

**Department/Section: Physics**

**NAAC Metric**

**2.4.4 Average percentage of full time teachers who received awards, recognition, fellowships at State, National, International level from Government/Govt. recognised bodies during the 2020-2021**

**3.4.2 The institution provides incentives to teachers who receive state, national and international recognitions/awards (2020-2021)**

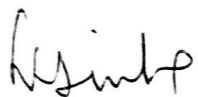
Name of full time teachers receiving awards from state level, national level, international level	Year of Award	P A N	Designation	Name of the award, fellowship, received from Government or Government recognised bodies	Name of the Awarding Agency	Incentives/Type of the incentive given by the HEI in recognition of the award	Link to the relevant documents	Page No.
Dr. Dilip Kumar Singh	2021		Assistant Professor	Invited talk-Advanced skills in Research and Protection in IPR				1
Prof. S. K. Rout	2021		Professor	Resource person -Refresher course-Recent Advances in Physics				2
Dr. Sanat Kumar Mukherjee	2020		Assistant Professor	Invited talk-National Webinar Modern Trends in Physics				3
Prof. Sunita Keshri	2020		Professor	Invited talk-Modern Approach on Magnetism and Material science in Engineering				4

*Sunita*

Prof. S. K. Rout	2020	Professor	Invited talk- Advanced Materials for Energy storage and Fuel Cell Applications				5
Prof. S. K. Rout	2021	Professor	Invited talk-Online Refresher Course in Physics, Sambalpur university				6
Prof. S. K. Rout	2021	Professor	Invited talk-Online Refresher Course in Physics, Pt. Ravishankar Shukla University, Raipur				7
Dr. Nishi Shrivastava	2020	Assistant Professor	Invited talk-Dept of Physics, Dr. RamManohar Lohia avadh University, Ayodhya				8
Dr. Dilip Kumar Singh	2021	Assistant Professor	Invited talk - Five-Day workshop on Advanced skills in research and protetion of IPR, Amity University, Noida				9-14
Prof. S. K. Rout	2020	Professor	Invited talk-Recent trends on energy and related Materials				15
Dr. Dilip Kumar Singh	2021	Assistant Professor	Reviewer- Optics Letters				16
Dr. Nishi Shrivastava	2020	Assistant Professor	Reviewer-Journal of Water and climate change				17-22
Dr. Saurabh Lahiri	2021	Assistant Professor	Reviewer-Physical Review Research				23
Dr. Saurabh Lahiri	2021	Assistant Professor	Reviewer-Journal of Physics A: Mathematical and Theoretical				24
Prof. Sunita Keshri	2021	Professor	Reviewer- AIP Advances				25
Dr. Sanat Mukherjee	2021	Assistant Professor	Reviewer- Inspire Manak awards				26
Prof. S. Konar	2021	Professor	Reviewer-Optik				27-28
Prof. S. Konar	2021	Professor	Reviewer-Communications in Nonlinear Science and Numerical Simulation				29-30
Prof. S. Konar	2021	Professor	Reviewer-Physica Scripta				31-32
Prof. S. Konar	2021	Professor	Reviewer-Chinese journal of Physics				33-34
Prof. S. Konar	2021	Professor	Reviewer-Journal of Optics				35
Dr. Dilip	2021	Assistant	Reviewer-Nanotechnology				36

*S. K. Rout*

Kumar Singh			Professor					
Prof. Sunita Keshri	2020		Professor	Thesis Reviewer-Guru Nanak Dev University, Amritsar				37-45
Dr. Nishi Shrivastava	2021		Assistant Professor	Committee Member-The 2021 International seminar on Environmental Engineering and Geoscience (ISEEG 2021)				46
Dr. Sanat Mukherjee			Assistant Professor	Reviewer-Applied surface sciences advances				47



Signature of Head  
(Prof. S. K. Sinha)  
Department of Physics  
BIT Mesra

Head  
Department of Physics  
Birla Institute of Technology  
Mesra, Ranchi-835215  
Jharkhand, INDIA

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**Invitation to deliver a talk in Workshop**

1 message

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**Dr. Sunita Rattan** <srattan@amity.edu>  
To: "dilipsinghnano1@gmail.com" <dilipsinghnano1@gmail.com>  
Cc: "Dr.Sangeeta Tiwari" <stiwari2@amity.edu>

Tue, Jun 1, 2021 at 4:07 PM

To  
Dr. Dilip Kumar Singh  
Assistant Professor  
Birla Institute of Technology, Mesra, Ranchi

Dear Dr. Singh

Thank you so much for giving your consent to deliver a talk in our Workshop entitled “Advanced Skills in Research and protection of IPR”.

Please find attached the formal invitation letter along with flyer and schedule of the program.

We look forward to your gracious presence in the eve

*With sincere regards,*

*Sunita Rattan  
Dean, Faculty of Science & Technology  
Director, Amity Institute of Applied Sciences,  
Amity University Uttar Pradesh, Noida  
Mob: 9810833703*

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**3 attachments**

 **Workshop schedule-AIAS-7-11 June 2021 .doc**  
82K

 **Brochure\_Final-01.06.2021.pdf**  
374K

 **Invitation letter-Dr Dilip Singh.docx**  
35K



From  
**Prof. B. Maharana,**  
Director

To,  
Dr. S. K. Rout  
Associate Professor  
Department of Physics, BIT, Mesra,  
Ranchi, Jharkhand.

Sir,

It is my pleasure to invite you as a Resource Person for the Online Refresher Course in Physics on the broad theme "Recent Advances in Physics" to be conducted by the UGC-Human Resource Development Centre (HRDC), Sambalpur University during 16.09.2021 to 29.09.2021. Thank you for your confirmation of acceptance through Dr. Banarji Behera, Coordinator of the programme. The Google meet links for the online class will be provided through email/WhatsApp one day before the scheduled classes.

You are requested to kindly deliver a total of 01 lecture of 90 minutes as per the following schedule:

Sl. No.	Date	Time	Topic
1.	16.09.2021	03.00 P.M. to 04.30 P.M.	Electrical Transport Properties of materials using Impedance Spectroscopy

As per the rules of UGC-HRDC, there is a provision of remuneration of @ Rs. 1500/- (Rupees One thousand five hundred) only per session of 90 minutes. **You are requested to submit the following documents for the reference of the participants/office, which is a mandate of the UGC-HRDC Programme.**

1. Abstract of the Lecture
2. The power point presentation of the Lecture
3. Passport size digital photograph
4. Brief Biodata
5. Five MCQ from your lecture along with the answer key

For further information and assistance please contact by Email/ WhatsApp to the Director, HRDC, Sambalpur University (Email: [ugchrdsu@suniv.ac.in](mailto:ugchrdsu@suniv.ac.in)/ [bmaharana@suniv.ac.in](mailto:bmaharana@suniv.ac.in)/ WhatsApp No. 9438439068). You may also contact Dr. Banarji Behera, Coordinator, Email- [banarjibehera@gmail.com](mailto:banarjibehera@gmail.com), Mob. 9439223383.

Your co-operation is highly solicited.

**National Webinar**  
**Modern Trends in Physics [NWMTP]**  
Organized by  
**Department of Physics**  
Ram Krishna College, Madhubani – 847211 (India)

**CERTIFICATE OF APPRECIATION**

This is to certify that

**Dr. Sanat Kumar Mukherjee**

From **Birla Institute of Technology, Mesra, Ranchi** has Delivered an **INVITED LECTURE** in this National Webinar held on 29 August, 2020 and his participation is duly acknowledged.



Dr. A. K. Mandal  
Chairman cum Principal



Dr Shree Narayan Yadav  
Convenor



Dr. Dharendra Kumar  
Organizing Secretary

19<sup>th</sup> September 2020

**To**  
**Dr. Sunita Keshri**  
Professor and Head, Physics  
Birla Institute of Technology Mesra, Ranchi,  
Jharkhand, India

**Dear Dr. Keshri**

**Greetings from Department of Physics, Maharaja Institute of Technology Mysore (MITM)!**

Please accept our sincere gratitude for accepting our invitation as a guest speaker for a Four Day International Webinar series on “**Modern Approach on Magnetism and Material Science in Engineering**” held on 15th-18th, September 2020 organised by the Department of Physics, MITM in association with IEEE RAS Chapter MITM.

It was very interesting to hear about your expertise and research on, “**Optical and Gas sensing properties of Wide Band Gap Semiconductor films**” (18<sup>th</sup> September 2020: Friday, 10:45 AM-11:45 AM (IST)).

We remain pleased for your participation in this International Webinar Series. We thank you for your valuable contribution, sharing of your knowledge and making the event a grand success.

Looking forward for your continuous support in the future.

Thanking You

With Best Regards



Dr. Vijaylakshmi Dayal  
Chairperson/Convener  
HOD, Department of Physics, MIT Mysore



Dr. Naresh Kumar B. G.  
Principal, MIT Mysore



Sanjeeb Kumar Rout &lt;skrout@bitmesra.ac.in&gt;

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**Regarding Processing of Honorarium fee for a speaker in the webinar**

1 message

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**Ananta Prasad Chakraverty** <apchakraverty@gmuniversity.ac.in>

Thu, Sep 10, 2020 at 11:24 PM

To: "Dr.S.K.Rout" &lt;skrout@bitmesra.ac.in&gt;

Cc: cks.env@gmail.com, skdas.gmu@gmail.com, skdas@gmuniversity.ac.in

To

Prof. Sanjib Kumar Rout

Professor

Dept. of Physics

Birla Institute of Technology, Mesra, Ranchi

Reference: 2 days Webinar on "Advanced Materials for Energy Storage and Fuel Cell Applications" held from 6th-7th Sept, 2020.

Dear Sanjib Sir

I may want to thank you for accepting our invitation as a speaker in our webinar series. Participants have appreciated both the talks with tremendous positive response. The objective of conducting the webinar is somewhat fulfilled by the organizing team. Thanking You once again for enriching your knowledge with our participants.

There is also a provision to felicitate the Invited speakers with a token of appreciation as an Honorarium fee of Rs 1500/-. The same was approved before the conduction of the webinar. Now, I need to apply the processing of the Honorarium fee from the Homi Bhaba Research centre of GM University. For this, I need your account details (Account No, IFSC Code, Name of the account holder, address and a cancelled cheque). I need to produce all these supportive documents for the process of the Honorarium fee. This process may take some days, depending upon the official opening of the university in the pandemic time. I may request you to kindly provide your account details. I may give a official notification to you after the processing of the fee from the GMU Account section.

I hope, You will again accept our invitation as a resource person in the upcoming seminar/webinar/FDP/Conference, if any. Your kind-hearted presence will definitely grace the occasion in future.

Thanking You

Regards

Dr. Ananta Prasad Chakraverty

Assistant Professor

School of Physics

GMU

COPY MAIL FORWARDED TO  
HEAD, SCHOOL OF PHYSICS, CO-CONVENER OF THE WEBINAR  
Research officer-Homi Bhaba Research Centre-GMU

**Dr. Ananta Prasad Chakraverty****Assistant Professor****School of Physics****Gangadhar Meher University, Sambalpur-768001****Odisha, India**





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UGC-HUMAN RESOURCE DEVELOPMENT CENTRE (HRDC)

SAMBALPUR UNIVERSITY

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NAAC Accredited 'A' Grade



UGC-HRDC, Sambalpur University  
Jyoti Vihar, Sambalpur, ODISHA-768019  
Email: ugchrdsu@suniv.ac.in  
Tel. No. (Office): (0663) 2432137

## Certificate

This is to certify that **Dr. S. K. Rout**, Associate Professor, Department of Physics, BIT, Mesra, Ranchi, Jharkhand has delivered two lectures as a Resource Person to the participants of “Online Refresher Course in Physics”, conducted by UGC-Human Resource Development Centre, Sambalpur University during 10.02.2021 to 23.02.2021 as per the following details:

Date	Time	Topic
11.02.2021	1.30 P.M. to 3.00 P.M.	Electrical characterisation of materials using Impedance Spectroscopy
15.02.2021	1.30 P.M. to 3.00 P.M.	Lead free piezoelectric ceramics for energy harvesting applications

Lectures are gratefully appreciated and well received by the participants. The UGC-HRDC, Sambalpur University expresses deep sense of gratitude for your esteemed co-operation.

Prof. Bulu Maharana

Director, HRDC

**Date: 11.08.21**

Dr. S. K. Rout  
Professor, Department of Physics,  
Birla Institute of Technology, Mesra  
Ranchi, 835 215, Jharkhand  
skrout@bitmesra.ac.in

We are happy to inform you that the School of Studies in Physics & Astrophysics and Human Resource Development Centre (HRDC), Pt. Ravishankar Shukla University (PRSU), Raipur, is organizing an Online **Refresher Course on Physics** during **16<sup>th</sup> August to 28<sup>th</sup> August, 2021**.

We invite you to deliver a lecture on the topic amongst the online using Google platform. The duration of the lecture will be 60 minutes (plus 30 minutes for discussion and interaction). **Your lecture is scheduled on 24<sup>th</sup> August at 12:15 pm.**

The participants of the Course (maximum 40 teachers) will join online on Google Meet from various affiliated colleges/departments of our university ([www.prsu.ac.in](http://www.prsu.ac.in)) and other Universities of the country.

An honorarium of Rs. 1500=00 for the lecture shall be paid by the HRDC online to your account. You are, therefore, requested to provide details of your **bank account, branch, IFSC code**.

**Kindly send us the following: (1) Title of your lectures with a brief write-up for circulation to participants; and (2) One page CV.**

Looking forward to having your fullest cooperation,

With best regards,



(Prof. Nameeta Brahme)  
Course Coordinator



(Prof. D.P. Bisen)  
Head, SoS in Physics & Astrophysics

Copy to:

1. The Registrar, PRSU, Raipur
2. The Finance Controller, PRSU, Raipur



**Dr. Rammanohar Lohia Avadh University Ayodhya, (U.P.)**

**डॉ० राममनोहर लोहिया अवध विश्वविद्यालय अयोध्या (उ०प्र०)**

## **CERTIFICATE OF WEBLECTURE**

*Organised By*

**Department of Physics and Electronics**

( Centre of Excellence by U.P. Govt.)

This is to certify that **Dr. (Mrs.) Nishi Srivastava, Assistant Professor, Department of Physics**

**BIT-Mesra Ranchi, India**

has delivered web lecture through Google Meet on **July,4,2020.**

The topic of her invited web lecture is

**Earth Climate System and Contribution of Aerosols in**

**Modulation of Climate.**

I wish her success in life.

**Prof.K.K. Verma**  
Head

## ABOUT THE UNIVERSITY

Amity University Uttar Pradesh was established by an Act of the State Legislature of Uttar Pradesh in 2005. The university is recognized by UGC under Section 22 of the UGC Act and accredited by the NAAC with grade 'A+'. Amity University offers programs on campus and through distance mode, in several fields of study at undergraduate, postgraduate, and doctoral levels. It has campuses in India and overseas. Amity is focused on pursuing and strengthening its relationship with the industry. The goal is to groom the students into industry ready professionals by giving them an extra edge with the knowledge of cutting-edge technologies, trainings on the latest market trends and imbining them with rich human values to make them socially responsive. At Amity we are passionate about grooming leaders who are not only thorough professionals but also good human beings with values and sanskars.

## ABOUT THE INSTITUTE

Amity Institute of Applied Sciences (AIAS) was established under the aegis of Amity University Uttar Pradesh with a vision to be a center of excellence for physical and chemical sciences. The main thrust and philosophy behind the establishment of the Institute is to promote in depth undergraduate & post Graduate education and conduct research in emerging areas of Applied

Sciences that will be beneficial for the Nation and the World at large. The Institute offers B.Sc. (Honors) programs in Physics, Chemistry, Mathematics and Statistics at undergraduate level and M.Sc. and Ph.D. programs in Applied Physics, Applied Chemistry, Applied Mathematics and Statistics. There are four departments in the institute, as below:

- Department of Physics
- Department of Chemistry
- Department of Mathematics
- Department of Statistics

In Amity Institute of Applied Sciences, teaching and learning are integrated with research nurturing both curiosity and creativity in an intellectually vibrant atmosphere of research. The Institute has faculty with expertise in various science discipline which helps in promoting interdisciplinary applied research as it has the benefit of different science, technology and innovation disciplines working together. The research background facilitates better understanding of the specific needs of industry within the different sectors. The students are trained to get equipped with all the basic knowledge and techniques required for research in their future professions.

## Five-Day Workshop on

## ADVANCED SKILLS IN RESEARCH AND PROTECTION OF IPR

7<sup>th</sup> - 11<sup>th</sup> JUNE, 2021



Organized By



**Department of Chemistry and  
Department of Physics  
Amity Institute of Applied Sciences  
Amity University Uttar Pradesh  
Noida, India**



## ABOUT THE WORKSHOP

The purpose of this workshop is value addition to the knowledge gained by students during their graduation by means of imparting advanced skills useful for research and protection of the new knowledge generated out of their research work. Research plays an important role in scientific and technological building and upliftment of the society as well as helps in business development and enhances preparedness. Knowledge of basic research concepts and strong research skills can make the students, a more competitive applicant, while pursuing their professional careers.

The aim of this workshop is to provide an opportunity to the students to learn basic skills useful in research that will include knowledge of some important software's, characterization techniques and information regarding protection of intellectual property rights. Experts from various fields are invited to deliver lectures, presentations, demonstration and impart hands on training wherever required.

Writing software has become central to research in many fields of science. In a mix of lectures and training sessions, use of some important software's will be taught, specific for use in physics and chemistry related research, like COMSOL, Atomic calculation engine (VASP), Quantum ESPRESSO,

NWChem & structural analysis and visualization tool, Origin 8.1, Chemdraw etc.

Scope of the characterization techniques, is probably the most essential and important part of research in any discipline, especially in physical and chemical sciences. Sessions will also be conducted on applications of selected characterization techniques like Raman spectroscopy, NMR and Nanomaterial Modelling and Simulation using DFT.

Knowledge of protection of new knowledge and ethics in research are vital for those aspiring to choose research as their careers. To help such students, lectures from experts on protection of Intellectual property rights, patent searching on WIPO, Google Patents & Indian Data base, Types of IPRs, Process & patentability, Introduction to ethics and research ethics, meaning of secrecy and confidentiality etc. will be conducted

Overall, this workshop will help the students to update their skills by gaining basic knowledge required to fulfil their future endeavours in the field of research and help them in their professions in various ways.

## OBJECTIVES

This course provides an understanding in the area of basic chemistry related software's,

characterization tools for practical applications, ethics in research and the protection of IPR. It is intended to provide the skills which are required to succeed in the industrial level. This course will expose the students to a coverage of experimental techniques using modern instrumentation.

## LEARNING OUTCOMES

On completion of the course the student will be able to:

- Understand the practical applications of characterization techniques and measurements,
- Design and draw of 2-D and 3D chemical structures, plot of graphs, ethics of research and IPR.
- Demonstrate and apply various instrumentation techniques available for elucidation of chemical structures depending on their physical and chemical properties.

### The course pedagogy includes:

- Seminars, invited lectures, workshops
- Hands on training
- Audio-visual aids
- Open source reference material
- Presentations
- Discussions on applications of topics covered etc.

## ORGANIZING COMMITTEE

### CHAIRPERSON

**Prof. (Dr.) Balvinder Shukla**  
Vice Chancellor, AUUP, NOIDA

### Co-CHAIRPERSON

**Prof. Sunita Rattan**  
Dean, Science & Technology, AUUP, NOIDA  
Director, AIAS, AUUP, NOIDA

### PROGRAM DIRECTOR

**Prof. Sangeeta Tiwari**  
Department of Chemistry, AUUP, NOIDA

### PROGRAM COORDINATORS

**Dr. Christine Jeyaseelan**  
HOD, Department of Chemistry, AUUP, NOIDA

**Dr. Ashok Kumar**  
HOD, Department of Physics, AUUP, NOIDA

### SESSION COORDINATORS

**Dr. Anita Gupta**  
Department of Chemistry, AUUP,  
NOIDA

**Dr. Manoj Raula**  
Department of Chemistry, AUUP,  
NOIDA

**Dr. Kumar Rakesh Ranjan**  
Department of Chemistry, AUUP,  
NOIDA

**Dr. Jyoti Katyal**  
Department of Physics, AUUP,  
NOIDA

**Dr. Maumita Das Mukherjee**  
Department of Chemistry, AUUP,  
NOIDA

**Dr. Tejendra Kumar Gupta**  
Department of Chemistry, AUUP,  
NOIDA

**Dr. Shefali Kanwar**  
Department of Physics, AUUP,  
NOIDA

### INVITED SPEAKERS

Dr. Amrish Chandra, AUUP, Noida  
Mrs. Pooja Kumar, Innove Intellects LLP  
Dr. Paresh Kumar Dave, IP Moment Services, New Delhi  
Dr. Shelly Biswas, BIT Mesra, Ranchi  
Dr. Dilip Kumar Singh, BIT Mesra, Ranchi  
Dr. Supratim Banerjee, IISER, Kolkata

Dr. Sudip Chakraborty, CUP, Bhatinda  
Mr. Nitish Chaurasia, COMSOL Multiphysics  
Dr. Deepti, DRDO  
Mr. Anil Kumar Sharma, Impulse Technology  
Mr. Sujay B Patil, Electrochemistry Metrohm India Pvt. Ltd.  
Prof. Bir Bikram Singh, Akal University, Punjab  
Dr. Satyen Saha, BHU, Varanasi

### INVITED SPEAKERS

Free Registration for the participants, e-certificate will be provided after successful completion of the program.

Registration Link:

<https://amityuni.live/81092643799>

Contact Number: +91 99530 05541

## PROGRAM SCHEDULE

**Day 1: 7<sup>th</sup> June, 2021**

### **Intellectual Property Rights and Ethics in Research-I**

**Inaugural Session: 9:30 am -10.00 am**

<b>Duration</b>	<b>Speaker Name/ Designation/ Affiliation</b>	<b>Topic of Lecture</b>
10.00 am - 1.00 pm	Dr.Amrish Chandra, Associate Professor Amity Institute of Pharmacy Pharmaceutical Technology Amity University Uttar Pradesh	Patent searching on WIPO, Google Patents & Indian Data base
<b>Lunch Break : 1:00 pm – 2:00 pm</b>		
2.00 pm - 5.00 pm	Mrs. Pooja Kumar Registered Patent Agent (Govt. of India), Startup Facilitator, Mentor, Women Entrepreneur Founder; Director: Innove Intellects LLP	Importance of IPR for Startup & Career in IPR

**Day 2: 8<sup>th</sup> June, 2021**

### **Intellectual Property Rights and Ethics in Research-II**

<b>Duration</b>	<b>Speaker Name/ Designation/ Affiliation</b>	<b>Topic of Lecture</b>
10.00 am - 1.00 pm	Dr.Paresh Kumar Dave Founder and MD IP Moment Services, Dwarka, New Delhi	Types of IPRs, Process & Patentability
<b>Lunch Break : 1:00 pm – 2:00 pm</b>		
2.00 pm - 5.00 pm	Dr. Shelly Biswas Assistant Professor, Space Engineering and Rocketry, BIT Mesra, Ranchi	Introduction to ethics and research ethics, meaning of secrecy and confidentiality



**Day 3: 9<sup>th</sup> June, 2021**  
**Practical uses/ applications of Characterization techniques**

<b>Duration</b>	<b>Speaker Name /Designation/ Affiliation</b>	<b>Topic of Lecture</b>
10.00 am - 11.00 am	Dr. Dilip Kumar Singh Assistant Professor Institute name: Birla Institute of Technology, Mesra, Ranchi	Raman Spectroscopy: The Finger prints of materials
11.00 am - 1:00 pm	Dr. Supratim Banerjee Assistant Professor, IISER Kolkata	NMR: A chemist's Best Friend
<b>Lunch Break : 1:00 pm – 2:00 pm</b>		
2:00 pm - 4:00 pm	Dr. Sudip Chakraborty, Assistant Professor, Central University of Punjab, Bhatinda	DFT – A Theoretical Approach
4.00 pm - 5.00 pm	Dr. Dilip Kumar Singh Assistant Professor Institute name: Birla Institute of Technology, Mesra, Ranchi	Physics of Raman Spectroscopy of carbon nano-materials and 2-D semiconductors

**Day 4: 10<sup>th</sup> June, 2021**  
**Use of software's in research**

<b>Duration</b>	<b>Speaker Name /Designation/ Affiliation</b>	<b>Topic of Lecture</b>
10.00 am - 11.30 am	Mr. Nitish Chaurasia COMSOL Multiphysics	Introduction to COMSOL multiphysics
11:30 am - 1:00 pm	Dr Deepti Scientist E DRDO	Laser and its application
<b>Lunch Break : 1:00 pm - 2.00 pm</b>		
2:00 pm – 5:00 pm	Mr. Anil Kumar Sharma Managing Director (Technical) Impulse Technology	Nanomaterial Modeling and Simulation using DFT on Exabyte.io Cloud Platform

**Day 5: 11<sup>th</sup> June, 2021**  
**Some Important Characterization Techniques**

<b>Duration</b>	<b>Speaker Name/ Designation/ Affiliation</b>	<b>Topic of Lecture</b>
9.30 am - 11.30 am	Mr. Sujay B Patil Assistant product Manager-Electrochemistry Metrohm India Pvt. Ltd.	Basic of Electrochemistry and different techniques and application
11:30 am - 1:30 pm	Prof. Bir Bikram Singh Professor and Head Dept. of Physics, Akal University, Talwandi Sabo, Bhatinda, Punjab	Nuclear phenomena within collective clusterization approach
<b>Lunch Break : 1:30 pm - 2.00 pm</b>		
2:00 pm - 4:00 pm	Dr. Satyen Saha, Associate Professor BHU, India	Ionic Liquids  Use of Origin and Chem Draw

**4:00-5:00 pm (1hr): Concluding / Vote of thanks**

**VIRTUAL**  
**FACULTY DEVELOPMENT PROGRAM**

ON

**RECENT TRENDS ON ENERGY  
 AND RELATED MATERIALS**

**Date : 26<sup>th</sup> – 28<sup>th</sup> August 2020**

**PROGRAM SCHEDULE**

**Time: 11am -12.30pm**

**DAY 1: 26<sup>th</sup> August 2020**

**Time: 2 - 3.30pm**

*Role of Spectroscopic Techniques for Energy Material Characterization and Applications*

**Dr. C. K. Jayasankar**

Professor

Sri Venkateswara University, Tirupati

*Doping Induced Modification Studies of Double Perovskite Oxides*

**Dr. Md. Ikram**

Professor

National Institute of Technology, Srinagar

**Time: 11am -12.30pm**

**DAY 2: 27<sup>th</sup> August 2020**

**Time: 2 - 3.30pm**

*Development of Nano-ceramics & Thin films for Microwave and Integrated Electronic Applications*

**Dr. Pamu Dobbidi**

Associate Professor

Indian Institute of Technology, Guwahati

*Technology Important Chalcogenide Crystals Grown by Bridgman Stockbarger Method*

**Dr. A. Arunkumar**

Associate Professor

AURC, Hyderabad

**Time: 11am -12.30pm**

**DAY 3: 28<sup>th</sup> August 2020**

**Time: 2 - 3.30pm**

*Electrical Properties of Cobalt Ferrite (CFO) and Polymer-CFO Nanocomposites*

**Dr. Sweety Supriya**

Assistant Professor

National Institute of Technology, Nagaland

*Electrical Characterization of Ceramics Using Impedance Spectroscopy*

**Dr. Sanjeeb Kumar Rout**

Professor

Birla Institute of Technology, Ranchi

**ORGANIZER**

**Prof. M. Antony Lilly Grace**

Department of Physics

CMR Institute of Technology

132 AECS Layout

Kundalahalli

Bengaluru - 560 037, India

Email: antony.l@cmrit.ac.in

Ph. No :9632182909

Mode of FDP: **Google Meet**

**Registration link:**

<https://forms.gle/jSfpmTWBVjRunazY8>

No registration fee

**e - certificate for all the participants**

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Dr. Raveesha K H

Dr. Rajesh Gopal

Dr. Suvitha

Dr. Shamsundar Hegde

Dr. Tukaram Shet

Dr. Ramdas Balan

Prof. Sudarshana

---

**Optics Letters 426960 review received**

1 message

---

**olmss@osa.org** <olmss@osa.org>  
To: dilipsinghnano1@gmail.com

Sun, Jun 27, 2021 at 12:44 PM

Manuscript ID: 426960 Type: letter

Title: Plasmonic heptamer-arranged nanoholes in a gold film on the end-facet of a photonic crystal fibre

Author: Pierre Berini

Dear DILIP SINGH,

Your comments and recommendation to Topical Editor Dai-Sik Kim for this manuscript have been received.

Thank you for your efforts in helping to maintain OSA's high standards of publication.

We hope you will continue to support Optics Letters as a reviewer. If you have not already done so, please visit the reviewer web site located at

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Please also let us know if you wish for us to send a review acknowledgment letter to your employer.

Sincerely,

Optics Letters Manuscript Office

[olmss@osa.org](mailto:olmss@osa.org)=====  
Review Confirmation  
=====

Decision

Accept with minor/optional revisions

Reviewer Questions

Reviewer Comments for Editor

Authors have been able to demonstrate the possibility of exciting various plasmonic modes in the transmitted spectra through the milled nanoholes on the fiber tips. These structures shows polarization dependent spectral response. Although it could had been interesting to observe specific functionality of PCF fibers with such novel nanostructures on the tip, which authors may take up in future.

Accepting the key fact that, fabrication of plasmonic heptamer supported on PCFs and possibility of exciting various modes in the broad spectral range is an interesting claim made by authors (demonstrated experimentally and supported by simulations), manuscript may be published in the Optics letters.

Reviewer Comments for Author

The article by Hamid Suleman about "plasmonic heptamer-arranged nanoholes in gold film on the end-facet of a photonic crystal fibers is an interesting article opening up new possibilities with photonic crystal fibers (PCFs) to explore various resonant plasmonic nanostructures with broad spectral range.

Accepting the key fact that, fabrication of plasmonic heptamer supported on PCFs and possibility of exciting various modes in the broad spectral range is an interesting claim made by authors (demonstrated experimentally and supported by simulations), manuscript may be published in the Optics letters.



Nishi Srivastava &lt;nishi.bhu@gmail.com&gt;

---

**Thank you for the review of JWC-D-20-00207**

1 message

---

**Damien Serre** <em@editorialmanager.com>  
Reply-To: Damien Serre <damien.serre@upf.pf>  
To: Nishi Srivastava <nishi.bhu@gmail.com>

25 August 2020 at 11:28

Journal of Water and Climate Change

Article title: Estimation of Urbanization on Wet Deposition of PM2.5: A Case Study in Xiong'an New Area, Northern China

Reference No: JWC-D-20-00207

Dear Dr. Srivastava,

Thank you for your review of this manuscript, we appreciate your time.

You can access your review comments by logging onto the Editorial Manager site at:

<https://www.editorialmanager.com/jwc/>, using your username and password to log in.

With best wishes,

Damien Serre

Editor

Journal of Water and Climate Change



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Nishi Srivastava &lt;nishi.bhu@gmail.com&gt;

---

**Thank you for the review of JWC-D-20-00196**

1 message

---

**Damien Serre** <em@editorialmanager.com>  
Reply-To: Damien Serre <damien.serre@upf.pf>  
To: Nishi Srivastava <nishi.bhu@gmail.com>

10 October 2020 at 20:21

Journal of Water and Climate Change

Article title: A quick method to investigate the occurrence frequency of dust and sand storms in urban areas

Reference No: JWC-D-20-00196

Dear Dr. Srivastava,

Thank you for your review of this manuscript, we appreciate your time.

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With best wishes,

Damien Serre

Editor

Journal of Water and Climate Change

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Nishi Srivastava &lt;nishi.bhu@gmail.com&gt;

---

**Thank you for the review of JWC-D-20-00178**

1 message

---

**Deeksha Rastogi** <em@editorialmanager.com>  
Reply-To: Deeksha Rastogi <rastogid@ornl.gov>  
To: Nishi Srivastava <nishi.bhu@gmail.com>

29 July 2020 at 20:38

Dear Dr. Srivastava,

Thank you for your review of the submission "Study of regional heterogeneity of cloud properties during different rainfall scenarios over monsoon dominated region" (ref: JWC-D-20-00178), which was sent to Journal of Water and Climate Change.

You can access your review comments by logging into <https://www.editorialmanager.com/jwc/>

Many thanks again for the time you spent reviewing this submission.

Sincerely yours,

Deeksha Rastogi  
Editor  
Journal of Water and Climate Change  
IWA Publishing

---

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---

**Thank you for the review of ATMENV-D-19-00806**

1 message

---

**Ngai T Lau** <eesserver@eesmail.elsevier.com>  
Reply-To: Ngai T Lau <atmosenv@cityu.edu.hk>  
To: nishi.bhu@gmail.com, nishi991@rediffmail.com

9 July 2019 at 16:43

\*\*\* Automated email sent by the system \*\*\*

Ms. Ref. No.: ATMENV-D-19-00806  
Title: Initial PM10 peak as a diagnostic alarm for the occurrence of the Middle Eastern Dust storms  
Atmospheric Environment + OA Mirror

Dear Dr srivastava,

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Your username is: [nishi.bhu@gmail.com](mailto:nishi.bhu@gmail.com)

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Kind regards,

Ngai T Lau, Ph.D.  
China Editorial Office  
Atmospheric Environment + OA Mirror

\*\*\*\*\*

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For more information about Scopus and ScienceDirect, please visit [www.info.scopus.com/ees/](http://www.info.scopus.com/ees/)

---

**Thank you for reviewing a submission for Journal of Water and Climate Change**

1 message

---

**Journal of Water and Climate Change** <em@editorialmanager.com>  
Reply-To: Journal of Water and Climate Change <jwc@iwap.co.uk>  
To: Nishi Srivastava <nishi.bhu@gmail.com>

21 October 2021 at 21:28

Dear Dr. Srivastava,

Thank you for your recent review of the submission "Disaggregation of future GCMs to generate IDF curves for the assessment of urban floods" (ref: JWC-D-21-00241R1), which has now been accepted for publication.

**Impressed by this paper?**

Recommend the paper for inclusion in our Reviewer's Choice online collection: simply respond to this email with a few lines on what makes the paper particularly significant or interesting. Your nomination will be considered by the Editors, who make regular additions to the collection.

We would also be very grateful if you could let us know your thoughts on the review process with IWA Publishing:  
<https://www.surveymonkey.co.uk/r/IWAPReviewer>

Many thanks once again for your helpful comments and advice.

With best wishes,

Journal Office  
Journal of Water and Climate Change  
IWA Publishing

---

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Sourabh Lahiri &lt;sourabhlahiri@gmail.com&gt;

---

**To\_referee LAHIRI XH10564W Noa**

1 message

---

**prresearch@aps.org** <prresearch@aps.org>

Mon, Nov 15, 2021 at 11:00 PM

Reply-To: prresearch@aps.org

To: sourabhlahiri@gmail.com

Re: XH10564W

Efficient asymmetric collisional Brownian particle engines

by C. E. Fern'andez Noa, Angel L. L. Stable, William G. C. Oropesa,  
et al.

Dear Dr. Lahiri,

Thank you very much for reviewing the above paper. We have followed your recommendation and accepted the paper for publication.

Yours sincerely,

Juan-Jose Lieten-Santos

Managing Editor

Physical Review Research

Email: [prresearch@aps.org](mailto:prresearch@aps.org)<https://journals.aps.org/prresearch/>

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<https://go.aps.org/3e2aLyu>



Sourabh Lahiri &lt;sourabhlahiri@gmail.com&gt;

---

**Thank you for reviewing for J. Phys. A: Math. Theor. - JPhysA-116200.R1**

1 message

---

**Journal of Physics A: Mathematical and Theoretical**Wed, Nov 10, 2021 at  
11:53 AM

&lt;onbehalfof@manuscriptcentral.com&gt;

Reply-To: jphysa@iopublishing.org

To: sourabhlahiri@gmail.com

Dear Dr Lahiri,

Re: "Fluctuations in heat engines"

Article reference: JPhysA-116200.R1

Thank you for your report on this Topical Review, which is being considered by Journal of Physics A: Mathematical and Theoretical.

We appreciate the time and effort that you have spent reviewing this manuscript and we are very grateful for your assistance. We hope that we will be able to call upon you again to review future manuscripts.

We are always looking for ways to improve our service. We would really appreciate it if you could take five minutes to complete a short survey about your experience of reviewing an article for IOP Publishing:  
<https://forms.office.com/r/T26Bu71Wz5>

We would like to thank you in advance for your help.

Yours sincerely

On behalf of:

Journal of Physics A: Mathematical and Theoretical

Editor-in-Chief: J A Minahan

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Letter reference: ERWTR05



S Keshri &lt;s\_keshri@bitmesra.ac.in&gt;

---

## Review Instructions for MS ADV21-AR-03050 at AIP Advances

---

aipadv-edoffice@aip.org <aipadv-edoffice@aip.org>  
Reply-To: aipadv-edoffice@aip.org  
To: s\_keshri@bitmesra.ac.in

Wed, Nov 17, 2021 at 11:44 AM

Dear Dr. Keshri,

Thank you for agreeing to review "**Magnetic and microwave absorbing properties of  $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$  nanoparticles**" by Tran Dang Thanh, C Xuan, Ta Ngoc Bach, Bui Xuan Khuyen, Dao Son Lam, Dinh Chi Linh, Le Thi Giang, and Vu Dinh Lam. We appreciate your time and expert opinion. To access the manuscript and submit your review, please go to:

<https://aipadvances.peerx-press.org/cgi-bin/main.plex?el=A3CR3IEQM5A4Bcsf1F1A9ftdTWqPupWLbnty1Dx47KaPZgY>

We anticipate receiving your review by 01-Dec-2021. If you are unable to complete the review by then, please contact us immediately by replying to this email.

The contents of the manuscript are, of course, confidential until published. Please let us know if you have any questions.

Sincerely,

Dario Arena  
Associate Editor  
AIP Advances

AIP Publishing  
1305 Walt Whitman Road  
Suite 300  
Melville, NY 11747-4300 USA

e-mail: [aipadv-edoffice@aip.org](mailto:aipadv-edoffice@aip.org)

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**National Innovation Foundation - India**  
Autonomous Body of the Department of Science and Technology, Govt. of India

**Dr. Vipin Kumar**  
Director

Gandhinagar: 11 January 2021



Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

**Fw: Thank you for the review of IJLEO-D-21-03104**

1 message

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:48 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
<http://scholar.google.co.in/citations?user=dVhKwuAAAAAJ&hl=en>

----- Forwarded message -----

**From:** Hartmut Bartelt <em@editorialmanager.com>  
**To:** Swapan Konar <swakonar@yahoo.com>  
**Sent:** Tuesday, 3 August 2021, 13:31:04 GMT+5:30  
**Subject:** Thank you for the review of IJLEO-D-21-03104

Ms. Ref. No.: IJLEO-D-21-03104  
Title: An ultrahighly sensitive pressure sensor based on high- birefringence side-hole photonic crystal fibers  
Optik

Dear Swapan,

Thank you for taking the time to review the above-referenced manuscript. You can access your comments and the decision letter when it becomes available.

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Yours sincerely,

Hartmut Bartelt  
Section Editor

Optik

\*\*\*\*\*

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Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

**Fw: Thank you for the review of CNSNS-D-20-02254**

1 message

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:51 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
<http://scholar.google.co.in/citations?user=dVhKwuAAAAAJ&hl=en>

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**From:** Weimin Han <em@editorialmanager.com>  
**To:** Swapan Konar <swakonar@yahoo.com>  
**Sent:** Friday, 12 February 2021, 21:26:29 GMT+5:30  
**Subject:** Thank you for the review of CNSNS-D-20-02254

Ms. Ref. No.: CNSNS-D-20-02254  
Title: Ellipticity angle effect on exact optical solitons and Modulation instability in birefringent fiber  
Communications in Nonlinear Science and Numerical Simulation

Dear Swapan,

Thank you for taking the time to review the above-referenced manuscript.

You can access your comments by:

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3. Click [Reviewer Login]

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Yours sincerely,

Weimin Han  
Associate Editor  
Communications in Nonlinear Science and Numerical Simulation

\*\*\*\*\*

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Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

**Fw: Thank you for reviewing for Phys. Scr. - PHYSSCR-115127**

1 message

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:50 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
<http://scholar.google.co.in/citations?user=dVhKwuAAAAAJ&hl=en>

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**From:** Physica Scripta <[onbehalf@manuscriptcentral.com](mailto:onbehalf@manuscriptcentral.com)>  
**To:** "swakonar@yahoo.com" <[swakonar@yahoo.com](mailto:swakonar@yahoo.com)>  
**Sent:** Friday, 16 July 2021, 17:05:12 GMT+5:30  
**Subject:** Thank you for reviewing for Phys. Scr. - PHYSSCR-115127

Dear Dr Konar,

Re: "Combined effects of electric, magnetic, and intense terahertz laser fields on the nonlinear optical properties in GaAs/GaAlAs quantum well with exponentially confinement potential"  
Article reference: PHYSSCR-115127

Thank you for your report on this Paper, which is being considered by Physica Scripta.

We appreciate the time and effort that you have spent reviewing this manuscript and we are very grateful for your assistance.

We hope that we will be able to call upon you again to review future manuscripts.

Yours sincerely

On behalf of:

Physica Scripta  
Managing Editor: Jade Holt

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Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

**Fw: Review for Chinese Journal of Physics - manuscript accepted**

1 message

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:51 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
<http://scholar.google.co.in/citations?user=dVhKwuAAAAJ&hl=en>

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**From:** Chinese Journal of Physics <em@editorialmanager.com>  
**To:** Swapan Swapan Konar <swakonar@yahoo.com>  
**Sent:** Wednesday, 2 December 2020, 03:20:20 GMT+5:30  
**Subject:** Review for Chinese Journal of Physics - manuscript accepted

Manuscript Number: CJPHY-D-20-01114R1  
Multi-wave trains and Sasa - Satsuma freak events generation in an optical metamaterial  
Bedel giscard onana essama; salome ndjakomo essiane, Professor; Frederic Biya - Motto; Mohammed Shabat; Jacques Atangana

Dear Prof. Swapan Konar,

Thank you for reviewing the above referenced manuscript. With your help, I have reached an accept decision on this manuscript.

The anonymised comments to author, from all reviewers, are included below. You can also access this information by logging into Editorial Manager as a reviewer.

Thank you for your contribution and time in reviewing this manuscript, which not only assisted me in reaching my decision, but also enables the author(s) to disseminate their work at the highest possible quality.

I am grateful to you for your assistance as a reviewer for Chinese Journal of Physics.

Kind regards,

Chin-Kun Hu  
Editor-in-Chief  
Chinese Journal of Physics

Comments to author:  
Please add volume and page number of References [8] and [9]  
when you prepare corrections for the proof of this paper.

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Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

---

**Fw: How was your reviewing experience Dr Konar?**

1 message

---

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:48 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
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**To:** "swakonar@yahoo.com" <[swakonar@yahoo.com](mailto:swakonar@yahoo.com)>  
**Sent:** Wednesday, 8 September 2021, 16:50:24 GMT+5:30  
**Subject:** How was your reviewing experience Dr Konar?

Dear Dr Konar,

Re: "Coherent coupling and modulation of the guided modes in photorefractive nonlinear slab waveguide" Article  
reference: JOPT-108822

We appreciate the time and effort that you have spent reviewing for our journal and we are very grateful for your assistance.

We would really appreciate it if you could take five minutes to complete a short survey about your experience of reviewing an article for IOP Publishing: <https://forms.office.com/r/T26Bu71Wz5>.

We would like to thank you in advance for your help.

Yours sincerely

On behalf of:  
Journal of Optics  
[iopscience.org/jopt](http://iopscience.org/jopt) | [jopt@iopublishing.org](mailto:jopt@iopublishing.org)  
Impact Factor: 2.379 | Citescore: 5.9

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Letter reference: ESPSNS05



Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

---

**Decision on an article you reviewed: NANO-129106**

1 message

**Nanotechnology** <onbehalf@manuscriptcentral.com>

Wed, Apr 21, 2021 at 2:40 PM

Reply-To: nano@iopublishing.org

To: nano@iopublishing.org

Re: "Growth Mechanism of Transfer-free Graphene Synthesized from Different Carbon Sources Verified by Ion Implantation" by Chen, Yi; Zhao, Yunbiao; Zhou, Danqing; Li, Yue; Zhao, Ziqiang

Thank you for your comments on this Paper being considered by Nanotechnology. We wanted to let you know that we have now made a decision on this article based on all of the feedback received. On this occasion our decision is: Reject

If you would like to see the referee reports for this article, they are now available by viewing the decision letter for this article in your referee centre at <https://mc04.manuscriptcentral.com/nano-iop>.

We are very grateful for your assessment of this paper and we look forward to working with you again in the future.

Yours sincerely

On behalf of:

Nanotechnology

Editor-in-Chief: Professor R LaPierre

[iopscience.org/nano](http://iopscience.org/nano) | [nano@iopublishing.org](mailto:nano@iopublishing.org) | Impact Factor: 3.551 | Citescore: 6.1

Want to find out what is happening to your submission?

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Letter ref: InfRef05



S Keshri &lt;s\_keshri@bitmesra.ac.in&gt;

---

**Evaluation of PhD thesis of Mr. Ranjeet Singh**

19 messages

---

ar exam2 <arexam2@gndu.ac.in>  
To: s\_keshri@bitmesra.ac.in

Thu, Oct 22, 2020 at 4:50 PM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA!

I have been directed by the Vice-Chancellor to request you to let us know if you would find, from your otherwise busy schedule and pre-occupations, some time to evaluate a thesis, on the topic, "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" to be submitted by Mr. Ranjeet Singh in the faculty of Engineering & Technology (Electronics Technology) for the award of the degree of Doctor of Philosophy (PhD). A document/pdf File of the summary of the thesis is attached herewith for your perusal.

I take this opportunity to convey your good self some relevant PhD. ordinances regarding the evaluation of the thesis:-

1. For the evaluation of the thesis, two months may be given to any examiner.
2. The examiners on the evaluation of the thesis will submit their evaluation report on the prescribed proforma. In each case, the examiners shall clearly submit to the University his/her critical evaluation, comments and suggestions on the PhD. thesis. Each examiner shall also send at least five questions to be asked from the candidate.

Keeping in view of the above-mentioned information, **kindly convey your consent to evaluate the thesis of the candidate through e-mail, so that we may send you a copy of thesis for evaluation. However, in case you are unable to evaluate the thesis owing to some reason, a line in reply in this regard will be greatly appreciated**

I hope you will spare some of your valuable time to evaluate the thesis. A token honorarium of Rs.2000/- will be paid for the job. An early reply in confirmation would be highly appreciated.

Thanks with warm regards.

Yours faithfully,

**Mrs Avtar Kaur**

**Assistant Registrar (Examinations-II),  
Guru Nanak Dev University,  
Amritsar-143005 (Punjab), INDIA.**

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Virus-free. [www.avast.com](http://www.avast.com)

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**2 attachments**



**RANJEET SINGH SUMMARY.pdf**  
132K



**RANJEET SINGH SUMMARY.docx**  
38K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: "Dean Faculty Affaris / Spons.Res" <dean.fasr@bitmesra.ac.in>

Thu, Oct 22, 2020 at 10:01 PM

Please advise. Thanks.

[Quoted text hidden]

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**2 attachments**



**RANJEET SINGH SUMMARY.pdf**  
132K



**RANJEET SINGH SUMMARY.docx**  
38K

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**Dean(Faculty Affairs and Sponsored Research)** <dean.fasr@bitmesra.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Sat, Oct 24, 2020 at 9:43 AM

Kindly go ahead.

Regards

SKonar

[Quoted text hidden]

--

Dr S.Konar, Professor  
Dean (Faculty Affairs and Sponsored Research)  
Birla Institute of Technology  
Mesra-835215, Ranchi

---

**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Sun, Oct 25, 2020 at 4:10 PM

Dear Mrs. A. Kaur,  
I do agree to evaluate this thesis.

With thanks.

S. Keshri

[Quoted text hidden]

--

-----  
Dr. Sunita Keshri  
Prof. & Head, Department of Physics  
Birla Institute of Technology  
Mesra, Ranchi-835215, Jharkhand, India  
Mob. +91-94311-05821, Fax: +91-651-2275401.

---

**ar exam2** <arexam2@gndu.ac.in>  
To: s\_keshri@bitmesra.ac.in

Wed, Oct 28, 2020 at 4:48 PM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA!

Thank you very much for your email dated 25.10.2020, conveying your consent to evaluate the PhD thesis titled, "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" submitted by Mr. Ranjeet Singh.

The soft copy of the thesis is attached herewith for your kind perusal. You are requested to evaluate the thesis and please send your evaluation report as per attached evaluation report proforma. We shall be highly indebted for your effort and kind cooperation in this regard. It is also respectfully submitted that if you are not comfortable with the soft copy please let us know so that we may send you the hard copy of the thesis also.

Kindly acknowledge the receipt of this email and the soft copy of the thesis as well.

Thanks with warm regards.

Yours faithfully,

Avtar Kaur

Assistant Registrar (Exams.II)

Guru Nanak Dev University,

Amritsar (Punjab), INDIA.

---

**3 attachments**



**Ph.D. Thesis Ranjeet Singh.pdf**  
10335K



**Indian Remuneration Bill proforma - Copy.doc**  
68K



**PhD Eval Report Proforma (Ranjeet Singh).doc**  
30K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Wed, Oct 28, 2020 at 5:38 PM

Thanks. I have received this.  
[Quoted text hidden]

---

**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: Applied Physics <appliedphysics@bitmesra.ac.in>

Mon, Nov 2, 2020 at 2:18 PM



----- Forwarded message -----




From: **ar exam2** <arexam2@gndu.ac.in>  
Date: Wed, Oct 28, 2020 at 4:48 PM  
Subject: Evaluation of PhD thesis of Mr. Ranjeet Singh  
To: <s\_keshri@bitmesra.ac.in>

[Quoted text hidden]

[Quoted text hidden]

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**3 attachments**

-  **Ph.D. Thesis Ranjeet Singh.pdf**  
10335K
-  **Indian Remuneration Bill proforma - Copy.doc**  
68K
-  **PhD Eval Report Proforma (Ranjeet Singh).doc**  
30K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: Applied Physics <appliedphysics@bitmesra.ac.in>

Tue, Nov 17, 2020 at 2:06 AM

[Quoted text hidden]

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**3 attachments**

-  **Ph.D. Thesis Ranjeet Singh.pdf**  
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-  **Indian Remuneration Bill proforma - Copy.doc**  
68K
-  **PhD Eval Report Proforma (Ranjeet Singh).doc**  
30K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: VR Gupta <vrgupta@bitmesra.ac.in>

Wed, Nov 18, 2020 at 4:03 PM

Madam,  
Can you please send few comments on the 'device fabrications' part of this thesis!  
Thanks.




----- Forwarded message -----

From: **ar exam2** <arexam2@gndu.ac.in>  
Date: Wed, 28 Oct, 2020, 4:48 PM  
Subject: Evaluation of PhD thesis of Mr. Ranjeet Singh  
To: <s\_keshri@bitmesra.ac.in>

[Quoted text hidden]

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**3 attachments**

-  **Ph.D. Thesis Ranjeet Singh.pdf**  
10335K
-  **Indian Remuneration Bill proforma - Copy.doc**  
68K
-  **PhD Eval Report Proforma (Ranjeet Singh).doc**  
30K

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**VR Gupta** <vrgupta@bitmesra.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Wed, Nov 18, 2020 at 5:19 PM

Ok I will check.

[Quoted text hidden]

---

**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: Shailendra Rajput <srajput85@outlook.com>

Thu, Nov 19, 2020 at 9:51 PM

Dear Shailendra,  
If you find some time, please make a few comments on this thesis, especially on XRD analysis.  
Good wishes.

----- Forwarded message -----




From: **ar exam2** <arexam2@gndu.ac.in>  
Date: Wed, Oct 28, 2020 at 4:48 PM  
Subject: Evaluation of PhD thesis of Mr. Ranjeet Singh  
To: <s\_keshri@bitmesra.ac.in>

[Quoted text hidden]

[Quoted text hidden]

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**3 attachments**

-  **Ph.D. Thesis Ranjeet Singh.pdf**  
10335K
-  **Indian Remuneration Bill proforma - Copy.doc**  
68K
-  **PhD Eval Report Proforma (Ranjeet Singh).doc**  
30K

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**Shailendra Rajput** <srajput85@outlook.com>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Fri, Nov 20, 2020 at 2:32 PM

Dear Ma'am,  
I will review the thesis.

Sincere regards,  
Shailendra

---

**From:** Dr. S. Keshri <s\_keshri@bitmesra.ac.in>  
**Sent:** Thursday, November 19, 2020 6:21 PM  
**To:** Shailendra Rajput <srajput85@outlook.com>  
**Subject:** Fwd: Evaluation of PhD thesis of Mr. Ranjeet Singh

[Quoted text hidden]

---

**ar exam2** <arexam2@gndu.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Tue, Dec 22, 2020 at 11:50 AM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA.

It is respectfully submitted that your evaluation report on the PhD thesis "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" submitted by Ranjeet Singh is awaited in this office. You are therefore, humbly requested to send your evaluation report through

email at your earliest convenience. We shall be highly indebted for your effort and kind cooperation in this regard.

A line of reply would be greatly appreciated.

Thanks with warm regards.

Assistant Registrar (Exams-II),  
Guru Nanak Dev University,  
Amritsar-143005 (Punjab), INDIA

[Quoted text hidden]

Dr. S. Keshri <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Thu, Dec 24, 2020 at 11:50 AM

Dear Mrs. Kaur,  
Good morning.

I will be needing 2-3 weeks more to summarize the evaluation report of the thesis as the semester evaluation work is going over here and I am very busy with that. Please send me the format of the evaluation report.

Thanks.  
S Keshri

On Tue, Dec 22, 2020 at 11:50 AM ar exam2 <arexam2@gndu.ac.in> wrote:

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA.

It is respectfully submitted that your evaluation report on the PhD thesis "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" submitted by Ranjeet Singh is awaited in this office. You are therefore, humbly requested to send your evaluation report through email at your earliest convenience. We shall be highly indebted for your effort and kind cooperation in this regard.

A line of reply would be greatly appreciated.

Thanks with warm regards.

Assistant Registrar (Exams-II),  
Guru Nanak Dev University,  
Amritsar-143005 (Punjab), INDIA

On Wed, Oct 28, 2020 at 5:38 PM Dr. S. Keshri <s\_keshri@bitmesra.ac.in> wrote:  
Thanks. I have received this.

On Wed, 28 Oct, 2020, 4:48 PM ar exam2, <arexam2@gndu.ac.in> wrote:

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA!

Thank you very much for your email dated 25.10.2020, conveying your consent to evaluate the PhD thesis titled, "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" submitted by Mr. Ranjeet Singh.

The soft copy of the thesis is attached herewith for your kind perusal. You are requested to evaluate the thesis and please send your evaluation report as per attached evaluation report proforma. We shall be highly indebted for your effort and kind cooperation in this regard. It is also respectfully submitted that if you are not comfortable with the soft copy please let us know so that we may send you the hard copy of the thesis also.

Kindly acknowledge the receipt of this email and the soft copy of the thesis as well.

Thanks with warm regards.

Yours faithfully,

Avtar Kaur

Assistant Registrar (Exams.II)

Guru Nanak Dev University,

Amritsar (Punjab), INDIA.

[Quoted text hidden]

ar exam2 <arexam2@gndu.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Tue, Dec 29, 2020 at 12:27 PM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA!

Thank you very much for your kind email. The evaluation report format is attached herewith for your kind perusal.

Thanks with best regards.

Assistant Registrar (Exams-II)  
Guru Nanak Dev University,  
Amritsar.

[Quoted text hidden]

 PhD Eval Report Proforma (Annex-II) NEW.docx

14K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Tue, Dec 29, 2020 at 1:16 PM

Thanks a lot.  
[Quoted text hidden]

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Sun, Jan 10, 2021 at 2:33 PM

Dear Mrs. A. Kaur,  
Please find enclosed the evaluation report of the PhD thesis of Mr. Ranjeet Singh.  
With thanks.  
S. Keshri

[Quoted text hidden]

-----  
Dr. Sunita Keshri  
Professor, Department of Physics

[Quoted text hidden]

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 **PhD Evaluation report by Prof. S. Keshri.pdf**  
107K

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**ar exam2** <arexam2@gndu.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Mon, Jan 11, 2021 at 10:41 AM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University Amritsar India,

Thank you very much for your kind email. This is to be acknowledged with thanks to the receipt of your evaluation report on the PhD thesis submitted by Mr. Ranjeet Singh. We are highly indebted for your effort and kind cooperation in this regard. You are also requested to send your remuneration bill as per attached proforma.

Thanks with warm regards.

Assistant Registrar (Exams-II),  
Guru Nanak Dev University,  
Amritsar-143005 (Punjab), INDIA

[Quoted text hidden]

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 **Indian Remuneration Bill proforma.doc**  
68K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Thu, Jan 14, 2021 at 12:04 AM

Dear Mrs. Kaur,

Page No 44

Thank you for your email. I would love to hand over the amount of the honorarium to the library of your University. So, please do the needful.

S. Keshri

[Quoted text hidden]





*Certificate*

awarded to

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The 2021 International Seminar on Environmental Engineering and Geosciences (ISEEG 2021)

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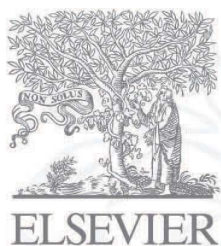
<http://iseeg.net>

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July 6, 2021







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**Department/Section: Physics**

**NAAC Metric 2.4.4** Average percentage of full time teachers who received awards, recognition, fellowships at State, National, International level from Government/Govt. recognised bodies during 2020-21 & **3.4.2** The institution provides incentives to teachers who receive state, national and international recognitions/awards

1. Commendation and monetary incentive at a University function

2.4.4 Average percentage of full time teachers who received awards, recognition, fellowships at State, National, International level from Government/Govt. recognised bodies during the 2020-2021 & 3.4.2 The institution provides incentives to teachers who receive state, national and international recognitions/awards

1. Commendation and monetary incentive at a University function

2. Commendation and medal at a University function

3. Certificate of honor

4. Announcement in the Newsletter / website (5)

Name of full time teachers receiving awards from state level, national level, international level	Year of Award	P A N	Designation	Name of the award, fellowship, received from Government or Government recognised bodies	Name of the Awarding Agency	Incentives/Type of the incentive given by the HEI in recognition of the award	Link to the relevant documents	Page No.
Dr. Dilip Kumar Singh	2021		Assistant Professor	Invited talk-Advanced skills in Research and Protection in IPR				1
Prof. S. K. Rout	2021		Professor	Resource person -Refresher course-Recent Advances in Physics				2
Dr. Sanat Kumar	2020		Assistant Professor	Invited talk-National Webinar Modern Trends in Physics				3

L



Mukherjee								
Prof. SunitaKeshri	2020		Professor	Invited talk-Modern Approach on Magnetism and Material science in Engineering				4
Prof. S. K. Rout	2020		Professor	Invited talk- Advanced Materials for Energy storage and Fuel Cell Applications				5
Prof. S. K. Rout	2021		Professor	Invited talk-Online Refresher Course in Physics, Sambalpur university				6
Prof. S. K. Rout	2021		Professor	Invited talk-Online Refresher Course in Physics, Pt. Ravishankar Shukla University, Raipur				7
Dr. Nishi Shrivastava	2020		Assistant Professor	Invited talk-Dept of Physics, Dr. RamManoharLohiaavadh University, Ayodhya				8
Dr. Dilip Kumar Singh	2021		Assistant Professor	Invited talk - Five-Day workshop on Advanced skills in research and protetion of IPR, Amity University, Noida				9-14
Prof. S. K. Rout	2020		Professor	Invited talk-Recent trends on energy and related Materials				15
Dr. Dilip Kumar Singh	2021		Assistant Professor	Reviewer- Optics Letters				16
Dr. Nishi Shrivastava	2020		Assistant Professor	Reviewer-Journal of Water and climate change				17-22
Dr. Saurabh Lahiri	2021		Assistant Professor	Reviewer-Physical Review Research				23
Dr. Saurabh Lahiri	2021		Assistant Professor	Reviewer-Journal of Physics A: Mathematical and Theoretical				24
Prof. SunitaKeshri	2021		Professor	Reviewer- AIP Advances				25
Dr. Sanat Mukherjee	2021		Assistant Professor	Reviewer- Inspire Manak awards				26
Prof. S. Konar	2021		Professor	Reviewer-Optik				27-28
Prof. S. Konar	2021		Professor	Reviewer-Communications in Nonlinear Science and Numerical Simulation				29-30
Prof. S. Konar	2021		Professor	Reviewer-PhysicaScripta				31-32

L

Prof. S. Konar	2021		Professor	Reviewer-Chinese journal of Physics				33-34
Prof. S. Konar	2021		Professor	Reviewer-Journal of Optics				35
Dr. Dilip Kumar Singh	2021		Assistant Professor	Reviewer-Nanotechnology				36
Prof. Sunita Keshri	2020		Professor	Thesis Reviewer-Guru Nanak Dev University, Amritsar				37-45
Dr. Nishi Shrivastava	2021		Assistant Professor	Committee Member-The 2021 International seminar on Environmental Engineering and Geoscience (ISEEG 2021)				46
Dr. Sanat Mukherjee			Assistant Professor	Reviewer-Applied surface sciences advances				47



Signature of Head  
(Prof. S. K. Sinha)  
Department of Physics  
BIT Mesra

Head  
Department of Physics  
Birla Institute of Technology  
Mesra, Ranchi-835215  
Jharkhand, INDIA

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**Invitation to deliver a talk in Workshop**

1 message

---

**Dr. Sunita Rattan** <srattan@amity.edu>  
To: "dilipsinghnano1@gmail.com" <dilipsinghnano1@gmail.com>  
Cc: "Dr.Sangeeta Tiwari" <stiwari2@amity.edu>

Tue, Jun 1, 2021 at 4:07 PM

To  
Dr. Dilip Kumar Singh  
Assistant Professor  
Birla Institute of Technology, Mesra, Ranchi

Dear Dr. Singh

Thank you so much for giving your consent to deliver a talk in our Workshop entitled “Advanced Skills in Research and protection of IPR”.

Please find attached the formal invitation letter along with flyer and schedule of the program.

We look forward to your gracious presence in the eve

*With sincere regards,*

*Sunita Rattan  
Dean, Faculty of Science & Technology  
Director, Amity Institute of Applied Sciences,  
Amity University Uttar Pradesh, Noida  
Mob: 9810833703*

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**3 attachments**

 **Workshop schedule-AIAS-7-11 June 2021 .doc**  
82K

 **Brochure\_Final-01.06.2021.pdf**  
374K

 **Invitation letter-Dr Dilip Singh.docx**  
35K



From  
**Prof. B. Maharana,**  
Director

To,  
Dr. S. K. Rout  
Associate Professor  
Department of Physics, BIT, Mesra,  
Ranchi, Jharkhand.

Sir,

It is my pleasure to invite you as a Resource Person for the Online Refresher Course in Physics on the broad theme "Recent Advances in Physics" to be conducted by the UGC-Human Resource Development Centre (HRDC), Sambalpur University during 16.09.2021 to 29.09.2021. Thank you for your confirmation of acceptance through Dr. Banarji Behera, Coordinator of the programme. The Google meet links for the online class will be provided through email/WhatsApp one day before the scheduled classes.

You are requested to kindly deliver a total of 01 lecture of 90 minutes as per the following schedule:

Sl. No.	Date	Time	Topic
1.	16.09.2021	03.00 P.M. to 04.30 P.M.	Electrical Transport Properties of materials using Impedance Spectroscopy

As per the rules of UGC-HRDC, there is a provision of remuneration of @ Rs. 1500/- (Rupees One thousand five hundred) only per session of 90 minutes. **You are requested to submit the following documents for the reference of the participants/office, which is a mandate of the UGC-HRDC Programme.**

1. Abstract of the Lecture
2. The power point presentation of the Lecture
3. Passport size digital photograph
4. Brief Biodata
5. Five MCQ from your lecture along with the answer key

For further information and assistance please contact by Email/ WhatsApp to the Director, HRDC, Sambalpur University (Email: [ugchrdsu@suniv.ac.in](mailto:ugchrdsu@suniv.ac.in)/ [bmaharana@suniv.ac.in](mailto:bmaharana@suniv.ac.in)/ WhatsApp No. 9438439068). You may also contact Dr. Banarji Behera, Coordinator, Email- [banarjibehera@gmail.com](mailto:banarjibehera@gmail.com), Mob. 9439223383.

Your co-operation is highly solicited.



**National Webinar**  
**Modern Trends in Physics [NWMTP]**  
Organized by  
**Department of Physics**  
Ram Krishna College, Madhubani – 847211 (India)

**CERTIFICATE OF APPRECIATION**

This is to certify that

**Dr. Sanat Kumar Mukherjee**

From **Birla Institute of Technology, Mesra, Ranchi** has Delivered an **INVITED LECTURE** in this National Webinar held on 29 August, 2020 and his participation is duly acknowledged.



Dr. A. K. Mandal  
Chairman cum Principal



Dr Shree Narayan Yadav  
Convenor



Dr. Dharendra Kumar  
Organizing Secretary

19<sup>th</sup> September 2020

**To**  
**Dr. Sunita Keshri**  
Professor and Head, Physics  
Birla Institute of Technology Mesra, Ranchi,  
Jharkhand, India

**Dear Dr. Keshri**

**Greetings from Department of Physics, Maharaja Institute of Technology Mysore (MITM)!**

Please accept our sincere gratitude for accepting our invitation as a guest speaker for a Four Day International Webinar series on “**Modern Approach on Magnetism and Material Science in Engineering**” held on 15th-18th, September 2020 organised by the Department of Physics, MITM in association with IEEE RAS Chapter MITM.

It was very interesting to hear about your expertise and research on, “**Optical and Gas sensing properties of Wide Band Gap Semiconductor films**” (18<sup>th</sup> September 2020: Friday, 10:45 AM-11:45 AM (IST)).

We remain pleased for your participation in this International Webinar Series. We thank you for your valuable contribution, sharing of your knowledge and making the event a grand success.

Looking forward for your continuous support in the future.

Thanking You

With Best Regards



Dr. Vijaylakshmi Dayal  
Chairperson/Convener  
HOD, Department of Physics, MIT Mysore



Dr. Naresh Kumar B. G.  
Principal, MIT Mysore



Sanjeeb Kumar Rout &lt;skrout@bitmesra.ac.in&gt;

---

**Regarding Processing of Honorarium fee for a speaker in the webinar**

1 message

**Ananta Prasad Chakraverty** <apchakraverty@gmuniversity.ac.in>

Thu, Sep 10, 2020 at 11:24 PM

To: "Dr.S.K.Rout" &lt;skrout@bitmesra.ac.in&gt;

Cc: cks.env@gmail.com, skdas.gmu@gmail.com, skdas@gmuniversity.ac.in

To  
Prof. Sanjib Kumar Rout  
Professor  
Dept. of Physics  
Birla Institute of Technology, Mesra, Ranchi

Reference: 2 days Webinar on "Advanced Materials for Energy Storage and Fuel Cell Applications" held from 6th-7th Sept, 2020.

Dear Sanjib Sir

I may want to thank you for accepting our invitation as a speaker in our webinar series. Participants have appreciated both the talks with tremendous positive response. The objective of conducting the webinar is somewhat fulfilled by the organizing team. Thanking You once again for enriching your knowledge with our participants.

There is also a provision to felicitate the Invited speakers with a token of appreciation as an Honorarium fee of Rs 1500/-. The same was approved before the conduction of the webinar. Now, I need to apply the processing of the Honorarium fee from the Homi Bhaba Research centre of GM University. For this, I need your account details (Account No, IFSC Code, Name of the account holder, address and a cancelled cheque). I need to produce all these supportive documents for the process of the Honorarium fee. This process may take some days, depending upon the official opening of the university in the pandemic time. I may request you to kindly provide your account details. I may give a official notification to you after the processing of the fee from the GMU Account section.

I hope, You will again accept our invitation as a resource person in the upcoming seminar/webinar/FDP/Conference, if any. Your kind-hearted presence will definitely grace the occasion in future.

Thanking You  
Regards

Dr. Ananta Prasad Chakraverty  
Assistant Professor  
School of Physics  
GMU

COPY MAIL FORWARDED TO  
HEAD, SCHOOL OF PHYSICS, CO-CONVENER OF THE WEBINAR  
Research officer-Homi Bhaba Research Centre-GMU

**Dr. Ananta Prasad Chakraverty**  
**Assistant Professor**  
**School of Physics**  
**Gangadhar Meher University, Sambalpur-768001**  
**Odisha, India**



UNIVERSITY GRANTS COMMISSION

UGC-HUMAN RESOURCE DEVELOPMENT CENTRE (HRDC)

SAMBALPUR UNIVERSITY

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NAAC Accredited 'A' Grade



UGC-HRDC, Sambalpur University  
Jyoti Vihar, Sambalpur, ODISHA-768019  
Email: ugchrdsu@suniv.ac.in  
Tel. No. (Office): (0663) 2432137

## Certificate

This is to certify that **Dr. S. K. Rout**, Associate Professor, Department of Physics, BIT, Mesra, Ranchi, Jharkhand has delivered two lectures as a Resource Person to the participants of “Online Refresher Course in Physics”, conducted by UGC-Human Resource Development Centre, Sambalpur University during 10.02.2021 to 23.02.2021 as per the following details:

Date	Time	Topic
11.02.2021	1.30 P.M. to 3.00 P.M.	Electrical characterisation of materials using Impedance Spectroscopy
15.02.2021	1.30 P.M. to 3.00 P.M.	Lead free piezoelectric ceramics for energy harvesting applications

Lectures are gratefully appreciated and well received by the participants. The UGC-HRDC, Sambalpur University expresses deep sense of gratitude for your esteemed co-operation.

Prof. Bulu Maharana

Director, HRDC

**Date: 11.08.21**

Dr. S. K. Rout  
Professor, Department of Physics,  
Birla Institute of Technology, Mesra  
Ranchi, 835 215, Jharkhand  
skrout@bitmesra.ac.in

We are happy to inform you that the School of Studies in Physics & Astrophysics and Human Resource Development Centre (HRDC), Pt. Ravishankar Shukla University (PRSU), Raipur, is organizing an Online **Refresher Course on Physics** during **16<sup>th</sup> August to 28<sup>th</sup> August, 2021**.

We invite you to deliver a lecture on the topic amongst the online using Google platform. The duration of the lecture will be 60 minutes (plus 30 minutes for discussion and interaction). **Your lecture is scheduled on 24<sup>th</sup> August at 12:15 pm.**

The participants of the Course (maximum 40 teachers) will join online on Google Meet from various affiliated colleges/departments of our university ([www.prsu.ac.in](http://www.prsu.ac.in)) and other Universities of the country.

An honorarium of Rs. 1500=00 for the lecture shall be paid by the HRDC online to your account. You are, therefore, requested to provide details of your **bank account, branch, IFSC code**.

**Kindly send us the following: (1) Title of your lectures with a brief write-up for circulation to participants; and (2) One page CV.**

Looking forward to having your fullest cooperation,

With best regards,



(Prof. Nameeta Brahme)  
Course Coordinator



(Prof. D.P. Bisen)  
Head, SoS in Physics & Astrophysics

Copy to:

1. The Registrar, PRSU, Raipur
2. The Finance Controller, PRSU, Raipur



**Dr. Rammanohar Lohia Avadh University Ayodhya, (U.P.)**

**डॉ० राममनोहर लोहिया अवध विश्वविद्यालय अयोध्या (उ०प्र०)**

## **CERTIFICATE OF WEBLECTURE**

*Organised By*

**Department of Physics and Electronics**

( Centre of Excellence by U.P. Govt.)

This is to certify that **Dr. (Mrs.) Nishi Srivastava, Assistant Professor, Department of Physics**

**BIT-Mesra Ranchi, India**

has delivered web lecture through Google Meet on **July,4,2020.**

The topic of her invited web lecture is

**Earth Climate System and Contribution of Aerosols in**

**Modulation of Climate.**

I wish her success in life.

**Prof.K.K. Verma**  
Head



## ABOUT THE UNIVERSITY

Amity University Uttar Pradesh was established by an Act of the State Legislature of Uttar Pradesh in 2005. The university is recognized by UGC under Section 22 of the UGC Act and accredited by the NAAC with grade 'A+'. Amity University offers programs on campus and through distance mode, in several fields of study at undergraduate, postgraduate, and doctoral levels. It has campuses in India and overseas. Amity is focused on pursuing and strengthening its relationship with the industry. The goal is to groom the students into industry ready professionals by giving them an extra edge with the knowledge of cutting-edge technologies, trainings on the latest market trends and imbining them with rich human values to make them socially responsive. At Amity we are passionate about grooming leaders who are not only thorough professionals but also good human beings with values and sanskars.

## ABOUT THE INSTITUTE

Amity Institute of Applied Sciences (AIAS) was established under the aegis of Amity University Uttar Pradesh with a vision to be a center of excellence for physical and chemical sciences. The main thrust and philosophy behind the establishment of the Institute is to promote in depth undergraduate & post Graduate education and conduct research in emerging areas of Applied

Sciences that will be beneficial for the Nation and the World at large. The Institute offers B.Sc. (Honors) programs in Physics, Chemistry, Mathematics and Statistics at undergraduate level and M.Sc. and Ph.D. programs in Applied Physics, Applied Chemistry, Applied Mathematics and Statistics. There are four departments in the institute, as below:

- Department of Physics
- Department of Chemistry
- Department of Mathematics
- Department of Statistics

In Amity Institute of Applied Sciences, teaching and learning are integrated with research nurturing both curiosity and creativity in an intellectually vibrant atmosphere of research. The Institute has faculty with expertise in various science discipline which helps in promoting interdisciplinary applied research as it has the benefit of different science, technology and innovation disciplines working together. The research background facilitates better understanding of the specific needs of industry within the different sectors. The students are trained to get equipped with all the basic knowledge and techniques required for research in their future professions.

## Five-Day Workshop on

## ADVANCED SKILLS IN RESEARCH AND PROTECTION OF IPR

7<sup>th</sup> - 11<sup>th</sup> JUNE, 2021



Organized By



**Department of Chemistry and  
Department of Physics  
Amity Institute of Applied Sciences  
Amity University Uttar Pradesh  
Noida, India**



## ABOUT THE WORKSHOP

The purpose of this workshop is value addition to the knowledge gained by students during their graduation by means of imparting advanced skills useful for research and protection of the new knowledge generated out of their research work. Research plays an important role in scientific and technological building and upliftment of the society as well as helps in business development and enhances preparedness. Knowledge of basic research concepts and strong research skills can make the students, a more competitive applicant, while pursuing their professional careers.

The aim of this workshop is to provide an opportunity to the students to learn basic skills useful in research that will include knowledge of some important software's, characterization techniques and information regarding protection of intellectual property rights. Experts from various fields are invited to deliver lectures, presentations, demonstration and impart hands on training wherever required.

Writing software has become central to research in many fields of science. In a mix of lectures and training sessions, use of some important software's will be taught, specific for use in physics and chemistry related research, like COMSOL, Atomic calculation engine (VASP), Quantum ESPRESSO,

NWChem & structural analysis and visualization tool, Origin 8.1, Chemdraw etc.

Scope of the characterization techniques, is probably the most essential and important part of research in any discipline, especially in physical and chemical sciences. Sessions will also be conducted on applications of selected characterization techniques like Raman spectroscopy, NMR and Nanomaterial Modelling and Simulation using DFT.

Knowledge of protection of new knowledge and ethics in research are vital for those aspiring to choose research as their careers. To help such students, lectures from experts on protection of Intellectual property rights, patent searching on WIPO, Google Patents & Indian Data base, Types of IPRs, Process & patentability, Introduction to ethics and research ethics, meaning of secrecy and confidentiality etc. will be conducted

Overall, this workshop will help the students to update their skills by gaining basic knowledge required to fulfil their future endeavours in the field of research and help them in their professions in various ways.

## OBJECTIVES

This course provides an understanding in the area of basic chemistry related software's,

characterization tools for practical applications, ethics in research and the protection of IPR. It is intended to provide the skills which are required to succeed in the industrial level. This course will expose the students to a coverage of experimental techniques using modern instrumentation.

## LEARNING OUTCOMES

On completion of the course the student will be able to:

- Understand the practical applications of characterization techniques and measurements,
- Design and draw of 2-D and 3D chemical structures, plot of graphs, ethics of research and IPR.
- Demonstrate and apply various instrumentation techniques available for elucidation of chemical structures depending on their physical and chemical properties.

### The course pedagogy includes:

- Seminars, invited lectures, workshops
- Hands on training
- Audio-visual aids
- Open source reference material
- Presentations
- Discussions on applications of topics covered etc.

## ORGANIZING COMMITTEE

### CHAIRPERSON

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Vice Chancellor, AUUP, NOIDA

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**Dr. Ashok Kumar**  
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NOIDA

**Dr. Shefali Kanwar**  
Department of Physics, AUUP,  
NOIDA

### INVITED SPEAKERS

Dr. Amrish Chandra, AUUP, Noida  
Mrs. Pooja Kumar, Innove Intellects LLP  
Dr. Paresh Kumar Dave, IP Moment Services, New Delhi  
Dr. Shelly Biswas, BIT Mesra, Ranchi  
Dr. Dilip Kumar Singh, BIT Mesra, Ranchi  
Dr. Supratim Banerjee, IISER, Kolkata

Dr. Sudip Chakraborty, CUP, Bhatinda  
Mr. Nitish Chaurasia, COMSOL Multiphysics  
Dr. Deepti, DRDO  
Mr. Anil Kumar Sharma, Impulse Technology  
Mr. Sujay B Patil, Electrochemistry Metrohm India Pvt. Ltd.  
Prof. Bir Bikram Singh, Akal University, Punjab  
Dr. Satyen Saha, BHU, Varanasi

### INVITED SPEAKERS

Free Registration for the participants, e-certificate will be provided after successful completion of the program.

Registration Link:

<https://amityuni.live/81092643799>

Contact Number: +91 99530 05541

## PROGRAM SCHEDULE

**Day 1: 7<sup>th</sup> June, 2021**

### **Intellectual Property Rights and Ethics in Research-I**

**Inaugural Session: 9:30 am -10.00 am**

<b>Duration</b>	<b>Speaker Name/ Designation/ Affiliation</b>	<b>Topic of Lecture</b>
10.00 am - 1.00 pm	Dr.Amrish Chandra, Associate Professor Amity Institute of Pharmacy Pharmaceutical Technology Amity University Uttar Pradesh	Patent searching on WIPO, Google Patents & Indian Data base
<b>Lunch Break : 1:00 pm – 2:00 pm</b>		
2.00 pm - 5.00 pm	Mrs. Pooja Kumar Registered Patent Agent (Govt. of India), Startup Facilitator, Mentor, Women Entrepreneur Founder; Director: Innove Intellects LLP	Importance of IPR for Startup & Career in IPR

**Day 2: 8<sup>th</sup> June, 2021**

### **Intellectual Property Rights and Ethics in Research-II**

<b>Duration</b>	<b>Speaker Name/ Designation/ Affiliation</b>	<b>Topic of Lecture</b>
10.00 am - 1.00 pm	Dr.Paresh Kumar Dave Founder and MD IP Moment Services, Dwarka, New Delhi	Types of IPRs, Process & Patentability
<b>Lunch Break : 1:00 pm – 2:00 pm</b>		
2.00 pm - 5.00 pm	Dr. Shelly Biswas Assistant Professor, Space Engineering and Rocketry, BIT Mesra, Ranchi	Introduction to ethics and research ethics, meaning of secrecy and confidentiality



**Day 3: 9<sup>th</sup> June, 2021**  
**Practical uses/ applications of Characterization techniques**

<b>Duration</b>	<b>Speaker Name /Designation/ Affiliation</b>	<b>Topic of Lecture</b>
10.00 am - 11.00 am	Dr. Dilip Kumar Singh Assistant Professor Institute name: Birla Institute of Technology, Mesra, Ranchi	Raman Spectroscopy: The Finger prints of materials
11.00 am - 1:00 pm	Dr. Supratim Banerjee Assistant Professor, IISER Kolkata	NMR: A chemist's Best Friend
<b>Lunch Break : 1:00 pm – 2:00 pm</b>		
2:00 pm - 4:00 pm	Dr. Sudip Chakraborty, Assistant Professor, Central University of Punjab, Bhatinda	DFT – A Theoretical Approach
4.00 pm - 5.00 pm	Dr. Dilip Kumar Singh Assistant Professor Institute name: Birla Institute of Technology, Mesra, Ranchi	Physics of Raman Spectroscopy of carbon nano-materials and 2-D semiconductors

**Day 4: 10<sup>th</sup> June, 2021**  
**Use of software's in research**

<b>Duration</b>	<b>Speaker Name /Designation/ Affiliation</b>	<b>Topic of Lecture</b>
10.00 am - 11.30 am	Mr. Nitish Chaurasia COMSOL Multiphysics	Introduction to COMSOL multiphysics
11:30 am - 1:00 pm	Dr Deepti Scientist E DRDO	Laser and its application
<b>Lunch Break : 1:00 pm - 2.00 pm</b>		
2:00 pm – 5:00 pm	Mr. Anil Kumar Sharma Managing Director (Technical) Impulse Technology	Nanomaterial Modeling and Simulation using DFT on Exabyte.io Cloud Platform

**Day 5: 11<sup>th</sup> June, 2021**  
**Some Important Characterization Techniques**

<b>Duration</b>	<b>Speaker Name/ Designation/ Affiliation</b>	<b>Topic of Lecture</b>
9.30 am - 11.30 am	Mr. Sujay B Patil Assistant product Manager-Electrochemistry Metrohm India Pvt. Ltd.	Basic of Electrochemistry and different techniques and application
11:30 am - 1:30 pm	Prof. Bir Bikram Singh Professor and Head Dept. of Physics, Akal University, Talwandi Sabo, Bhatinda, Punjab	Nuclear phenomena within collective clusterization approach
<b>Lunch Break : 1:30 pm - 2.00 pm</b>		
2:00 pm - 4:00 pm	Dr. Satyen Saha, Associate Professor BHU, India	Ionic Liquids Use of Origin and Chem Draw

**4:00-5:00 pm (1hr): Concluding / Vote of thanks**

**VIRTUAL**  
**FACULTY DEVELOPMENT PROGRAM**

ON

**RECENT TRENDS ON ENERGY  
 AND RELATED MATERIALS**

**Date : 26<sup>th</sup> – 28<sup>th</sup> August 2020**

**PROGRAM SCHEDULE**

**Time: 11am -12.30pm**

**DAY 1: 26<sup>th</sup> August 2020**

**Time: 2 - 3.30pm**

*Role of Spectroscopic Techniques for Energy  
 Material Characterization and Applications*

**Dr. C. K. Jayasankar**

Professor

Sri Venkateswara University, Tirupati

*Doping Induced Modification Studies of  
 Double Perovskite Oxides*

**Dr. Md. Ikram**

Professor

National Institute of Technology, Srinagar

**Time: 11am -12.30pm**

**DAY 2: 27<sup>th</sup> August 2020**

**Time: 2 - 3.30pm**

*Development of Nano-ceramics & Thin films for  
 Microwave and Integrated Electronic Applications*

**Dr. Pamu Dobbidi**

Associate Professor

Indian Institute of Technology, Guwahati

*Technology Important Chalcogenide Crystals  
 Grown by Bridgman Stockbarger Method*

**Dr. A. Arunkumar**

Associate Professor

AURC, Hyderabad

**Time: 11am -12.30pm**

**DAY 3: 28<sup>th</sup> August 2020**

**Time: 2 - 3.30pm**

*Electrical Properties of Cobalt Ferrite (CFO)  
 and Polymer-CFO Nanocomposites*

**Dr. Sweety Supriya**

Assistant Professor

National Institute of Technology, Nagaland

*Electrical Characterization of Ceramics Using  
 Impedance Spectroscopy*

**Dr. Sanjeeb Kumar Rout**

Professor

Birla Institute of Technology, Ranchi

**ORGANIZER**

**Prof. M. Antony Lilly Grace**

Department of Physics

CMR Institute of Technology

132 AECS Layout

Kundalahalli

Bengaluru - 560 037, India

Email: antony.l@cmrit.ac.in

Ph. No :9632182909

Mode of FDP: **Google Meet**

**Registration link:**

<https://forms.gle/jSfpmTWBVjRunazY8>

No registration fee

**e - certificate for all the participants**

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Dr. Rajesh Gopal

Dr. Suvitha

Dr. Shamsundar Hegde

Dr. Tukaram Shet

Dr. Ramdas Balan

Prof. Sudarshana

---

**Optics Letters 426960 review received**

1 message

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**olmss@osa.org** <olmss@osa.org>  
To: dilipsinghnano1@gmail.com

Sun, Jun 27, 2021 at 12:44 PM

Manuscript ID: 426960 Type: letter

Title: Plasmonic heptamer-arranged nanoholes in a gold film on the end-facet of a photonic crystal fibre

Author: Pierre Berini

Dear DILIP SINGH,

Your comments and recommendation to Topical Editor Dai-Sik Kim for this manuscript have been received.

Thank you for your efforts in helping to maintain OSA's high standards of publication.

We hope you will continue to support Optics Letters as a reviewer. If you have not already done so, please visit the reviewer web site located at

<https://prism.osapublishing.org> to update your research interests and the OCIS codes that best designate your areas of expertise. This allows us to better identify the new submissions that will be of most interest to you.

Please also let us know if you wish for us to send a review acknowledgment letter to your employer.

Sincerely,

Optics Letters Manuscript Office

[olmss@osa.org](mailto:olmss@osa.org)=====  
Review Confirmation  
=====

Decision

Accept with minor/optional revisions

Reviewer Questions

Reviewer Comments for Editor

Authors have been able to demonstrate the possibility of exciting various plasmonic modes in the transmitted spectra through the milled nanoholes on the fiber tips. These structures shows polarization dependent spectral response. Although it could had been interesting to observe specific functionality of PCF fibers with such novel nanostructures on the tip, which authors may take up in future.

Accepting the key fact that, fabrication of plasmonic heptamer supported on PCFs and possibility of exciting various modes in the broad spectral range is an interesting claim made by authors (demonstrated experimentally and supported by simulations), manuscript may be published in the Optics letters.

Reviewer Comments for Author

The article by Hamid Suleman about "plasmonic heptamer-arranged nanoholes in gold film on the end-facet of a photonic crystal fibers is an interesting article opening up new possibilities with photonic crystal fibers (PCFs) to explore various resonant plasmonic nanostructures with broad spectral range.

Accepting the key fact that, fabrication of plasmonic heptamer supported on PCFs and possibility of exciting various modes in the broad spectral range is an interesting claim made by authors (demonstrated experimentally and supported by simulations), manuscript may be published in the Optics letters.





Nishi Srivastava &lt;nishi.bhu@gmail.com&gt;

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**Thank you for the review of JWC-D-20-00207**

1 message

---

**Damien Serre** <em@editorialmanager.com>  
Reply-To: Damien Serre <damien.serre@upf.pf>  
To: Nishi Srivastava <nishi.bhu@gmail.com>

25 August 2020 at 11:28

Journal of Water and Climate Change

Article title: Estimation of Urbanization on Wet Deposition of PM2.5: A Case Study in Xiong'an New Area, Northern China

Reference No: JWC-D-20-00207

Dear Dr. Srivastava,

Thank you for your review of this manuscript, we appreciate your time.

You can access your review comments by logging onto the Editorial Manager site at:

<https://www.editorialmanager.com/jwc/>, using your username and password to log in.

With best wishes,

Damien Serre

Editor

Journal of Water and Climate Change

*In compliance with data protection regulations, you may request that we remove your personal registration details at any time. ([Remove my information/details](#)). Please contact the publication office if you have any questions.*



Nishi Srivastava &lt;nishi.bhu@gmail.com&gt;

---

**Thank you for the review of JWC-D-20-00196**

1 message

---

**Damien Serre** <em@editorialmanager.com>  
Reply-To: Damien Serre <damien.serre@upf.pf>  
To: Nishi Srivastava <nishi.bhu@gmail.com>

10 October 2020 at 20:21

Journal of Water and Climate Change

Article title: A quick method to investigate the occurrence frequency of dust and sand storms in urban areas

Reference No: JWC-D-20-00196

Dear Dr. Srivastava,

Thank you for your review of this manuscript, we appreciate your time.

You can access your review comments by logging onto the Editorial Manager site at:

<https://www.editorialmanager.com/jwc/>, using your username and password to log in.

With best wishes,

Damien Serre

Editor

Journal of Water and Climate Change

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Nishi Srivastava &lt;nishi.bhu@gmail.com&gt;

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**Thank you for the review of JWC-D-20-00178**

1 message

---

**Deeksha Rastogi** <em@editorialmanager.com>  
Reply-To: Deeksha Rastogi <rastogid@ornl.gov>  
To: Nishi Srivastava <nishi.bhu@gmail.com>

29 July 2020 at 20:38

Dear Dr. Srivastava,

Thank you for your review of the submission "Study of regional heterogeneity of cloud properties during different rainfall scenarios over monsoon dominated region" (ref: JWC-D-20-00178), which was sent to Journal of Water and Climate Change.

You can access your review comments by logging into <https://www.editorialmanager.com/jwc/>

Many thanks again for the time you spent reviewing this submission.

Sincerely yours,

Deeksha Rastogi  
Editor  
Journal of Water and Climate Change  
IWA Publishing

---

In compliance with data protection regulations, you may request that we remove your personal registration details at any time. (Use the following URL: <https://www.editorialmanager.com/jwc/login.asp?a=r>). Please contact the publication office if you have any questions.

**Thank you for the review of ATMENV-D-19-00806**

1 message

**Ngai T Lau** <eesserver@eesmail.elsevier.com>  
Reply-To: Ngai T Lau <atmosenv@cityu.edu.hk>  
To: nishi.bhu@gmail.com, nishi991@rediffmail.com

9 July 2019 at 16:43

\*\*\* Automated email sent by the system \*\*\*

Ms. Ref. No.: ATMENV-D-19-00806  
Title: Initial PM10 peak as a diagnostic alarm for the occurrence of the Middle Eastern Dust storms  
Atmospheric Environment + OA Mirror

Dear Dr srivastava,

By way of thanks for your review of this manuscript Elsevier are delighted to offer you a voucher for 30% DISCOUNT on BOOKS & E-BOOKS at the ELSEVIER STORE. The advancement of science depends on the dedication and contribution of people like you, so please accept this token of gratitude on behalf of the Atmospheric Environment + OA Mirror publishing and editorial team. To redeem your voucher, please visit the following page: [http://store.elsevier.com/coArticle.jsp?pageid=17100008&utm\\_source=email&utm\\_medium=email&utm\\_content=AEA&utm\\_campaign=Reviewersthankyou](http://store.elsevier.com/coArticle.jsp?pageid=17100008&utm_source=email&utm_medium=email&utm_content=AEA&utm_campaign=Reviewersthankyou).

You may access your review comments and the decision letter (when available) by logging onto the Elsevier Editorial System at <https://ees.elsevier.com/atmenv/>. Please login as a Reviewer:

Your username is: [nishi.bhu@gmail.com](mailto:nishi.bhu@gmail.com)

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[https://service.elsevier.com/app/answers/detail/a\\_id/5968/](https://service.elsevier.com/app/answers/detail/a_id/5968/)

I hope you enjoyed having access to references, abstracts, and full-text articles in Scopus and ScienceDirect for 30 days. If you have not yet activated your access, you can use your EES login details to register at [www.scopus.com/reviewer](http://www.scopus.com/reviewer) up to 6 months after you accepted the invitation to review.

Kind regards,

Ngai T Lau, Ph.D.  
China Editorial Office  
Atmospheric Environment + OA Mirror

\*\*\*\*\*

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For more information about Scopus and ScienceDirect, please visit [www.info.scopus.com/ees/](http://www.info.scopus.com/ees/)

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**Thank you for reviewing a submission for Journal of Water and Climate Change**

1 message

---

**Journal of Water and Climate Change** <em@editorialmanager.com>  
Reply-To: Journal of Water and Climate Change <jwc@iwap.co.uk>  
To: Nishi Srivastava <nishi.bhu@gmail.com>

21 October 2021 at 21:28

Dear Dr. Srivastava,

Thank you for your recent review of the submission "Disaggregation of future GCMs to generate IDF curves for the assessment of urban floods" (ref: JWC-D-21-00241R1), which has now been accepted for publication.

**Impressed by this paper?**

Recommend the paper for inclusion in our Reviewer's Choice online collection: simply respond to this email with a few lines on what makes the paper particularly significant or interesting. Your nomination will be considered by the Editors, who make regular additions to the collection.

We would also be very grateful if you could let us know your thoughts on the review process with IWA Publishing:  
<https://www.surveymonkey.co.uk/r/IWAPReviewer>

Many thanks once again for your helpful comments and advice.

With best wishes,

Journal Office  
Journal of Water and Climate Change  
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Sourabh Lahiri &lt;sourabhlahiri@gmail.com&gt;

---

**To\_referee LAHIRI XH10564W Noa**

1 message

---

**prresearch@aps.org** <prresearch@aps.org>

Mon, Nov 15, 2021 at 11:00 PM

Reply-To: prresearch@aps.org

To: sourabhlahiri@gmail.com

Re: XH10564W

Efficient asymmetric collisional Brownian particle engines  
by C. E. Fern'andez Noa, Angel L. L. Stable, William G. C. Oropesa,  
et al.

Dear Dr. Lahiri,

Thank you very much for reviewing the above paper. We have followed  
your recommendation and accepted the paper for publication.

Yours sincerely,

Juan-Jose Lieten-Santos  
Managing Editor  
Physical Review Research  
Email: [prresearch@aps.org](mailto:prresearch@aps.org)  
<https://journals.aps.org/prresearch/>  
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Physical Review Journal Metrics updated with 2020 JCR stats  
<https://go.aps.org/3e2aLyu>





Sourabh Lahiri &lt;sourabhlahiri@gmail.com&gt;

---

**Thank you for reviewing for J. Phys. A: Math. Theor. - JPhysA-116200.R1**

1 message

**Journal of Physics A: Mathematical and Theoretical**

Wed, Nov 10, 2021 at 11:53 AM

&lt;onbehalfof@manuscriptcentral.com&gt;

Reply-To: jphysa@iopublishing.org

To: sourabhlahiri@gmail.com

Dear Dr Lahiri,

Re: "Fluctuations in heat engines"

Article reference: JPhysA-116200.R1

Thank you for your report on this Topical Review, which is being considered by Journal of Physics A: Mathematical and Theoretical.

We appreciate the time and effort that you have spent reviewing this manuscript and we are very grateful for your assistance. We hope that we will be able to call upon you again to review future manuscripts.

We are always looking for ways to improve our service. We would really appreciate it if you could take five minutes to complete a short survey about your experience of reviewing an article for IOP Publishing: <https://forms.office.com/r/T26Bu71Wz5>

We would like to thank you in advance for your help.

Yours sincerely

On behalf of:

Journal of Physics A: Mathematical and Theoretical

Editor-in-Chief: J A Minahan

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Letter reference: ERWTR05



S Keshri &lt;s\_keshri@bitmesra.ac.in&gt;

---

## Review Instructions for MS ADV21-AR-03050 at AIP Advances

---

**aipadv-edoffice@aip.org** <aipadv-edoffice@aip.org>  
Reply-To: aipadv-edoffice@aip.org  
To: s\_keshri@bitmesra.ac.in

Wed, Nov 17, 2021 at 11:44 AM

Dear Dr. Keshri,

Thank you for agreeing to review "**Magnetic and microwave absorbing properties of La<sub>0.7</sub>Sr<sub>0.3</sub>MnO<sub>3</sub> nanoparticles**" by Tran Dang Thanh, C Xuan, Ta Ngoc Bach, Bui Xuan Khuyen, Dao Son Lam, Dinh Chi Linh, Le Thi Giang, and Vu Dinh Lam. We appreciate your time and expert opinion. To access the manuscript and submit your review, please go to:

<https://aipadvances.peerx-press.org/cgi-bin/main.plex?el=A3CR3IEQM5A4Bcsf1F1A9ftdTWqPupWLbnty1Dx47KaPZgY>

We anticipate receiving your review by 01-Dec-2021. If you are unable to complete the review by then, please contact us immediately by replying to this email.

The contents of the manuscript are, of course, confidential until published. Please let us know if you have any questions.

Sincerely,

Dario Arena  
Associate Editor  
AIP Advances

AIP Publishing  
1305 Walt Whitman Road  
Suite 300  
Melville, NY 11747-4300 USA

e-mail: [aipadv-edoffice@aip.org](mailto:aipadv-edoffice@aip.org)

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## Certificate

This is to certify that

**Dr Sanat Kumar Mukherjee of BIT Mesra, Jharkhand**

*Has served as reviewer of innovative ideas/innovations received under the INSPIRE Awards-MANAK for the year 2020-21*

*I appreciate his support and efforts towards INSPIRING INNOVATORS OF TOMORROW*



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**National Innovation Foundation - India**  
Autonomous Body of the Department of Science and Technology, Govt. of India

**Dr. Vipin Kumar**  
Director

Gandhinagar: 11 January 2021



Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

**Fw: Thank you for the review of IJLEO-D-21-03104**

1 message

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:48 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
<http://scholar.google.co.in/citations?user=dVhKwuAAAAAJ&hl=en>

----- Forwarded message -----

**From:** Hartmut Bartelt <em@editorialmanager.com>  
**To:** Swapan Konar <swakonar@yahoo.com>  
**Sent:** Tuesday, 3 August 2021, 13:31:04 GMT+5:30  
**Subject:** Thank you for the review of IJLEO-D-21-03104

Ms. Ref. No.: IJLEO-D-21-03104  
Title: An ultrahighly sensitive pressure sensor based on high- birefringence side-hole photonic crystal fibers  
Optik

Dear Swapan,

Thank you for taking the time to review the above-referenced manuscript. You can access your comments and the decision letter when it becomes available.

To access your comments and the decision letter, please do the following:

1. Go to this URL: <https://www.editorialmanager.com/ijleo/>
2. Enter your login details
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Thank you again for sharing your time and expertise.

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Yours sincerely,

Hartmut Bartelt  
Section Editor

Optik

\*\*\*\*\*

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Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

**Fw: Thank you for the review of CNSNS-D-20-02254**

1 message

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:51 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
<http://scholar.google.co.in/citations?user=dVhKwuAAAAAJ&hl=en>

----- Forwarded message -----

**From:** Weimin Han <[em@editorialmanager.com](mailto:em@editorialmanager.com)>  
**To:** Swapan Konar <[swakonar@yahoo.com](mailto:swakonar@yahoo.com)>  
**Sent:** Friday, 12 February 2021, 21:26:29 GMT+5:30  
**Subject:** Thank you for the review of CNSNS-D-20-02254

Ms. Ref. No.: CNSNS-D-20-02254  
Title: Ellipticity angle effect on exact optical solitons and Modulation instability in birefringent fiber  
Communications in Nonlinear Science and Numerical Simulation

Dear Swapan,

Thank you for taking the time to review the above-referenced manuscript.

You can access your comments by:

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Yours sincerely,

Weimin Han  
Associate Editor  
Communications in Nonlinear Science and Numerical Simulation

\*\*\*\*\*

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Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

**Fw: Thank you for reviewing for Phys. Scr. - PHYSSCR-115127**

1 message

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:50 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
<http://scholar.google.co.in/citations?user=dVhKwuAAAAAJ&hl=en>

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**From:** Physica Scripta <[onbehalfof@manuscriptcentral.com](mailto:onbehalfof@manuscriptcentral.com)>  
**To:** "swakonar@yahoo.com" <[swakonar@yahoo.com](mailto:swakonar@yahoo.com)>  
**Sent:** Friday, 16 July 2021, 17:05:12 GMT+5:30  
**Subject:** Thank you for reviewing for Phys. Scr. - PHYSSCR-115127

Dear Dr Konar,

Re: "Combined effects of electric, magnetic, and intense terahertz laser fields on the nonlinear optical properties in GaAs/GaAlAs quantum well with exponentially confinement potential"  
Article reference: PHYSSCR-115127

Thank you for your report on this Paper, which is being considered by Physica Scripta.

We appreciate the time and effort that you have spent reviewing this manuscript and we are very grateful for your assistance.

We hope that we will be able to call upon you again to review future manuscripts.

Yours sincerely

On behalf of:

Physica Scripta  
Managing Editor: Jade Holt

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Letter reference: ESPSNS05



Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

**Fw: Review for Chinese Journal of Physics - manuscript accepted**

1 message

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:51 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
<http://scholar.google.co.in/citations?user=dVhKwuAAAAJ&hl=en>

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**From:** Chinese Journal of Physics <em@editorialmanager.com>  
**To:** Swapan Swapan Konar <swakonar@yahoo.com>  
**Sent:** Wednesday, 2 December 2020, 03:20:20 GMT+5:30  
**Subject:** Review for Chinese Journal of Physics - manuscript accepted

Manuscript Number: CJPHY-D-20-01114R1  
Multi-wave trains and Sasa - Satsuma freak events generation in an optical metamaterial  
Bedel giscard onana essama; salome ndjakomo essiane, Professor; Frederic Biya - Motto; Mohammed Shabat; Jacques Atangana

Dear Prof. Swapan Konar,

Thank you for reviewing the above referenced manuscript. With your help, I have reached an accept decision on this manuscript.

The anonymised comments to author, from all reviewers, are included below. You can also access this information by logging into Editorial Manager as a reviewer.

Thank you for your contribution and time in reviewing this manuscript, which not only assisted me in reaching my decision, but also enables the author(s) to disseminate their work at the highest possible quality.

I am grateful to you for your assistance as a reviewer for Chinese Journal of Physics.

Kind regards,

Chin-Kun Hu  
Editor-in-Chief  
Chinese Journal of Physics

Comments to author:  
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Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

**Fw: How was your reviewing experience Dr Konar?**

1 message

**swapan konar** <swakonar@yahoo.com>  
To: "Dr. Dilip Kumar Singh" <dilipsinghnano1@gmail.com>

Fri, Nov 26, 2021 at 11:48 AM

Dr. S. Konar  
B. M. Birla Chair Professor, Department of Physics  
Birla Institute of Technology, Mesra-835215  
Ranchi, India  
<http://scholar.google.co.in/citations?user=dVhKwuAAAAAJ&hl=en>

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**From:** Journal of Optics <[onbehalfof@manuscriptcentral.com](mailto:onbehalfof@manuscriptcentral.com)>  
**To:** "swakonar@yahoo.com" <[swakonar@yahoo.com](mailto:swakonar@yahoo.com)>  
**Sent:** Wednesday, 8 September 2021, 16:50:24 GMT+5:30  
**Subject:** How was your reviewing experience Dr Konar?

Dear Dr Konar,

Re: "Coherent coupling and modulation of the guided modes in photorefractive nonlinear slab waveguide" Article  
reference: JOPT-108822

We appreciate the time and effort that you have spent reviewing for our journal and we are very grateful for your assistance.

We would really appreciate it if you could take five minutes to complete a short survey about your experience of reviewing an article for IOP Publishing: <https://forms.office.com/r/T26Bu71Wz5>.

We would like to thank you in advance for your help.

Yours sincerely

On behalf of:  
Journal of Optics  
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Impact Factor: 2.379 | Citescore: 5.9

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Letter reference: ESPSNS05



Dr. Dilip Kumar Singh &lt;dilipsinghnano1@gmail.com&gt;

---

**Decision on an article you reviewed: NANO-129106**

1 message

**Nanotechnology** <onbehalf@manuscriptcentral.com>

Wed, Apr 21, 2021 at 2:40 PM

Reply-To: nano@iopublishing.org

To: nano@iopublishing.org

Re: "Growth Mechanism of Transfer-free Graphene Synthesized from Different Carbon Sources Verified by Ion Implantation" by Chen, Yi; Zhao, Yunbiao; Zhou, Danqing; Li, Yue; Zhao, Ziqiang

Thank you for your comments on this Paper being considered by Nanotechnology. We wanted to let you know that we have now made a decision on this article based on all of the feedback received. On this occasion our decision is: Reject

If you would like to see the referee reports for this article, they are now available by viewing the decision letter for this article in your referee centre at <https://mc04.manuscriptcentral.com/nano-iop>.

We are very grateful for your assessment of this paper and we look forward to working with you again in the future.

Yours sincerely

On behalf of:

Nanotechnology

Editor-in-Chief: Professor R LaPierre

[iopscience.org/nano](http://iopscience.org/nano) | [nano@iopublishing.org](mailto:nano@iopublishing.org) | Impact Factor: 3.551 | Citescore: 6.1

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Letter ref: InfRef05



S Keshri &lt;s\_keshri@bitmesra.ac.in&gt;

---

**Evaluation of PhD thesis of Mr. Ranjeet Singh**

19 messages

---

ar exam2 <arexam2@gndu.ac.in>  
To: s\_keshri@bitmesra.ac.in

Thu, Oct 22, 2020 at 4:50 PM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA!

I have been directed by the Vice-Chancellor to request you to let us know if you would find, from your otherwise busy schedule and pre-occupations, some time to evaluate a thesis, on the topic, "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" to be submitted by Mr. Ranjeet Singh in the faculty of Engineering & Technology (Electronics Technology) for the award of the degree of Doctor of Philosophy (PhD). A document/pdf File of the summary of the thesis is attached herewith for your perusal.

I take this opportunity to convey your good self some relevant PhD. ordinances regarding the evaluation of the thesis:-

1. For the evaluation of the thesis, two months may be given to any examiner.
2. The examiners on the evaluation of the thesis will submit their evaluation report on the prescribed proforma. In each case, the examiners shall clearly submit to the University his/her critical evaluation, comments and suggestions on the PhD. thesis. Each examiner shall also send at least five questions to be asked from the candidate.

Keeping in view of the above-mentioned information, **kindly convey your consent to evaluate the thesis of the candidate through e-mail, so that we may send you a copy of thesis for evaluation. However, in case you are unable to evaluate the thesis owing to some reason, a line in reply in this regard will be greatly appreciated**

I hope you will spare some of your valuable time to evaluate the thesis. A token honorarium of Rs.2000/- will be paid for the job. An early reply in confirmation would be highly appreciated.

Thanks with warm regards.

Yours faithfully,

**Mrs Avtar Kaur**

**Assistant Registrar (Examinations-II),  
Guru Nanak Dev University,  
Amritsar-143005 (Punjab), INDIA.**

---



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**2 attachments**



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132K



**RANJEET SINGH SUMMARY.docx**  
38K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: "Dean Faculty Affaris / Spons.Res" <dean.fasr@bitmesra.ac.in>

Thu, Oct 22, 2020 at 10:01 PM

Please advise. Thanks.

[Quoted text hidden]

---

**2 attachments**



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132K



**RANJEET SINGH SUMMARY.docx**  
38K

---

**Dean(Faculty Affairs and Sponsored Research)** <dean.fasr@bitmesra.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Sat, Oct 24, 2020 at 9:43 AM

Kindly go ahead.

Regards

SKonar

[Quoted text hidden]

--

Dr S.Konar, Professor  
Dean (Faculty Affairs and Sponsored Research)  
Birla Institute of Technology  
Mesra-835215, Ranchi

---

**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Sun, Oct 25, 2020 at 4:10 PM

Dear Mrs. A. Kaur,  
I do agree to evaluate this thesis.

With thanks.

S. Keshri

[Quoted text hidden]

--

-----  
Dr. Sunita Keshri  
Prof. & Head, Department of Physics  
Birla Institute of Technology  
Mesra, Ranchi-835215, Jharkhand, India  
Mob. +91-94311-05821, Fax: +91-651-2275401.

---

**ar exam2** <arexam2@gndu.ac.in>  
To: s\_keshri@bitmesra.ac.in

Wed, Oct 28, 2020 at 4:48 PM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA!

Thank you very much for your email dated 25.10.2020, conveying your consent to evaluate the PhD thesis titled, "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" submitted by Mr. Ranjeet Singh.

The soft copy of the thesis is attached herewith for your kind perusal. You are requested to evaluate the thesis and please send your evaluation report as per attached evaluation report proforma. We shall be highly indebted for your effort and kind cooperation in this regard. It is also respectfully submitted that if you are not comfortable with the soft copy please let us know so that we may send you the hard copy of the thesis also.

Kindly acknowledge the receipt of this email and the soft copy of the thesis as well.

Thanks with warm regards.

Yours faithfully,

Avtar Kaur

Assistant Registrar (Exams.II)

Guru Nanak Dev University,

Amritsar (Punjab), INDIA.

---

**3 attachments**



**Ph.D. Thesis Ranjeet Singh.pdf**

10335K



**Indian Remuneration Bill proforma - Copy.doc**

68K



**PhD Eval Report Proforma (Ranjeet Singh).doc**

30K

---

**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Wed, Oct 28, 2020 at 5:38 PM

Thanks. I have received this.

[Quoted text hidden]

---

**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: Applied Physics <appliedphysics@bitmesra.ac.in>

Mon, Nov 2, 2020 at 2:18 PM



----- Forwarded message -----




From: **ar exam2** <arexam2@gndu.ac.in>  
Date: Wed, Oct 28, 2020 at 4:48 PM  
Subject: Evaluation of PhD thesis of Mr. Ranjeet Singh  
To: <s\_keshri@bitmesra.ac.in>

[Quoted text hidden]

[Quoted text hidden]

---

**3 attachments**

-  **Ph.D. Thesis Ranjeet Singh.pdf**  
10335K
-  **Indian Remuneration Bill proforma - Copy.doc**  
68K
-  **PhD Eval Report Proforma (Ranjeet Singh).doc**  
30K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: Applied Physics <appliedphysics@bitmesra.ac.in>

Tue, Nov 17, 2020 at 2:06 AM

[Quoted text hidden]

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**3 attachments**

-  **Ph.D. Thesis Ranjeet Singh.pdf**  
10335K
-  **Indian Remuneration Bill proforma - Copy.doc**  
68K
-  **PhD Eval Report Proforma (Ranjeet Singh).doc**  
30K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: VR Gupta <vrgupta@bitmesra.ac.in>

Wed, Nov 18, 2020 at 4:03 PM

Madam,  
Can you please send few comments on the 'device fabrications' part of this thesis!  
Thanks.




----- Forwarded message -----

From: **ar exam2** <arexam2@gndu.ac.in>  
Date: Wed, 28 Oct, 2020, 4:48 PM  
Subject: Evaluation of PhD thesis of Mr. Ranjeet Singh  
To: <s\_keshri@bitmesra.ac.in>

[Quoted text hidden]

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**3 attachments**

-  **Ph.D. Thesis Ranjeet Singh.pdf**  
10335K
-  **Indian Remuneration Bill proforma - Copy.doc**  
68K
-  **PhD Eval Report Proforma (Ranjeet Singh).doc**  
30K

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**VR Gupta** <vrgupta@bitmesra.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Wed, Nov 18, 2020 at 5:19 PM

Ok I will check.

[Quoted text hidden]

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: Shailendra Rajput <srjput85@outlook.com>

Thu, Nov 19, 2020 at 9:51 PM

Dear Shailendra,  
If you find some time, please make a few comments on this thesis, especially on XRD analysis.  
Good wishes.

----- Forwarded message -----




From: **ar exam2** <arexam2@gndu.ac.in>  
Date: Wed, Oct 28, 2020 at 4:48 PM  
Subject: Evaluation of PhD thesis of Mr. Ranjeet Singh  
To: <s\_keshri@bitmesra.ac.in>

[Quoted text hidden]

[Quoted text hidden]

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**3 attachments**

-  **Ph.D. Thesis Ranjeet Singh.pdf**  
10335K
-  **Indian Remuneration Bill proforma - Copy.doc**  
68K
-  **PhD Eval Report Proforma (Ranjeet Singh).doc**  
30K

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**Shailendra Rajput** <srjput85@outlook.com>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Fri, Nov 20, 2020 at 2:32 PM

Dear Ma'am,  
I will review the thesis.

Sincere regards,  
Shailendra

---

**From:** Dr. S. Keshri <s\_keshri@bitmesra.ac.in>  
**Sent:** Thursday, November 19, 2020 6:21 PM  
**To:** Shailendra Rajput <srjput85@outlook.com>  
**Subject:** Fwd: Evaluation of PhD thesis of Mr. Ranjeet Singh

[Quoted text hidden]

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**ar exam2** <arexam2@gndu.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Tue, Dec 22, 2020 at 11:50 AM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA.

It is respectfully submitted that your evaluation report on the PhD thesis "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" submitted by Ranjeet Singh is awaited in this office. You are therefore, humbly requested to send your evaluation report through

email at your earliest convenience. We shall be highly indebted for your effort and kind cooperation in this regard.

A line of reply would be greatly appreciated.

Thanks with warm regards.

Assistant Registrar (Exams-II),  
Guru Nanak Dev University,  
Amritsar-143005 (Punjab), INDIA

[Quoted text hidden]

Dr. S. Keshri <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Thu, Dec 24, 2020 at 11:50 AM

Dear Mrs. Kaur,  
Good morning.

I will be needing 2-3 weeks more to summarize the evaluation report of the thesis as the semester evaluation work is going over here and I am very busy with that. Please send me the format of the evaluation report.

Thanks.  
S Keshri

On Tue, Dec 22, 2020 at 11:50 AM ar exam2 <arexam2@gndu.ac.in> wrote:

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA.

It is respectfully submitted that your evaluation report on the PhD thesis "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" submitted by Ranjeet Singh is awaited in this office. You are therefore, humbly requested to send your evaluation report through email at your earliest convenience. We shall be highly indebted for your effort and kind cooperation in this regard.

A line of reply would be greatly appreciated.

Thanks with warm regards.

Assistant Registrar (Exams-II),  
Guru Nanak Dev University,  
Amritsar-143005 (Punjab), INDIA

On Wed, Oct 28, 2020 at 5:38 PM Dr. S. Keshri <s\_keshri@bitmesra.ac.in> wrote:  
Thanks. I have received this.

On Wed, 28 Oct, 2020, 4:48 PM ar exam2, <arexam2@gndu.ac.in> wrote:

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA!

Thank you very much for your email dated 25.10.2020, conveying your consent to evaluate the PhD thesis titled, "**Processing and Characterization of Substituted M-phase  $\text{Li}_{1+x-y}\text{Nb}_{1-x-3y}\text{Ti}_{x+4y}\text{O}_3$  Solid Solution for Microwave Applications**" submitted by Mr. Ranjeet Singh.

The soft copy of the thesis is attached herewith for your kind perusal. You are requested to evaluate the thesis and please send your evaluation report as per attached evaluation report proforma. We shall be highly indebted for your effort and kind cooperation in this regard. It is also respectfully submitted that if you are not comfortable with the soft copy please let us know so that we may send you the hard copy of the thesis also.

Kindly acknowledge the receipt of this email and the soft copy of the thesis as well.

Thanks with warm regards.

Yours faithfully,

Avtar Kaur

Assistant Registrar (Exams.II)

Guru Nanak Dev University,

Amritsar (Punjab), INDIA.

[Quoted text hidden]

ar exam2 <arexam2@gndu.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Tue, Dec 29, 2020 at 12:27 PM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University, Amritsar, INDIA!

Thank you very much for your kind email. The evaluation report format is attached herewith for your kind perusal.

Thanks with best regards.

Assistant Registrar (Exams-II)  
Guru Nanak Dev University,  
Amritsar.

[Quoted text hidden]

 PhD Eval Report Proforma (Annex-II) NEW.docx

14K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Tue, Dec 29, 2020 at 1:16 PM

Thanks a lot.

[Quoted text hidden]

---

**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Sun, Jan 10, 2021 at 2:33 PM

Dear Mrs. A. Kaur,  
Please find enclosed the evaluation report of the PhD thesis of Mr. Ranjeet Singh.  
With thanks.  
S. Keshri

[Quoted text hidden]

-----  
Dr. Sunita Keshri  
Professor, Department of Physics

[Quoted text hidden]

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 **PhD Evaluation report by Prof. S. Keshri.pdf**  
107K

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**ar exam2** <arexam2@gndu.ac.in>  
To: "Dr. S. Keshri" <s\_keshri@bitmesra.ac.in>

Mon, Jan 11, 2021 at 10:41 AM

**Respected Professor (Dr.) Sunita Keshari,**

Kindly accept greetings from Guru Nanak Dev University Amritsar India,

Thank you very much for your kind email. This is to be acknowledged with thanks to the receipt of your evaluation report on the PhD thesis submitted by Mr. Ranjeet Singh. We are highly indebted for your effort and kind cooperation in this regard. You are also requested to send your remuneration bill as per attached proforma.

Thanks with warm regards.

Assistant Registrar (Exams-II),  
Guru Nanak Dev University,  
Amritsar-143005 (Punjab), INDIA

[Quoted text hidden]

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 **Indian Remuneration Bill proforma.doc**  
68K

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**Dr. S. Keshri** <s\_keshri@bitmesra.ac.in>  
To: ar exam2 <arexam2@gndu.ac.in>

Thu, Jan 14, 2021 at 12:04 AM

Dear Mrs. Kaur,

Page No 44

Thank you for your email. I would love to hand over the amount of the honorarium to the library of your University. So, please do the needful.

S. Keshri

[Quoted text hidden]





*Certificate*

awarded to

**Nishi Srivastava**

from Birla Institute of Technology

as the **Committee Member of ISEEG 2021**

The 2021 International Seminar on Environmental Engineering and Geosciences (ISEEG 2021)

will be held on July 23-25, 2021 in Shenzhen, China

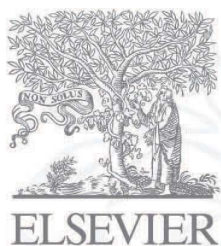
<http://iseeg.net>

2021 International Seminar on  
Environmental Engineering and Geosciences

July 6, 2021







Applied Surface Science Advances

# Certificate of Reviewing

Awarded since February 2021 (1 review)  
presented to

**S. K. MUKHERJEE**

in recognition of the review contributed to the journal

The Editors of Applied Surface Science Advances



**Department/Section: Physics**

**NAAC Metric 3.1.3** Percentage of teachers receiving national/ international fellowship/financial support by various agencies for advanced studies/ research during 2020-21 (3)

3.1.3 Percentage of teachers receiving national/ international fellowship/financial support by various agencies for advanced studies/ research during 2020-2021 (3)

Sl.No.	Name of the teacher awarded national/ international fellowship/financial support	Name of the award/fellowship	Year of the Award	Awarding Agency	Link to certificates
None					

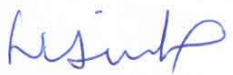
Signature of Head  
(Prof. S. K. Sinha)  
Department of Physics  
BIT Mesra

Head  
Department of Physics  
Birla Institute of Technology  
Mesra, Ranchi-835215  
Jharkhand, INDIA

**Department/Section: Physics**

**NAAC Metric 3.3.2** Number of workshops/seminars conducted on Research methodology, Intellectual Property Rights (IPR), entrepreneurship, skill development during 2020-21 (10)

3.3.2 Number of workshops/seminars conducted on Research methodology, Intellectual Property Rights (IPR), entrepreneurship, skill development during the last five years (10)				
3.3.2.1: Total number of workshops/seminars conducted on Research methodology, Intellectual Property Rights (IPR), entrepreneurship, skill development year wise during the last five years				
Year	Name of the workshop/ seminar	Number of Participants	Date From – To	Link to the Activity report on the website
None				

  
Signature of Head  
(Prof. S. K. Sinha)  
Department of Physics  
BIT Mesra

Head  
Department of Physics  
Birla Institute of Technology  
Mesra, Ranchi-835215  
Jharkhand, INDIA



**Department/Section: Physics**

**NAAC Metric 3.3.3** Number of awards / recognitions received for research/innovations by the institution/teachers/research scholars/students during the last five years (10)

3.3.3 Number of awards / recognitions received for research/innovations by the institution/teachers/research scholars/students during the last five years (10)

3.3.3.1: Total number of awards / recognitions received for research/ innovations won by institution/teachers/research scholars/students year wise during the last five years

Year of Award	Title of the innovation	Name of the Awardee	Name of the Awarding Agency with contact details	Category- institution/teacher/research scholar/student	Page No.
2021	AWSAR AWARD	SHOMAILA KHANAM	DST GOVT OF INDIA	Research scholar	1
2021	Inpire PhD Fellowship	Vignesh D	DST Govt of India	Research Scholar	2



Signature of Head  
(Prof. S. K. Sinha)  
Department of Physics  
BIT Mesra

Head  
Department of Physics  
Birla Institute of Technology  
Mesra, Ranchi - 835 215  
Jharkhand, India





अवसर (शोध की अभिव्यक्ति के लिए लेखन कौशल), विज्ञान एवं प्रौद्योगिकी विभाग (डीएसटी), भारत सरकार की एक पहल है। इसका उद्देश्य भारत में विज्ञान, प्रौद्योगिकी और नवोन्मेष के क्षेत्र में पीएचडी शोध छात्रों और पोस्ट-डॉक्टरल फेलो द्वारा वैज्ञानिक शोधों की जानकारी का प्रसार लोकप्रिय विज्ञान लेखन प्रारूप में किया जाना है।

**AWSAR** (Augmenting Writing Skills for Articulating Research) is an initiative of Department of Science and Technology (DST), Government of India. It attempts to disseminate Indian research in Science, Technology & Innovation being pursued by Ph.D. Scholars and Post Doctoral Fellows (PDFs) in popular science writing format.



सत्यमेव जयते  
भारत सरकार  
GOVERNMENT OF INDIA  
विज्ञान एवं प्रौद्योगिकी विभाग  
DEPARTMENT OF SCIENCE AND TECHNOLOGY

अवसर पुरस्कार  
(शोध की अभिव्यक्ति के लिए लेखन कौशल)

**AWSAR AWARD**  
(Augmenting Writing Skills for Articulating Research)

**शुमैला खानम**

को पीएचडी श्रेणी में लोकप्रिय विज्ञान लेखन के लिए प्रशंसा प्रमाण पत्र, राष्ट्रीय विज्ञान दिवस, 28 फरवरी, 2021, पर प्रदान किया जाता है।

This Certificate of Appreciation is Presented to

**Shomaila Khanam**

for her Popular Science Story Selected under Ph.D. Category,  
on the National Science Day, 28<sup>th</sup> February, 2021.



प्रो. आशुतोष शर्मा Prof. Ashutosh Sharma  
सचिव, भारत सरकार Secretary to the Government of India  
विज्ञान एवं प्रौद्योगिकी विभाग Department of Science and Technology





No: DST/INSPIRE Fellowship/[IF190951]  
GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE and TECHNOLOGY  
Department of Science and Technology  
Technology Bhawan New Mehrauli Road  
New Delhi-110016

Date: 3 September, 2021

**Subject: Award of INSPIRE Fellowship to the Research Students [IF190951]**

Dear VIGNESH D,

The Government of India has launched a unique Scheme "Innovation in Science Pursuit for Inspired Research (INSPIRE)" with several components. INSPIRE Fellowship provides fellowship in Basic and Applied Sciences. I am pleased to inform you that you have been Selected for the award of INSPIRE Fellowship to host the same at the University/Institute/College/National Laboratory as indicated in the application form of your subsequent admission.

The value of the Fellowship will be at Par with the Junior Research Fellowship (JRF)/ Senior Research Fellowship (SRF) of Government of India along with a Contingency grant. The Fellowship shall be available to you from INSPIRE Fellowship Effective Date (which will be communicated through 1st Sanction Order) for a period of five years or completion of your doctoral (PhD) program, whichever is earlier.

If you are willing to join or switching over from earlier fellowship to INSPIRE Fellowship, you will require to upload the scan copy of Joining-cum-Acceptance Letter (JCA) (available at <http://online-inspire.gov.in> and at template in your online dashboard), and also submit Bank details of your Host Institute along with the scan copy of cancelled blank cheque of given account details **within one month from the date of this letter, in your online portal only**, for taking necessary actions at INSPIRE Program Secretariat for releasing of your fellowship amount. Please also note that in the JCA Letter the Host Institution, Research Supervisor and Research Topic shall not be change or modification from initially submitted documents/ information for Final Offer. The Terms & Conditions for implementation of INSPIRE Fellowship are enclosed herewith.

**Documents submitted in any other modes like email attachment or by post or in-person shall not be acceptable.**

In the event of your having being found ineligible at any state in future for the award/eligibility for INSPIRE Fellowship due to any reason (including unintentional computer error or printer's devil etc) this offer will be deemed withdrawn.

Ms.Tamanna Arora  
Scientist 'C'

VIGNESH D

C/O : V DHARMARAJAN

Address: 25c door no - G1, Flat - Fairy land Pari street, Gandhi nagar, Saligramam

City : Auroville

State/UT: TAMIL NADU - 600093

This is a Computer Generated Offer Letter. No Signature is required

Date: 3 September, 2021

**GENERAL INSTRUCTIONS**

Dear VIGNESH D,

**Please note that these documents are necessary to upload within one month from the date of this letter at INSPIRE Online Webportal only for financial release after final selection**

1. Joining-cum-Acceptance (JCA) Letter for INSPIRE Fellowship (template available in your dashboard in online portal)
2. Relieving Order from previous Fellowship/Job (if availing)
3. Copy of Cancelled Blank Cheque of the Host University/ College/ Institute Account for transferring the fund (Account should be registered in Public Financial Management System: <https://pfms.nic.in>)
4. PFMS registration certificate, or Unique Agency Code in case of University/College/Institute is newly registered in Public Financial Management System
5. Since the fund would be transferred under Science & Technology Institutional and Human Capacity Building (1817), Hence bank account number of Host University/College/Institute should be registered under this scheme in PFMS
6. **Please note that these documents are necessary to upload within one month from the date of this letter at INSPIRE Online Webportal only, otherwise it will be treated as the candidate has not intrested in accepting the INSPIRE Fellowship.**

Thanking you,

Ms.Tamanna Arora  
Scientist 'C'

**Department/Section: Physics**

**NAAC Metric 3.4.5** Number of research papers per teacher in the Journals notified on UGC website during 2020-21(15)

**NAAC Metric 3.4.5** Number of research papers per teacher in the Journals notified on UGC website during 2020-2021

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	IS SN number	Link to the recognition in UGC enlistment of the Journal			Page No.
						Link to website of the Journal	Link to article/paper/abstract of the article	Is it listed in UGC Care list/Scopus/Web of Science/other, mention	
Low cost electrical probe station using etched tungsten nanoprobe: role of cathode geometry	Rakesh K Prasad and Dilip K Singh	Physics	Nano Express	2020	2632-959X	<a href="https://iopscience.iop.org">https://iopscience.iop.org</a>			1
Comparative spectroscopic analysis, performance and emissions evaluation of Madhuca longifolia and Jatropa curcas produced biodiesel	Rajeshwari Chatterjee, Sanat Kumar Mukherjee, Biswajit Paul & Somnath Chattopadhyaya	Physics	Environmental Science and Pollution Research	2021	09441344161474	<a href="https://iopscience.iop.org/article/10.1088/2632-959X/2021/10/1088/2632-959X">https://iopscience.iop.org/article/10.1088/2632-959X/2021/10/1088/2632-959X</a>		Scopus	2

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					99	959X/a bb6c4			
Structural, magnetic and transport properties of Ca and Sr doped Lanthanum manganites	Sunita KESHRI , Shailendra RAJPUT , Sonali BISWAS , Leena JOSHI , Wojciech SUSKI, and Piotr WIŚNIEWSK	Physics	Journal of Metals, Materials and Minerals	2021	85 76 14 9	<a href="https://www.springer.com/journal/11356/">https://www.springer.com/journal/11356/</a>	<a href="https://link.springer.com/article/10.1007%2Fs11356-021-15081-0">https://link.springer.com/article/10.1007%2Fs11356-021-15081-0</a>		3
Large magnetocaloric effect near room temperature in La <sub>0.67</sub> δSr <sub>0.33</sub> MnO <sub>3</sub> manganite nanomaterials	Sonali Biswas and SunitaKeshri	Physics	J Mater Sci: Mater Electron	2020	09 57- 45 22	<a href="http://jmmm.material.chula.ac.th/">http://jmmm.material.chula.ac.th/</a>	DOI: 10.14456/jmm.2021.xx		4
Exploring the extent of validity of quantum work fluctuation theorems in the presence of weak measurements	SourabhLahiri, Subhashish Banerjee, A. M. Jayannavar	Physics	Quantum Information Processing	2021	15 70 07 55	<a href="https://www.springer.com/journal/10854">https://www.springer.com/journal/10854</a>	<a href="https://doi.org/10.1007/s10854-020-04694-9">https://doi.org/10.1007/s10854-020-04694-9</a>		5
Atomic mapping of Li:ZnO thin films and its spectroscopic analysis	Ali sadekKadari ,AbdelkaderNebattiEch- Chergui, Sanat Kumar Mukherjee, Leonardo Velasco, Rajan Kumar Singh, Mohamed walidMohamedi, ErdalAkyildiz, AbdelhalimZoukel,	Physics	Inorganic Chemistry Communicati ons	2021	13 87- 70 03				6

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	Kouider Driss-Khodja, Bouhalouane Amrani, Mohammed Reda Chellali								
Enhanced attraction between particles in a bidisperse mixture with random pairwise interactions	Madhu Priya, Prabhat K. Jaiswal	Physics	PHASE TRANSITIONS	2020	01-15-94	<a href="https://www.worldscientific.com/worldscinet/ijmpb">https://www.worldscientific.com/worldscinet/ijmpb</a>	DOI: 10.1142/S0217979219502205		7
Flow behaviour of a model colloid-polymer mixture using mode-coupling theory	Madhu Priya	Physics	AIP Conference Proceedings	2020	0094-243X	<a href="https://www.scienceirect.com/journal/inorganic-chemistry-communications">https://www.scienceirect.com/journal/inorganic-chemistry-communications</a>	<a href="https://doi.org/10.1016/j.inoche.2021.108852">https://doi.org/10.1016/j.inoche.2021.108852</a>		8
Host-parasite coevolution: Role of selection, mutation, and asexual reproduction on evolvability	Madhu Priya, Prabhat K. Jaiswal and Manish Dev Shrimali	Physics	AIP Conference Proceedings	2020	0094-243X				9
Host-parasite coevolution:	Madhu Priya, Prabhat K.	Physics	AIP, Chaos	2020	10	<a href="https://">https://</a>	<a href="https://">https://</a>		10

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Role of selection, mutation, and asexual reproduction on evolvability	Jaiswal and Manish Dev Shrimali				54-1500	www.researchgate.net/journal/Phase-Transitions-1029-0338	doi.org/10.1080/01411594.2020.1813287		
Investigation of artificial neural network performance in the aerosol properties retrieval	Nishi Srivastava, D. Vignesh and Nisheeth Saxena	Physics	Journal of Water and Climate Change	2021	2040-2244				11
Impact of meteorological parameterization schemes on CTM model simulations	Nishi Srivastava, Nadege Blond	Physics	Atmospheric Environment	2022	0957-1272	https://doi.org/10.1063/5.0016578			12
Structural, thermal stability and electrical conductivity of zirconium substituted barium cerate ceramics	Bibek Kumar Sonu, Ela Sinha	Physics	Journal of Alloys and Compounds	2020	0925-8388				13
Correlation between experimental and theoretical study of scheelite and wolframite-type tungstates	P. Yadava, Prabal Dev Bhuyan, S.K. Rout, Yogesh Sonvaned, Sanjeev K. Gupta, E. Sinha	Physics	Materials Today Communications	2020	2352-4928	https://aip.scitation.org/journal/apc			14
Structural and dielectric properties of Cu-doped $\alpha$ -ZnMoO <sub>4</sub> ceramic system for enhanced green light emission and potential	Sameer Kumar Tiwari, Anterdipan Singh, Pritam Yadav, Bibek Kumar Sonu, Rolly Verma, S. K.	Physics	Journal of Materials Science: Materials in Electronics	2021	0957-4522	https://doi.org/10.1063/5.0016578			15


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microwave applications	Rout, Ela Sinha									
Sliding Wear behaviour of Thermally Sprayed WC 20 Cr3C2-7Ni and La2 O3 Composite coatings	Mishra Tribhuwan Kishore, Kumar Arbind, Sinha Sanjay Kumar	Physics	Emerging Materials Research	2021	20460155, 20460147					16
Experimental investigation and study of HVOF Sprayed WC- 12Co WC- 10 Co-4 Cr and Cr3 C2- 25 Ni Cr Coating on its sliding wear behaviour	Mishra Tribhuwan Kishore, Kumar Arbind, Sinha Sanjay Kumar	Physics	International Journal of Refractory Metals and hard Materials	2021	0263-4368.	<a href="https://aip.scitation.org/">https://aip.scitation.org/</a>	<a href="https://doi.org/10.1063/5.0010057">https://doi.org/10.1063/5.0010057</a>			17
Revisiting Cosmic Microwave background radiation using blackbody Radiation inversion	Kostav Konar, Kinshuk Bose and R K Paul	Physics	Sci Rep 11,	2021	2045-2322					18
Correlation between experimental and theoretical study of scheelite and wolframite-type tungstates	P. Yadava, Prabal Dev Bhuyanb, S.K. Routa, Yogesh Sonvaned, Sanjeev K. Gupta, E. Sinha	Physics	Materials Today Communications	2020	2352-4928.	<a href="https://iwaponline.com/jwcc">https://iwaponline.com/jwcc</a>	<a href="https://doi.org/10.2166/wcc.2021.336">https://doi.org/10.2166/wcc.2021.336</a>			19
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## PAPER

Low cost electrical probe station using etched tungsten nanoprobes:  
role of cathode geometry

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E-mail: [dilipsinghnano1@gmail.com](mailto:dilipsinghnano1@gmail.com)**Keywords:** electrochemical etching, tungsten tip, DC voltage, low cost probe stationSupplementary material for this article is available [online](#)

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**Abstract**

Electrical measurement of nano-scale devices and structures requires skills and hardware to make nano-contacts. Such measurements have been difficult for number of laboratories due to cost of probe station and nano-probes. In the present work, we have demonstrated possibility of assembling low cost probe station using USB microscope (US \$ 30) coupled with in-house developed probe station. We have explored the effect of shape of etching electrodes on the geometry of the microprobes developed. The variation in the geometry of copper wire electrode is observed to affect the probe length (0.58 mm to 2.15 mm) and its half cone angle (1.4° to 8.8°). These developed probes were used to make contact on micro patterned metal films and was used for electrical measurement along with semiconductor parameter analyzer. These probes show low contact resistance ( $\sim 4 \Omega$ ) and follows ohmic behavior. Such probes can be used for laboratories involved in teaching and multidisciplinary research activities and Atomic Force Microscopy.

**1. Introduction**

Advancement in the field of nanofabrication has led to miniaturization of devices to nanometers. Research labs and teaching efforts in the field of electronics and opto-electronic devices to such small dimensions, require probes for micron or smaller size. Additionally, these factors have limited the access of experts from various domains of science and engineering to explore nanoscale structures for multi-disciplinary applications. Various research groups have attempted to devise methods of fabricating metallic nano-probes using cost effective techniques to achieve reproducible tip geometry.

There are various methods for the formation of tungsten tip like cutting [1, 2], mechanical pulling [3–11], grinding [12, 13], ion milling [14–18], ion beam-induced deposition [19], electrochemical etching [20–35] and electrochemical machining [36]. Recently in 2019 Yamaguchi *et al* introduced a new method called flame etching to fabricate tungsten tip [37]. In 1951, Miller *et al* reported about possibility of fabrication of sharp metal tips by electrochemical process [38]. With time there have been refinements in the methods to get sharp, smooth and long taper tip with perfectly conical geometry.

The driving force for the research in this direction has been the concern about reproducibility of probe geometry and their immense application in nano characterization tools for topography, electrical and optical measurements [34, 39, 40]. Few notable improved techniques for electrochemical etching are drop-off methods with direct current (DC) voltage [20, 41], dynamic etching technique [39], reverse chemical etching [24, 42, 43].

Chemical etching is one of the most effective method for fabricating various types of nano-probes with different geometry. For the purpose of chemical etching, Sodium hydroxide (NaOH) or Potassium hydroxide (KOH) as electrolytes has been used with varying molar concentration in the range 0.1 M–10 M [26, 27, 29, 30, 44]. Tungsten wire has been used as an anode during etching while a variety of materials like stainless steel [25], chromium-nickel stainless steel [44], iridium [26], platinum [28] and tungsten wire [29] have been used as cathode. Although different researchers have used cathode of varying geometry (wire or rod,



# Comparative spectroscopic analysis, performance and emissions evaluation of *Madhuca longifolia* and *Jatropha curcas* produced biodiesel

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## Abstract

In order to fulfil the growing need to replace fossil fuels, investigations exploring the production of biodiesel from agricultural biomass have gained attention. In this study, biodiesels were produced from *Madhuca longifolia* and *Jatropha curcas* by means of pre-treatment followed by a two-step acid-base homogeneous catalyst method. These biodiesels were blended with diesel at different percentages. The efficacy of the process was examined using various characterization methods while the efficiency of the produced biodiesels was examined by their engine performance and emission tests. Both *Madhuca* and *Jatropha*-based biodiesels exhibited physiochemical properties like that of diesel. Biodiesels were produced by pre-treating with orthophosphoric acid and toluene. The second step involves acid esterification, followed by base transesterification. Raman spectra exhibited C=O stretching at  $1725\text{ cm}^{-1}$  indicating conversion of *Madhuca* and *Jatropha* oil into biodiesel. Fourier transform infrared spectroscopy showed a strong presence of fatty acid profile and triglyceride ester linkage at  $1744\text{ cm}^{-1}$ . Ultraviolet-visible (UV) spectra confirmed the presence of conjugated dienes in the extracted biodiesels. UV absorbance at 320 nm decreased linearly with blend percentage.  $^1\text{H}$  and  $^{13}\text{C}$  nuclear magnetic resonance (NMR) confirmed the presence of methyl ester moiety at  $3.6\ \delta$  (ppm) and methoxy carbon at  $51.2\ \delta$  in biodiesel, distinguishing it from diesel. In the engine performance tests, the variations of brake specific fuel consumption, exhaust gas temperature and brake thermal efficiency versus brake power were studied. The emission tests of different blends were done in terms of carbon monoxide, nitrous oxide and unburnt hydrocarbon. The *Jatropha* biodiesel exhibited lower mean brake specific fuel consumption, exhaust gas temperature, emitted less carbon monoxide and unburnt hydrocarbon than *Madhuca* biodiesel. The average decrease in brake thermal efficiency was more in *Jatropha* biodiesel than *Madhuca* biodiesel. The present work uses for the first time treatment of ortho phosphoric acid and toluene to produce biodiesel followed by a two-step homogeneous acid-base catalyst method, drastically reducing free fatty acid value.

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**Keywords** Engine performance · Engine emissions · Fourier transform infrared spectroscopy · Raman spectra · Nuclear magnetic resonance · Ultraviolet-visible spectroscopy

## Introduction

Biodiesel as an alternative fuel is non-toxic, renewable, biodegradable and carbon-neutral fuel (Chatterjee et al. 2015). Earlier research indicates that biodiesels emit lesser carbon monoxide (CO) and particulate matter, but higher nitrogen monoxide (NO) as compared to diesel (Joshi and Pegg 2007). Kannan (2019) revealed that oxidation catalysts decrease oxidation temperature, which reduces oxides of nitrogen (NO<sub>x</sub>) emission. The addition of nano additives enhances thermal efficiency and lowers fuel consumption (Ganesan et al. 2020). In the combustion process, biodiesel exhibits no



# Structural, magnetic and transport properties of Ca and Sr doped Lanthanum manganites

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## Abstract

This article presents a comparative study for the effect of average A-site cation size on the structural, transport and magnetic properties of Lanthanum manganites. Three polycrystalline colossal magneto-resistive compounds were synthesized using standard solid state reaction method. The electrical resistivity data is analyzed employing standard two-phase model to understand the conduction mechanism. The resistance of polycrystalline ceramic depends on the intragrain resistance (intrinsic resistance) and the intergrain or grain-boundary resistance (extrinsic resistance). The substitution of Sr ions at La-site provides higher magnetic and metal-insulator transitions as compared to Ca ions. The combined substitution of Ca and Sr ions at La-site offers nearby room temperature magnetic and metal-insulator transitions. Irreversibility in the temperature dependent DC magnetization is observed in the zero-field-cooled and field-cooled measurements. It is noticed that the larger average radius of the A-site cations possesses higher magnetic and metal-insulator transition temperatures. Temperature dependent thermoelectric power curves show a hump like behavior, which indicates a smooth transition from the low-temperature metallic behavior to high-temperature semiconductor-like behavior.

## 1. Introduction

Colossal Magnetoresistance (CMR) effect in the manganites has attracted widespread attraction of research community because of their interesting physical properties [1-5]. The perovskite manganites of general formula  $R_{1-x}A_xMnO_3$  (where  $R$  is trivalent rare earth ion and  $A$  is alkaline earth element) are found to possess significant CMR effect [1,2]. In addition to this, these materials show specific features of ferromagnetic-paramagnetic phase transition, and metal-insulator transition. The interest in CMR materials was reinforced due to their specific technological applications such as spintronic devices, magnetic recording media, magnetic sensors, permanent magnets etc. These materials also exhibit a high Seebeck coefficient (also known as thermoelectric power), because the  $4f$  levels in these compounds situate nearby the Fermi energy and create large density of states at the Fermi level [6]. A systematic analysis of its data provides information about the conduction mechanisms. Also, thermoelectric power of the manganites needs to be explored in view of the green energy candidates.

The characteristic behavior of  $La_{1-x}A_xMnO_3$  manganites strongly depend on the concentration of substitution at La-site [1-6]. The mixed valence state of Mn ions ( $Mn^{3+}$  and  $Mn^{4+}$ ) is induced by the substitution of divalent or trivalent cations at La-site. The manganites exhibit metal-insulator (M-I) transition temperature ( $T_{MI}$ ) and paramagnetic to

ferromagnetic transition at Curie temperature ( $T_C$ ) [7]. The conduction mechanism of the manganites can be explained in terms of two types of CMR effects: intrinsic and extrinsic [5]. In general, the intrinsic CMR effect is noted in the vicinity of intrinsic M-I transition and  $T_C$  [3], and it can be explained using the double exchange (DE) interaction mechanism between  $Mn^{3+}$  and  $Mn^{4+}$  ions [8]. The DE mechanism is also responsible for the occurrence of ferromagnetism. In addition to the DE mechanism, the strong electron-phonon interaction arising from Jahn-Teller splitting should also be considered for the observed CMR effect [9]. On the other hand, the extrinsic CMR effect is related to the natural and artificial grain boundaries and identified by a broad M-I transition [10,11]. The extrinsic M-I transition temperature is always lower than that of intrinsic one. The extrinsic CMR effect is originated from the spin polarized tunneling among adjacent grains [12,13]. Several fundamental questions have been raised regarding the conductivity mechanisms in CMR materials as magnitude of resistance changes significantly with the application of magnetic field. Previous studies proposed different models for conduction mechanism in the paramagnetic phase [14-19]. In general, it is noted that the presence of small polarons plays a key role in the unusual transport properties of manganites. However, an open question about the precise transport process of small polarons remains unanswered. It is a matter of dispute and demands further investigations.





# Large magnetocaloric effect near room temperature in $\text{La}_{0.67}(\text{Sr}, \text{K}/\text{Pb})_{0.33}\text{MnO}_3$ manganite nanomaterials

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## ABSTRACT

The magnetic and magnetocaloric properties of  $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$  (LSMO),  $\text{La}_{0.67}\text{Sr}_{0.23}\text{K}_{0.10}\text{MnO}_3$  (LSKMO), and  $\text{La}_{0.67}\text{Sr}_{0.23}\text{Pb}_{0.10}\text{MnO}_3$  (LSPMO) manganite nanomaterials were investigated. The superparamagnetic behavior of these nanomaterials was analyzed using the log-normal weighted Langevin function. Large change in magnetic entropy ( $\Delta S_M$ ) and relative cooling power (RCP) were observed near the Curie temperature,  $T_C$ , for all samples. The maximum change in entropy ( $-\Delta S_M^{\text{max}}$ ) is found to be 5.0, 5.3, and 6.2  $\text{Jkg}^{-1}\text{K}^{-1}$  under 7 T magnetic field for LSMO, LSKMO, and LSPMO samples, respectively, whereas the corresponding RCP values are 400, 440, and 325  $\text{Jkg}^{-1}$ . The isothermal magnetization data were analyzed thoroughly, using Arrott plots according to Banerjee's criterion. Moreover, the critical exponents ( $\beta$ ,  $\gamma$  and  $\delta$ ) were calculated using the modified Arrott plot. The Widom scaling relation was studied to confirm the dependability of these critical exponents. The magnetocaloric effect was also analyzed by considering the Landau theory. Our findings indicate that these samples can have promising applications for magnetic refrigeration.

## 1 Introduction

Perovskite-structured manganites with chemical formula  $\text{R}_{1-x}\text{A}_x\text{MnO}_3$  (R = trivalent rare earth element and A = alkaline earth) have revived immense attention due to their interesting transport, magnetic and structural behaviors as well as potential applications in recent technology [1–5]. These materials exhibit numerous functional properties such as colossal magnetoresistance (CMR) effect, superparamagnetism, and magnetocaloric effect (MCE). Ferromagnetic behavior (below Curie temperature,  $T_C$ ) of

these manganites becomes superparamagnetic when its particle size is small, and the magnetic spins get influenced by thermal fluctuation. For such nanomaterials, thermal fluctuation is strong enough to demagnetize a previously saturated assembly spontaneously. This causes a large saturation magnetization as well as a non-hysteretic  $M$ – $H$  curve with zero remanence and coercivity. These nanomaterials have been widely studied for different biomedical applications [6–9]. Apart from this, in recent years, perovskite manganites have attained enormous interest in exploring the possibility of making them

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## Exploring the extent of validity of quantum work fluctuation theorems in the presence of weak measurements

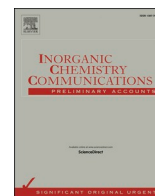
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Authors: Sourabh Lahiri, Subhashish Banerjee, A. M. Jayannavar

### Important notes

### Abstract

Work fluctuation theorems have been one of the important achievements in the field of nonequilibrium Statistical Physics, both in the classical and quantum regimes. Conventionally, the work done on a quantum system is defined by means of a two-point measurement scheme, where a projective measurement of the Hamiltonian is performed both at the beginning and at the end of the process. Recently, quantum work fluctuation theorems in the context of generalized measurements have received a lot of attention. Here, we define a weak value of work, within the broad framework of generalized measurements and show that the deviation from the exact work fluctuation theorems are much less in this formalism as compared to previous efforts in the literature, using a two-level system as the model. We find that the original form of Jarzynski equality (valid for projective two-point measurements) does not remain exact in this framework. Nevertheless, the deviations are in general small, so that an approximate effective temperature of the thermal bath can be deduced using our results. Further, in the limit of the measurements being projective, the exact form of the work fluctuation theorems is recovered.



## Atomic mapping of Li:ZnO thin films and its spectroscopic analysis

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X-rays photoelectron spectroscopy (XPS)

Raman and Fourier transform infrared (FTIR)

## ABSTRACT

Lithium detection in materials is often crucial even with sophisticated compositional analysis techniques, like Energy Dispersive X-ray (EDX) spectroscopy and X-ray photoelectron spectroscopy (XPS). The present work focuses on the three-dimensional compositional mapping of Li in Li-doped ZnO films using atom probe tomography (APT). A syringe pump spray pyrolysis (SSP) technique was prosperously used to synthesize undoped and Li doped zinc oxide (ZnO) thin films with Li concentration range from 0 to 8 at.% onto glass substrates. The chemical reagents used for this experiment are Zinc acetate ( $\text{Zn}(\text{acac})_2$ ) and lithium acetate ( $\text{Li}(\text{acac})_2$ ) under atmospheric conditions. Spectroscopic analyses of the films using Raman and Fourier transform infra-red (FTIR) spectroscopic techniques were done to confirm phase formation. Diffuse but strong absorption peaks within  $400 - 600 \text{ cm}^{-1}$  in FTIR spectra confirm compound formation while the existence of  $E_2^{\text{High}}$  and  $E_1(\text{LO})$  vibration modes in Raman spectra confirms the hexagonal wurtzite nature of ZnO films. Structure evolution of the films were ascertained using scanning electron microscopy (SEM). The stoichiometric ratio of Zn and O was estimated using EDX while their chemical state was probed using XPS. XPS also gives a qualitative account of Li with its probable chemical state. The latter is quantitatively estimated and mapped with atomic resolution using APT, where Li concentration was found to be  $\sim 7.5\%$ , which is very close to the concentration introduced in the solution. APT confirms a uniform dispersion of Li, Zn and O along the film surface with no significant segregation or concentration fluctuation even at the atomic scale.

## 1. Introduction

Zinc oxide (ZnO) is an important II-VI semiconductor material, largely used in a wide variety of technological applications [1,2]. ZnO can exist in wurtzite, zinc blende and rocksalt structures [3,4]. Among these, the wurtzite lattice symmetry of the host ZnO is known as thermodynamically the most stable phase. Its wide and direct band gap (3.37 eV), high excitation binding energy (60 meV) and high refractive index makes it a suitable candidate for UV LEDs, OLED, laser materials [5,6], piezoelectric energy harvester [7], photocatalytic and as sensor

[8]. The low absorbance of visible light and improved conductivity after doping, place ZnO in the category of one of the best transparent conducting materials [9]. Due to its technological importance, undoped and doped ZnO films have been deposited by various techniques, such as, sol gel [10,11], chemical vapour deposition [12,13], sputtering [7,14], thermal evaporation [15] and pulsed laser deposition [16,17], hydrothermal process [18,19] and spray-pyrolysis [8], etc. Pertaining to the requirements of foldable and wearable electronics, development of thin films on complex shaped substrates is in demand. Spray pyrolysis come up as a versatile low-cost method for developing films in this

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# Enhanced attraction between particles in a bidisperse mixture with random pair-wise interactions

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## ABSTRACT

We study a complex mixture with bidispersity in size and polydispersity in energy using computer simulation. The energy polydispersity between the bidisperse particles is introduced by considering random pair-wise interactions. Extensive molecular dynamics simulations are performed to compute potential energy and neighborhood identity ordering (NIO) parameter as a function of temperature for different size-ratios and concentrations of the two species by quenching it from a high-temperature fluid state to a solid state. Our findings demonstrate an enhancement of the neighborhood identity ordering on the addition of particles of different sizes, which also depends on particle concentration. Moreover, a comparatively higher increase in the NIO parameter is achieved by tuning the size-ratio of the particles. We also propose that the NIO parameter is a good marker to differentiate multicomponent systems (below the liquid to solid transition temperature) with different size-ratios and concentrations.

## ARTICLE HISTORY

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## KEYWORDS

Polydispersity; molecular dynamics simulation; liquid-solid transition; colloids; multicomponent alloys

## 1. Introduction

Understanding the relationship between the microscopic structure of a material and its response to external perturbations, e.g. temperature, pressure, etc., is of great technological and industrial significance. These perturbations may result in the phase transformations of the material from an unstable state to its preferred thermodynamic equilibrium state [1–3]. The subsequent dynamics of materials with few components, for instance, binary mixtures, has been a subject of intense study in the literature [3–5]. However, it is also of considerable interest to study polydisperse systems exhibiting a spread in a variable characterizing the constituent particles. In particular, designing materials with desired properties and strength have led scientists to consider systems with many components, which may vary across some distribution in interactions, shapes, sizes, and charges [6–8]. Polydispersity is present in systems as diverse as high-entropy alloys [9–13] and complex fluids [7, 14–16], such as polymer blends, liquid crystals, colloidal suspensions, and find industrial applications in bitumen, paint, automotive fuels, etc. [14].

For developing new materials, the traditional alloying strategy is to select one dominant component and add other elements in small amounts to improve specific properties. Such techniques put a restriction on further improvement of mechanical properties, and while achieving high strength ( $\sim$  GPa), usually, failure of materials occurs. To explore an even more comprehensive range of remarkable new materials, strategies like the equiatomic substitution of the main element with multi-element systems have been very successful and reviewed in Ref. [12]. The introduction of polydispersity in such high-entropy alloys [9,10,17,18] gives rise to a variety of amorphous and

# Flow behaviour of a model colloid-polymer mixture using mode-coupling theory

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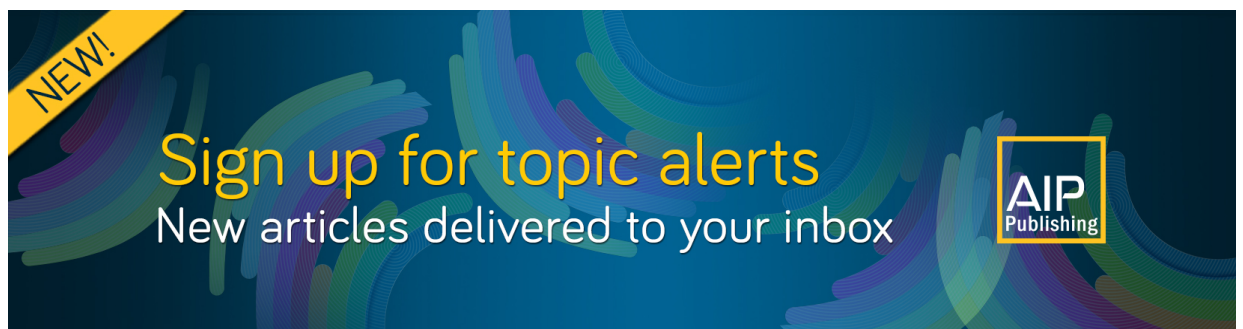
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## Investigation of artificial neural network performance in the aerosol properties retrieval

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### ABSTRACT

Aerosols are an integral part of Earth's climate system and their effect on climate makes this field a relevant research problem. The artificial neural network (ANN) technique is an upcoming technique in different research fields. In the current work, we have evaluated the performance of an ANN with its parameters in simulating the aerosol's properties. ANN evaluation is performed over three sites (Kanpur, Jaipur, and Gandhi College) in the Indian region. We evaluated the performance of ANN for model's hyperparameter (number of hidden layers) and optimizer's hyperparameters (learning rate and number of iterations). The optical properties of aerosols from AERONET (Aerosol RObotic NETwork) are used as input to ANN to estimate the aerosol optical depth (AOD) and Angstrom exponent. Results emphasized the need for optimal learning rate values and the number of iterations to get accurate results with low computational cost and to avoid overfitting. We observed a 23–25% increase in computational time with an increase in iteration. Thus, a meticulous selection of these parameters should be made for accurate estimations. The result indicates that the developed ANN can be utilized to derive AOD, which is not assessed at AERONET stations.

**Key words:** AERONET, aerosols, AOD, artificial neural network

### HIGHLIGHTS

- In designing an ANN, we must choose the optimal number of iterations based on computational cost and quality of results.
- Our finding indicates that ANN with more hidden layers can perform reasonably well at a low number of iterations.
- The specific site may need a different set of hyperparameters for the best performance of the ANN.
- The developed ANN can be utilized to derive AOD, which is not assessed at AERONET stations

## 1. INTRODUCTION

Aerosols contribute a tiny fraction to the atmosphere but substantially impact the whole Earth's climate system. Aerosols emanate from natural or anthropogenic sources and have a wide range of interactions with other components of the Earth system. The impact of aerosols on the climate system significantly changes with a change in their size and composition of aerosol (Satheesh & Srinivasan 2006). Thus, accurate measurements of aerosols' properties are essential for the exact estimate of their impact and their interaction with other components of the climate system. The properties of aerosols have high spatial variation owing to various factors. The leading causes are chemical composition, size distribution, shape, wind speed and direction, terrain properties, relative humidity, and numerous others. The measurement of aerosols involves high levels of uncertainty and, subsequently, its impact on climate also involves a high level of uncertainty (IPCC Report 2007, 2013). The uncertainties associated with aerosol measurements and their effects on the climate make this a promising field of research. High spatial and temporal variability in aerosol distribution makes it more challenging to quantify their impacts and the associated uncertainties (Srivastava *et al.* 2016). The researchers have implemented various approaches to examine the properties and role of aerosol in the climate system to reduce the uncertainties (Wilcox *et al.* 2006; Nakajima *et al.* 2007; Bellouin *et al.* 2008; Zhang *et al.* 2008; Yin *et al.* 2015). Ground-based observations, satellite measurements, and numerical/chemical transport model simulations are frequently used techniques to study aerosol properties (Chin *et al.* 2009; Lu *et al.* 2011; Yang *et al.* 2017; Li *et al.* 2019).



# Association of modeled PM<sub>2.5</sub> with aerosol optical depth: model versus satellite

Nishi Srivastava<sup>1</sup>

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## Abstract

Particulate matters  $< 2.5 \mu\text{m}$  (i.e., PM<sub>2.5</sub>) are very important for health as well as radiative forcing studies. But over Indian continent, there is scarcity of the observation for PM<sub>2.5</sub> concentration which gets measured over only few locations with very coarse resolution. Limitations on resolution in space and time posed by the real-time measurements caused requirement of other measurements with high resolution in space and time. In this regard, satellite observations and model came up as good alternative as they can produce information with high resolution. Satellites and chemical transport models play a significant role and give wider option to study spatial and temporal patterns of particulate matter, especially for finer mode. In the present work, we have simulated the particulate matters (PM<sub>2.5</sub>) over the Indian continent from 4–29.5°N and 67–88.5°E with the help of a chemical transport model ‘CHIMERE.’ We found its connection with satellite estimate aerosol optical depth (AOD) from MODIS and MISR sensors. Modeled results can be set for higher resolution than satellite data, so in the absence of satellite data, these relations can be useful. Particulate matters with aerodynamic radius  $< 2.5$  are a contributor to total aerosol load which causes columnar aerosol optical depth. In this work, we took PM<sub>2.5</sub> concentration as an indicator of aerosol loading and thus compared it with columnar aerosol optical depth. Both approaches are coherent for various seasons on the year except monsoon as in the monsoon season availability of data from satellite was not consistent.

**Keywords** Aerosol · Aerosol optical depth · Particulate matter · Chemical transport model

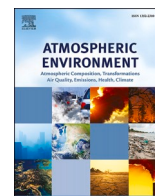
## 1 Introduction

Atmospheric aerosols are integral part of our environmental and climate system, thus significantly affecting the climatic radiative forcing. We understand that anthropogenic aerosols have strong radiative forcing but our knowledge about the amount and sign of radiative forcing still incorporates large uncertainty. Precise and consistent measurements of aerosol distribution and properties are required to reduce the gaps in understanding the global radiative effects of aerosol. Aerosol size varies in different sizes from fine mode to coarse

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# Impact of meteorological parameterization schemes on CTM model simulations

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## HIGHLIGHTS

- We quantified the significance of cloud/microphysical meteorological parameterization schemes in the simulation of aerosols by a CTM.
- This type of analysis study is sparse over the Indian sub-continent though essential to the realistic simulation of aerosols over this region.
- It is essential to evaluate the effect of cloud, and microphysics on the aerosol simulation as aerosol concentration and cloud are interlinked.
- Results indicate that a single parameterization scheme set may not produce good results for all the parameters/pollutants.
- These results also infer that ensemble modeling could also lead to a better option than using single simulations.

## ARTICLE INFO

### Keywords:

Microphysics parameterization schemes  
Cumulus parameterization scheme  
Aerosols  
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Sensitivity study

## ABSTRACT

Meteorology plays a key role in regional aerosol concentration and distribution. Microphysics and cloud formation processes in the atmosphere is interlinked with aerosol and their removal processes. To characterize their role in modulating the aerosols/pollutants concentration simulation by a chemical transport model (CTM, here we have taken CHIMERE model); we have performed this study with different microphysical (MP) schemes (Kessler Scheme/Lin Scheme/WRF single Moment 3-class (WSM3) scheme) and cumulus cloud parameterization (CU) schemes (Kain-Fritsch Scheme/Betts-Miller-Janjic Scheme/Grell 3D) of Weather Research and Forecasting Model (WRF). We have used the WRF model over a domain (3°S-41.8°N; 59.5°-102.5°E) with the resolution of (0.25° × 0.25°) while CHIMERE model simulations are performed over the domain (6°-37.5°N; 67°-95.5°E) with the similar resolution for a selected period of monsoon. In total nine combinations are framed with MP and CU schemes to observe the sensitivity of CTM to these schemes. Simulated results are compared with the satellite (TRMM/MODIS) and reanalysis data (MERRA-2) to appraise the model's performance with various parameterization scheme combinations. Results indicate that despite the same initial and boundary conditions and model configuration, notable differences occurred in the simulated meteorological parameters with different scheme combinations. Results suggested that CTM performed in a reliable range with cumulus scheme Betts-Miller-Janjic Scheme (BMJ) and Grell 3D scheme with microphysical parameterization scheme Purdue Lin Scheme over Indian continent. The study also suggests that a single set may not produce good results for all the parameters/pollutants; thus, we have to choose the parameterization schemes which give optimal results for all the parameters/pollutants. These results also infer that ensemble modeling could also lead to a better option than using single simulations.

## 1. Introduction

Aerosols are an integral part of the climate system as they have a huge impact on the human health, ecosystem, climate, and radiation budget of the earth. Thus, the exact representation of aerosol is essential

for climatic and health-related studies. Though several research works are performed to quantify the impact of aerosols on the climate system, complex interaction with other components of the earth climate system poses restrictions on the understanding of their distribution (Babu and Moorthy, 2002; Bond et al., 2004; Chin et al., 2009; De Meij et al., 2009;

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# Structural, thermal stability and electrical conductivity of zirconium substituted barium cerate ceramics

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Thermogravimetric analysis

Ceramics

## ABSTRACT

Barium cerate perovskite ceramics substituted with zirconium  $\text{BaCe}_{1-x}\text{Zr}_x\text{O}_3$  ( $x = 0, 0.05, 0.10, 0.15, 0.20$ ) were prepared by the standard solid-state reaction route. The x-ray diffraction patterns affirmed the single-phase orthorhombic symmetry of the synthesized ceramics. The thermal stability of the samples has been checked by thermogravimetric analysis (TGA). TGA of dry and pre-hydrated ( $p\text{H}_2\text{O}$  ( $g$ )  $\approx 0.03$  atm and 1.0 atm) compositions revealed that all the samples are stable up to a temperature of 800 °C. However, the samples treated at a higher partial pressure of water are found less stable. The crystalline phase of the studied compositions before and after TGA was measured with the Raman study, confirming that most of the parent phases exist or remain stable even after the treatment of samples at higher vapor pressure. Thermal stability gradually improved with increasing Zr-substitution. The TGA results that are consistent with the Raman studies proved the sample with  $x = 0.20$  is the most stable among the studied compositions. Complex impedance spectroscopy studies clearly demonstrated the impact of bulk and grain boundary on the total resistance of the compounds with different zirconium contents. The Arrhenius dependence of the total conductivity indicates that the conductivity decreased with an increase in Zr concentration both in air and wet nitrogen atmosphere. Comparing the conductivity under both ambiances suggests that some additional charged species participate in the conduction mechanism under the wet environment. These are ascribed to the protonic defects, developing into barium cerate via extrinsic oxygen vacancies because of high-temperature sintering.

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## 1. Introduction

Until now, major shares of energy sources are fossil fuels, which are finite and cannot be added. An increasing trend in the global energy demand not only leads to the depletion of fossil fuels; it also raises the emission of greenhouse gases like  $\text{CO}_2$ ,  $\text{SO}_2$ , etc., to an alarming level. Hence the world is considering various alternatives for energy production that are renewable, green/clean, and are derived from renewable resources that are constantly rejuvenated by nature. These forms of natural energy are converted into usable energy by accessible renewable energy technologies that can substitute traditional fossil fuels. Renewable power is flourishing, as innovation reduces costs and begins to deliver on the promise of a clean and green energy future i.e. providing benefits of low carbon emissions and other types of pollutants. From this perspective, a solid oxide fuel cell (SOFC) is a favorable technology for sustainable

energy production. High-temperature proton conductors (HTPC) have vast applications in solid oxide fuel cells (SOFCs), hydrogen separation and steam electrolysis, etc. [1]. One of the major issues in improving the performance of intermediate temperature SOFCs ( $IT < 700$  °C) is the development of sufficiently high ion/proton conducting solid oxide electrolytes at these temperatures [2]. The ability to approach lower temperatures will further enhance cell power performance and pave the way for numerous inexpensive non-Pt catalysts as well as avoid costly cooling systems in automobile applications. The HTPCs materials are perovskite-based oxides with large proton conductivity represented by the general formula  $\text{ABO}_3$ , having a divalent element in the A-site, and a tetravalent element in the B-site. Protons readily migrate into the perovskite lattice by the Grotthuss type mechanism that leads to a smaller value of activation energy than oxide-ion conductors and hence results in larger conductivity values in the intermediate temperature (IT, 400–700 °C) range [3]. However, the materials are exposed to certain disadvantages. The cerium based compositions are unstable in reducing atmospheres (e.g.  $\text{CO}_2$ , and  $\text{SO}_2$ ) and easily reacts with water [4–6]. On the other hand, zirconates have good

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## Correlation between experimental and theoretical study of scheelite and wolframite-type tungstates



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### ARTICLE INFO

#### Keywords:

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Scheelite  
Wolframite  
Density functional theory (DFT)  
Band gap  
Photoluminescence

### ABSTRACT

Structural and optical properties of  $AWO_4$  ( $A = Ba, Sr, Ca, Mg, \text{ and } Zn$ ) ceramics were investigated. The structural analysis confirmed the scheelite-type tetragonal structure for ( $A = Ba, Sr \text{ and } Ca$ ) $WO_4$  and wolframite-type monoclinic structure for ( $A = Zn \text{ and } Mg$ ) $WO_4$  compounds. The experimentally observed optical band gap ( $E_g$ ) found to be in the range of 4.17–5.92 eV agree with those calculated with the help of density functional theory. A decrease in band gap value with the decrease in ionic radii of  $A^{2+}$  in the  $AWO_4$  compound was observed. An intense blue-green photoluminescence emission was observed for these materials and correlated with  $E_g$ . The environmental factor  $h_e$  calculated by complex chemical bond theory has been correlated with the broadening of PL excitation bands. The excitation spectra revealed that there subsists a negative relation between  $h_e$  and position of energy levels.

### 1. Introduction

The semiconductor tungstate crystals  $AWO_4$ , in general, crystallize in the scheelite-type tetragonal structure having space group  $I4_1/a$  (No. 88) for an ionic radius of A-site ion  $> 1.0 \text{ \AA}$  ( $A = Ba, Ca, Sr, Eu, Pb$ ) with tetrahedral coordination of tungsten, or in the wolframite-type monoclinic structure ( $P2_1/c$ ), for  $A^{2+}$  cations  $< 1.0 \text{ \AA}$ , ( $A = Cd, Co, Fe, Mg, Ni, Zn$ ) with octahedral coordination of tungsten [1–3]. Other tungstates crystallize in structures associated with scheelite, resembling monoclinic  $HgWO_4$  ( $C2/c$ ) [4] and cubic  $SnWO_4$  ( $P2_13$ ) [5] or to wolframite, similar to triclinic  $CuWO_4$  ( $P\bar{1}$ ) [6]. Because of excellent optical properties, these materials have found practical applications in phosphors, light-emitting diodes, solid-state lasers, photocatalyst, scintillators [7–12]. A precise knowledge of  $E_g$  is required for all these applications. Despite the efforts being made so far, no agreement concerning  $E_g$  in metal tungstates has been reached. In the particular cases of  $CaWO_4$  [13] and  $ZnWO_4$  [14],  $E_g$  ranges from 4.4–6.8 eV and from 3.8 to 5.7 eV, respectively. Therefore, it is difficult to determine  $E_g$  precisely. All these materials have got scientific attention as they have photoluminescence (PL) emissions in the visible regions of the electromagnetic spectrum. For example, Cavalcante et al. observed an intense green PL emission (maximum at 520 nm) in  $(Ba_{1-x}Pr_{2x/3})WO_4$  ceramics with ( $x = 0.00, 0.01 \text{ and } 0.02$ ) synthesized by the

coprecipitation technique. They also observed a significant decrease in PL emission when  $Ba^{2+}$  is replaced by  $Pr^{3+}$  ion [15]. Thongtem et al. analyzed the room temperature PL behavior of  $SrWO_4$  prepared by microwave irradiation technique, excited using 270 nm excitation wavelength. According to these authors, the intrinsic peaks of PL spectra have been confirmed at maximum emissions of 418 nm [16]. Cavalcante et al. examined the PL behavior of aggregated  $CaWO_4$  micro- and nanocrystals synthesized by the co-precipitation method [17]. According to these authors, the PL spectra showed an intense blue emission. Several kinds of intrinsic or extrinsic defects that are associated with the degree of structural order-disorder are responsible for this broad luminescence. The shifting of the PL emission maxima can be attributed to the variations in the density of structural defects. The broad blue-green-yellow emission has been observed in  $ZnWO_4$  [18,19]. The PL properties of  $MgWO_4$  ceramic synthesized by solid-state reaction route have been reported in our preceding work. This emission spectrum covers a wide band from 380 to 558 nm [20]. The molecular interactions occurring in compounds possessing different crystal structures affecting their optical phenomena are being studied extensively in recent times using density functional theory (DFT) [21–23].

Furthermore, Longo et al. reported the nanomorphology and oriented attachment mechanism for the formation of  $CaWO_4$  nanocrystals by employing experimental techniques such as FEG-SEM, TEM,

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# Structural and dielectric properties of Cu-doped $\alpha$ -ZnMoO<sub>4</sub> ceramic system for enhanced green light emission and potential microwave applications

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## Abstract

In this article, the synthesis of the Zn<sub>1-x</sub>Cu<sub>x</sub>MoO<sub>4</sub> ceramic system was carried out by a solid-state reaction route, and their structural, morphological, and optical properties were investigated. The samples were characterized by X-ray diffraction, scanning electron microscopy, Raman spectroscopy, FT-IR spectroscopy, and UV–Vis spectrophotometry. Structural analysis confirms the formation of a triclinic structure with space group P1 and point group symmetry C1 without any secondary phase formation. The decrease in effective nuclear charge with the introduction of Cu<sup>2+</sup> ion decreases the bandgap from 3.57 to 2.78 eV. The potential application in the visible (green) region of the electromagnetic spectrum is supported by the reduction of the bandgap. The increasing Cu<sup>2+</sup> concentration is accompanied by Photoluminescence peaks being shifted toward larger wavelength side, covering a broad range of visible region from 300 to 600 nm. The broad range luminescence emission spectra that happened with ZnMoO<sub>4</sub> occurred due to the electronic transition between (MoO<sub>4</sub>)<sup>2-</sup> complexes or between Mo<sub>4d</sub> and O<sub>2p</sub> states. Hakki–Coleman method was applied for the study of microwave dielectric parameters and shows increase of  $\epsilon_{\text{obs}}$  from 8.35 to 12.52 with a simultaneous decrease in dielectric loss (tan  $\delta$ ) from 0.01 to 0.005, respectively. The corresponding quality factor ( $Q \times f$ ) was calculated. The observed high-quality factor could be used as high signal speed microwave materials.

## 1 Introduction

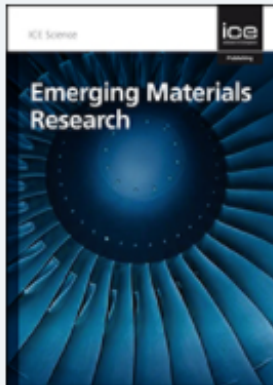
In recent years, the broad practical application of metal molybdate (AMoO<sub>4</sub>) in every area of science and technology led to the advancement of these materials. The metal molybdate AMoO<sub>4</sub> (A = Zn, Mg, Cu, Ca, Sr) semiconductors materials have shown enhanced photocatalytic and photoluminescence effect. Among these groups of metal molybdates, Zinc molybdate shows much attractive application in LEDs [1–3], photocatalysis [4, 5], humidity sensors [6], use in battery electrodes [7], scintillation detectors [3, 8–10], and drug delivery. Zinc molybdate exists in two different crystal structures, i.e.,  $\alpha$ -ZnMoO<sub>4</sub> and  $\beta$ -ZnMoO<sub>4</sub>, where  $\alpha$ -ZnMoO<sub>4</sub>

crystal presents a triclinic structure of space group P1 and point group symmetry C1 [11] and  $\beta$ -ZnMoO<sub>4</sub> crystal has Wolframite-type monoclinic structure of space group P2/c and point group symmetry  $C_{2h}^4$  [12]. In  $\alpha$ -ZnMoO<sub>4</sub>, distorted octahedral [ZnO<sub>6</sub>] cluster is formed due to the coordination of six oxygen atom with the Zn<sup>2+</sup> cation, while tetrahedral [MoO<sub>4</sub>] cluster is formed by the linkage of molybdenum (Mo) with four oxygen atoms. In the  $\beta$ -ZnMoO<sub>4</sub> crystal, the formation of [ZnO<sub>6</sub>/MoO<sub>6</sub>] cluster is seen due to molybdenum and zinc which are encircled with six oxygen atoms. The formation of these two crystal structures is dependent on the processing time/temperature and synthesis conditions [13, 14]. A literature survey reveals that the optical and electrical properties of ZnMoO<sub>4</sub> can be altered by introducing cations at the B-site of the ABMoO<sub>4</sub> structure. For example, Zhou et al. [15] reported the enhanced red emission in Eu<sup>2+</sup>-doped ZnMoO<sub>4</sub> due to  $f$ - $f$  transition. Xiaoxia et al. [1] have demonstrated that Tb<sup>2+</sup>-doped ZnMoO<sub>4</sub> prepared using the co-precipitation method is promising green phosphorus and has application in NUV and white LEDs based on blue emissions. Also the doping concentration at 6 mol%

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[Next >](#)

### Sliding wear behaviour of thermally sprayed WC-20Cr<sub>3</sub>C<sub>2</sub>-7Ni and La<sub>2</sub>O<sub>3</sub> composite coatings

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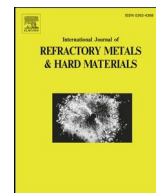
Keywords: abrasive coatings nanoparticles

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### Abstract

In this paper, the sliding wear behaviour of WC-20Cr<sub>3</sub>C<sub>2</sub>-7Ni and lanthanum (III) oxide (La<sub>2</sub>O<sub>3</sub>) composite coating is investigated. The influence of lanthanum (III) oxide is evaluated by varying its proportion (1, 2 and 3 wt%) in WC-20Cr<sub>3</sub>C<sub>2</sub>-7Ni coating material. The high-velocity oxy-fuel (HVOF) technique is used to deposit the coatings on AISI 1020 carbon (C) steel. The mechanical strength and metallurgical quality of the deposit were confirmed by microhardness, adhesive strength and porosity measurements; scanning electron microscopy; and X-ray diffractometry. Further, the sliding wear behaviour of the composite coating is tested on pin-on-disc apparatus with silicon carbide (SiC) as counter material at room temperature. From the investigation, it was found that 2% lanthanum (III) oxide in WC-20Cr<sub>3</sub>C<sub>2</sub>-7Ni coating achieved good adhesive strength with minimum wear rate. Addition of lanthanum (III) oxide in WC-20Cr<sub>3</sub>C<sub>2</sub>-7Ni prevented the coating from undergoing boundary segregation, crack propagation and grain refinement. Abrasion and ploughing are the common wear mechanisms observed in worn surfaces.

+



## Experimental investigation and study of HVOF sprayed WC-12Co, WC-10Co-4Cr and Cr<sub>3</sub>C<sub>2</sub>-25NiCr coating on its sliding wear behaviour

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### ARTICLE INFO

#### Keywords:

Sliding wear  
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SEM  
XRD  
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### ABSTRACT

An experimental investigation followed by a comparative study of HVOF sprayed WC-12Co, WC-10Co-4Cr and Cr<sub>3</sub>C<sub>2</sub>-25NiCr coatings were conducted at three different loads of 20, 40 and 60 N. Sliding wear of coated specimens against hardened EN-32 disc was performed as per the G 99-5 standard at room temperature. The feedstock powders and corresponding coatings were characterized for microstructural studies along with porosity, microhardness, and adhesive bond strength. The experimental results suggest that the stability of the transfer layer plays a significant role in stable wear. The WC-12Co coating shows the best sliding wear resistance, maximum microhardness which was found to be 56.6% and 9.6% higher than WC-10Co-4Cr and Cr<sub>3</sub>C<sub>2</sub>-25NiCr coatings. The maximum adhesive bond strength was found to be 2.03% and 10.5% higher in WC-12Co than WC-10Co-4Cr and Cr<sub>3</sub>C<sub>2</sub>-25NiCr. Tribo oxide layer counterbalances to stabilize the wear during high heat generation at higher loads. Various aspects and mechanisms of these improvements are discussed in this paper.

### 1. Introduction

Surface modification and its optimization is a challenging aspect for modern industrial application to increase the wear resistance. Wear reduces component life, decreases the cycle time and increases the power consumption resulting in enhancement of the operating cost of the machine. Coating deposition is the best method to enhance wear resistance and is presently applied in various industrial applications such as turbine, cylinder and valve, aerospace, oil refinery, and roller in paper mill [1,2]. Coating by thermally sprayed techniques includes flame spray, high-velocity oxy-fuel coating (HVOF), plasma spray, HVOF and detonation gun [3]. High-Velocity Oxy-Fuel (HVOF) is so far the best competent route for coating deposition to fulfill the modern industrial requirements. HVOF coatings offer good mechanical and microstructural properties [4]. HVOF coatings withstand in harsh conditions such as moisture, penetration of abrasive and erosive particles [5]. HVOF is extensively used for the deposition of hard metal powder and metal powder composite [6–8]. HVOF coating is preferably an appropriate method especially for tungsten carbide, chromium carbide and their matrix [9]. HVOF coatings minimize the porosity and decarburization owing to low flash temperature and higher spray velocity, resulting in excellent wear resistance, toughness and bond strength

[4,10]. WC-Co and WC-Co-Cr coatings retain excellent sliding and abrasive wear resistance, better hardness and toughness [11,12]. The Cr<sub>3</sub>C<sub>2</sub>-25NiCr coating exhibits superior wear behaviour at higher temperatures [13]. Mechanical, wear and microstructural properties of coatings are governed by parameters like feedstock powder, residual stress, resultant porosity, binder fraction, and grain size of powder [14]. The small grain size of powder not only decreases the porosity but also increases the wear-resistance and hardness [15–17].

Tungsten, nickel and chromium-based coatings effectively enhance the wear resistance and other mechanical properties. Cobalt and Nickel binders are widely used in coatings which increase toughness, but cobalt is extensively used with WC due to higher bonding strength and superior microstructural properties [18]. Nickel binder provides better corrosion resistance than Co binder [19,20].

WC-12Co, WC-10Co-4Cr and Cr<sub>3</sub>C<sub>2</sub>-25NiCr coatings show different wear behaviour due to the formation of new phases of W<sub>2</sub>C, Co<sub>3</sub>W<sub>3</sub>C and Cr<sub>7</sub>C<sub>3</sub> during spraying [21,22]. Hardness and bond strength are also affected by these new phases. Consequently, in this specific circumstance, extensive examinations that add to a better comprehension of a sliding wear phenomenon of WC-12Co, WC-10Co-4Cr and Cr<sub>3</sub>C<sub>2</sub>-25NiCr coatings are important. Researchers investigated the abrasive and erosive wear behaviour of WC-12Co, WC-10Co-4Cr and Cr<sub>3</sub>C<sub>2</sub>-

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# Revisiting cosmic microwave background radiation using blackbody radiation inversion

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Blackbody radiation inversion is a mathematical process for the determination of probability distribution of temperature from measured radiated power spectrum. In this paper a simple and stable blackbody radiation inversion is achieved by using an analytical function with three determinable parameters for temperature distribution. This inversion technique is used to invert the blackbody radiation field of the cosmic microwave background, the remnant radiation of the hot big bang, to infer the temperature distribution of the generating medium. The salient features of this distribution are investigated and analysis of this distribution predicts the presence of distortion in the cosmic microwave background spectrum.

A blackbody is an ideal object which can absorb all of the incident radiation of all frequency. The total power radiated per unit frequency per unit solid angle by a unit area of a blackbody emitter can be expressed by Planck's law<sup>1,2</sup>

$$P(\nu) = \frac{2h\nu^3}{c^2} \frac{1}{e^{\frac{h\nu}{kT}} - 1} \quad (1)$$

where  $\nu$  is frequency,  $T$  is the absolute temperature,  $h$  is Planck's constant,  $k$  is Boltzmann's constant and  $c$  is the speed of light. Usually telescopes are used to measure this power spectrum of any celestial object. But due to its finite field of view a telescope can observe a small portion of the sky at any time. These small portions consist of different blackbody radiators with different temperature  $T$  and each of them are in thermal equilibrium. When a collection of blackbodies with probability distribution  $\alpha(T)$  and temperature  $T$  is considered, the total radiated power per unit area is given by the integration over the distribution as<sup>3</sup>

$$W(\nu) = \frac{2h\nu^3}{c^2} \int_0^{\infty} \frac{\alpha(T)}{e^{\frac{h\nu}{kT}} - 1} dT \quad (2)$$

where  $W(\nu)$  is the radiated power per unit frequency per unit area and per unit solid angle and  $\alpha(T)$  is the probability distribution of temperature of the blackbody. The dimension of  $\alpha(T)$  is  $\frac{1}{K}$ .

The blackbody radiation inversion problem aims to find the probability distribution of temperature from the radiated power spectrum.

In practice, a set of discrete values of  $W(\nu)$  are available experimentally. By using this set of data,  $\alpha(T)$  can be calculated by blackbody inversion method.

For mathematical convenience, a dimensionless parameter  $G(\nu) = \frac{c^2}{2h\nu^3} W(\nu)$  is used.

$$G(\nu) = \int_0^{\infty} \frac{\alpha(T)}{e^{\frac{h\nu}{kT}} - 1} dT \quad (3)$$

Equation (3) is the first kind of Fredholm integral equation and is an ill-posed problem. Bojarski was the first to propose a solution to this problem using Laplace transform with an iterative process<sup>4</sup>. Since then various other methods have been proposed for solving this problem like Tikonov regularization method<sup>5</sup>, universal function set method<sup>6</sup>, Mellin transform method<sup>7</sup>, modified Mobius inverse formula<sup>8</sup>, variational expectation





# Correlation between experimental and theoretical study of scheelite and wolframite-type tungstates

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## ARTICLE INFO

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## ABSTRACT

Structural and optical properties of  $AWO_4$  ( $A = Ba, Sr, Ca, Mg, \text{ and } Zn$ ) ceramics were investigated. The structural analysis confirmed the scheelite-type tetragonal structure for ( $A = Ba, Sr \text{ and } Ca$ ) $WO_4$  and wolframite-type monoclinic structure for ( $A = Zn \text{ and } Mg$ ) $WO_4$  compounds. The experimentally observed optical band gap ( $E_g$ ) found to be in the range of 4.17–5.92 eV agree with those calculated with the help of density functional theory. A decrease in band gap value with the decrease in ionic radii of  $A^{2+}$  in the  $AWO_4$  compound was observed. An intense blue-green photoluminescence emission was observed for these materials and correlated with  $E_g$ . The environmental factor  $h_e$  calculated by complex chemical bond theory has been correlated with the broadening of PL excitation bands. The excitation spectra revealed that there subsists a negative relation between  $h_e$  and position of energy levels.

## 1. Introduction

The semiconductor tungstate crystals  $AWO_4$ , in general, crystallize in the scheelite-type tetragonal structure having space group  $I4_1/a$  (No. 88) for an ionic radius of A-site ion  $> 1.0 \text{ \AA}$  ( $A = Ba, Ca, Sr, Eu, Pb$ ) with tetrahedral coordination of tungsten, or in the wolframite-type monoclinic structure ( $P2_1/c$ ), for  $A^{2+}$  cations  $< 1.0 \text{ \AA}$ , ( $A = Cd, Co, Fe, Mg, Ni, Zn$ ) with octahedral coordination of tungsten [1–3]. Other tungstates crystallize in structures associated with scheelite, resembling monoclinic  $HgWO_4$  ( $C2/c$ ) [4] and cubic  $SnWO_4$  ( $P2_13$ ) [5] or to wolframite, similar to triclinic  $CuWO_4$  ( $P\bar{1}$ ) [6]. Because of excellent optical properties, these materials have found practical applications in phosphors, light-emitting diodes, solid-state lasers, photocatalyst, scintillators [7–12]. A precise knowledge of  $E_g$  is required for all these applications. Despite the efforts being made so far, no agreement concerning  $E_g$  in metal tungstates has been reached. In the particular cases of  $CaWO_4$  [13] and  $ZnWO_4$  [14],  $E_g$  ranges from 4.4–6.8 eV and from 3.8 to 5.7 eV, respectively. Therefore, it is difficult to determine  $E_g$  precisely. All these materials have got scientific attention as they have photoluminescence (PL) emissions in the visible regions of the electromagnetic spectrum. For example, Cavalcante et al. observed an intense green PL emission (maximum at 520 nm) in  $(Ba_{1-x}Pr_{2x/3})WO_4$  ceramics with ( $x = 0.00, 0.01 \text{ and } 0.02$ ) synthesized by the

coprecipitation technique. They also observed a significant decrease in PL emission when  $Ba^{2+}$  is replaced by  $Pr^{3+}$  ion [15]. Thongtem et al. analyzed the room temperature PL behavior of  $SrWO_4$  prepared by microwave irradiation technique, excited using 270 nm excitation wavelength. According to these authors, the intrinsic peaks of PL spectra have been confirmed at maximum emissions of 418 nm [16]. Cavalcante et al. examined the PL behavior of aggregated  $CaWO_4$  micro- and nanocrystals synthesized by the co-precipitation method [17]. According to these authors, the PL spectra showed an intense blue emission. Several kinds of intrinsic or extrinsic defects that are associated with the degree of structural order-disorder are responsible for this broad luminescence. The shifting of the PL emission maxima can be attributed to the variations in the density of structural defects. The broad blue-green-yellow emission has been observed in  $ZnWO_4$  [18,19]. The PL properties of  $MgWO_4$  ceramic synthesized by solid-state reaction route have been reported in our preceding work. This emission spectrum covers a wide band from 380 to 558 nm [20]. The molecular interactions occurring in compounds possessing different crystal structures affecting their optical phenomena are being studied extensively in recent times using density functional theory (DFT) [21–23].

Furthermore, Longo et al. reported the nanomorphology and oriented attachment mechanism for the formation of  $CaWO_4$  nanocrystals by employing experimental techniques such as FEG-SEM, TEM,

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# Optical Signal Transmission through Masked Aperture to Extend the Depth of Focus in Optical Coherence Tomography

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## ABSTRACT:

Optical Coherence Tomography (OCT) imaging technique has emerged as a non- or minimally invasive modality in the clinical pathogenesis such as deep tissue examining and optical biopsy etc. The OCT imaging increases the Depth of Focus (DoF) by devising mechanisms to increase an Optical Transfer Function (OTF) of the imaging system. This is achieved through an apodization technique on the surface of lens in conjugation with the femtosecond Bessel-type laser beam. An investigation on postulation of OTF through a masked aperture, or specifically a micro-dot is investigated to measure variations of intensity profile at the optical coordinates in the radial as well as axial directions. The intensity variations in the radial and axial coordinates are calibrated to obtain the information, which significantly helps in devising of OCT imaging system. A theoretical investigation of OTF matching the experimental relationship between spot size and DoF in response to obscuration ratio is presented in this paper. This mathematical approach could be applied to different types of masking functions by meticulously exploring the parameters of optical coordinates.

**KEYWORDS:** Optical Transfer Function, Geometrical Coordinate, Optical Coordinate, Spot Size, Depth of Focus, Obscuration, Pupil Function.

## 1. INTRODUCTION

The advancement in an Optical Coherence Tomography (OCT) imaging technique has revolutionized the cell biopsy in accurate diagnosis of the disease and its treatment during pre- and post-surgical procedures [1]. It is preferred over the common stained histological examination due to one of the robust reasons that an OCT imaging is a real-time non- or minimally invasive diagnostic technique involving minimal sampling errors [2]. Moreover, due to its high resolution, such OCT has numerous applications in the area of retinal imaging in ophthalmology [3-4], brain tissue imaging [5], and deep tissue imaging [6-7], etc. The high resolution of OCT is achieved via increasing the depth of focus (DoF) of an optical beam and via minimizing an attenuation of backscattered light from the tissues by selecting the wavelength of the order of ca. ~1300 nm [7]-[8]. The common endoscopic type of OCT imaging system such as Stratus OCT is composed of swept laser source (probe beam), single-mode optical fiber, Gradient Index (GRIN) lens, and small prism to deflect focused light onto a tissue [4],[6].

The imaging system relies on studying an optical probe beam of two important factors such as its spot size and the depth of focus (DoF) [9]-[10]. The spot size of the focusing lens is given by  $\lambda/(2NA)$ , where  $\lambda$  is the wavelength and NA is the numerical aperture of that optical system. Another definitions uses the Full Width at Half Maximum (FWHM) and  $(1/e^2)$  times the maximum of transmitted intensity at the focal plane of the optical system. The estimation of DoF is approximately proportional to the product of the wavelength  $\lambda$  and the square of the f-number (the ratio between the focal length  $f$ , and the diameter  $D$ , of the imaging lens), i.e.,  $\lambda(f/D)^2$ . In terms of intensity, the DoF is the distance between the focal point and the point where the intensity decreases to 90%, while in application like imaging systems, it is 50% [11].

The deep tissue imaging could be achieved by increasing the DoF by using numerous types of the aperture of the imaging lens such as axicon [12], diffractive axicon [13], annular aperture [14], binary phase array of annuli [15], and cubic phase mask [16],

# Electrical Discharges: An Emerging Modality in Sterilization, Disinfection, and Therapeutics

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## ABSTRACT:

Electrical discharges are the key mechanism to the generation of atmospheric pressure plasmas which are further classified as equilibrium and non-equilibrium plasmas, also referred to as thermal and non-thermal plasmas. The technological advancement of non-thermal plasma has extended its potential clinical non-invasive applications in a multitude of disciplines such as dermatology, ophthalmology and oncology, etc. to bolster tissue generation, refraction error correction and necrosis of the cancerous cells in the domain of plasma medicine, respectively. A fundamental on the various types of discharges and their mechanism is investigated. A perspective on the application of non-thermal plasmas in the domains such as sterilization and disinfection is presented in this review. We have focused on the plasma therapeutics and its significance as a clean and dry therapy to treat superficial skin diseases via the mechanism of proliferation of basal skin cells and prothrombin stimulation to cauterize the blood through Argon Plasma generated by Argon Plasma Coagulator. We propose to fabricate atmospheric pressure plasma devices and understanding of the associated plasma radicals that aids in the activation of biochemical and biomolecular reactions to treat the cutaneous and sub-cutaneous diseases.

**KEYWORDS:** Thermal and Non-Thermal Plasmas, Sterilization, Disinfection, Cell Proliferation, Dielectric Barrier Discharge, Argon Plasma Coagulator.

## 1. INTRODUCTION

Stars glowing brightly is an evident example of thermonuclear fusion reaction of hydrogen ions, which are also known as plasma, and hence these stars are nothing but balls of Hot Plasmas radiating EM waves of various wavelengths. So basically, Plasma is a Sea of ionized gases [1]. It is sometimes also known as the fourth state of matter. The logic behind this is like when we heat solid state, we get liquid state which in turn turns into gaseous state on heating. Then on further heating of gas leads to the formation of ionized gases i.e., plasma. But describing Plasma formation through heating is not correct. Plasmas are produced by making atoms collide with fast moving particles (photoionization [2]) or by electric breakdown by applying strong electric fields (When electric breakdown occurs electrons move with huge amount of energy between two electrodes). So, when these things occur the particles collide with the atoms making the electrons on the outer orbitals of the atoms leaves their place and become free. Due to this there is a creation of an ion and one free electron. When large number of atoms get converted to ion by leaving one or more electrons there is creation of Plasma. Thus,

Plasma consists of charged particles but the total charge of it is zero i.e., its neutral. Plasma usually exists in vacuum because in presence of air the amount of heat gets dissipated thus the ions again turn into neutral atoms [1].

Plasma can't be prepared at room condition because room temperature and conditions are not suitable for its creations. From Saha equation we know that  $n_i/n_n \approx 2.4 \times 10^{21} (T^{3/2}/n_i) e^{(-U/RT)}$  [1], and if we put the value of the quantities for room condition, we get  $n_i/n_n \approx 10^{-122}$  [1], which is very low to be recognized. As the temperature is raised, the degree of ionization remains low until  $U_i$  is only a few times  $KT$ . Then  $n_i/n_n$  rises abruptly, and the gas is in a plasma state [1].

Thus, to be now more precise we can say, that "Plasma is a quasineutral gas of charged and neutral particles which exhibits collective behavior." [1]. To understand the meaning of quasineutral and quasineutrality let us suppose that the density of the ionized ions is  $n_i$ , density of electrons is  $n_e$ . When  $n_i \sim n_e \sim n$ , where  $n$  is the common density, known as plasma density. This condition is known as quasineutrality and the medium is said to be in the state of quasineutral [1].

## Review Article

# Pivotal Role of Quantum Dots in the Advancement of Healthcare Research

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The quantum dot is a kind of nanoparticle whose dimension is smaller than the size of a typical nanoparticle ranging from tens of nanometers to a few hundredths of nanometers. The quantum mechanical behavior associated with the quantum dot displays different optical and electronic properties, enabling the quantum dot to find potential applications in a multitude of areas such as solar cells, light-emitting diodes, lasers, and biomedical applications. The objective of this investigation is to explore its fundamentals, synthesis, and applications, especially in the healthcare domain. We have discussed the quantum dot synthesis techniques using chemical methods, namely, wet-chemical methods and vapor-phase methods and plasma processing methods, namely, an ion sputtering method and plasma-enhanced chemical vapor deposition method. We have thoroughly investigated the application of quantum dots in imaging, diagnostics, and gene therapy areas. A significant outcome of this review is to propose quantum dots as a new modality in the treatment of cancer and gene therapeutics in the healthcare domain and the potentials of artificial intelligence to improve their performance via the applications of neural networks.

## 1. Introduction

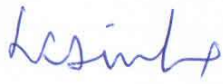
From solar panels to medical applications, quantum dots are receiving discernible attention in today's world due to their unparalleled and cutting-edge scope [1, 2]. Quantum dots are colloidal semiconductor nanoparticles that exhibit a distinctive set of optical and transport properties due to their spatial confinement regime, also known as the quantum confinement effect. In bulk semiconductors, the presence of multiple atoms causes splitting of electronic energy levels which when grouped forms an energy band. The most filled band, known as the valence band, is at lower energy, and the mostly empty band known as the conduction band is at relatively higher energy. The valence band and conduction band are forbidden by an energy gap, called a bandgap. In order to excite a valence electron to the conduction band, the applied radiation of energy radiation must be equivalent to the forbidden energy of the bandgap. After absorption of suitable energy, an electron ( $e^-$ ) can jump into conduction

from the valence band which causes the formation of vacant space in the valence band, known as a hole ( $h^+$ ). This pair of electrons ( $e^-$ ) and hole ( $h^+$ ) can be perceived as a hydrogen-like species and is known as an exciton. These excitons for a specific semiconductor bear a separation between the electron ( $e^-$ ) and hole ( $h^+$ ) which is called the exciton Bohr radius. In quantum dots, the excitons are confined to a much smaller volume of the semiconductor material which is in order of its exciton Bohr radius. This results in less splitting of the energy bands and leads to a quantum confinement region [3]. Such a region of electron-hole pairs in various dimensions within a material and the electronic energy bands associated with it are discrete and quantized. The size and the composition of the quantum dots can be altered to allow the energy levels and the bandgap to be fine-tuned to specific desired energies. Quantum dots are bandgap tunable by their dimension (diameter ranging typically from 2 to 10 nm) which means that their optical and electrical properties can be engineered to meet specific biomedical applications [4].

**Department/Section: Physics**

**NAAC Metric 3.4.6** Number of books and chapters in edited volumes published per teacher during 2020-21 (15)

3.4.6 Number of books and chapters in edited volumes published per teacher during the last five years (15)								
3.4.6.1: Total number of books and chapters in edited volumes / books published, and papers in national/international conference-proceedings year wise during the last five year								
Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Title of the proceedings of the conference	Year of publication	ISBN/ISSN number of the proceeding	Whether at the time of publication affiliating institutions was same (Yes/No)	Name of the publisher
None								

  
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Department/Section: Physics

NAAC Metric 5.1.2 Average percentage of students benefited by career counseling and guidance for competitive examinations offered by the Institution during the last 2020-21 (10)

5.1.2 Average percentage of students benefited by career counseling and guidance for competitive examinations offered by the Institution during the last 2020-21 years (10)			
Year	Name of the Activity conducted by the HEI to offer guidance for competitive examinations & career counseling offered by the institution during the last five years	Number of students attended / participated	Link to the relevant document
None			




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**Department/Section: Physics**

**NAAC Metric 5.2.1** Average percentage of students qualifying in state/ national/ international level examinations during **2020-21** (eg: NET/SLET/GATE/GMAT/CAT/GRE/JAM/IELTS/TOEFL/Civil Services/State government examinations) (10)

5.2.1 Average percentage of students qualifying in state/ national/ international level examinations during the last five years (eg: NET/SLET/GATE/GMAT/CAT/GRE/JAM/IELTS/TOEFL/Civil Services/State government examinations) (10)															
Year	Registration number/roll number for the exam	Names of students selected/qualified	NET	SLET	GATE	GMAT	CAT	GRE	JAM	IELTS	TOEFL	Civil Services	State government examinations	Any such other Examinations	Link the relevant Documents
	None														
	<b>Total</b>														
															<b>Grand Total</b>


  
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**Department/Section: Physics**

**NAAC Metric 5.2.3** Percentage of recently graduated students who have progressed to higher education (previous graduating batch)  
(15)

Sl. No.	Name of student enrolling into higher education	Program graduated from	Name of institution admitted to	Name of programme admitted to
	None			

  
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