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Session: 2020-22

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DECLARATION

I hereby declare that the work presented in this project dissertation entitled "Synthesis of Barium Stannate ($BaSnO_3$) by combustion method" submitted for the partial fulfilment of the requirement for the degree of Master of Science in Physics has been done in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) under the supervision of Dr. H.S. Tewari, is my own conducted.

Date:



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CERTIFICATE FROM THE SUPERVISOR

This is to certify that the project dissertation entitled as "Synthesis of Barium Stannate ($BaSnO_3$) by combustion method" submitted by Mr. Abhay Prakash Mishra Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for the partial fulfilment of the requirement for the degree of Master of Science in Physics is an original work carried out by him under my supervision and guidance.

To the best of my knowledge, the matter embodied in the project dissertation has not been submitted to any other University/ Institute for the award of any Degree or Diploma.

Date: 15/09/2022


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This is to certify that the project dissertation entitled “Synthesis of Barium Stannate ($BaSnO_3$) by combustion method” submitted by Mr. Abhay Prakash Mishra for the partial fulfilment of the requirement for the degree of Master of Science in Physics is approved.

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Chapter 04: Literature Review.

Chapter 05: Synthesis of Nanopowders, Reaction Involved, Procedure.

Chapter 06: Raman Spectroscopy of BaSnO_3 .

Chapter 07: Conclusion.

References

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GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (CG)



A Project On

“First principle study of the Structural and
Electronic Properties of cathode material
 $\text{Li}_2\text{FeSiO}_4$ ”

A Dissertation in Partial Fulfillment for the Degree of

Master of Science in Physics

Submitted By

ALPANA CHOUDHARY

Roll No.: 20408003

Under the Supervision of

Dr. M. N. Tripathi

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DECLARATION

I declare that the work entitled "First principle study of the Structural and Electronic Properties of cathode material $\text{Li}_2\text{FeSiO}_4$ " is a record of an project work done by me under the guidance of Dr. M. N. TRIPATHI Associate professor of GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR.

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CERTIFICATE

This is to certify that the dissertation entitled "**First principle study of the Structural and Electronic Properties of cathode material $\text{Li}_2\text{FeSiO}_4$** " submitted by **ALPANA CHOUDHARY**, Department of pure and applied physics, Guru Ghasidas Vishwavidyalaya, Bilaspur, in partial fulfilment of the requirement for the degree of M.Sc. in Physics is an project work carried by her.

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Dr. M. N. TRIPATHI
Supervisor

M. N. Tripathi

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APPROVAL CERTIFICATE

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STUDY OF PHOTOMETRIC CALIBRATION OF CCD SYSTEM BY USING M67 STAR CLUSTER



A

Project Dissertation Submitted

In partial fulfillment of the requirement for the degree of
MASTER OF SCIENCE(M.Sc.) IN PHYSICS

SUPERVISOR:

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SUBMITTED BY:

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DECLARATION

I here by declare that the work presented in this project dissertation entitled " STUDY OF PHOTOMETRIC CALIBRATION OF CCD SYSTEM BY USING M67 STAR CLUSTER " submitted for the partial fulfillment of the requirement for the degree of Master of Science in Physics has been done in the department of Pure & Applied Physics ,Guru Ghasidas University , Bilaspur(C.G.) under the supervision of Dr. Parijat Thakur, is my own conducted

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**STRUCTURAL CHARACTERIZATION AND OPTICAL PROPERTIES OF
CaSrSiO₄:Y³⁺ SYNTHESIZED BY COMBUSTION METHOD**

**SUBMITTED AS PARTIAL FULFILMENT
OF
MASTER OF SCIENCE (PHYSICS)**

SESSION 2021-22

**SUBMITTED BY
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GURU GHASIDAS VISHWAVIDYALAYA BILASPUR (C.G.)**

DECLARATION

I hereby declared that the work present in project entitled "STRUCTURAL CHARACTERIZATION AND OPTICAL PROPERTIES OF $\text{CaSrSiO}_4:\text{Y}^{3+}$ SYNTHESIZED BY COMBUSTION METHOD" submitted as partial fulfillment of M.Sc. Physics have been performed in Department of Pure and Applied Physics, GURU GHASIDAS VISHWAVIDLAYALA, BILASPUR under the supervision of DR. R. P. PATEL (Associate Professor), Department of Pure and Applied Physics GGV Bilaspur.

The work present in the project dissertation is original and will remain intellectual property of Department.

Chandramani Lahre

विभागाध्यक्ष/H.O.D.
शुद्ध एवं अनुप्रयुक्त भौतिकी विभाग
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Date:

Place: Bilaspur (C.G.)

Chandramani Lahre

CHANDRAMANI LAHRE

Roll No. - 20408005

Enrollment No. - GGV/17/7041

M.Sc. (Physics) IV Semester

FORWARDING CERTIFICATE

This is to certify that CHANDRAMANI LAHRE has carried out the project in Department of Pure and Applied Physics, GURU GHASIDAS UNIVERSITY, BILASPUR (C.G.).

On the topic: "*Structural characterization and Optical properties of $\text{CaSrSiO}_4:\text{Y}^{3+}$ synthesized by Combustion Method*".

The project is submitted for the partial fulfillment of requirement of the degree of Master of Science in Physics (Honors') is forwarded to examiner for evaluation. I wish him every success in life.


DR. M. N. TRIPATHI

Head of Department

Department of Pure and Applied Physics

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

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CERTIFICATE

This is to certify that *CHANDRAMANI LAHRE* has carried out the project on the topic "*Structural characterization and Optical properties of $CaSrSiO_4:Y^{3+}$ synthesized by Combustion Method*" in the Department of Pure and Applied Physics, GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) under my supervision. She has worked diligently, meticulously and methodically and collected the literature very sincerely and carefully. To the best of our knowledge the work presented in this project is original and has not been submitted anywhere. I recommended the project report to be forwarded to the respective examiner for evaluation. I wish her all success in her life and career.



Guided By

Dr. R. P. Patel

Associate Professor

Dept. of Pure and Applied Physics

Guru Ghasidas Vishwavidyalaya



Submitted By

Chandramani Lahre

Roll No. - 20408005

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M. Sc. IV Semester (Physics)



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References

Umbipastu

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PROJECT ON:

STUDY OF SMALL MOLECULE C8-BTBT THIN FILMS BY SPIN COATING METHOD

Submitted under partial fulfilment of the requirements of the
degree of Master of Science (Physics)

SUBMITTED BY:

DALTON SAHU (M.Sc physics 4th sem)

ROLL NO. 20408006

Enrollment No. GGV/17/7043

SUPERVISED BY:

Dr. A.K SINGH

(ASSOCIATE PROFESSOR)



whbipastu

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Department of Pure and Applied Physics

GURU GHASIDAS VISHWAVIDYALAYA BILASPUR

(A Central University Established by the Central Universities Act 2009 No 25 of 2009)

2021-22

DECLARATION

I hereby declare that the work presented in this report entitle "STUDY OF SMALL MOLECULE C8-BTBT THIN FILMS BY SPIN COATING METHOD" Submitted as partial fulfilment for the degree of M.Sc. Physics which has been performed in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), 495009, under the supervision Of Dr. A.K SINGH, (Associate Professor).

The work presented in this project dissertation is original and will remain intellectual property of department of pure and applied physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.).

Sauj .

Date: 15.09.22

Place: GGV BILASPUR

DALTON SAHU

M.Sc. IV Semester (Physics)

Roll No. -20408006

Enrollment No. GGV/17/7043

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(A Central University Established by the Central Universities Act No. 25 of 2009)

DATE:

CERTIFICATE

This is to certify that the **Ma. DALTON SAHU** has carried out the project under my supervision in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya Bilaspur (C.G.), on the topic "STUDY OF SMALL MOLECULE C8-BTBT THIN FILMS BY SPIN COATING METHOD" To the best of my knowledge the work presented in this project is original and has not been submitted anywhere.

Arun Kumar Singh
Dr. A.K SINGH
Associate Professor

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(A Central University Established by the Central Universities Act No. 25 of 2009)

Forwarding Certificate

This is to certify that **DALTON SAHU** has carried out the project in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya Bilaspur (C.G.), on the topic "STUDY OF SMALL MOLECULE C8-BTBT THIN FILMS BY SPIN COATING METHOD" This report is submitted for partial fulfillment of the requirement for the degree of M.Sc. in Physics and for examiner's evaluation.

I wish every success in her life.

Date:

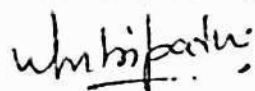

Dr. M.N. TRIPATHI
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DEPARTMENT OF PURE & APPLIED PHYSICS
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
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A project report on
Green synthesis of Reduced Graphene Oxide
SUBMITTED FOR
partial fulfillment of the requirement for the Degree of
MASTER OF SCIENCE (M.Sc.)
(PHYSICS HONS)

SESSION: 2020 - 2022

SUPERVISED BY


Dr. Jai Singh

Associate Prof.

Dept. of Pure & Applied

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SUBMITTED BY

Dhruti Mohan Panda

M.Sc. (PHYSICS)

(IV SEMESTER)

Roll No. – 20408007

Enroll. No. – GGV/20/07802



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(A Central University Established by Central Universities Act 2009 No. 25 of 2009)

DECLARATION

I hereby declare that the work presented in the project entitled "" is submitted for partial fulfillment of M.Sc. Physics. The work has been performed in the Department of Pure & Applied physics, guidance and suggestion received from my supervisor **Dr. Jai Singh** Department of Pure & Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), 495009, INDIA

The work presented in this project dissertation is original and remain intellectual property of Department of Pure & Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), 495009, INDIA.

Dhruvi mohan Panda

Dhruvi Mohan Panda

Date:- 14.09.2022

M.Sc. (Physics) IV semester
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Place: Bilaspur

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(A Central University Established by Central Universities Act 2009 No. 25 of 2009)

CERTIFICATE


This is to certify that Mr. Dhruvi Mohan Panda has carried out of the project reported entitled, “Green Synthesis of Reduced Graphene Oxide” this project is submitted for the partial fulfillment of the requirements for the award of Master of Science Degree in Physics at Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur (C.G.), 495009, India is an authentic work carried out by him under my supervision and guidance.

He has worked diligently, meticulously and methodically and collected the literature very sincerely and carefully. To the best of our knowledge the work presented in this project has been performed solely by the candidate. I recommended the project report to be forwarded to the respective examiners for evaluation.

“I wish for him every success in the future”

Date:- 14.09.2022

Place: - Bilaspur


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Associate Prof.

SUPERVISED

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Bilaspur (C.G.)

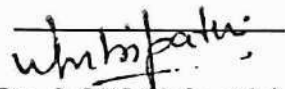


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Forwarding Certificate

This is certified that Mr. Dhruti Mohan Panda carried out the project in the Department of Pure & Applied Physics, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur (C.G.) on the topic: “**Green Synthesis of Reduced Graphene Oxide**” this project is submitted for the partial fulfillments of requirements for the degree of M.Sc. in Physics and forwarded to examiner for evolution.

“I wish him every success in his life”


Dr. M.N. Tripathi

HOD

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1. Abstract-

In this study Graphene oxide (GO) is synthesized by Modified Hummer's method which was later act as a precursor for the synthesis of reduced Graphene oxide (r-GO) by simplest biological method (green synthesis). Solvent extracted from *Psidium guajava* (Guava) plant leaves were used to reduce Graphene oxide. This method is cheap and the reducing agent is eco-friendly, locally available and the by-product doesn't release any toxic gases or substance in to the environment unlike the antioxidant chemicals such as ascorbic acid or hydrazine. And the synthesis method is easy and scalable. No chemicals are used for reduction, and its environmentally friendly i.e., no toxic gas released in between the synthesis procedure, so it's totally green synthesis of reduced graphene oxide from graphene oxide. And we see various application of GO and r-GO as it's a special contender for replacing Graphene in various mass production and industry because of similar property like Pristine graphene.

Umbipasthi

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Synthesis and characterization of Cu:Zno Thin Film for Optoelectronic Applications

A Project report submitted for partial

Fulfillment of the award of degree

M. Sc in Physics

Submitted by

Mr. Dinesh Mahato

Supervised by

Dr. Rakesh Kumar Pandey



Department of Pure and Applied Physics,

Guru Ghasidas Vishwavidyalaya,

Bilaspur – 495 009 (C.G)

(2021-2022)

u/mhripasthu

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CERTIFICATE

This is to certify that Mr. Dinesh Mahato has carried out the project under my supervision in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G) on the topic "*Synthesis and characterization of Cu doped ZnO thin film for optoelectronic application*". During this project work she has learnt that how to synthesis the zinc oxide and what its characteristics are.

To the best of our knowledge the work presented in this project is original and has not been submitted anywhere.

Supervised by

Dr. R. K. Pandey

Assistant professor

M. N. Tripathi
Head of Department

Dr. M. N. Tripathi

Associate professor

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Conclusion

Umbipasthi

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बिलासपुर (छ.ग.)/Bilaspur (C.G.)

**“SYNTHESIS AND CHARACTERISATION OF LEAD
ZIRCONATE TITANATE (PZT) CERAMIC”**

SUBMITTED AS PARTIAL FULFILMENT OF

Master of Science (Physics)

SESSION – 2021-22

SUBMITTED BY

GULSHAN KUMAR SAO

M.Sc. PHYSICS 4TH SEMESTER

ROLL NO. – 20408009

ENROLLMENT NO. – GGV/17/7055

GUIDED BY:

Dr. M.P. SHARMA

ASSISTANT PROFESSOR



DEPARTMENT OF PURE AND APPLIED PHYSICS

GURU GHASIDAS VISHWAVIDYALAYA

BILASPUR (C.G.), 495009

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Department of Pure and Applied Physics
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Forwarding Certificate

This is to certify that Mr Gulshan Kumar Sao has carried out review project in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G. on the topic "Synthesis and Characterisation of Lead Zirconate Titanate (PZT) Ceramic". This project is Submitted as partial fulfilment for degree of M.Sc. in Physics and forwarded to examiner for evaluation.


Dr. M. N. Tripathi

Head of Department

Department of Pure and Applied Physics

Guru Ghasidas Vishwavidyalaya

Bilaspur, C.G.

विभागाध्यक्ष/H.O.D.

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गुरु घासीदास विश्वविद्यालय,

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Department of Pure and Applied Physics
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Certificate

This is to certify that Mr Gulshan Kumar Sao has carried out project on the topic "Synthesis and Characterisation of Lead Zirconate Titanate (PZT) Ceramic" in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G. under my supervision.

He has worked diligently, meticulously and methodically and collected the literature very sincerely and carefully.

I recommend the project report to be forwarded to the respective examiners for Evaluation. I wish her all the success in her carrier and life.

Supervised By

Dr. M.P. Sharma

Assistant Professor,

Department of Pure and Applied Physics

Guru Ghasidas Vishwavidyalaya

Bilaspur, C.G.

u/m/pasthu

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- Characterization
 - Raman Spectroscopy
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 - Raman Analysis
- Conclusion
- Reference

u/bipasthi

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बिलासपुर (छ.ग.)/Bilaspur (C.G.)

**“SYNTHESIS AND CHARACTERIZATION OF REDUCED
GRAPHENE OXIDE AND ITS PHOTOCATALYTIC ACTIVITY”**

SUBMITTED AS PARTIAL FULFILLMENT OF

Master of Science (Physics)

SESSION – 2021-22

SUBMITTED BY:

HIMANI

M.Sc. PHYSICS 4TH SEMESTER

ROLL NO. – 20408010

ENROLLMENT NO. – GGV/17/7060

GUIDED BY:

Dr. GOVERDHAN REDDY TURPU

ASSISTANT PROFESSOR



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Forwarding Certificate

This is to certify that Miss Himani has carried out review project in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G. on the topic "Synthesis and Characterization of Reduced Graphene Oxide and Its Photocatalytic Activities". This project is Submitted as partial fulfilment for degree of M.Sc. in Physics and forwarded to examiner for evaluation.

Dr. M. N. Tripathi

Head of Department

Department of Pure and Applied Physics

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She has worked diligently, meticulously and methodically and collected the literature very sincerely and carefully.

I recommend the project report to be forwarded to the respective examiners for Evaluation. I wish her all the success in her carrier and life.

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 - Raman spectroscopy studies:
 - UV-Visible studies of rGO:
- Conclusions
- Reference

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“Study of Anomalous Hall Effect in Half Metallic Heusler alloy Co_2ZrAl ”

SUBMITTED AS PARTIAL FULFILLMENT OF

Master of Science (Physics)

SESSION – 2020-22

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M.Sc. PHYSICS 4TH SEMESTER

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M. N. Tripathi

Dr. M. N. Tripathi
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Department of Pure and Applied Physics
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He has worked diligently, meticulously and methodically and collected the literature very sincerely and carefully.

I recommend the project report to be forwarded to the respective examiners for Evaluation. I wish her all the success in her carrier and life.

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5. References

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ofc

**STRUCTURAL STUDY OF TOPOLOGICAL
INSULATOR Bi_2Te_3**

A Project dissertation submitted

In partial fulfilment of the requirements for the Degree of
MASTER OF SCIENCE (M.Sc.) in Physics

By

JAGRITI SAHU

M.Sc. IV Semester Physics

Enrollment No. - GGV/17/7064

Roll No. – 20408012

Under the guidance of

Dr. PRADIP DAS



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DEPARTMENT OF PURE AND APPLIED PHYSICS

**GURU GHASIDAS VISHWAVIDYALAYA,
BILASPUR (C.G.), INDIA**

Session: 2022



Certificate from the Supervisor

This is to certify that the report entitled “ *STRUCTURAL STUDY OF TOPOLOGICAL INSULATOR Bi_2Te_3* ” carried out by JAGRITI SAHU of Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur for the partial fulfilment of the requirements for the degree of MASTER OF SCIENCE IN PHYSICS (Specialisation in Material Science), at Guru Ghasidas Vishwavidyalaya, Bilaspur is absolutely carried out by her under my supervision and guidance.

It is certified that all corrections/suggestions indicated for the project had been incorporated in it. The project has been approved as it satisfies the requirement in respect of procedure and experimental techniques prescribed for this project.

To the best of our knowledge, these results have not been submitted by her for the award of any other degree or diploma.

Dr. Pradip Das

ASSISTANT PROFESSOR

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APPROVAL CERTIFICATE

This is to certify that the report entitled " *STRUCTURAL STUDY OF TOPOLOGICAL INSULATOR Bi_2Te_3* " by JAGRITI SAHU, is approved for the degree of M.Sc.in Physics (Specialization in Material Science).

Examiner

M. N. Tripathi

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Date : 14/09/2022

Place : GGV, Bilaspur (C.G.)

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Large scale shell model calculation for $^{42-44}\text{Ca}_{(Z=20)}$ isotopes

Dissertation Thesis

Submitted in the Partial Fulfilment of the Degree Of

Masters Of Sciences in Physics

(The academic year 2021-22)

by

Jeetesh Gupta

Roll No:20408013

Under the supervision of

Dr. T.Trivedi



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Material Science Section

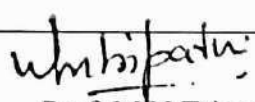
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APPROVAL SHEET

This report entitled "Large scale shell model calculation for $^{42-44}\text{Ca}$ isotopes" by **Jeetesh Gupta** is approved for the degree of Master of Science in Physics.

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Department of Physics
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Prof. M.N. Tripathi
Head Of Department
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CERTIFICATE

This is to certify that the work contained in this project report entitled "large scale Shell model calculation for calcium ca^{42-44} nuclei" submitted by Jeetesh Gupta (Roll no : 20408013) to(Guru Ghasidas Central University) towards partial requirement of Masters of Science in Physics has been carried out by him under my supervision and that it has not been submitted elsewhere for the award of any degree.

Guru ghasidas Central University

Bilaspur September 2022

Dr. T. Trivedi

Project Supervisor



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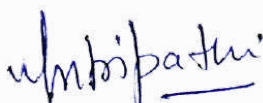
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LDM	Liquid-drop model
SEMF	Semi-empirical mass formula
CI	Configuration interaction


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A Project Report on
Raman Studies of Calcium Doped Bismuth Ferrite
($\text{Bi}_{1-x}\text{Ca}_x\text{FeO}_3$)

Submitted for the Partial Fulfillment of
Degree of M.Sc. in Physics

by

Kamlesh Padam

Roll No:20408014

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Under the Supervision of

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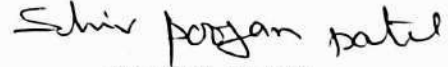
Session: 2021-2022

CERTIFICATE

This is to certify that the project work entitled "Raman Studies of Calcium doped Bismuth Ferrite($\text{Bi}_{1-x}\text{Ca}_x\text{FeO}_3$)" to fulfill the requirements for the degree of M.Sc. in physics under my supervision.


(Dr. M.N. Tripathi)

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(Dr. S.P. Patel)


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ABSTRACT

Multiferroics exhibit unique combination of ferroic properties simultaneously. For instance in BiFeO_3 , magnetic and electric properties co-exist. In this work, Ca-doped BiFeO_3 samples with general formula, $\text{Bi}_{1-x}\text{Ca}_x\text{FeO}_3$ ($x=0.00, 0.05, 0.20, 0.25, \text{ and } 0.30$) have been synthesized in order to find out the morphotropic phase boundary with different doping compositions. The Raman has been carried to study the structural properties of the samples.



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Synthesis and Characterization of α -Fe₂O₃ Nanoparticles

by Simple Co-Precipitation Method

Submitted for

Final fulfillment of the requirement for the Degree of

MASTER OF SCIENCE (PHYSICS)

SESSION: 2021-2022

SUBMITTED BY

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Roll No: 20408015

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(A Central University Established by Central Universities Act 2009 No. 25 of 2009)



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(A Central University Established by Central Universities Act 2009 No. 25 of 2009)

FORWARDING CERTIFICATE

This is certify that **Mr. Krishna Patel** carried out the project in the Department of Pure & Applied Physics, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, (C.G.), on the topic: "Synthesis and Characterization of α -Fe₂O₃ Nanoparticles by Simple Co-Precipitation Method" this project is submitted for the partial fulfillments of requirements for the degree of M.Sc. in Physics and forwarded to examiner for evolution.

I wish him every success in his life.

M. N. Tripathi

Dr. M. N. TRIPATHI

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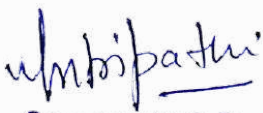
CERTIFICATE


This is to certify that **Mr. Krishna Patel** has carried out of the project reported entitled, “**Synthesis and Characterization of α -Fe₂O₃ Nanoparticles by Simple Co-Precipitation Method**” this project is submitted for the partial fulfillment of the requirements for the award of Master of Science Degree in Physics at Department of Pure & Applied Physics, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, (C.G.), is an authentic work carried out by him under my supervision and guidance.

He has worked diligently, meticulously and methodically and collected the literature very sincerely and carefully. To the best of our knowledge the work presented in this project has been performed solely by the candidate. I recommended the project report to be forwarded to the respective examiners for evaluation.

I wish for him every success in the future.

Date: 11/5/24
Place: Bilaspur


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Umbipatni

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शुद्ध एवं अनुप्रयुक्त भौतिकी विभाग
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A BRIEF OVERVIEW: ANTENNAS RESEARCH FOR 6G WIRELESS COMMUNICATION



Project dissertation submitted

In partial fulfilment of the requirement for the degree of
MASTER OF SCIENCE (M.Sc.) IN PHYSIC

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Submitted by

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Session: 2020-2022

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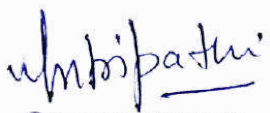
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To the best of my knowledge, the matter embodied in the project dissertation has not been submitted to any other University/ Institute for the award of any Degree or Diploma.

Date: 10/09/2022


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Umbipasthi

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Luminescence investigation of Eu^{2+} activated $\text{BaAl}_{12}\text{O}_{19}$ Phosphor



A Project dissertation Submitted
In partial fulfillment of the requirements for the Degree of
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By

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(M. Sc. IV Semester)

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Supervisor

Dr. Shalinta Tigga

M. N. Tripathi
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Dr. M. N. Tripathi

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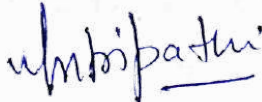
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Synthesis of spinel Ferrite Zn^{2+} doped $Ni_{0.8-x}Co_{0.2}Fe_2O_4$

Submitted in partial fulfillment of the requirements

Of the degree of

Master of Science (Physics)

By

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Roll No:- 20408018, IV th Sem

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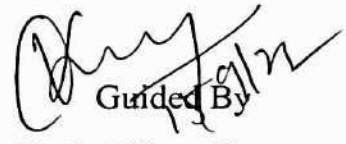
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Date:-14/09/2022

Place :- Bilaspur



Guided By
Dr R. Vijaya Kumar
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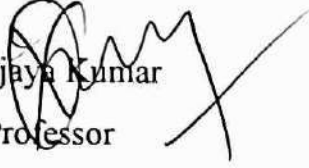


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This is to certify that MANISHANKAR CHANDRA is a student of Master of Science (M.Sc in Physics), has carried out the project work as mentioned in this report entitled "Spinel Ferrite Synthesis Technique" during his 4th semester of studies in Master of Science (M.Sc in Physics) as a part of curriculum for obtaining the degree of M.Sc from the GGV,BILASPUR(C.G.) to which the institute is affiliated. This certificate issued by the undersigned does not cover any responsibility regarding the statement made and work carried out by the concerned student. The current dissertation is hereby being forwarded for evaluation for the purpose for which it has been submitted.

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Head of Department

Dr M. N. Tripathi

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“Structural and optical characterization of Copper Sulfide Nanoparticles”

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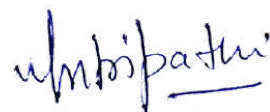
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Iron Oxide Nanoparticle (IONP) Synthesis to Applications



A

Project dissertation submitted

In partial fulfilment of the requirement for the degree of

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ABSTRACT:- Iron oxides are chemical compounds which have different polymorphic forms, including γ -Fe₂O₃ (maghemite), Fe₃O₄ (magnetite), and FeO (wustite). Among them, the most studied are γ -Fe₂O₃ and Fe₃O₄, as they possess extraordinary properties at the nanoscale (such as super paramagnetism, high specific surface area, biocompatible etc.), because at this size scale, the quantum effects affect matter behavior and optical, electrical and magnetic properties. Therefore, in the nanoscale, these materials become ideal for surface functionalization and modification in various applications such as separation techniques, magnetic sorting (cells and other biomolecules etc.), drug delivery, cancer hyperthermia, sensing etc., and also for increased surface area-to-volume ratio, which allows for excellent dispersibility in the solution form.

Iron oxide nanoparticle (IONP)-based available clinical applications are RNA/DNA extraction and detection of infectious bacteria and viruses. Such technologies are important at POC (point of care) diagnosis. IONPs can play a key role in these perspectives. Although there are various methods for synthesis of IONPs, one of the most crucial goals is to control size and properties with high reproducibility to accomplish successful applications. Using multiple characterization techniques to identify and confirm the oxide phase of iron can provide better characterization capability.

This work provides an in-depth overview of different properties, synthesis methods, and mechanisms of iron oxide nanoparticles (IONPs) formation, and the diverse range of their applications. Different characterization factors and strategies to confirm phase purity in the IONP synthesis field are reviewed. First, properties of IONPs and various synthesis routes with their merits and demerits are described. We also describe different synthesis strategies and formation mechanisms for IONPs such as for: wustite (FeO), hematite (α -Fe₂O₃), maghemite (γ -Fe₂O₃) and magnetite (Fe₃O₄). We also describe characterization of these nanoparticles and various applications in detail. In conclusion, we present a detailed overview on the properties, size-controlled synthesis, formation mechanisms and applications of IONPs.

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A Project On

**“First Principle Study of the Structural, Electronic
and Optical Properties of BaZrS₃”**

A Dissertation in Partial Fulfillment for the Degree of

Master of Science in Physics

Submitted By

POOJA CHOUDHARY

Roll No.: 20408021

Under the Supervision of

Dr. M.N. Tripathi

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Bilaspur (C.G.)

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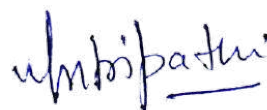
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Study Of Timing Analysis of Swift J1658.2–4242



A Project Dissertation Submitted
in
Partial Fulfilment of the Requirements for the
Degree of Master of Science (M.Sc) in Physics

by
POOJA KAUSHIK
Roll No:20408022

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Year: 2020-2022

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Place:

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**“STRUCTURAL CHARACTERIZATION & OPTICAL
PROPERTIES OF BaSrSiO₄: Pr³⁺ PHOSPHORS SYNTHESIZED
BY COMBUSTION TECHNIQUE”**

SUBMITTED AS PARTIAL FULFILLMENT OF

Master of Science (Physics)

SESSION – 2021-22

SUBMITTED BY:

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M.Sc. PHYSICS 4TH SEMESTER

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She has worked diligently, meticulously and methodically and collected the literature very sincerely and carefully.

I recommend the project report to be forwarded to the respective examiners for Evaluation. I wish her all the success in her carrier and life.

Supervised By

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PROJECT ON STUDY OF SMALL MOLECULE C8-BTBT THIN FILM BY DROP CASTING METHOD

Submitted under partial fulfilment of the requirements of the degree of
Master of Science (Physics)

SUBMITTED BY:

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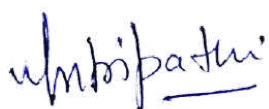
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I wish every success in his life.

Date:

M.N. Tripathi

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Review On Perovskite Solar Cell



A Project dissertation Submitted SESSIONS: 2021-
2022

In partial fulfilment of the requirements for the Degree of MASTER OF
SCIENCE (M.Sc.) in PHYSICS

By

Priya Kar

(M.sc. 4th sem) SUPERVISED
BY

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Associate professor

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Abstract

The recent rapid development in perovskite solar cells has led to significant research interest due to their notable photovoltaic performance, currently exceeding 25% power conversion efficiency for small-area PSCs. The work is structured in three parts. First is a brief overview of large-area PSCs, followed by a discussion of the preparation methods and methods to improve PSC efficiency, quality and stability. This review concludes the blade coating, slot-die coating, and ink-jet printing carry the highest potential for the scalable manufacture of large area PSCs with moderate-to-high PCEs.

A novel all-solid-state, hybrid solar cell based on organic-inorganic metal halide perovskite ($\text{CH}_3\text{NH}_3\text{PbX}_3$) materials has attracted great attention from the researchers all over the world and is considered to be one of the top 10 scientific breakthroughs in 2013. The perovskite materials can be used not only as light-absorbing layer, but also as an electron/hole transport layer due to the advantages of its high extinction coefficient, high charge mobility, long carrier lifetime, and long carrier diffusion distance. The photoelectric power conversion efficiency of the perovskite solar cells has increased from 3.8% in 2009 to 22.1% in 2016, making perovskite solar cells the best potential candidate for the new generation of solar cells to replace traditional silicon solar cells in the future. In this paper, we introduce the development and mechanism of perovskite solar cells, describe the specific function of each layer, and focus on the improvement in the function of such layers and its influence on the cell performance. Next, the synthesis methods of the perovskite light-absorbing layer and the performance characteristics are discussed. Finally, the challenges and prospects for the development of perovskite solar cells are also briefly presented.

1. Introduction

Day by day, the consumption of energy gradually increased globally with population. The reduction of non-renewable energy sources like fossil fuels causes the environmental issues, which lead to the advancement of



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A PROJECT REPORT ON
**“Synthesis and Characterization of Cu:ZnO Doped
High Dielectric Material”**



Submitted for partial fulfilment of the requirement for the degree of

Master of Science in Physics

SUPERVISED BY:

Dr. Rakesh Kumar Pandey

Assistant Professor

SUBMITTED BY:

Roman Das

Roll No.-20408027

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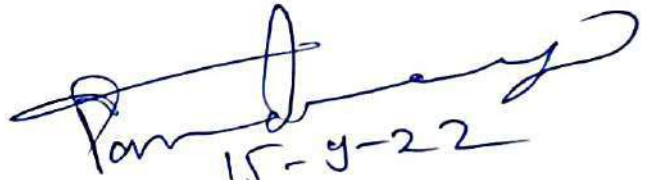
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I wish every success in her life.

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DR.M.N.TRIPATHI

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Date: 14/09/2022

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A

Project Report on

**“Synthesis and Characterization of Zn doped Cobalt ferrite prepared
by Solid state method”**

Submitted in partial fulfillment for the award of the degree of

Master of Science in Physics

Submitted By

ROOPASHREE SAHU

M.Sc. Physics

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Enrollment No :- GGV/20/07808

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DEPARTMENT OF PURE AND APPLIED PHYSICS

GURU GHASIDAS UNIVERSITY, BILASPUR (C.G) INDIA

(A Central University Established by the Central University Act 2009 No.25 of 2009)

APPROVAL CERTIFICATE

This is to certify that the project entitled **“Synthesis and Characterization of Zn doped Cobalt ferrite prepared by Solid state method”** submitted by **ROOPASHREE SAHU** is approved for the award of Master of Science in Physics.

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DATE.....

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- NANO PARTICLES
- FERRITE NANO PARTICLES AND ITS TYPES
- INTRODUCTION TO COBALT FERRITE

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- RAMAN STUDY
- RESULT
- CONCLUSION
- REFERENCE

u/mipastu

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A

Project Report on

“Synthesis and Characterization of Cu-doped BaTiO₃”

Submitted in partial fulfillment for the award of the degree of

Master of Science in Physics

Submitted By

ROSHAN KUMAR

M.Sc. (Physics) IV Semester

Roll No :-20408029

Enrollment No :- GGV/20/07809

Under the Supervision of

Dr GOVERDHAN REDDY TURPU

[Assistant Professor]



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2021-22

DEPARTMENT OF PURE AND APPLIED PHYSICS

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(A Central University Established by the Central University Act 2009 No.25 of 2009)

CERTIFICATE

This is to certify that the project entitled “**Synthesis and Characterization of Cu-doped BaTiO₃**” submitted by **ROSHAN KUMAR** in the partial fulfilment for the requirements for the award of Master of Science Degree in Physics at Department of Pure and Applied Physics, Guru Ghasidas University, Bilaspur (C.G.) 495009, INDIA is an authentic work carried out by him under my supervision and guidance.



Dr GOVERDHAN REDDY TURPU

ASSISTANT PROFESSOR

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This is to certify that the project entitled “**Synthesis and Characterization of Cu-doped BaTiO₃**” submitted by **ROSHAN KUMAR** is approved for the award of Master of Science in Physics.



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GURU GHASIDAS UNIVERSITY



Magnetic exchange interactions in ferromagnetic half metallic Co₂ZrAl from first principles calculations

A project dissertation submitted in a partial fulfilment of the requirements for the degree of
Master of Science (M.Sc.) In Physics

By

RUBEE SWARNKAR

(M.Sc. Physics 4th sem)

Under the guidance of

P. RAMBABU

Assistant Professor

Department of Pure and Applied Physics

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SEPTEMBER 2022

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Certificate from supervisor

This is to be certify that the report entitled “Magnetic exchange interactions in ferromagnetic half metal Co_2ZrAl from first principles calculations” carried out by Rubee Swarnkar of Department of Pure and Applied Physics, Guru Ghasidas University, Bilaspur, for the partial fulfilment of requirements for the degree Master of Science in Physics (Specialization in Material Science) at GGV Bilaspur is absolutely carried out by her under my supervision and guidance.

To best of our knowledge, these results have not been submitted by her for the award of any other degree or diploma.

P. Rambabu

Assistant Professor

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Approval Certificate

This is to certify that the report entitled “Magnetic exchange interactions in ferromagnetic half metal Co_2ZrAl from first principles calculations” by Rubee Swarnkar is approved for the degree of M.Sc. in Physics (Specialization in Material Science).

Examiner

Dr.M. N. Tripathi

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**“THE REVIEW OF ANTENNA FOR 5G
WIRELESS COMMUNICATION”**



A
Project dissertation submitted

In partial fulfilment of the requirement for the degree of


MASTER OF SCIENCE (M.Sc.) IN PHYSICS

Supervisor
Dr. ALKA SINGH
(Assistant professor)
Department of Pure and Applied Physics,
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Department of Pure & Applied Physics
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(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)

CERTIFICATE FROM THE SUPERVISOR

This is to certify that the project dissertation entitled as "**THE REVIEW OF ANTENNA FOR 5G WIRELESS COMMUNICATION**" submitted by **SHREYA SINGH RAJPUT**, Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for the partial fulfilment of the requirement for the degree of *Master of Science in Physics* is an original work carried out by him under my supervision and guidance.

To the best of my knowledge, the matter embodied in the project dissertation has not been submitted to any other University/ Institute for the award of any Degree or Diploma.

Date:

u/bipatni

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APPROVAL CERTIFICATE

This is to certify that the project dissertation entitled “**The review of 5G wireless communication**” submitted by **SHREYA SINGH RAJPUT** for the partial fulfilment of the requirement for the degree of Master of Science in Physics is approved.

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Umbipastu

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- (a) Millimeter wave
- (b) Smart cellular all
- (c) Massive MIMO

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15. Challenges
16. Antenna for 5G wireless communication
17. Antenna design considerations
18. Fundamental Antenna parameters.

a.) Band Width

b.) Radiation pattern

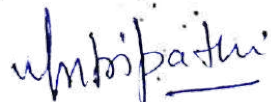
19. MIMO :-

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- b) MIMO channel Model
- c) MIMO channel capacity
- d) Forms of MIMO

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To Obtain The Transit Light curve Of Exoplanet TrES-5b Through Photometric Observation



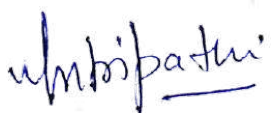
A Project Dissertation Submitted
in
Partial Fulfilment of the Requirements for the
Degree of Master of Science (M.Sc) in Physics

by
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Roll No:20408041

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Department Of Pure and Applied Physics
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Year: 2020-2022


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CERTIFICATE

This is certify that Vandana Bhardwaj has worked on post graduate dissetation project entitled **“To Obtain The Transit Light curve Of Exoplanet TrES-5b Through Photometric Observation”** under the supervision of Dr. Parijat Thakur and this work has not been formed the basis for award of any other similar title. It represents entirely an independent work on the part of candidate

Signature of Supervisor

Date:

Place:

H.O.D (physics)

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- Detection Method Of Exoplanets
- Photometric Observation Of TrES-5
- CCD Data Reduction & Aperture Photometry
- Transit Light Curve
- Normalization Of Transit Light Curve of TrES-5
- Discussion & Conclusion
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**STRUCTURAL, CHARACTERIZATION AND OPTICAL PROPERTIES OF
AlSrSiO₄: Nd⁺³ SYNTHESIED BY COMBUTION METHOD**

SUBMITTED AS PARTIAL FULFILMENT

OF

MASTER OF SCIENCE (PHYSICS)

SESSION 2021-22

SUBMITTED BY

Name: Varsha KURREY
MSC 4TH SEMESTER PHYSICS
ROLL NUMBER-20408043

AUGUST-2022



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Under the guidance of
Dr. Rajendra Prasad Patel

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THESIS CERTIFICATE

This is to certify that the thesis entitled "synthesis, characterisation and optical properties Of $\text{AlSrSiO}_4: \text{Nd}^{+3}$ by combustion method" submitted by Varsha Kurrey to Guru Ghasidas university, Bilaspur Chhattisgarh for the award of the degree of Master of Science in physics is a bona fide record of research work carried out by him under my supervision. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

Associate Professor
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Guru Ghasidas University

Place: Bilaspur

Date: 15 September 2022

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INTRODUCTION

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REFERENCE



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A PROJECT REPORT ON

“To study the chemical doping of CVD grown Graphene
by Raman Spectroscopy”



Submitted for partial fulfillment of the requirement for the degree of
Master of Science in Physics

SUPERVISED BY:

Dr. A. K. SINGH

(Associate Professor)

SUBMITTED BY:

VIKASH K. KHUNTE

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(A Central University Established by the Central Universities Act No. 25 of 2009)

DATE:


CERTIFICATE

This is to certify that the MA. VIKASH KUMAR KHUNTE has carried out the project under my supervision in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya Bilaspur (C.G.), on the topic "To study the Chemical Doping of CVD grown Graphene by Raman Spectroscopy" To the best of my knowledge the work presented in this project is original and has not been submitted anywhere.

Date:


Dr. A. K. SINGH

Associate professor


विभागाध्यक्ष/H.O.D.
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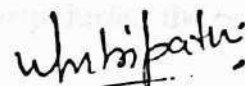
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(A Central University Established by the Central Universities Act No. 25 of 2009)

Forwarding Certificate

This is to certify that MA.VIKASH KUMAR KHUNTE has carried out the project in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya Bilaspur (C.G.), on the topic "To study the Chemical Doping of CVD grown Graphene by Raman Spectroscopy" This report is submitted for partial fulfilment of the requirement for the degree of M.Sc. in Physics and for examiner's evaluation.

I wish every success in his life.



Dr. M. N. TRIPATHI

Date:

Head of the Department

विभागाध्यक्ष/H.O.D.

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A PROJECT REPORT ON
Synthesis and characterization of Magnesium and Iron
codoped zinc oxide based High Dielectric Material

By

Miss. Anishi Jaiswal

ROLL NO.:20408046

REGISTRATION NO.: GGV/17/7020

SESSION: 2021-2022

Under the supervision Of

Dr. R. K. Pandey

(ASSISTANT PROFESSOR)

Report submitted

In partial fulfillment for the Degree of



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MASTER OF SCIENCE PHYSICS

(SPECIALIZATION IN MATERIAL SCIENCE)

Department of Pure and Applied Physics

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This is to certify that the report entitled Synthesis and characterization of Magnesium and Iron codoped zinc oxide based High Dielectric Material carried out by Miss. Anishi Jaiswal of Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G) for the partial fulfilment of the requirement for the Degree of MASTER OF SCIENCE IN PHYSICS (specialization in Material Science), is absolutely carried out by her under my supervision and guidance.

To the best of our knowledge, these results have not been Submitted by her for the award of any other degree or diploma.

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"Structure and Characterization of Co-Substituted Ni-Zn Ferrites"



Nahar Patel

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Project dissertation submitted

In partial fulfillment of the requirement for the degree of

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Session: 2021-22

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To the best of my knowledge, the matter embodied in the project dissertation has not been submitted to any other University/ Institute for the award of any Degree or Diploma.

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Reference

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A project report on

SYNTHESIS AND CHARACTERIZATION OF Zn-DOPED
BaTiO₃

SUBMITTED FOR

Partial fulfillment of the requirement for the Degree of

MASTER OF SCIENCE (M.Sc. IV SEM)

(PHYSICS HONORS)

SESSION: 2021- 2022

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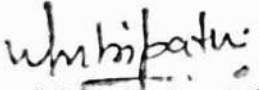
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Study of elastic properties of the Heusler alloy Co_2ZrAl

A project dissertation submitted in a partial fulfilment of the requirements for the degree of
Master of Science (M.Sc.) In Physics

By

HRISHIKESH SINHA

(M.Sc. Physics 4th sem)

Under the guidance of

P. Rambabu

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SEPTEMBER 2022

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Certificate from supervisor

This is to be certify that the report entitled “**Study of Elastic properties of Heusler alloy Co_2ZrAl** ” carried out by **Hrishikesh Sinha** of **Department of Pure and Applied Physics, Guru Ghasidas University, Bilaspur**, for the partial fulfilment of requirements for the degree **Master of Science in Physics (Specialization in Material Science)** at **GGV Bilaspur** is absolutly carried out by her under my supervision and guidance.

To best of our knowledge, these results have not been submitted by her for the award of any other degree or diploma.

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Synthesis and Characterization of SnSe A Topological Crystalline Insulator

SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS
OF
MASTER OF SCIENCE
IN
PHYSICS
SESSION 2020-2022

Under the supervision of:

Dr. PRADIP DAS
Assistant Professor
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Submitted by:

SAKSHI RAJWADE
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DECLARATION

I hereby declared that the work present in project entitled "**Synthesis and Characterization of SnSe - A Topological Crystalline Insulator**" submitted as partial fulfilment of M.Sc. physics have been performed in Department of Pure And Applied Physics, GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR under the supervision of Dr. PRADIP DAS, Assistant Professor, Department of Pure and Applied Physics GGV BILASPUR, (CG) .

The work present in the project dissertation is original and will remain intellectual property of Department.

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Large Scale Shell Model Calculations for Oxygen $^{18-19}\text{O}$ ($Z=8$) Isotopes

A Project Report Submitted
for Partial Fulfillment of the
requirements for the Degree of

**MASTER OF
SCIENCE**

In

Department of Physics

by

Sandeep Kumar Lahare

Roll No: 20408032



To

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September 2022

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DECLARATION

I hereby declare that the work presented in this report entitle “Large Scale Shell Model Calculation for O¹⁸⁻¹⁹ Isotopes” Submitted as partial fulfilment for the degree of M.Sc. Physics which has been performed in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), 495009, under the supervision of Dr. T.Trivedi, Assistant Professor. The work presented in this project dissertation is original and will remain intellectual property of department of pure and applied physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.).

Date: 15-09-2022

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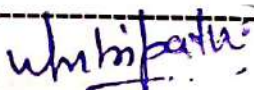
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This is to certify that MR. SANDEEP KUMAR LAHARE has carried out the project in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya Bilaspur (C.G.), on the topic “To Study the Large Scale Shell Model Calculation for $^{18-19}\text{O}$ Isotopes” This report is submitted for partial fulfilment of the requirement for the degree of M.Sc. in Physics and for examiner’s evaluation.

I wish every success in his life.



Dr. M. N. TRIPATHI

Head of the Department

Date:

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A Project Report on
Raman Studies of Strontium Doped Bismuth Ferrite
(Bi_{1-x}Sr_xFeO₃)

Submitted for the Partial Fulfillment of
Degree of M.Sc. in Physics

by

Sanjeev Kumar Lahray

Roll No:20408033

Registration No: GGV/17/7114

Under the Supervision of

Dr. S.P. Patel

Assistant Professors



Department of Pure & Applied Physics
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Session: 2021-2022

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Declaration


I hereby declare that work present in this project entitled “**Raman Studies of Strontium doped Bismuth Ferrite ($\text{Bi}_{1-x}\text{Sr}_x\text{FeO}_3$)**” submitted for the partial fulfillment for degree of **M.Sc. in Physics** is performed in Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur under the supervision of **Dr. S. P. Patel**.



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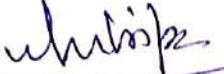
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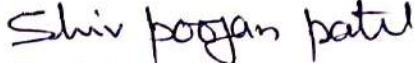
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CERTIFICATE

This is to certify that the project work entitled "Raman Studies of Strontium doped Bismuth Ferrite ($\text{Bi}_{1-x}\text{Sr}_x\text{FeO}_3$)" to fulfill the requirements for the degree of M.Sc. in physics under my supervision.


(Dr. M.N. Tripathi)

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ABSTRACT

In last few decades multiferroics ceramics has become one of the most important and exciting forefront materials. It shows great promise for providing us in the near future that will change the direction of technological advances in a wide range of applications. This paper is a brief review of the effect of Sr^{2+} doping on $\text{Bi}_{1-x}\text{Sr}_x\text{FeO}_3$ ($x = 0.00, 0.05, 0.10, 0.15, 0.20, 0.25, 0.30$) multiferroic ceramics has been investigated by Raman spectroscopy. Showed a gradual change in crystal structure from rhombohedral (R3c) to pseudotetragonal (P4/mmm) with enhanced divalent Sr^{2+} ion concentration. All the 13 Raman modes predicted by group theory ($\Gamma_{\text{R3c}} = 4A_1 + 9E$) for R3c structure of $\text{Bi}_{1-x}\text{Sr}_x\text{FeO}_3$ ($x = 0.00, 0.05, 0.10, 0.15, 0.20, 0.25, 0.30$) were observed in the present study. E-1 to E-5 modes disappear completely as compared to parent BFO. The structural phase transition and weakening of long-range ferroelectric order with increasing doping concentration are thus further confirmed from Raman scattering spectra. A-site Sr^{2+} doping increases fluctuations in cation-site occupancy and causes broadening in Raman modes. The results showed a change in the magnetic order from antiferromagnetic for the undoped sample to the ferromagnetic order for the co-doped samples. This change is attributed to the modulations in the magnetic moment due to crystal structure distortions. All samples show high relative permittivity values, which were enhanced by doping with Sr^{2+} .

Keywords: Multiferroics, BiFeO_3 , Sr -doping, Raman Scattering.



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“Synthesis and Characterization of SrMoO₄”

A

Project dissertation submitted

In partial fulfilment of the requirement for the degree of

Master of Science (M.Sc.) in Physics

Supervisor

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Submitted by

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DECLARATION

I hereby declare that the work present in this project entitled “**Synthesis and Characterization of SrMoO₄**” Submitted as partial fulfilment of M. Sc. Physics has been performed in the Department of Pure and Applied Physics , Guru Ghasidas Vishwavidyalaya, Bilaspur under the supervision of Dr Dinesh Uthra.

The work presented in this project dissertation is original and will remain intellectual property of Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya Bilaspur (C.G.) .

Date :- 14/09/2022

Place : Bilaspur



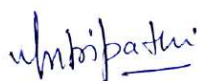
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CERTIFICATE

This is to certify that the project dissertation entitled as “ **Synthesis and Characterization of SrMoO_4** ” submitted by **Mr. Satnam Singh** Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for the partial fulfilment of the requirement for the degree of *Master of Science in Physics* is an original work carried out by him under my supervision and guidance.

To the best of my knowledge, the matter embodied in the project dissertation has not been submitted to any other University/ Institute for the award of any Degree or Diploma.

Date: 14.9.22

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FORWARDING CERTIFICATE

This is to certify that the project dissertation entitled “ Synthesis and Characterization of SrMoO_4 ” submitted by **Mr. Satnam Singh** for the partial fulfilment of the requirement for the degree of Master of Science in Physics is approved.

I wish him for bright future in his life.

Date:.....

Place: Bilaspur

M.N. Tripathi

Dr. M.N. Tripathi
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DEPARTMENT OF PURE & APPLIED PHYSICS

A

PROJECT REPORT

ON

**“Photoluminescence and Thermoluminescence Studies of
Combustion Synthesized SrMgAl₁₀O₁₇:Ce³⁺ Phosphor”**

(Submitted in partial fulfillment of the requirement for the award of the degree)

Of

Master of Science

In

Physics

Under the Guidance of

Dr. SHALINTA TIGGA

Assistant Professor

Submitted by

SONAM LAHRE

M.Sc. 4th Semester

Roll No. 20408036

Enrollment No: GGV/20/07813

SESSION 2022-23

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CERTIFICATE

This is to certify that the project entitled “**Photoluminescence and Thermoluminescence Studies of Combustion Synthesized SrMgAl₁₀O₁₇:Ce³⁺ Phosphor**” submitted by **SONAM LAHRE** in the partial fulfillment for the requirements for the award of Master of Science Degree in Physics at Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) 495009, India is an authentic work carried out by **SONAM LAHRE** under my supervision and guidance. To the best of my knowledge, the matter embodies in the project work has not been submitted to any other University/Institute for the award of Degree or Diploma.

Shalinta
15/09/22
Dr. SHALINTA TIGGA

ASSISTANT PROFESSOR

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APPROVAL CERTIFICATE

his is to certify that the project entitled "Photoluminescence and Thermoluminescence studies of Combustion Synthesized SrMgAl₁₀O₁₇:Ce³⁺ Phosphor" submitted by "SONAM AHRE" is approved for the award of Master of Science in Physics.



Dr. M. N. Tripathi

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DECLARATION

I hereby declare that the work presented in the project entitled “**Photoluminescence and Thermoluminescence Studies of Combustion Synthesized SrMgAl₁₀O₁₇:Ce³⁺ Phosphor**” submitted to the partial fulfilment of Master of Science in Physics has been performed in the Department of Pure & Applied Physics Guru Ghasidas Vishwavidyalaya Bilaspur (C.G.), 495009 under the Guidance of **Dr. SHALINTA TIGGA** carried out by me.

The work presented in this dissertation is original and remain intellectual property of Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) 495009, India.

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- PHOTOLUMINESCENCE STUDIES
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- CONCLUSION

REFERENCES

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“Physical and spectroscopic studies of CdO

incorporating Boro-Bismuthate glasses”

Submitted in the particular fulfilment of the requirements of the

Degree at Master of Science (Physics Hons)

By

Soumyasonali Biswal

M.Sc. Physics 4th Semester

Roll No: 20408037

Enroll No: GGV/20/07814

Supervisor:

Dr. R Vijaya Kumar

Assistant Professor

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Declaration

I declare that this written submission represents my ideas in my own words and where other's ideas or words have been included, I have adequately Cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the University and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Soumya Sonali Biswal
(Signature)

Name: Soumyasonali Biswal

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Date: 14/09/2022

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This is to certify that Soumya Sonali Biswal has carried out the project in Department of Pure and Applied Physics, Guru Ghasidas University, Bilaspur (C.G.). On the topic "**Physical and spectroscopic studies of CdO containing Boro-Bismuthate glasses and its XRD and Raman characterization**".

The project is submitted for the partial fulfilment of requirement of the degree of Master in Science (Physics Hons).



Dr. M .N Tripathi

Head of Dept. of Pure and Applied Physics
Guru Ghasidas Vishwavidyalaya, Bilaspur

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Reference


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Project Report

On

Preparation and Characterization of $\text{Bi}_2(\text{Fe}_{1-x}\text{Co}_x)_2\text{O}_6$ lead free double perovskite



By

Ms. SUSHMA CHAUHAN

ROLL NO.: 20408038

REGISTRATION NO.: GGV/17/7129

Under the supervision

of

PROF. P.K. BAJPAI

Report submitted in partial fulfilment for the Degree of
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September, 2022

**Department of Pure and Applied Physics
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Bilaspur (C.G.) 495009, India**

Date: 15/09/2022

CERTIFICATE

This is to certify that Ms. Sushma Chauhan has carried out the project under my supervision in the Department of Pure and Applied physics, Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G. on the topic “**Synthesis and Characterization of $\text{Bi}_2(\text{Fe}_{1-x}\text{Co}_x)_2\text{O}_6$ lead free double perovskite**” to the best of our knowledge the work presented in this project is original and has not been submitted anywhere.

I wish her success in her future endeavors.

Supervisor

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FORWARDING CERTIFICATE

This is to certify that Ms. Sushma Chauhan has carried out the project in the Department of Pure and Applied physics, Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G. on the topic "Synthesis and Characterization of $\text{Bi}_2(\text{Fe}_{1-x}\text{Co}_x)_2\text{O}_6$ lead free double perovskite " This project is submitted for the partial fulfilment of requirement for the degree of M.Sc. in physics and for examiner's evaluation.

I wish her every success in her life.


(DR. M.N. TRIPATHI)
Associate Professor

Head of the Department
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शुद्ध एवं अनुप्रयुक्त भौतिकी विभाग
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DECLARATION

I hereby declare that the work presented in this project entitled "**Synthesis and Characterization of $\text{Bi}_2(\text{Fe}_{1-x}\text{Co}_x)_2\text{O}_6$ lead free double perovskite**" submitted as partial fulfilment for the degree of M.Sc. Physics, has been performed in the Department of Pure and Applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur under the supervision of Prof. P.K. Bajpai.

The work presented in this project dissertation is original and will remain intellectual property of Department of Pure and applied Physics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.).

Date: 15/09/2022

Place : Dept. of pure and applied physics
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(SUSHMA CHAUHAN)


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**“REVIEW ON SYNTHESIS AND CHARACTERIZATION OF BaTiO₃
FERROELECTRIC MATERIAL”**

Submitted in partial fulfilment of the requirements

Of the degree of

Master of Science (Physics Honor's)

By:

Thaneshvar Sahu

M.Sc. (Physics)4th semester

ROLL No-20408039

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Supervisor:

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(A Central University Established by the Central Universities Act 2009 No 25 of 2009)

Session 2021-22

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DECLARATION

I hereby declare that the work presented in this report entitled "REVIEW ON SYNTHESIS AND CHARACTERIZATION OF BaTiO₃ FERROELECTRIC MATERIAL" submitted as partial fulfillment for the degree of 'M.Sc. Physics' has been performed in the Department of Pure and Applied Physics, GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.), under the supervision of **Dr. H.S. TEWARI SIR**

Date: 15-09-2022
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CERTIFICATE

This is to certify that Mr. **Thaneshvar Sahu** has studied and prepared a report under my supervision in the Department of Pure and Applied Physics, GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.), on the topic "REVIEW ON SYNTHESIS AND CHARACTERIZATION OF $BaTiO_3$ FERROELECTRIC MATERIAL".


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FORWARDING CERTIFICATE

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I wish him every success and blessings in his life.



Forwarded to

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A Project On

**“First principle study of the Structural and
Electronic Properties of Monolayer WSe₂”**

A Dissertation in Partial Fulfillment for the Degree of

Master of Science in Physics

Submitted By

THANNURAM BHARDWAJ

Roll No.: 20408040

Under the Supervision of

Dr. M. N. Tripathi

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This is to certify that the dissertation entitled "First principle study of the Structural and Electronic Properties of Monolayer WSe₂ " submitted by **THANNURAM BHARDWAJ**, Department of pure and applied physics, Guru Ghasidas Vishwavidyalaya, Bilaspur, in partial fulfillment of the requirement for the degree of M.Sc. in Physics is an project work carried by him.

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This is to certify that the project entitled "First principle study of the Structural and Electronic Properties of Monolayer WSe₂" submitted by **THANNURAM BHARDWAJ** is approved
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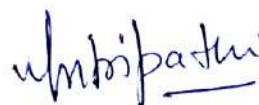
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CHAPTER 1