

Present and Future Dimensions of Physics at BIT Mesra



Department of Physics
Birla Institute of Technology Mesra
Ranchi-835215 (India)

Year of Establishment *	No of Faculties (Total- 17)		
	Professor	Associate Professor	Assistant Professor
1955	04	01	12 + 04 (Expected to join)
	02 (Scientific officers) , 02 Technicians and 05 Non-teaching members		
	IMSc Students (105), MSc Students (54), Ph.D Scholars (23)		

P.G. Programmes

[Integrated M.Sc. Physics](#) (CBCS-05 Years course)

[M.Sc. Physics](#) (CBCS-02 Years course)

U.G. Programmes

[Physics for 1st Semester B.Tech.\(CBCS\)](#) (700 students)

[Minor in Engineering Physics for B.Tech.\(CBCS- Open Elective Papers \)](#)

M.Sc. Physics (Specializations offered)

(a) Condensed Matter Physics

(b) Photonics

(c) Theoretical and Computational Physics

(d) *Electronics*

(e) *Plasma Sciences*

Doctoral Programme

Area of Research

Theoretical Physics

- Photonics
- Statistical physics
- Nonequilibrium Statistical Mechanics
- Plasma physics, Cosmology &
- Atmospheric Physics

Experimental Physics

- Materials Science
- Opto-electronic Materials
- Dielectric / Piezo-electric Materials
- Nanostructured /Nano-scale Materials
- Superconductivity
- Solar Cell
- Holography
- Bio-active Materials / Bio-physics
- Growth and Applications of Thin films
- DLC and Hard-Coatings
- Energy-harvesting materials
- Surface and Interface Physics
- Ion Beam Modification of Materials
- Oxidation resistance and Corrosion Resistance

Interdepartmental Collaboration with

[Department of Mechanical Engineering](#)

[Department of Electronics and Communication Engg.](#)

[Department of Pharmaceutical Sciences and Tech.](#)

[Department of Chemical Engineering](#)

[Department of Civil and Environmental Engg.](#)

[Department of Chemistry](#)

[Department of Remote sensing](#)

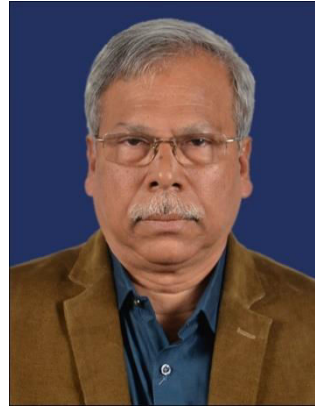
New Faculties-Welcome to BIT



Dr. Suman Ghosh
PhD: IIT Kharagpur
30 September, 2021
Theoretical Physics
Quantum field theory
in curved space time



Dr. Ram K. Dewanjee
PhD: IIT Delhi
30 September, 2021
Particle Physics
One of the main analysts
in the search for top-quark
associated Higgs boson
production ($t\bar{t}H/tH$)
in the multi-lepton final state



Prof. Amitava Mitra
Adjunct Faculty
PhD: IIT Kharagpur
February 01, 2021
Experimental Materials Sc.
Best Metallurgist of the
Year-2006



Dr. Rajyavardhan Ray
PhD: IIT Kanpur
December 2021
Theoretical Physics
Strongly correlated and
spin-orbit coupled systems
Density Functional Theory
Classical Monte Carlo
simulations, Effective
Hamiltonian techniques



Dr. Anupam Roy
PhD: IOPB & Cultivation of Sc.
01 November, 2021
**Experimental Condensed
Matter Physics**, Surface
Physics and Materials
Science, Epitaxial Thin
Films and Nanostructures,
Layered Materials.

Faculties (Theoretical Physics-08)



Prof. S. Konar
Photonics
Ph.D (JNU)



Dr. S. Lahiri
*Nonequilibrium
Statistical Mechanics*
Ph.D (IOP, Bhubaneswar)



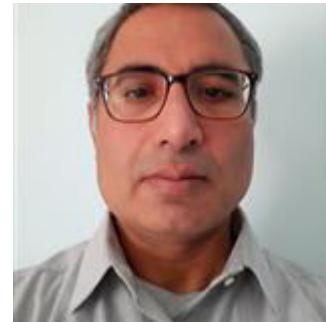
Dr. Madhu Priya
Statistical physics
Ph.D (JNU, Delhi)



Dr. Pawan K. Tiwari
*Plasma Physics,
Bio-Physics*
IIT Delhi



Dr. R. K. Pal
Plasma physics, Cosmology
Ph.D (SINP)



Dr. Rajeev Kumar
Plasma Physics
Ph.D (SINP)



Dr. Ravindra Kumar
High Energy Physics
IIT Kanpur



Dr. Nishi Shrivastava
*Atomospheric
Physics, Numerical
modelling*
Ph.D (IISC Bangalore)

Faculties (Experimental Physics-09)



Prof. S. K. Sina
(HOD)
Material Science
Ph.D (Bombay Univ)



Prof. S. Keshri
Material Science
Ph.D (BIT Mesra)



Prof. S. K. Rout
Material Science
Ph.D (NIT Rourkela)



Dr. Kingshuk Bose
Holography
Ph.D (BIT Mesra)



Dr. Dilip K. Singh
Nanotechnology,
Nano-Optics
Ph.D (IIT Guwahati)



Dr. Sanat Mukherjee
Thin Films
Ph.D (BIT Mesra)



Dr. Rishi Sharma
Photovoltaics
Ph.D (BIT Meara)



Dr. Ela Sinha
Material Science
Ph.D (NIT Rourkela)



Dr. Sourabh Baruah
Material Science
Ph.D (IIT Kanpur)

Research focus – Materials perspectives

Dielectric / Piezo-electric Materials



Opto-electronic Materials



Bio-active Materials / Bio-physics



Nanostructured / Nano-scale Materials



Growth and Applications of Thin films



Carbon and 2D-Materials



Hard-Coatings



Energy-harvesting materials



Project Proposals Submitted (2021)

Submitted by	Submitted to	Amount requested
1. Modulation in Aerosol Radiative forcing: Investigations on Composition Dependence		
Dr. Nishi Srivastava	SERB	26.40 Lakh
2. Graphene Oxide based quasi-solid electrolytes for next generation Solar Cells		
Dr. Rishi Sharma	DST	34.96 Lakh
3. Mechanically stable transparent conducting oxides for flexible solar cells		
Dr. S. K. Mukherjee	SERB (Core Research Grant)	28.96 Lakh
4. Biocompatibility and mechanical studies of nanostructured HAP, metal doped nanostructured HAP on alumina by RF Magnetron Sputtering		
Dr. S. K. Sinha, Co-PI	DST-SERB	
5. Development of efficient cathode materials for solid oxide electrolyte cell (SOEC) applications		
Dr. Ela Sinha	DST-SERB	41.14 Lakh

Project Proposals Submitted (2021) . . . contd.

Submitted by	Submitted to	Amount requested
6. Development of environment friendly and efficient electrocaloric material for solid state self-cooling device applications		
Dr. S. K. Rout	DST-SERB	58.68 Lakh
7. Development of measurement systems and sensors for gas concentration.		
M K Sinha, Dr. R Kumar, Dr. S K Sinha	SAC, ISRO	26.50 Lakh
8. Study of Quantum Thermal Machines and their optimization		
Dr. S. Lahiri	SERB-Core Research Group	22.33 Lakh

Projects (Ongoing)

1. Investigation on Optical Pulse and Beam Propagation in Semiconductor Quantum Well and Quantum Dot Nanostructures with Emphasis to the Development of Photonic Device					
Prof S. Konar (PI), Dr K Bose (CI)	DRDO	05.01.2018	3 years	24.60 Lakhs	
2. Development of environmental friendly perovskite materials for self -powered vibrational energy harvesting device applications					
S.K.Rout (PI), Ela Sinha (CI)	SERB, DST, New Delhi	July 2017	3 Years	55.80 lakhs	
3. Development of rare earth modified barium zirconate as an efficient proton conducting material at intermediate temperature					
Ela Sinha(PI)	SERB, DST, New Delhi	14.03.2017	3 Years	29.68 Lakhs	
4. Development of super-lubricated Nano-crystalline Diamond film on bearing materials for aerospace applications					
Dr. Rishi Sharma, Dr. S.K. Mukherjee	AR&DB	18.12.19	3 Years	26.115 Lakhs	

Projects (Ongoing)

... contd.

5. Faster and brighter single photons from 2D crystals and their interfacing with plasmonic waveguides.				
Dr. D.K. Singh, Dr. L.N.Tripathy, Dr. R.V. Nair (IIT Ropar)	CRS Scheme NPIU TEQIP MHRD	11.07.2019	1 Year	13.69 Lakhs
6. Electrical and magnetotransport studies of nano-devices of few/mono-layer transition metal dichalcogenides.				
Dr. S. Baruah Dr. D.K. Singh	CRS Scheme NPIU TEQIP MHRD	11.07.2019	1 Year	19.00 Lakhs
7. Nonlinear rheology of dense colloidal suspensions				
Dr. Madhu Priya	DST-SERB	24.08.2018	3 Years	22.45 Lakhs
8. Study of Stochastic Heat Engines using Active Particles				
Sourabh Lahiri (PI)	DST-SERB	25.10.2018	3 years	21.49 Lakhs

CAPITAL BUDGET DEPARTMENT OF PHYSICS

INR in Lac

1	DIGITAL STORAGE OSCILLOSCOPES	0.80
2	FUNCTION GENERATORS	0.80
3	THICKNESS PROFILOMETER FOR THIN FILM THICKNESS MEASUREMENT	25.00
4	MAGNETO ELECTRIC COUPLING MEASUREMENT SYSTEM	7.00
5	DOCTOR'S BLADE AUTOMATIC FILM COATER	1.50
6	REFRIGERATOR	0.50
7	COMPTON EXPERIMENT	13.00
8	HE-NE LASER	2.25
9	OPTICAL CHOPPER	1.00
10	USB OSCILLOSCOPE	1.00
11	MOUNTED LINEAR POLARIZERS	1.60
12	QUARTER WAVE-PLATE, HALF WAVE-PLATES,	1.00
13	POSTS & ACCESSORIES ESSENTIALS KIT, IMPERIAL AND UNIVERSAL COMPONENTS, 254 PIECES	1.65
14	SPUTTERING TARGET (AL)	0.16
15	SILVER PASTE	0.25
16	EXPERIMENTAL SETUP FOR DETECTION OF MUONS	7.00
17	QUANTUM ERASER EXPERIMENTAL SETUP	9.20
18	ELECTRON DIFFRACTION EXPREIMENTAL SETUP	2.80
19	BALMER SERIES/ DETERMINATION OF RYDBERG'S CONSTANT SETUP	2.80
20	SETUP FOR ATOMIC SPECTRA OF TWO-ELECTRON SYSTEM: HE, HG	2.80

82.11

Present Facilities

Software and computational facilities

Matlab (For scientific computation)

Mathematica (For calculations)

VASP (For Molecular & CMP simulations and Modeling)

Labview (For automation and instrumentation)

Workstation for Heavy computation (02)

Computation terminals for M.Sc students (~ 50 Nos)

Experimental Facilities

Anodic Vacuum Arc Deposition System

Hind High Vac Ltd., Bangalore

- Purchased under ISRO RESPOND project in 1998.
- This is an arc plasma aided thin film deposition unit.
- The system has been in use for depositing thin films of metals and metal alloys primarily.
- It offers some definite advantages like macroparticle free deposition, very high deposition rate, low system cost as well as running cost.



Experimental Facilities cont.....



Cascaded Anode
Plasma Arc
Generator
Hypertherm, USA

- We have an atmospheric pressure arc plasma generator intended for studies in basic arc plasma phenomena.
- It is a wall stabilized thermal plasma device that has application in arc cutting, welding, drilling, spheroidization, hazardous waste disposal etc.

Experimental Facilities cont.....



Radio frequency magnetron sputtering system
Plasma Consult, Germany

- Is a three-target thin film deposition system capable of depositing single as well as multilayer thin films of a variety of materials.
- Reactive deposition like oxides, nitrides and carbides have been carried out using this system.

Experimental Facilities cont.....

Plasma Nitriding System

Milman, Pune

- Purchased under TEQIP
- thermochemical case hardening process
- to increase wear resistance, surface hardness



Experimental Facilities cont.....

Co-sputtering System

Vacuum Techniques Pvt. Ltd., Bangalore

- This system was purchased under DST-FIST during 2006.
- The system has been in use for co-sputtering multi-component thin films, reactive deposition and can as well be used for multilayer thin films.



Experimental Facilities cont.....

Double-Target Magnetron Sputtering

Advanced Process Technologies Pvt. Ltd., Pune

The unit was procured under DST project and finds application in developing thin films of Giant Magnetoresistance and Colossal Magnetoresistance materials.

- It requires small sized targets, particularly suited for depositing films of expensive materials composition.



Experimental Facilities cont.....

CVD

- We are equipped with a variety of CVD units viz., DC CVD, Thermal CVD, PECVD, Microwave CVD and Hot Filament CVD.
- These units are being used for development of DLC films, NCD and UNCD Films, CNT and Graphene, Nanowires and 2-D semiconducting structures, etc.



Thermal CVD

DC CVD



Microwave CVD

Hot filament CVD



PECVD

Experimental Facilities cont.....

Atmospheric Pressure Plasma Jet

Studies on Cold Plasma
Processing of Materials
at atmospheric pressure.



Experimental Facilities cont.....

Solar Simulator

Characterization and standardization of solar cells developed in the lab.



Experimental Facilities cont.....



Closed cycle liquid helium cryostat with 2-T electromagnet

- Low temperature conductivity measurement of samples in the temperature range of 10 K to 350 K

Nano-indenter

- Nanoindenter is used **to characterize thin films**, intended for coatings on cutting tools, thermal barrier coatings, microhardness in industrial quality and control, scratch and wear resistance, etc.



Experimental Facilities cont.....

Raman Spectrometer



Purchased under the FIST program of DST.
Non destructive characterization of samples for their chemical composition and structure, molecular analysis.

Experimental Facilities cont.....

Plasma
diagnostics unit

Langmuir probe electrical
diagnostic setup for
studies on basic plasma
characteristics.



Experimental Facilities cont.....

Additional Facilities

Apart from these, we have several other vital equipment viz.

- Ferroelectric Loop Tracer 20kV
 - Radiant Technologies Inc., P-PM2
 - aixACCT systems, TF analyzer 2000
- Impedance Analyzer
 - Solartron, SI 12603
- LCR Meter
 - HIOKI, IM3536
- D33 Meter (piezoelectric materials testing)
 - APC international, Ltd., YE2730A
- Keithley Parameter Analyzer SCS-4200 (C-V, pulse I-V measurement, Nano material, nano tube & graphene testing)
- UV-Vis Spectrometer
 - PerkinElmer Inc., Lambda 35
- Photoluminescence Spectrometer
 - PerkinElmer Inc., LS55



Loop Tracer



UV-Vis Spectrometer



Keithley Parameter Analyzer SCS-4200

Experimental Facilities cont.....

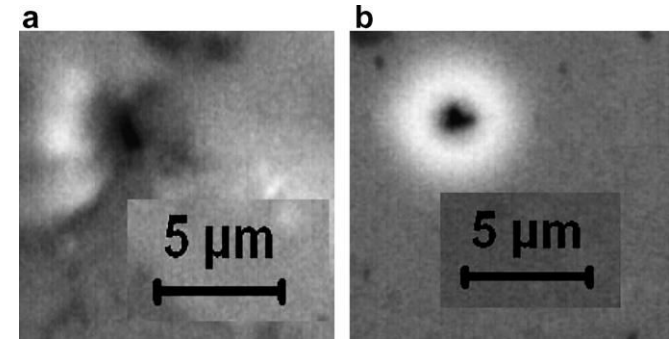
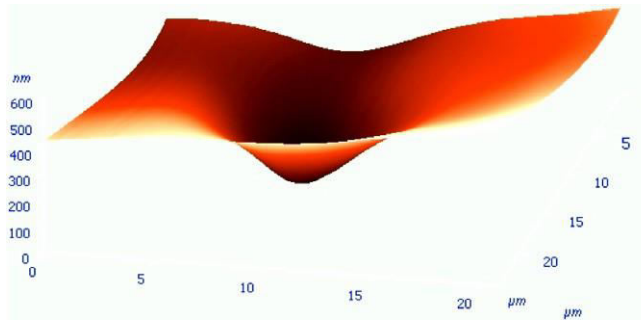
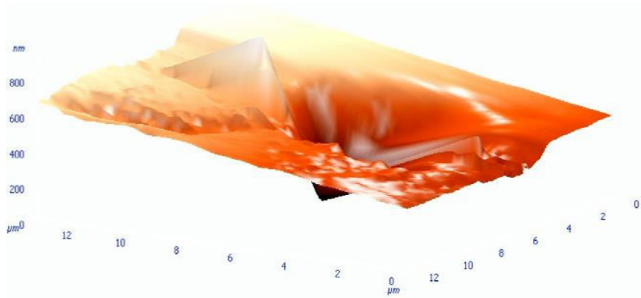
Furnaces

Ball milling system and a host of furnaces for material syntheses are also available in the department, included are the following:

- Box furnace 1700 °C
 - Muffle furnace 1800 °C
- and
- Tubular furnace 1700 °C
- to name a few.

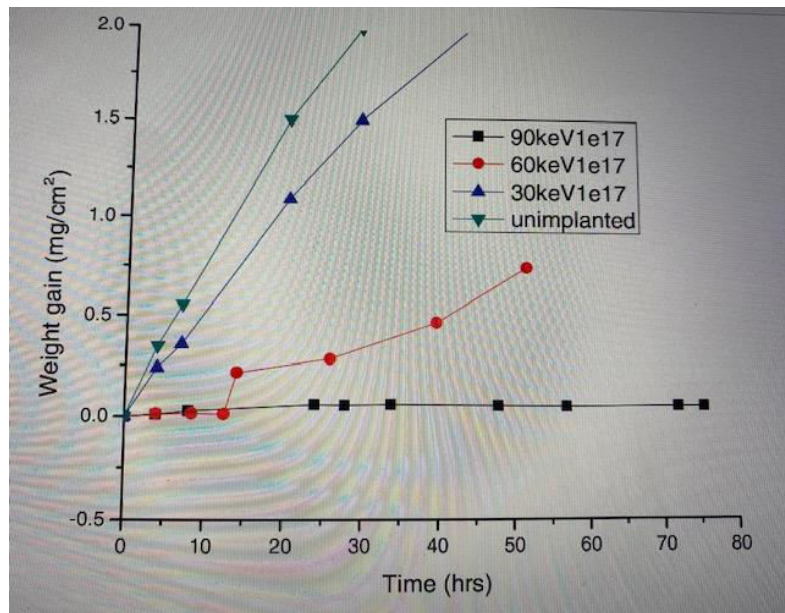


Ion Beam Modification of Materials-New ideas

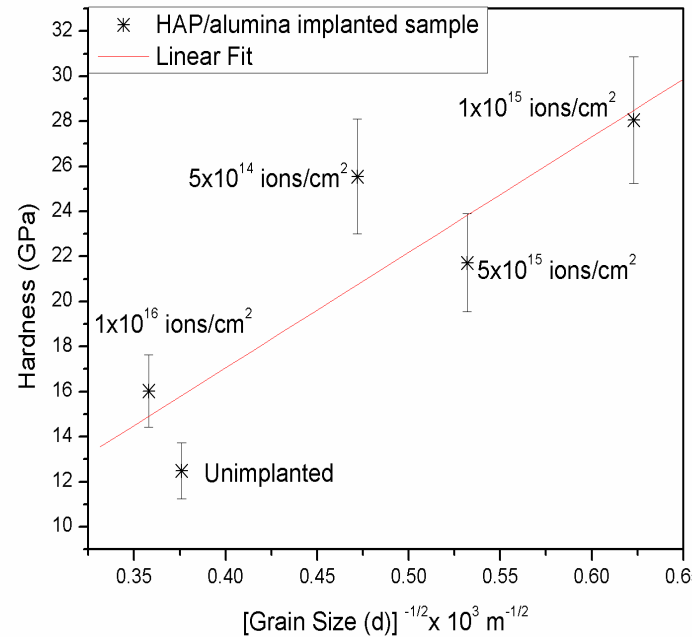


...S K Sinha et al. / Nucl. Instr. and Meth. in Phys. Res. B 264 (2007) 254–258

Ductility improvement using AFM and OM is shown by just looking onto the images



Improvement in oxidation resistance of IMI 834 after nitrogen ion implantation



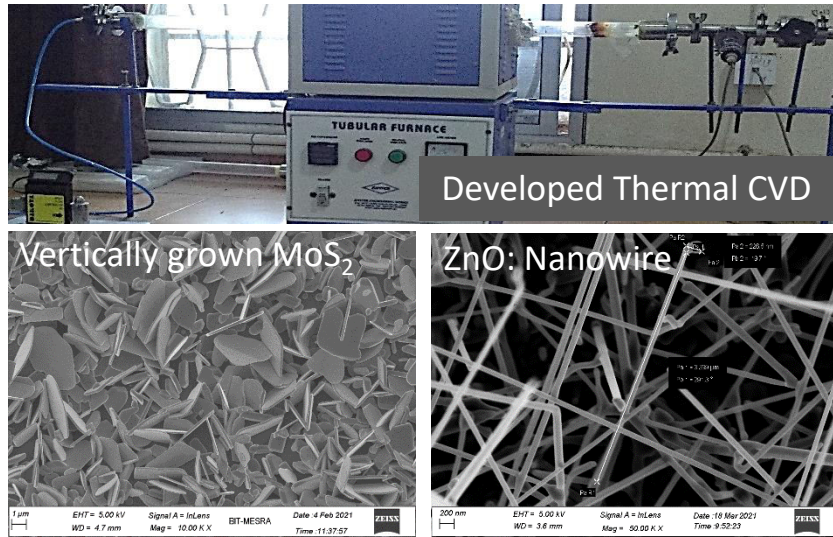
Verification of Hall-Petch relation

Hall Petch equation
 $H = H_0 + k d^{-1/2}$

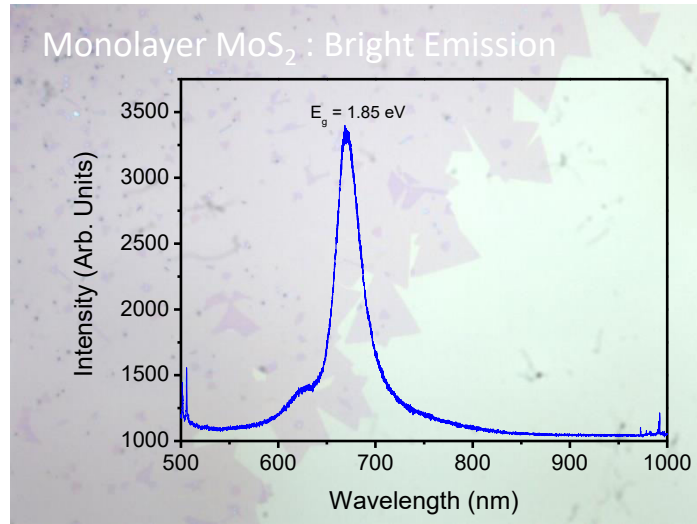
Where, H is Hardness and d is grain size

H_0 and k are constants for a particular material

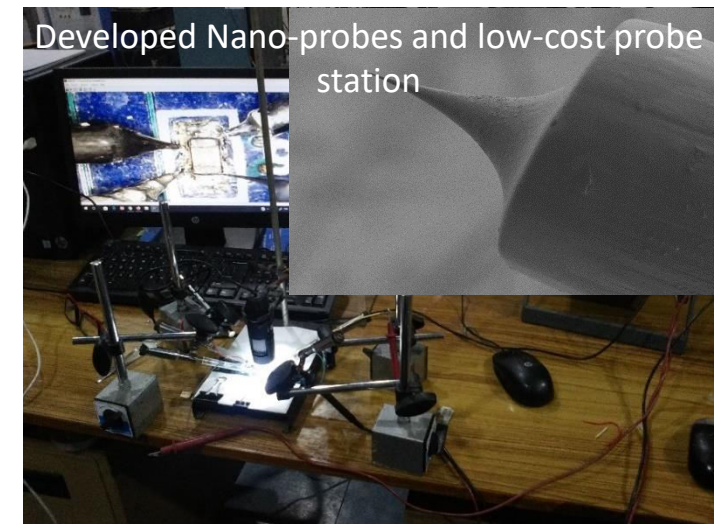
Nanostructured Opto-electronic Materials and Devices (NOMAD)



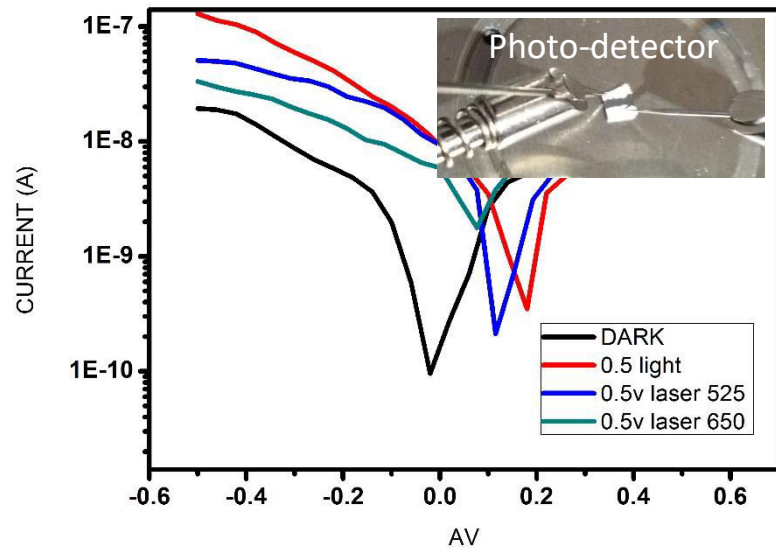
CVD growth of Nano-structures for Opto-electronics



Monolayer MoS₂ for Opto-electronics



Developed Nano-probes and low-cost probe station



2D-Photo-detectors: Engineering its photo-response

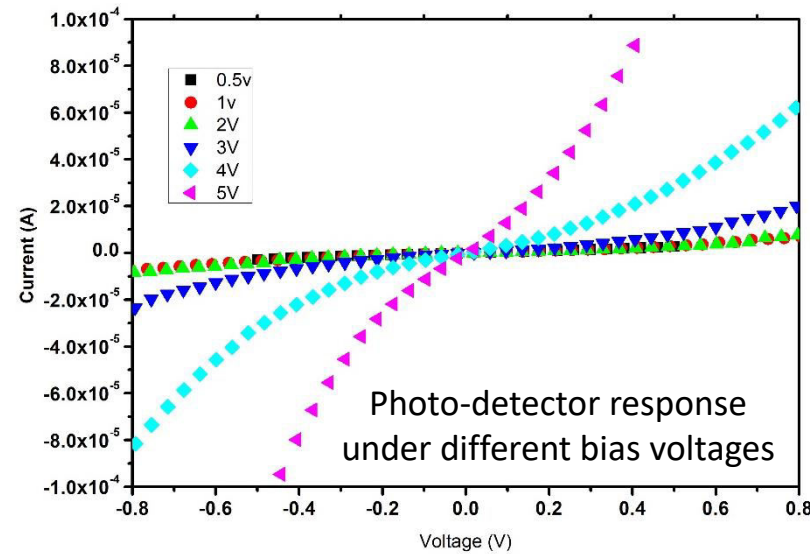
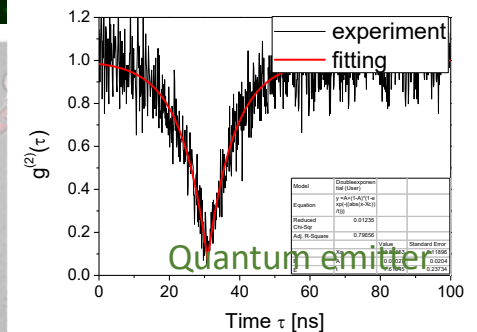
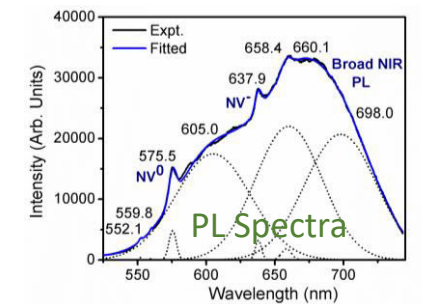
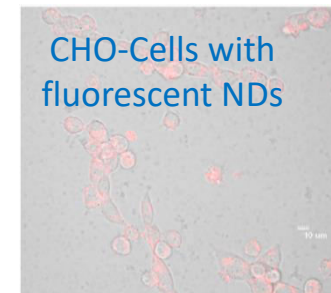
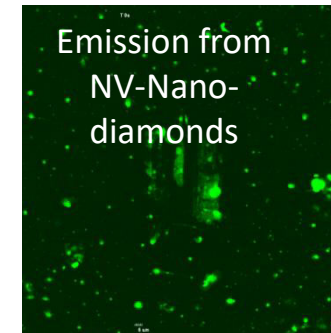
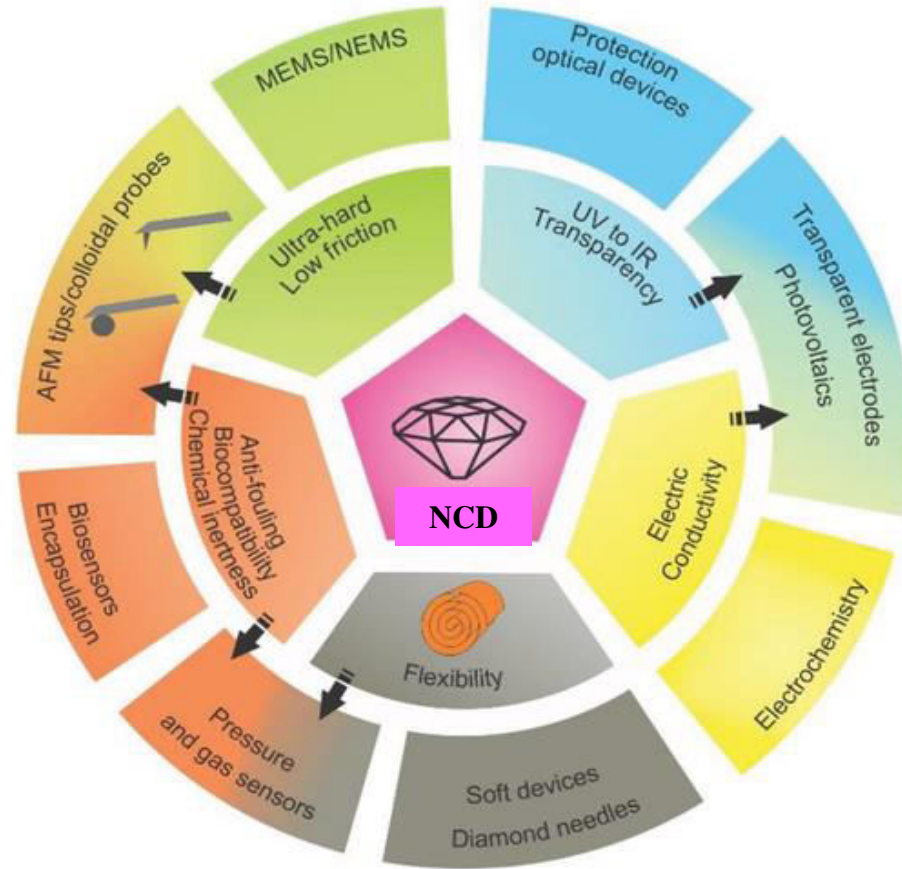


Photo-detector response under different bias voltages

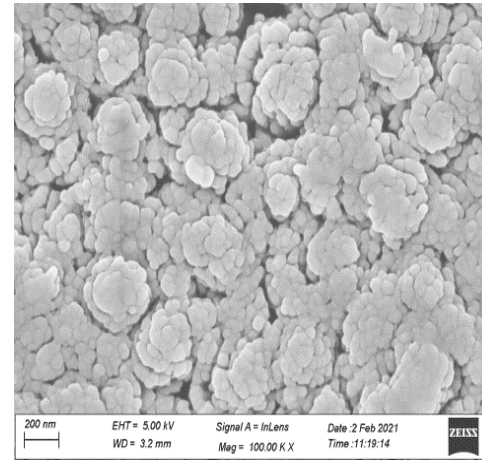


Fluorescent NV Centres in Nano-diamonds (NDs)

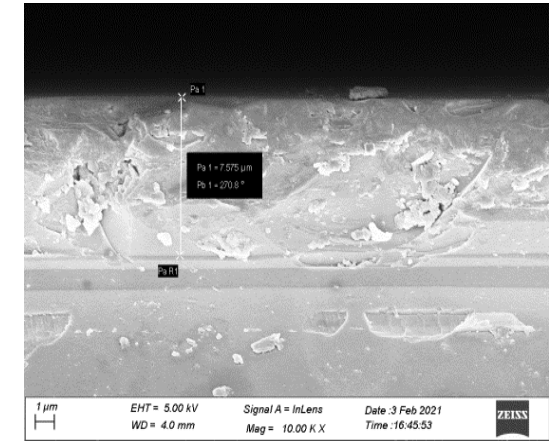
Nanocrystalline Diamond (NCD) Coatings



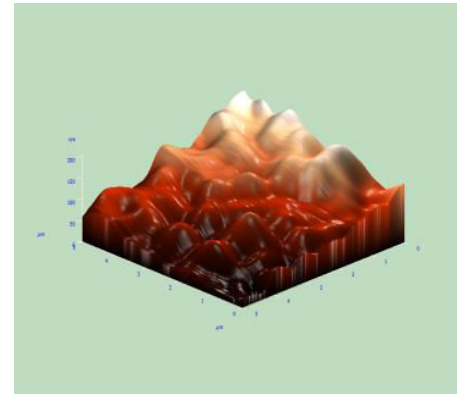
Application Areas



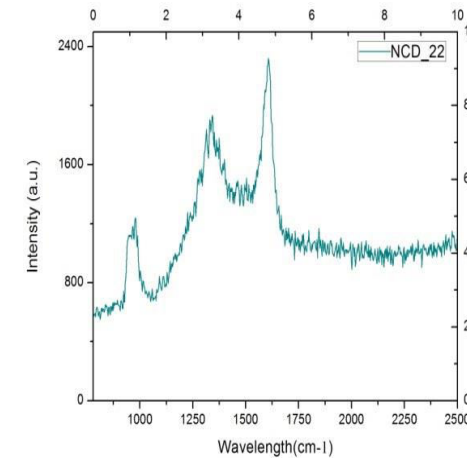
FESEM image of NCD films



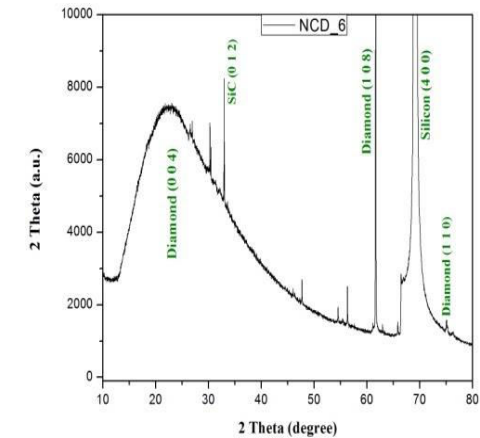
Cross-section image of NCD films



AFM image of NCD films

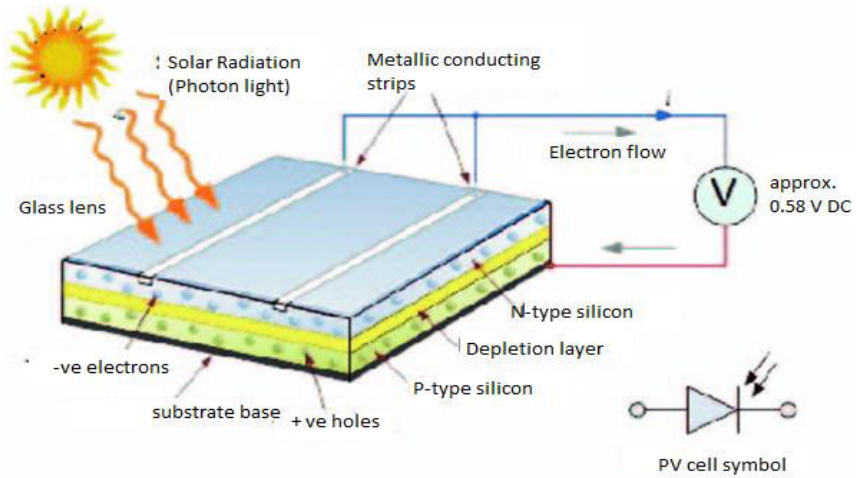


Raman Spectra of NCD films



XRD of NCD films

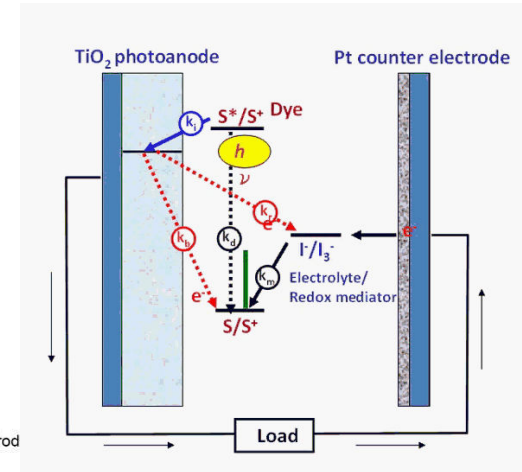
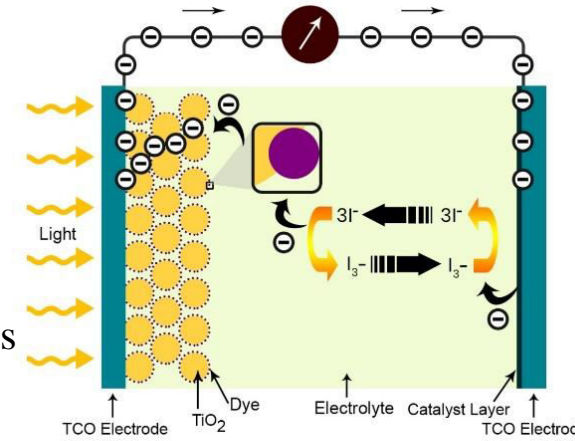
SOLAR CELL



Basic diagram of solar cell

Application Areas:

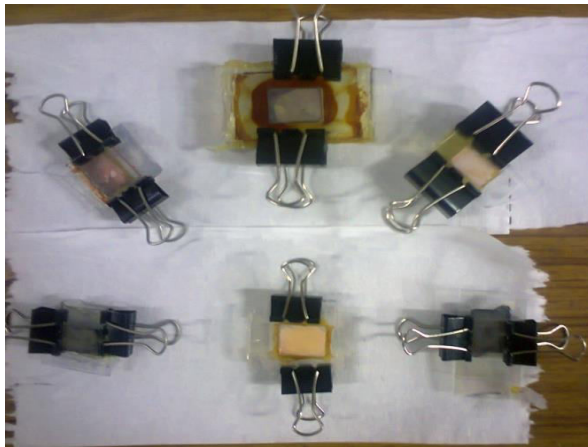
- Solar farms
- Stand-alone power
- Remote locations
- Building related needs
- Power in space
- Military uses
- Transportation



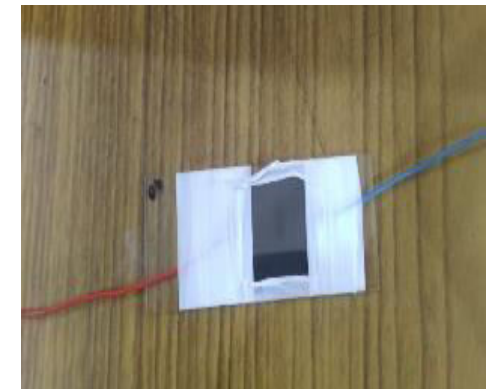
Schematic diagram and working of Dye Sensitized Solar Cell

Graphene based Solar cell

Recently we are working on graphene based solar cell which is more efficient than DSSC.

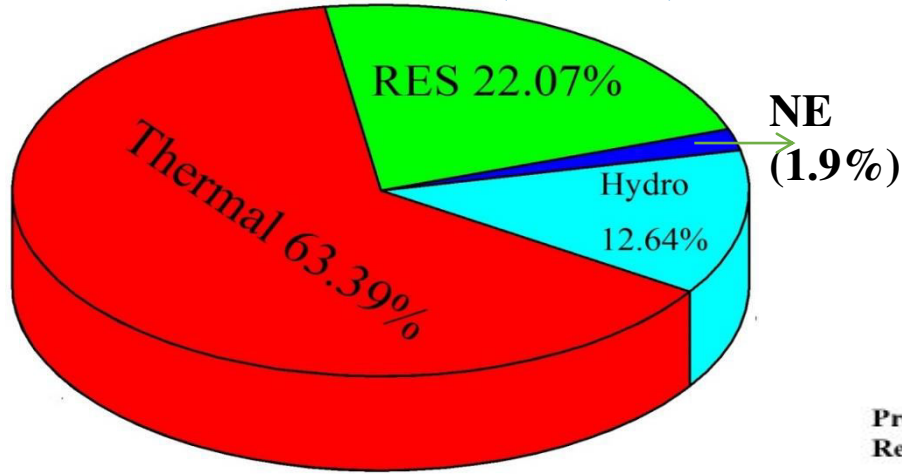


Prototype of DSSC prepared at Plasma Lab, Physics Dept.



Development of ceramic electrolyte for fuel cell applications

Mission 2022 –
50% (175 GW)



Energy Share of India (2019)

– powerministry.nic.in

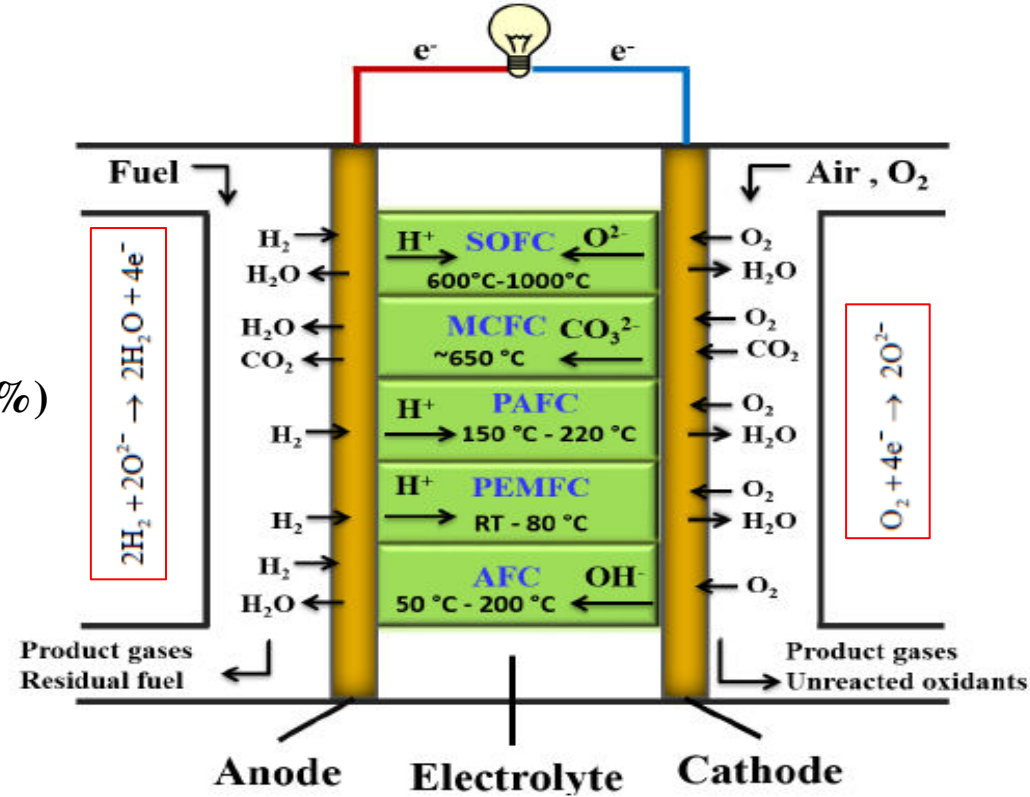


Figure 1.2: Illustration of the basic components of a fuel cell and classification of fuel cell on the basis of electrolyte.

Solid Oxide Fuel Cells (SOFC):

Molten Carbonate Fuel Cells (MCFC):

Phosphoric Acid Fuel Cells (PAFC):

Polymer Electrolyte Membrane Fuel Cell (PEMFC):

Alkali Fuel Cell (AFC)

RES (Renewable Energy Sources) include Small Hydro Project (≤ 40 kW), Solar and Wind Energy, Fuel cells, Biomass Power, Urban & Industrial Waste Power.

Significant Accomplishment of Prof. S. Keshri :

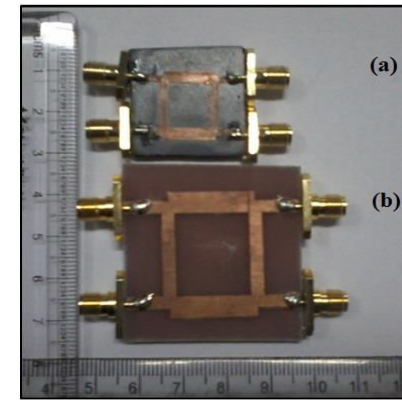
- Received *Indo-Russian (DST-RFBR) bilateral project* in 2012.
- Worked as Principal Investigator of several projects of UGC, DST etc.
- Guided six Ph. D. scholars.
- Published around fifty SCI journal papers.
- Presented invited/oral papers in different international/national Conferences
- Received Gold Medal for the position of First Class First in B.Sc. (Physics) under the University of Burdwan, W. B.

Her group has developed different Electroceramic materials, such as

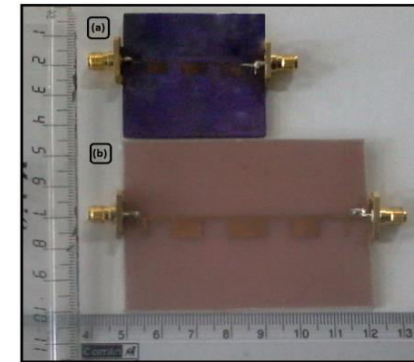
- Manganites
- Electronic Composites
- Microwave Dielectrics
- Wide bandgap semiconductors
- High temperature superconductors, etc.

Some of these materials have been used for different applications.

- Manganite nanomaterials have been tested for few biomedical applications.
- Dielectric materials have been used for designing and fabricating few special types of antennas, coupler and filter circuits working in the microwave frequency range.
- Wide bandgap semiconductors have been used for gas sensors.



Photograph of microstrip branch-line coupler, built on (a) the ceramic and (b) FR4 substrates.



Photograph of microstrip filter, built on (a) the ceramic and (b) FR4 substrates.

Faculty Name: Dr. Sanat Kr. Mukherjee
 Topic of research: Transparent Conducting Oxides

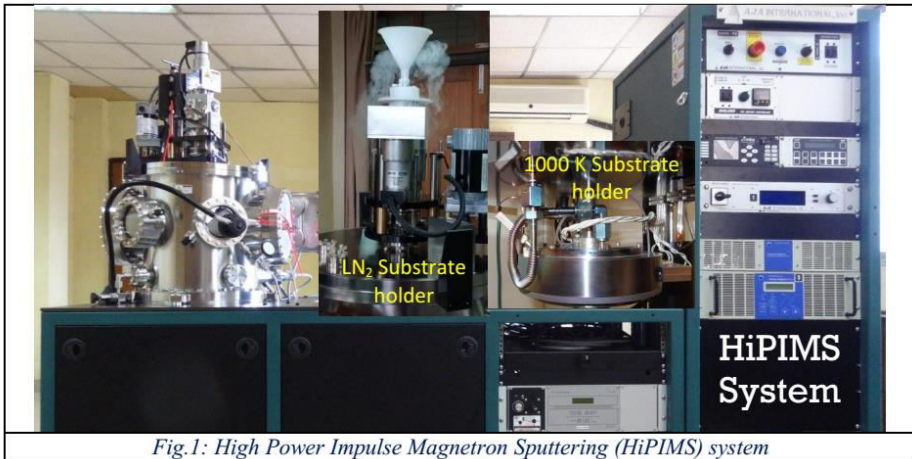


Fig.1: High Power Impulse Magnetron Sputtering (HiPIMS) system

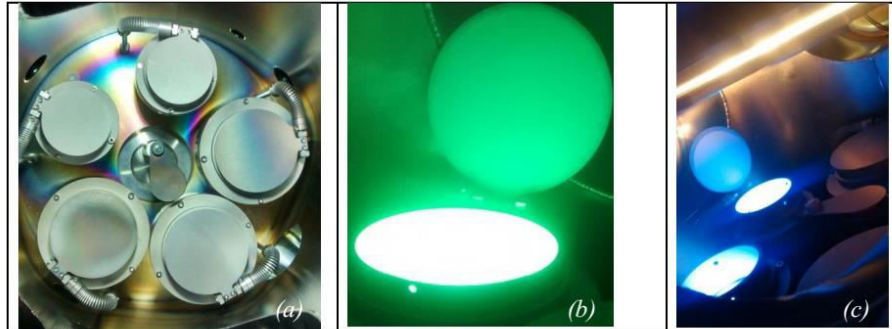
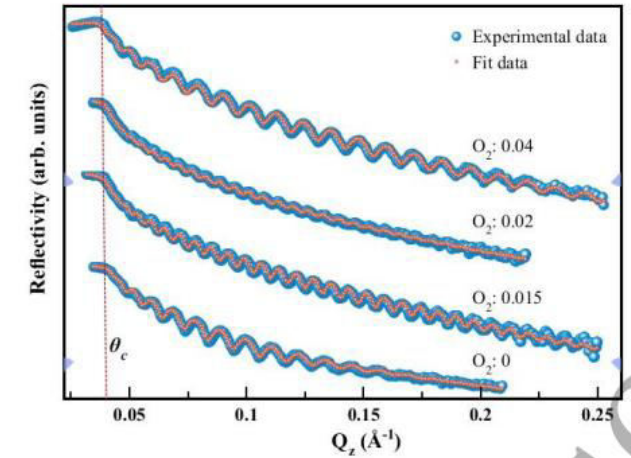
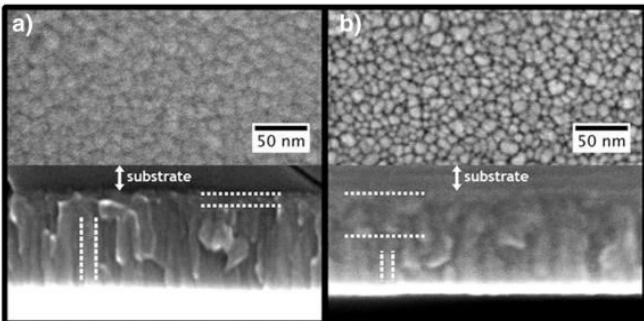


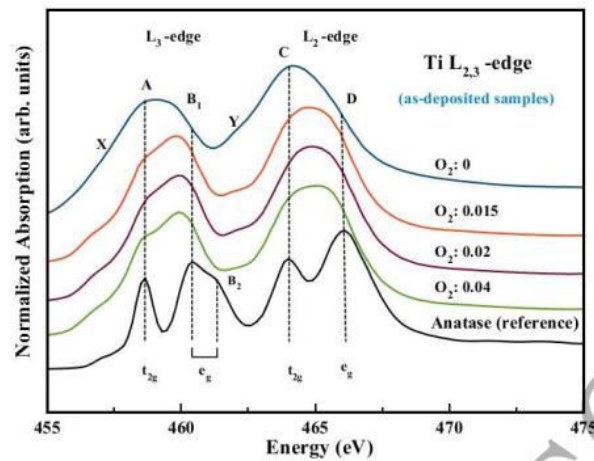
Fig.2: Distribution of magnetron sources in HiPIMS system (a), view of HiPIMS plasma while Cu is sputtered with oxygen (b) co-sputtering of Fe and Rh targets at 973 K (c).



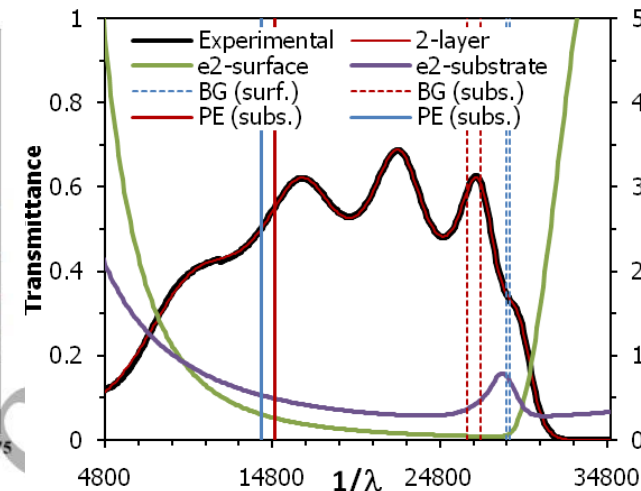
XRR of films for thickness and mass density measurements



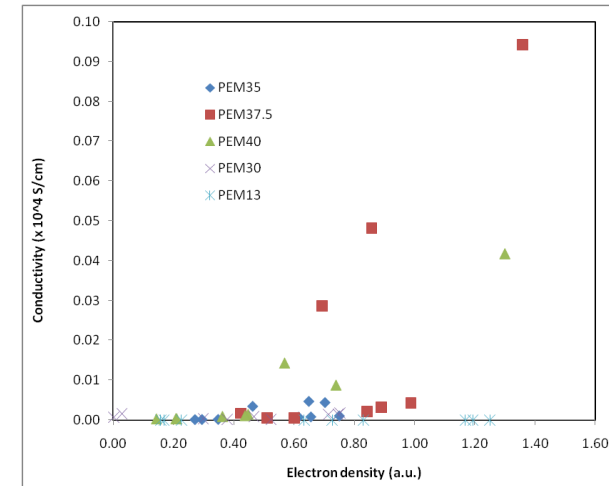
FE-SEM micrographs of Nb:TiO₂ films showing 2-layer deposition.



L_{2,3}-edge XANES spectra of Ti in as-deposited films.



Dielectric modeling for the estimation of double band-gap and plasma edge.



Variation of conductivity with electron density in Nb:TiO₂ films.

Lead free relaxors for energy harvesting and high-density capacitor applications

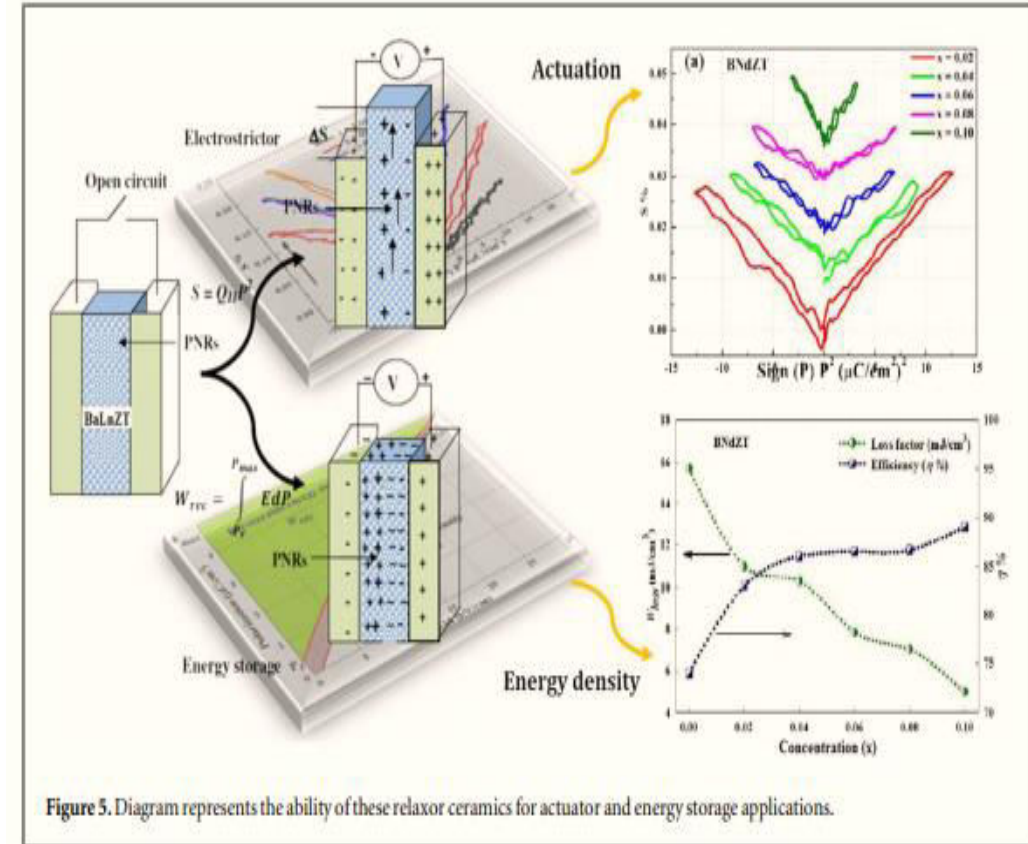
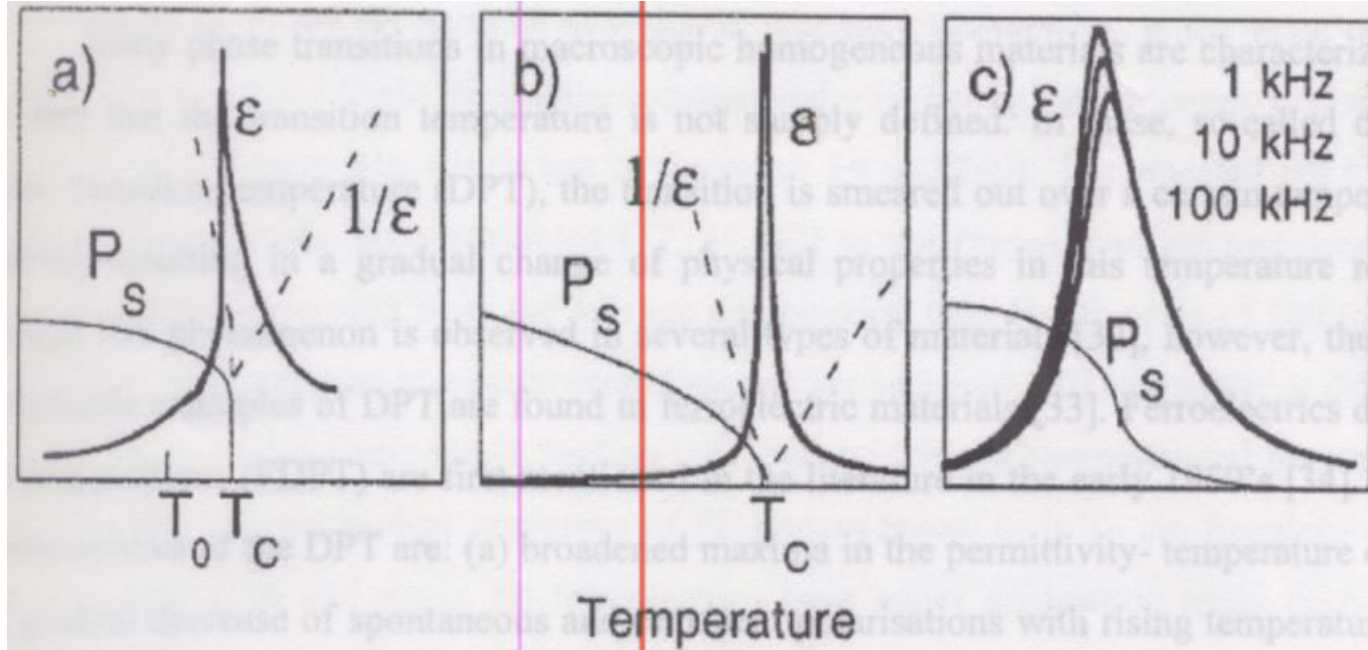
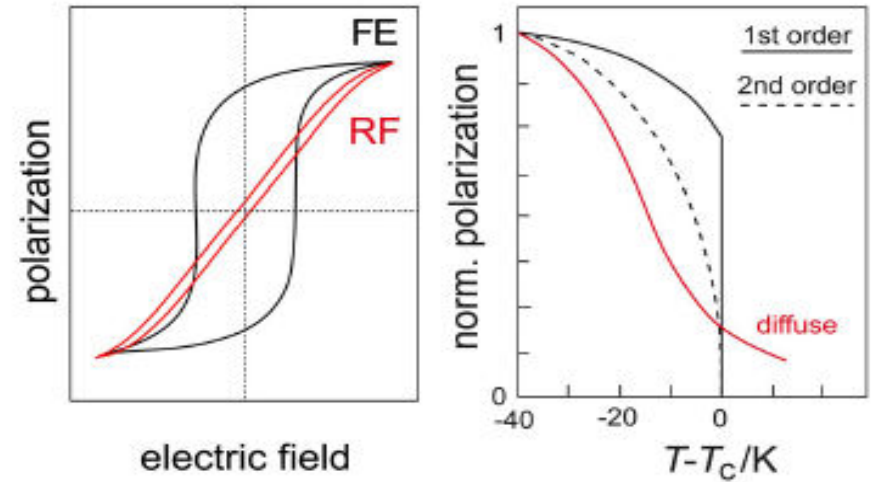
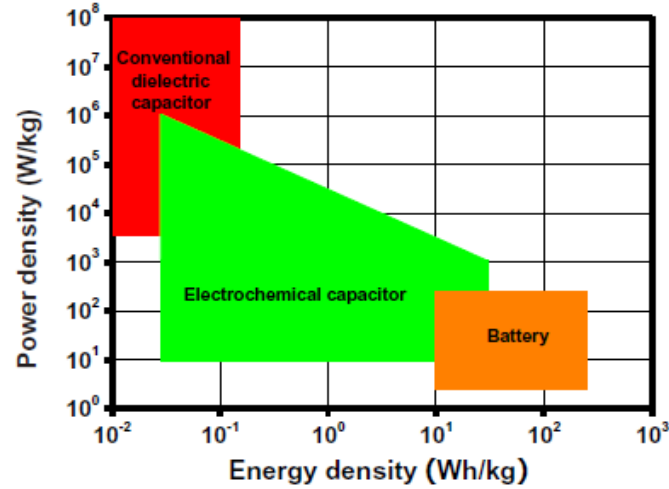
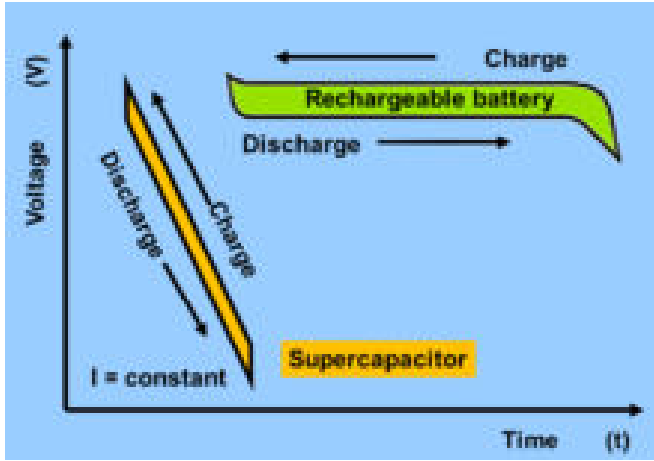
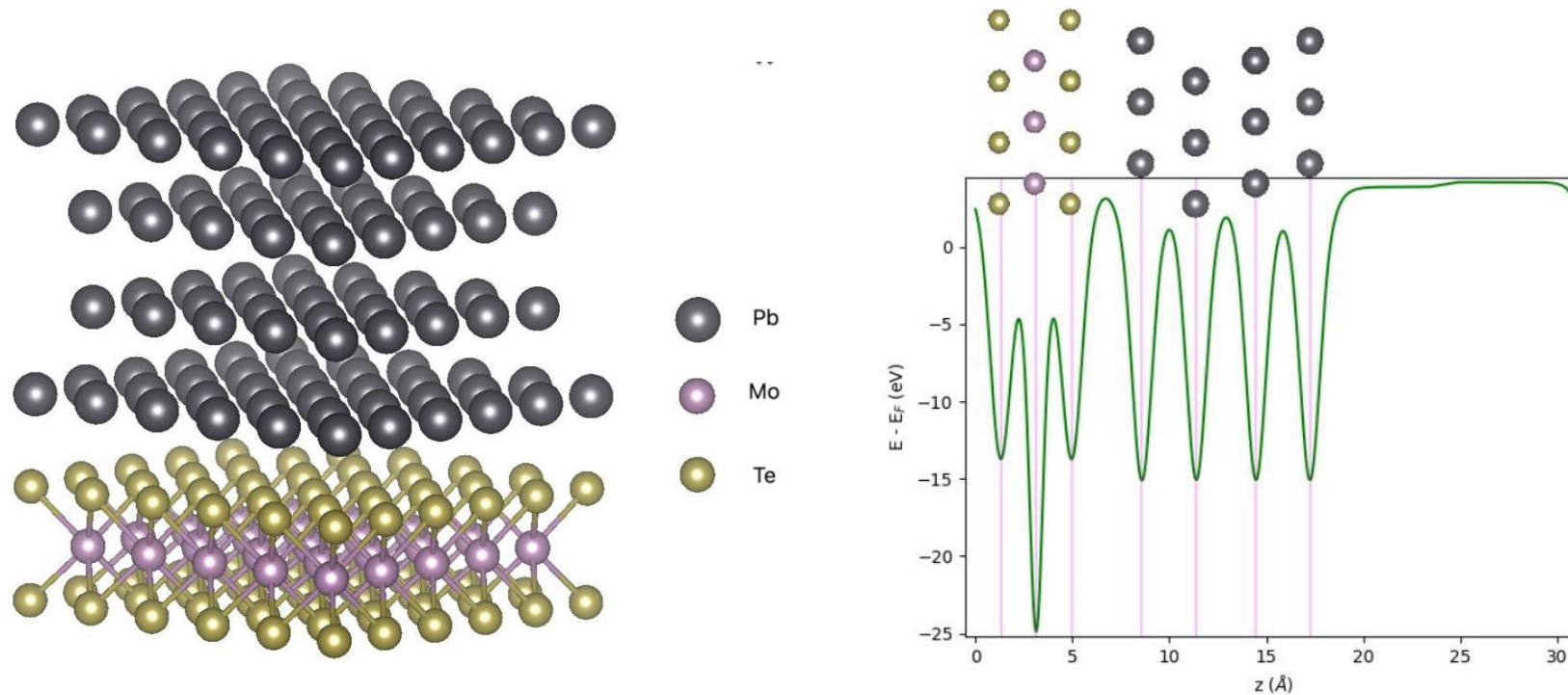


Figure 5. Diagram represents the ability of these relaxor ceramics for actuator and energy storage applications.

Faculty Name: Dr. Sourabh Barua
Designation: Assistant Professor, TEQIP
Research Topic: Metal - Transition Metal Dichalcogenides (TMDC) interfaces and
Physics Education

Analysing the Schottky barrier at Pb-monolayer 2H MoTe₂ Interface from first principles.

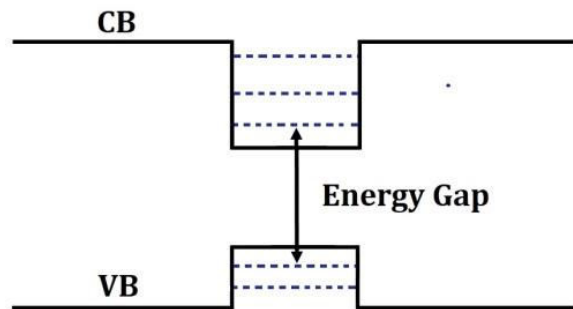
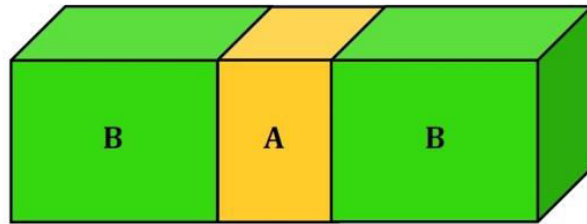


A paper on UG laboratory experiment titled “Arduino based temperature controlled sample holder using power transistor”, S. Mitra, A. Mishra and Sourabh Barua under review in European Journal of Physics.

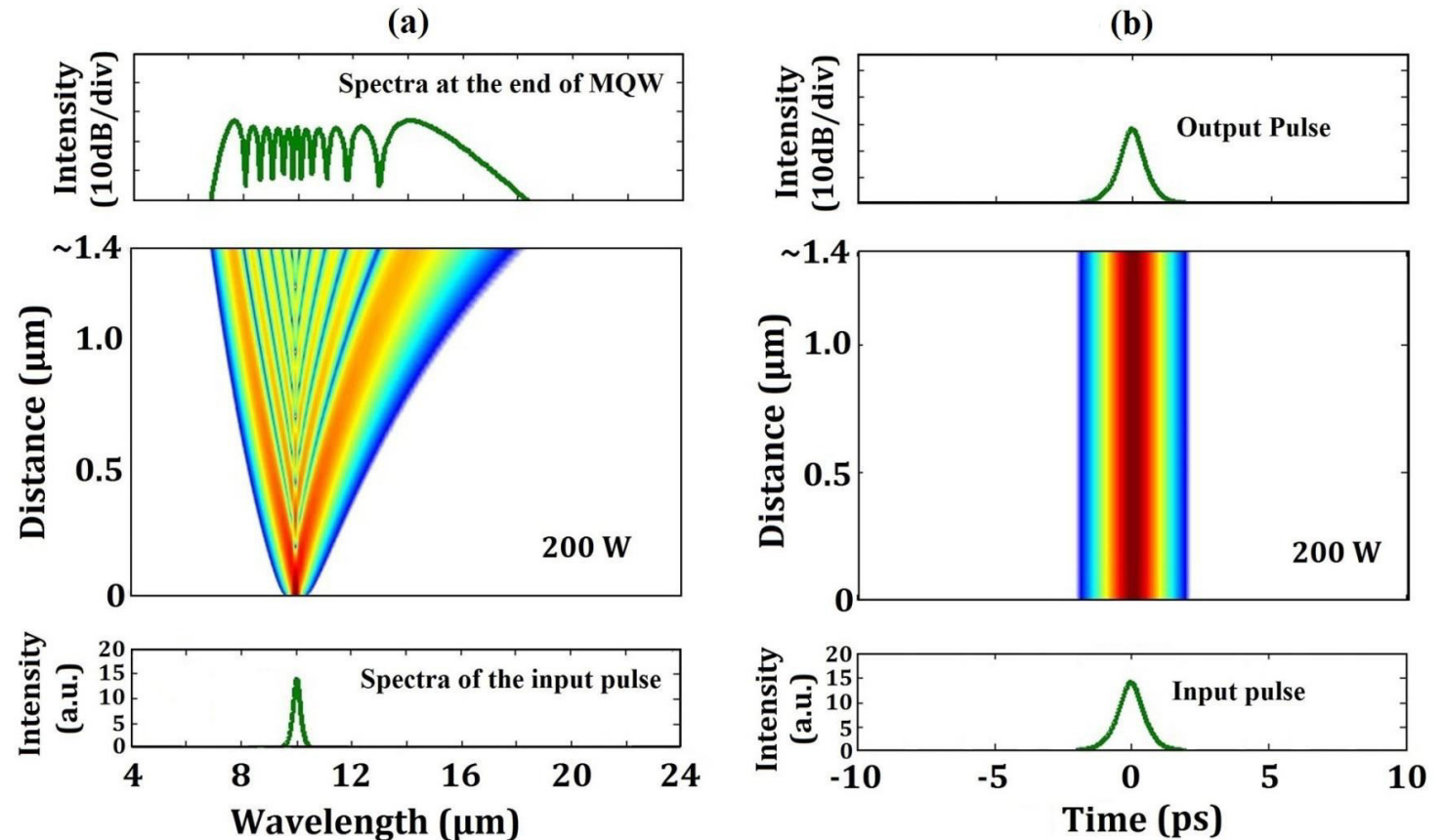
Faculty Name: Dr. Swapan Konar

Topic of research: Quantum Wells as New Supercontinuum Laser Source

Single Quantum Well



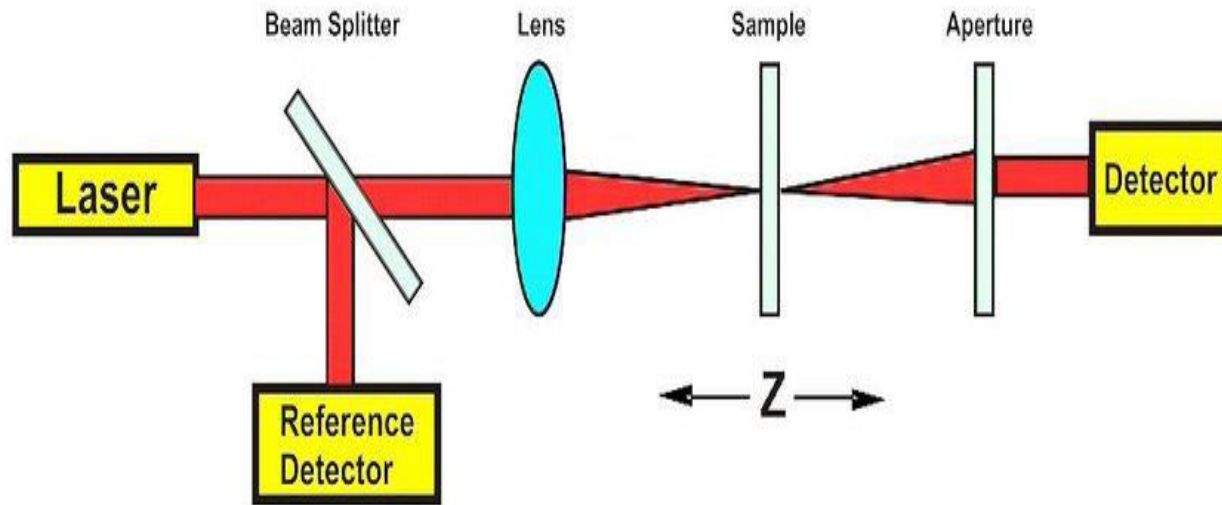
Nonlinearities in Quantum Wells are exploited to generate Optical Supercontinuum



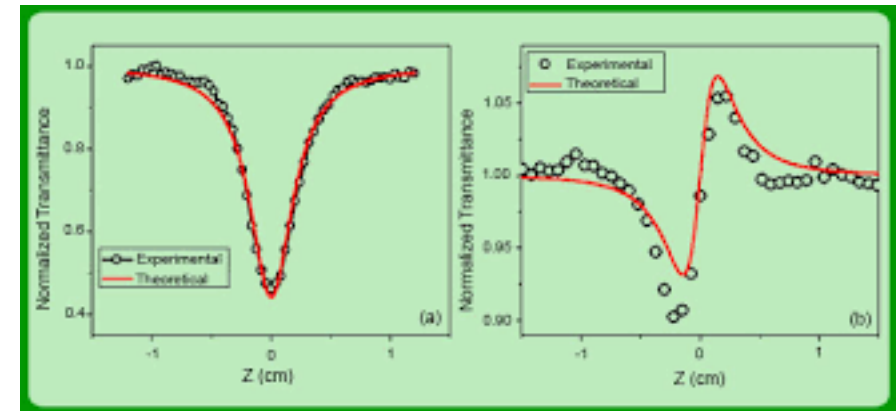
Supercontinuum generation at low input power level due to Optical nonlinearity induced SPM in Quantum Wells

Faculty Name: Dr. Kingshuk Bose

Topic of research: Non Linear optical materials and its Applications



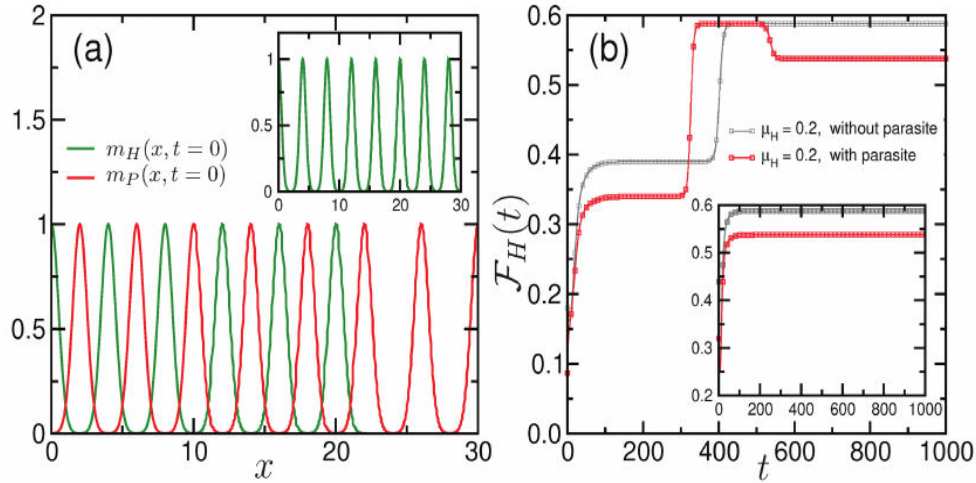
Z scan setup



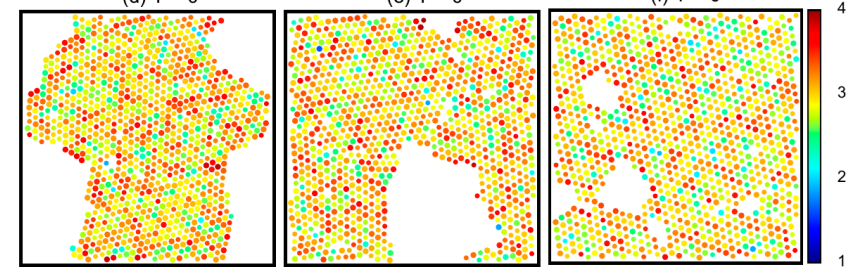
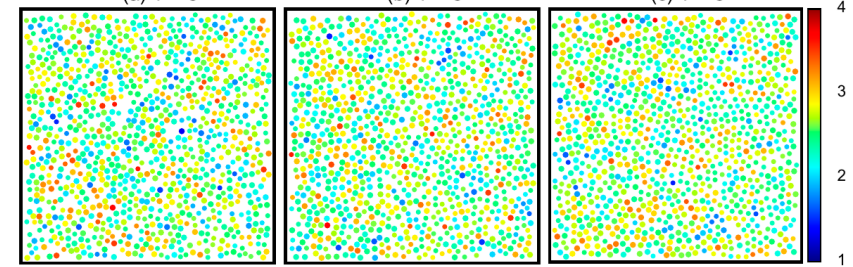
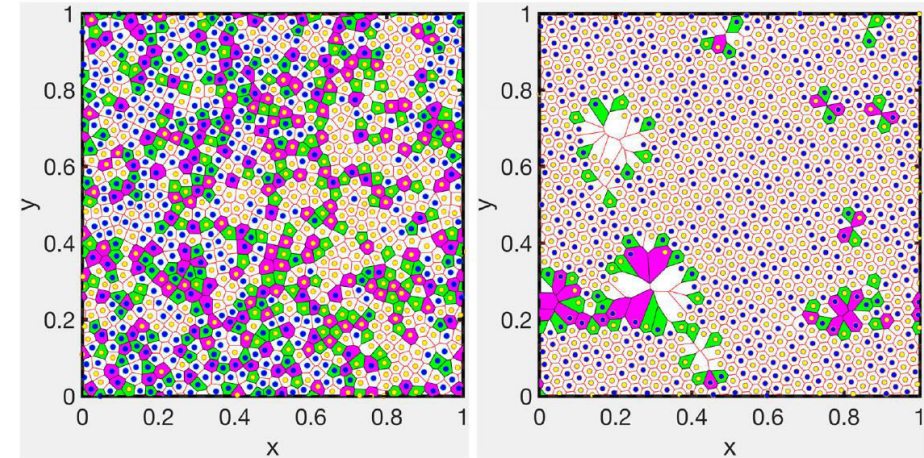
Typical z scan of a sample in open aperture and closed aperture

Faculty Name: Dr. Madhu Priya

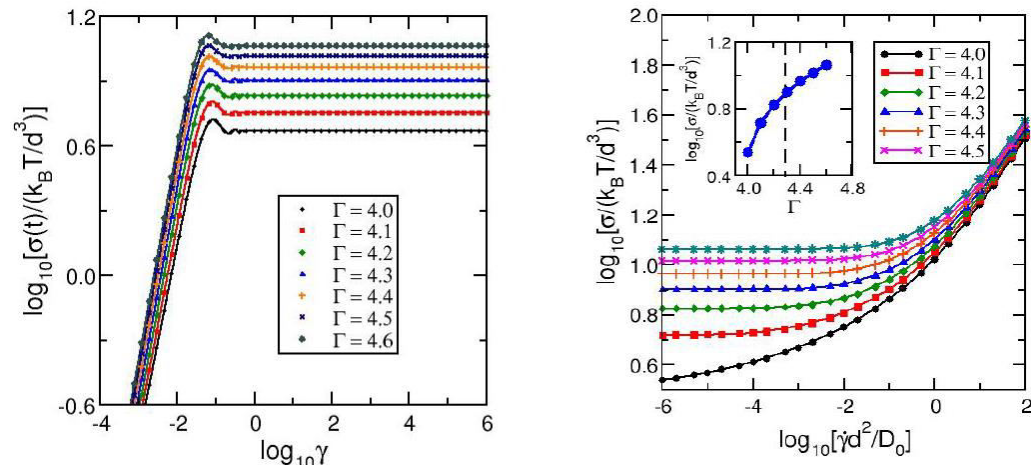
Topic of research: Structure and Dynamics of Complex Systems



A mathematical model based on diffusion-drift type equation is developed, which demonstrates faster evolution of hosts in presence of parasites.



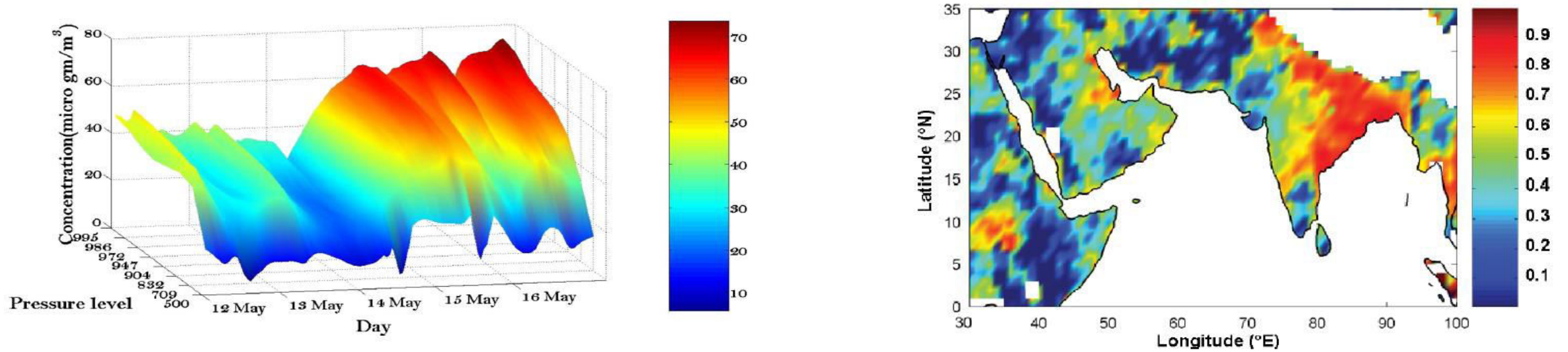
Properties of a mixture with random particle interactions are studied in the solid phase and regimes of enhanced mechanical properties were identified using molecular dynamics simulations.



Stress-strain curves and flowcurves of a model colloid-polymer mixture are obtained using mode-coupling theory

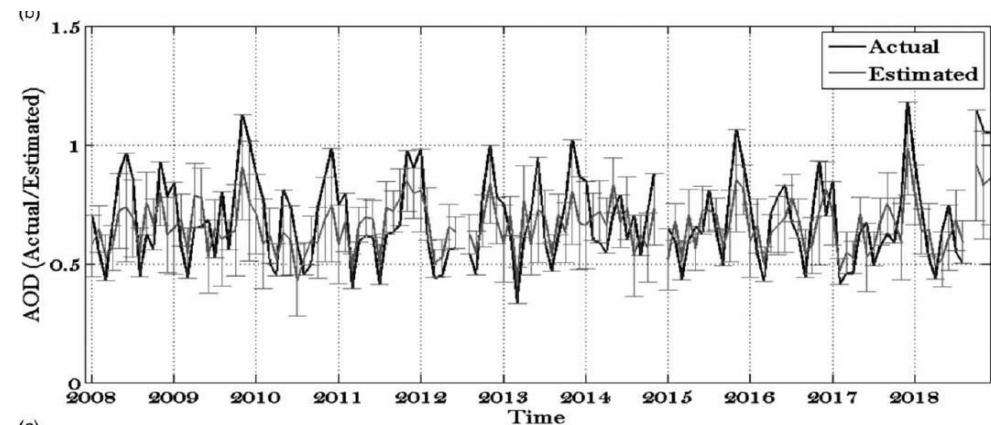
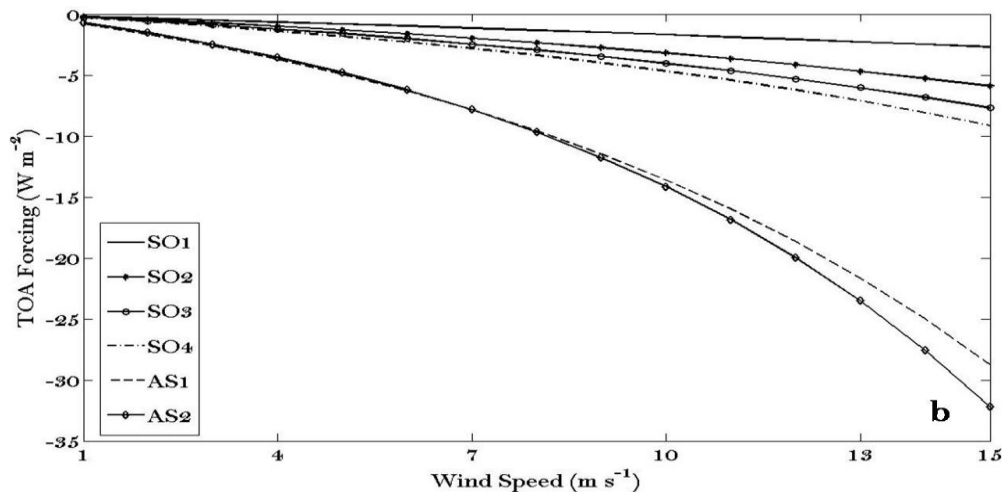
Faculty Name: Dr. Nishi Srivastava

Topic of research: Aerosol Characterization and Numerical Modeling



Simulation of Dust Storm with the help of Chemical Transport Model.

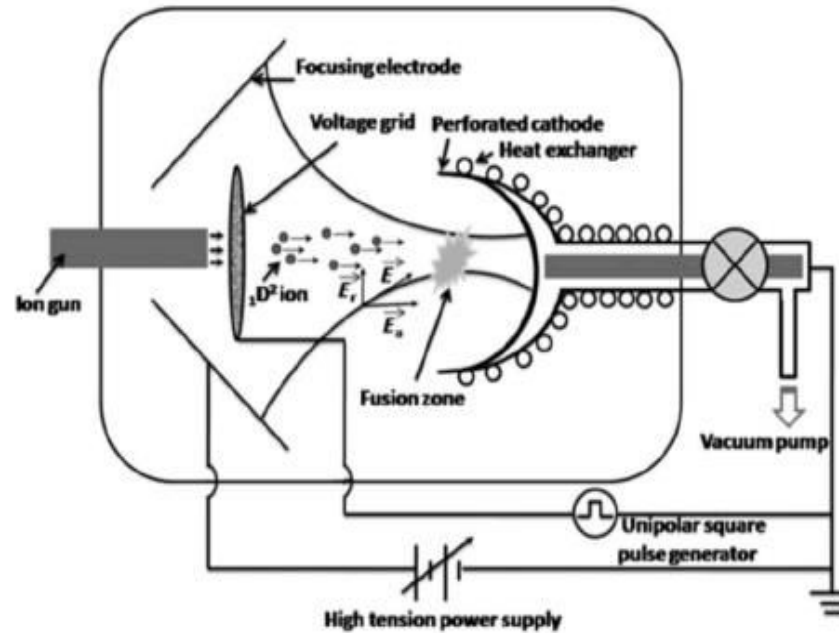
Distribution of Anthropogenic Aerosols estimated with the help of remote sensing techniques



Variation of radiative forcing in short wave range a function of wind speed at TOA

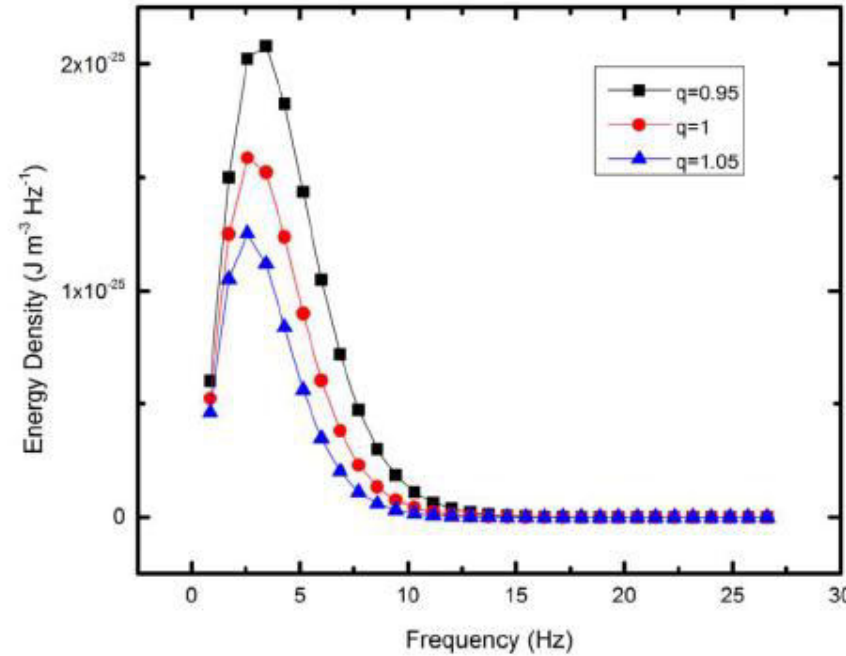
Comparison of ANN-estimated Aerosol Optical Depth with AERONET-observed Aerosol Optical Depth @ 500nm (Kanpur)

Faculty Name: Dr. Ratan Kumar Paul
 Topic of research: Fusion, Radiation and Cosmology



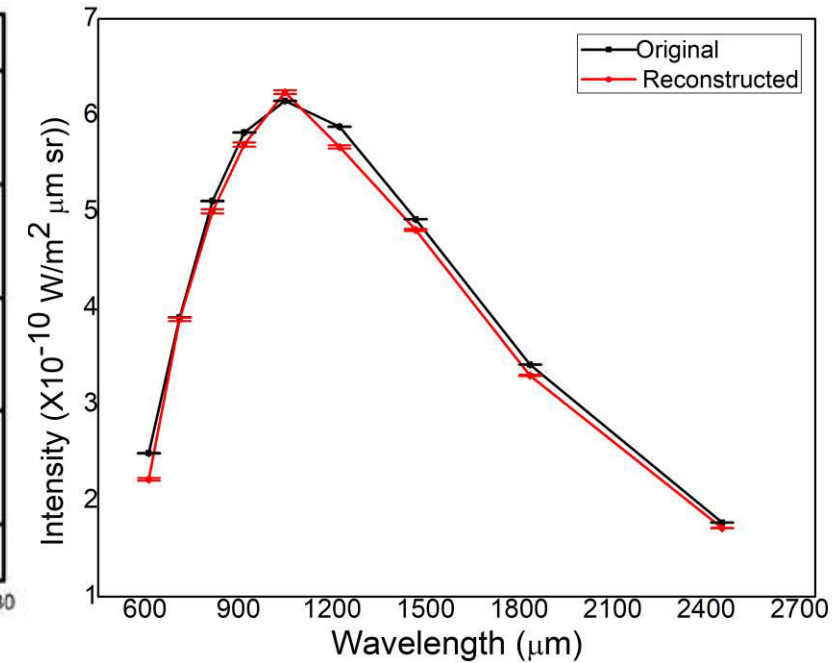
Working principle of the proposed electrostatic confinement apparatus to achieve fusion.

Journal of Plasma Physics 81.1 (2015): 1-18



Energy density versus frequency for different q (nonextensive entropic index) values at a temperature value $T = 2.725$ K

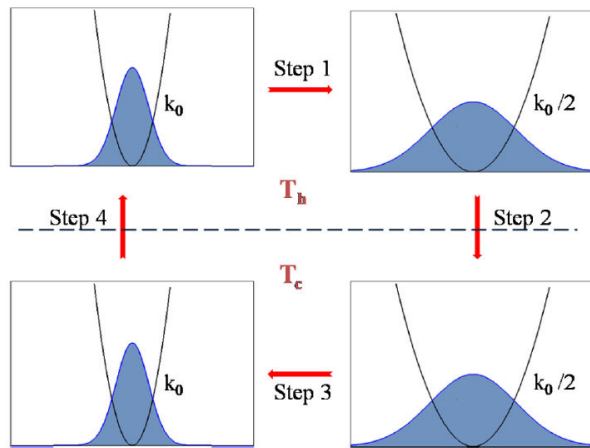
Annals of Physics 395 (2018): 317-325



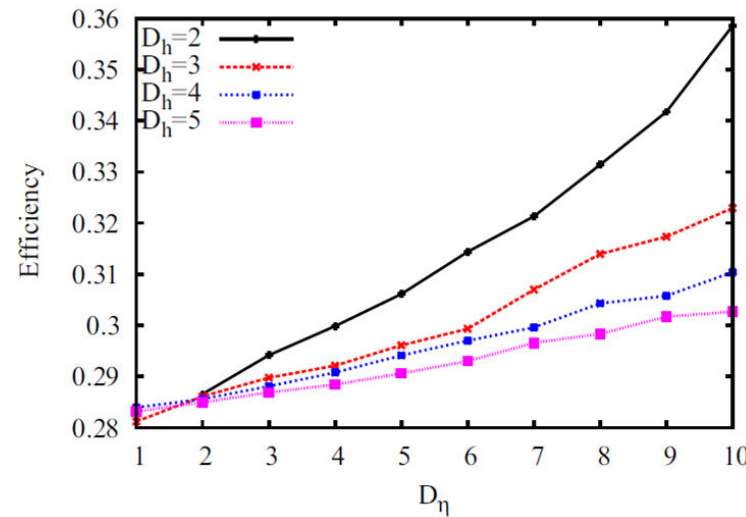
Deviation between original (COBE data) and reconstructed (using BRI) data signifies the distortion in CMB spectra.

Scientific Reports 11.1 (2021): 1-9

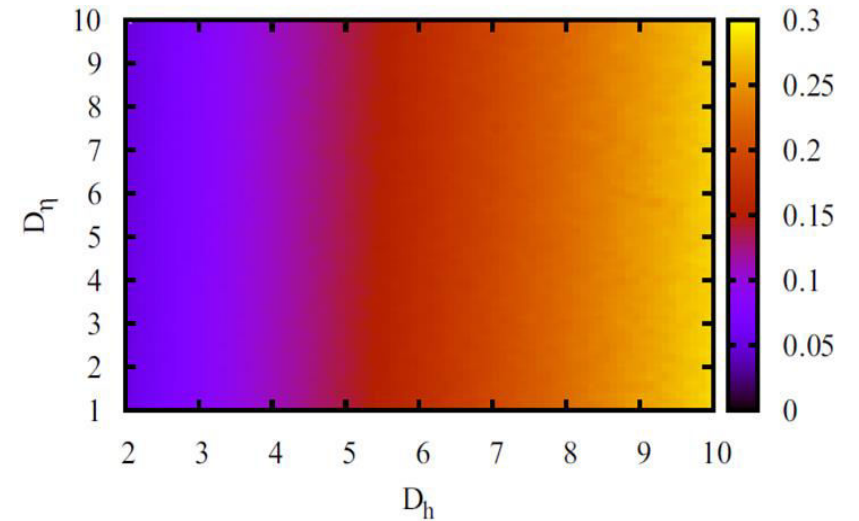
Faculty Name: Dr. Sourabh Lahiri
 Topic of research: Microscopic Engines and Refrigerators



A model for micro heat engines



Increase in efficiency with increase in activity of a self-propelling colloidal particle



Variation in Efficient Power with thermal and active drives

His group's interests lie in the thermodynamics of tiny thermal engines that are subjected to constant thermal fluctuations. They can be either classical or quantum in nature. Our recent findings show that presence of self-propulsion (ability to move by itself) among the constituent particles of the working medium leads to enhanced performance. We wish to explore quantum engines along similar lines. We are also interested in the modifications in quantum thermodynamics in presence of the so-called weak or non-destructive quantum measurements.

Fellowship / Awards received by Faculty Members

International awards / Fellowship received by Faculty Members

Name	Award/ fellowship	Year of Award	Agency
Dr. Sourabh Lahiri	Research fellowship (KIAS)	2012	Korea Institute for Advanced Study
Dr. Sourabh Lahiri	CNRS research fellowship	2014	Centre National de la Recherche Scientifique (CNRS)
Dr. Dilip K. Singh	Brain-Korea21 Post-Doc Fellowship	2010	Seoul National University, Korea (MHRD, Korea)
Dr. Madhu Priya	DLR-DAAD Postdoctoral Fellowship	2013	DLR-DAAD, Germany

National awards / Fellowship received by Faculty Members

Dr. Dilip K.Singh	DST-INSPIRE Faculty	2013	DST, Govt. of India
Dr. Madhu Priya	SERB-ECR Award	2018	DST, Govt. of India
Dr. Sourabh Lahiri	SERB-ECR Award	2018	DST, Govt. of India
Dr. Nishi Srivastava	SERB Overseas Post-Doctoral Fellowship	2016	DST, Govt. of India

Research Grants / Sponsored project received by Department (in past 05 Years)

Project title	Investigator	Funding agency	Year of Award	Funds (Lakhs)
Photonics and Opto-electronics				
Investigation on Optical Pulse and Beam propagation in Semiconductor Quantum Well and Quantum Dot Nanostructures with Emphasis to the Development of Photonic Devices	S Konar PI	DRDO, New Delhi	2018	24.60
Nanodiamonds for nanophotonics and bio-imaging applications	Dilip K. Singh	DST-Inspire Faculty award	2014	35.00
Self-similar modes of femto-second laser pulse and beam propagation in media with two or multi-photon absorption and nonlinear refraction	Dr. S. Konar (PI)	DST-RFBR	2013	14.30
Material Science / Condensed Matter Physics				
Development of High Piezoelectric Bismuth Layered Perovskites Materials for Transducer Applications	S.K.Rout (PI)	NRB New Delhi	2014	15.90
Investigation on Photoluminescence and microwave dielectric properties of some tungstates and molybdates prepared by microwave assisted solid state reaction route	S.K.Rout (PI)	DST, India	2013	24.00
Development of Bismuth Based Materials for Piezoelectric Microsystem in Robotic Applications	S.K.Rout (PI)	BRNS, Mumbai	2016	33.72
Development of environmental friendly perovskite materials for self-powered vibrational energy harvesting device applications	S.K.Rout (PI)	DST, India	2017	55.80
Facile synthesis and characterizations of magnetically modulated luminescent nanocomposites	Dr. Samrat Mukherjee Dr. P. K. Barhai	AICTE	2011	8.50
Study of physico-technological principles of preparation of new magnetic nanostructures for multifunctional biomedical applications	Dr. S Keshri (PI), Dr. Swastika Ganguly (CI)	DST-RFBR	2013	9.00
Study of spin injection and spin dynamics in semiconductors for spintronic applications	Dr. Samrat Mukherjee	CSIR	2013	9.41
Effect of rare earth elements on structural, dielectric and optical properties of BaZrO ₃	Dr. Ela Sinha	DST	2013	20.00
Studies on microwave dielectric ceramics and their device applications.	Dr. Sunita Keshri	SERB, DST (India)	2013	31.72

Research Grants / Sponsored project received by Department (In past 05 years) -...page2

Project title	Investigator	Funding agency	Year of Award	Funds (Lakhs)
Plasma Physics				
In-situ spectroscopic investigation of growth mechanism of nitride shape mercury alloy (SMA) thin films & its correlation with mech. tribological chemical & biological relativity	Dr. I. Banerjee (PI)	DST	2014	22.10
Diagnosis of Plasmas in ECR ion source	Dr. S. K. Mahapatra(PI) Dr.I.Banerjee(Co-PI)	DST	2016	50.00
Opto-electronic Materials and Devices				
Development of Mesoscopic Solid State Solar Cells	Dr. S. K. Mahapatra(PI) Dr.I.Banerjee(Co-PI)	BRNS	2016	28.59
Development and characterization of doped TiO as transparent conducting oxides using high power impulse magnetron sputtering (HiPIMS)	Dr. Sanat K. Mukherjee	UGC- DAE, Indore	2014	10.38
TEQIP Collaborative Research Scheme	Dr. Sourabh Barua	NPIU-MHRD	2019	19.08
TEQIP Collaborative Research Scheme	Dr. Dilip Kumar Singh	NPIU-MHRD	2019	13.69
Bio-materials and Bio-Physics				
Transferred Arc Plasma Modelling & Synthesis of Iron Oxide Nanoparticles for Biomedical Applications	Dr.I.Banerjee(PI) Dr. S. K. Mahapatra(Co-PI)		2015	24.23
Impact of Meteorological model grid and parameter change in a Chemical Transport Model in terms of aerosols concentration and distribution, Fast Track Project	Dr. Nishi Srivastava	DST-SERB	2013	20.5
Theoretical Physics (Statistical Physics)				
Study of Stochastic Heat Engines using Active Particles	S. Lahiri (PI)	SERB, DST (India)	2018	21.49
Nonlinear Rheology of Dense Colloidal Suspensions	Madhu Priya (PI)	SERB, DST (India)	2018	22.45
Total Funded project cost (05 Years)				5.46 Crore

**List of equipments available and functional
(Cost Rs. 5 lakhs and above).**

Plasma Laboratory-I

Name of the Equipment, Make and Model	Year of Purchase	Funding Agency
Raman Spectrometer (Wavelength: 514 & 785 nm , Make: Renishaw, UK)	2012	FIST-II
FERROELECTRIC LOOP TRACER, Model Number: Precision Premier II Ferroelectric Test System (Make: M/S. Radiant Technologies Inc)	2011	FIST-II
NanoIndenter & NanoTribometer, (Make: Center for Tribology, Inc. USA.)	2011	FIST-II
3 Target RF Magnetron Sputter coating unit (Plasma Consult, Germany)	2007	TEQIP-I
Magnet (2 Tesla)	2009	UGC
Cryostat Setup	2006	Institute Fund + UGC
Anodic Vacuum Arc Plasma Coating Unit	1998	ISRO
Nd: YAG laser	2007	TEQIP-I
Atmospheric Pressure Plasma Jet (Fabricated by Techno Instruments)	2013	BRNS

Contd..

Plasma Laboratory-II

Name of the Equipment	Year of Purchase	Funding Agency
Plasma Nitriding System (Make: Milman)	2007	TEQIP-I
DC-PECVD system	2007	Fabricated
Thermal CVD System (Technos, Instruments, Jaipur)	2012	UGC-SAP
Microwave PECVD system; (Make: Vacuum Technique Pvt. Ltd. Bangalore)	2010	DST Project
RF-PECVD (Make: Advanced Process Technology, Pune)	2007	TEQIP
RF/DC Magnetron Co- sputter system (Make: Vacuum Technique Pvt. Ltd. Bangalore)	2007	FIST-I
Polishing Setup (Make: Aimil)	2013	TEQIP-II

Furnace Lab

Name of the Equipment, Make and Model	Year of Purchase	Funding Agency
High Temperature Tube Furnace (Make: Baisak)	2013	Institute Fund
Planetary Ball Milling Unit	2010	DST
High Temperature Box Furnace (Make: Baisak)	2008	UGC
High Temperature Box Furnace (Make: Baisak)	2009	TEQIP

Student progression to higher education, Dept. of Physics

Name of students enrolling into higher education	Year of Admission	Duration	Program graduated from	Department graduated from	Name of institution joined	Name of programme admitted to
Shailendra Singh Rajput PHD/57/09	2009	2009-2014	PHD	Physics	Xi'an Jiaotong University, China Department of Electrical and Electronics Engineering, Ariel University, Israel	Post Doctoral Fellowship (2015-2017) Post Doctoral Fellowship (2017 to till date)
Aviral Prakash IPH/10002/13	2013	2013-2017	IMSc	Physics	PennStateEberly College of Science	PHD
BishupadaBehera IPH/10001/13	2013	2013-2017	IMSc	Physics	University of Calgary, Canada	PHD
ShivangSrivatatava IPH/10014/13	2013	2013-2017	IMSc	Physics	Slovakian Academy of Sciences, Czech Republic	PHD
Sarvottam Singhl PH/10019/13	2013	2013-2017	IMSc	Physics	IISER, Pune	IPHD
StavHaldar IPH/10005/13	2013	2013-2017	IMSc	Physics	HRI, Allahabad	IPHD
Soham Chatterjee IPH/10012/13	2013	2013-2017	IMSc	Physics	BITS, Pilani	PHD
Mayank Mishra IPH/10018/13	2013	2013-2017	IMSc	Physics	BYJUSJhink N Learn	PHD
Khushboo Singh MT/NSNT/10007/13	2013	2013-2015	MTech (NST)	Physics	IIT Delhi	PHD

Unmesha RayMT.NSNT/10002/13	2013	2013-2015	MTech (NST)	Physics	IIT Kharagpur	PHD
Joydip Dutta SAP/10005/13	2013	2013-2015	MSc	Applied Physics	IIT (ISM) Dhanbad	PHD
Gaurav Mukherjee IPH/10018/14	2014	2014-2018	IMSc	Physics	IIT, Bombay	MSc
Pratish Tiwari IPH/10014/14	2014	2014-2018	IMSc	Physics	SPUP Jodhpur	MSc. Criminology
SreejaLoha Choudhury SAP/10003/15	2015	2015-2017	MSc	Physics	International Max Plank Research School	PHD
Rishabh Mishra SAP/10002/15	2015	2015-2017	MSc	Physics	Swinburne University of Technology, Australia	PHD
Arpana Singh SAP/10007/15	2015	2015-2017	MSc	Physics	Australia	PHD
Surabhi Sharma SAP/10005/15	2015	2015-2017	MSc	Physics	Australia	PHD
Yagnik Chatterjeel PH/10003/15	2015	2015-2019	IMSc	Physics	NIT, Rourkela	MSc
Yatharth C. Bhasin IPH/10033/15	2015	2015-2019	IMSc	Physics	IIT Indore	MSc
Akshay Kumar IPH/10022/15	2015	2015-2019	IMSc	Physics	NIT Surathkal	MSc
Preetam RajGayari IPH/10004/15	2015	2015-2019	IMSc	Physics	IIT Guwahati	MSc

A NawafIPH/10008/15	2015	2015-2019	IMSc	Physics	IIT Bombay	IPHD, Energy Sciences
Sanidhya Sinha IPH/10021/15	2015	2015-2019	IMSc	Physics	IISER Thiruvananthapuram	PHD
Sukanya Shukla IPH/10006/16	2016	2016-2020	IMSc.	Physics	LSE, London	MSc Philosophy of Science
Krishna Kumar IPH/10013/16	2016	2016-2020	MSc	Physics	JNU Delhi	MSc
Sumit Kumar Yadav IPH/10032/17	2017	2017-2021	IMSc	Physics	FMS BHU	MBA
Preet Mishra SAP/10012/17	2017	2017-2019	MSc	Physics	JNU, SCIS	PhD
Pawan Kumar Dubey SAP/10008/17	2017	2017-2019	MSc	Physics	Ariel University, Israel	PhD

Collaborations

Prof. S. Konar

1. DrZlatkoJovanoski
School of Physical, Environmental and Mathematical Sciences
Northcott Drive, Campbell ACT 2600 UNSW@ADFA Australia
2. Dr. V. A. Trofimov, Professor, Chair of Computational Methods, Faculty of Computational Mathematics and Cybernetics, Lomonosov Moscow State University, Vorobyovy Gory, Moscow 119992, Russia

Prof. S. Keshri

1. Prof. A. S. Kamzin, Russian Academy of Sciences, Ioffe Physical Technical Institute, St. Petersburg, Russia.
2. Prof. N. Perov, Moscow State University, Russia
3. Prof. A. K. Yahya, University Technology of Mara, Malaysia.
4. Prof. Jan Petzelt, Institute of Physics, Acad. Sci. Czech Rep., Na Slovance 2, Czech Republic.
5. Dr. Piotr Wisniewski, Magnetic Research Division, Institute of Low Temperature & Structure Research, Polish Academy of Sciences, Poland.
6. Dr. V. F. Kraidenov of the Institute of High Pressure Physics of Russian Academy of Sciences, Troitsk, Moscow.

Dr. S. Barua

1. Superconductivity and Magnetism Group, Warwick University, Coventry CV4 7AL United Kingdom.

Prof. S. Keshri

UGC-DAE Consortium for Scientific Research, Kolkata & Indore; IUAC, New Delhi; etc.

Dr. S. K. Sinha

1. IUAC New Delhi
2. IGCAR Kalpakkam
3. Mumbai University
4. IOP Bhuvneshwar
5. IUC Indore

Dr. S. Barua

1. Dr. Aveek Bid, IISc Bangalore
2. Dr. L. N. Tripathi, VIT Vellore

Dr. M. Priya

1. Prabhat Kumar Jaiswal, Assistant Professor, Department of Physics, Indian Institute of Technology Jodhpur, Karwar 342037, Rajasthan, India.
2. Manish Dev Shrimali, Professor, Department of Physics, Central University of Rajasthan, NH-8, Bandar Sindri, Ajmer 305817, Rajasthan, India.
3. Sanjay Puri, Professor, School of Physical Sciences, Jawaharlal Nehru University, New Delhi, Delhi 110067, India.

Ph.D. Produced

Degree Awarded: 07 Perusing :23

Future Dimensions of growth

Micro & Nano Fabrication laboratory



Multi-target E-beam evaporation system

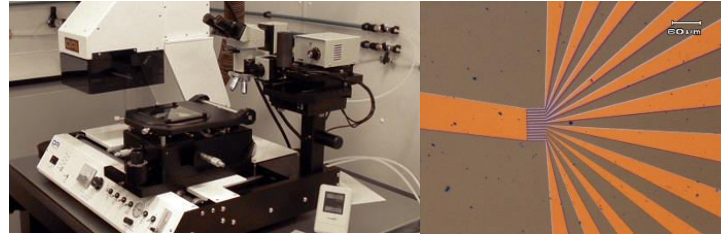
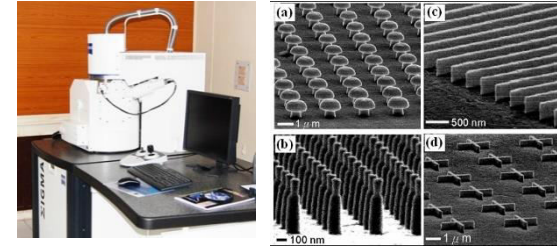
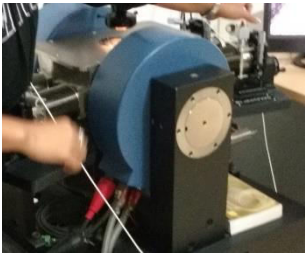


Photo-Lithography
(Optical Mask Aligner and metallization)



Electron-beam Lithography
(up-gradation of existing FESEM)

Development of Electronic and Opto-electronic / Device Characterization Facility



I-V and Mobility measurement system



Opto-electronic property measurement system

Energy Harvesting Material and Devices Laboratory

Future Dimensions of growth

- **Emphasis on Inter-departmental collaboration works and projects.**
- **Increasing participation of under-graduates in research actives.**
- **Bilateral project participation.**
- **Expanding activities in the area of Photonics, Nuclear and particle physics, Computational physics, Bio-physics, Cosmology and Astro-physics.**
- **Inclusions of training and teaching programs of Data science, Machine learning, Artificial intelligence in Core-Physics papers and research works.**
- **Increasing students participation and accessibility to laboratory beyond scheduled classes**
- **Student and faculty presentation series.**
- **Strengthening further actives in the area of Material science and Condensed matter physics for high-impact publications and international projects.**

Last 5 Years Important publications (2016-2021)

1. Tribhuwan Kishore Mishra, A Kumar and **S.K.Sinha**, Experimental investigation and study of HVOF sprayed WC-12Co, WC-10Co-4Cr and Cr₃C₂-25NiCr coating on its sliding wear behaviour, **International Journal of Refractory Metals and Hard Materials**, Volume 94, January 2021, 105404 (Impact Factor:3.407)
2. T. K. Mishra, A. Kumar, **S. K. Sinha**, Sliding Wear Behavior of Thermally Sprayed WC-20Cr₃C₂-7Ni and La₂O₃ Composite Coatings, Emerging Materials Research Volume 10 Issue 2, June2021, pp. 1-9, ISSN 2046-0147 | E-ISSN 2046-0155
3. Rohit Mukherjee, **S. Konar** , and Puspashree Mishra "Phase-sensitive modulation instability in asymmetric coupled quantum wells" **PHYSICAL REVIEW A 103, 033517 (2021)** (Impact Factor: 3.140)
4. Vikash Kumar, Neha Singh, Soumita Jana, **Sanjeeb Kumar Rout**, Ratan Kumar Dey, Gajendra Prasad Singh, Surface polar charge induced Ni loaded CdS heterostructure nanorod for efficient photo-catalytic hydrogen evolution, **International Journal of Hydrogen Energy** 46 (30), (2021),16373-16386. (Impact Factor: 4.939)
5. Khusboo Agrawal, Banarji Behera, S.C. Sahoo, **S.K. Rout**, Ashok Kumar, Piyush R. Das , Mn doped multiferroic in Ga_{0.97}Nd_{0.03}FeO₃ electroceramics, , **Journal of Magnetism and Magnetic Materials**, 536 (2021) 168121. (Impact Factor: 2.993)
6. Arpita Singha, Swetapadma Praharaj, **Sanjeeb Kumar Rout**, Rolly Verma, Dibyaranjan Rout, Electric Field and Temperature Induced Abnormal Phase Transitions in 0.78Na_{0.5}Bi_{0.5}TiO₃-0.2SrTiO₃-0.02K_{0.5}Na_{0.5}NbO₃ Lead Free Ceramic Materials **Research Bulletin, Materials Research Bulletin**, (142),(2021), 111407(Impact Factor: 4.58 in yr 2020)
7. Sameer Kumar Tiwari, Anterdipan Singh, Pritam Yadav, Bibek Kumar Sonu, Rolly Verma, **S. K. Rout**, **Ela Sinha**, Structural and dielectric properties of Cu-doped α-ZnMoO₄ ceramic system for enhanced green light emission and potential microwave applications, , **Journal of Materials Science: Materials in Electronics**, 32, (2021), 12881–12889. . (Impact Factor: 2.195)
8. Konar, K., **Bose, K. & Paul, R.K.** Revisiting cosmic microwave background radiation using blackbody radiation inversion. **Sci Rep 11, 1008 (2021)**. . (Impact Factor: 4.379)
9. BK Sonu, **E. Sinha**, Structural, thermal stability and electrical conductivity of zirconium substituted barium cerate ceramics, **Journal of Alloys and Compounds 860, 158471 (2021)**. (Impact Factor: 4.650)
10. Mritunjoy Prasad Ghosh, Subhadeep Datta, **Rishi Sharma**, Kamar Tanbir, Manoranjan Kar, Samrat Mukherjee, Copper doped nickel ferrite nanoparticles: Jahn-Teller distortion and its effect on microstructural, magnetic and electronic properties, **Materials Science & Engineering B, Vol 263 (2021) 114864**. (Impact Factor: 5.88)
11. Rohit Mukherjee and **S. Konar**; Parity-Time Symmetry and Asymmetric Diffraction of Light in four-level Triple Quantum Wells; **Journal of Optics 22, 105402 (2020)** (Impact Factor: 2.379).
12. Rohit Mukherjee, **S. Konar**; Effect of quintic nonlinearity on self-phase modulation and modulation instability in multiple coupled quantum wells under electromagnetically induced transparency; **Results in Physics 17, 103090 (2020)** (Impact Factor: 4.019).
13. Sonali Biswas, and **Sunita Keshri**, Large magnetocaloric effect near room temperature in La_{0.67}(Sr,K/Pb)_{0.33}MnO₃ manganite nanomaterials, Journal of Materials science: Materials Electronics (Springer Publication), 31, 2020, 21896–21912(Impact Factor: 2.195).
14. Deep Shikha, Md. Shahid, **S. K. Sinha**, Improvement in adhesion of HAP deposited on alumina after Ar⁺ ions implantation and its physiochemical properties, **Surfaces and Interfaces (Elsevier) 19(2020)100485 Feb 2020**. (Impact Factor: 4.837).
15. P. Yadav, Praba Dev Bhuyan, **S. K. Rout**, Yogesh Sonvane, Sanjeev K. Gupta, and **E. Sinha***, Correlation between experimental and theoretical study of scheelite and wolframite-type tungstates, **Materials Today Communication, 25(2020)101417**. (Impact Factor: 2.678).
16. Sakti P. Muduli, Sabyasachi Parida, Sasmita Nayak, **Sanjeeb K. Rout**, Effect of Graphene Oxide loading on ferroelectric and dielectric properties of hot pressed Poly(vinylidene fluoride) matrix composite film. **Polymer Composites 41 (2020) 2855–2865**(Impact Factor:

16. D. K. Kushvaha, B. Tiwari, **S. K. Rout**, Enhancement of electrical energy storage ability by controlling grain size of polycrystalline BaNb₂O₆ for high density capacitor application, **Journal of Alloys and Compounds** **829** (2020) **154573**. (Impact Factor: 4.650)
17. D. K. Kushvaha, **S. K. Rout**, B. Tiwari, Density Dependent Ionic Transport in Polycrystalline SrNb₂O₆ Ceramic, **Physica B**, **579** (2020) **411910-8p**. . (Impact Factor: 2.41)
18. SK Tiwari, A Singh, P Yadav, BK Sonu, R Verma, **SK Rout**, **E Sinha**, structural and dielectric properties of CU-doped c ZnMnO₄ Ceramic System for enhanced green light emission and potential microwave applications **Journal of Materials Science**, **1-9** (2020) (Impact Factor: 3.442)
19. **Srivastava, N.** Association of modeled PM_{2.5} with aerosol optical depth: model versus satellite. **Nat Hazards** **102**, **689–705** (2020). (Impact Factor: 2.254)
20. **Madhu Priya**, Prabhat K. Jaiswal, and Manish Dev Shrimali, Host–parasite coevolution: Role of selection, mutation, and asexual reproduction on evolvability, **Chaos** **30**, **073103** (2020). (Impact Factor: 2.643)
21. Abhilash Bajpai and **Rishi Sharma**, Atmospheric Pressure Plasma Jet: A complete tool for surface enhanced Raman spectroscopy substrates preparation, **Vacuum**, Vol. **172**, **109033** (2020). (Impact Factor: 3.627)
22. A. Kumari, P. S. Pal, A. Saha and **S. Lahiri**, Stochastic heat engine using an active particle, **Phys. Rev. E** **101**, **032109** (2020). (Impact Factor: 2.529)
23. G Vinai, C Bigi, Akhil Rajan, Matthew David Watson, TL Lee, Federico Mazzola, S Modesti, **Sourabh Barua**, M Ciomaga Hatnean, G Balakrishnan, PDC King, P Torelli, G Rossi, G Panaccione [Proximity-induced ferromagnetism and chemical reactivity in few layers VSe₂ heterostructures](#), **Physical Review B**, **101**, **035404**, 2020.(Impact Factor: 4.036)
24. Laxmi Narayan Tripathi, **Sourabh Barua**, *Growth and characterization of two-dimensional crystals for communication and energy applications***Progress in Crystal Growth and Characterization of Materials**, **65**, **4**, **100465**, 2019.(impact Factor: 8.00)
25. Nitu Borgohain, **S. Konar**; Broadband mid-infrared supercontinuum generation in three-level multiple quantum wells using short optical pulses; **Optics and Laser Technology** **120**, **105684** (2019). (Impact Factor: 3.319).
26. Mohit Sharma, Vigneswaran Dhasarathan, Julia S. Skibina, Murugan Senthil Mani Rajan, **S. Konar**, Thu Trang Hoang, and Quang Minh Ng; Giant Nonlinear AlGaAs-Doped Glass Photonic Crystal Fibers for Efficient Soliton Generation at Femto-Joule Energy; **IEEE Photonics Journal** **11**, **7102411**(2019) (Impact Factor: 2.833).
27. Avishek Satapathy, **Ela Sinha**, Bibek K Sonu, **S. K Rout**, Conduction and relaxation phenomena in barium zirconate ceramic in wet N₂ environment, **Journal of Alloys and Compounds**, **811** (2019) **152042**. (Impact Factor: 4.650)
28. Rolly Verma, **S K Rout**, Frequency dependent ferro-antiferro phase transition and internal bias field influenced piezoelectric response of donor and acceptor doped bismuth sodium titanate ceramics, **Journal of Appl. Physics**, **126** (2019) **094103**. (Impact Factor: 2.286)
29. D. K. Kushvaha, **S. K. Rout**, B. Tiwari, Structural, piezoelectric and highdensity energy storage properties of lead-free BNKT-BCZT solid solution,**Journal of Alloys and Compounds**, **782** (2019) **270-276**. (Impact Factor: 4.650)
30. Anterdipan Singh, Sameer Kumar Tiwari, Pritam Yadav, Bibek Kumar Sonu, Rolly Verma, **Ela Sinha**, **S. K. Rout**, Effect of Molybdenum on structural, optical and microwave dielectric properties of copper tungstate, **Journal of Materials Science: Materials in Electronics**, **30** (23), (2019) **20758–20769**. . (Impact Factor: 2.195)
31. P Yadav, **E Sinha**, Structural, photophysical and microwave dielectric properties of α-ZnMoO₄ phosphor, **Journal of Alloys and Compounds** **795**, **446-452** (2019) (Impact Factor: 4.650)
32. A Satapathy, **E Sinha**, A comparative proton conductivity study on Yb-doped BaZrO₃ perovskite at intermediate temperatures under wet N₂ environment, **Journal of Alloys and Compounds** **772**, **675-682** (2019) (Impact Factor: 4.650)

33. Sagarika Chandra, **Nishi Srivastava** (Corresponding Author), Manoj Kumar, Vertical structure of atmospheric boundary layer over Ranchi during the summer monsoon season **Meteorology and Atmospheric Physics (2018)**. <https://doi.org/10.1007/s00703-018-0600-y>; ISSN 0177-7971, August 2019, Volume 131, Issue 4, pp 765–773 (Impact Factor: 2.204)
34. Nalin Prashant Poddar, **S. K. Mukherjee**, Effect of substrates and post-deposition annealing on rf-sputtered Al-doped ZnO (AZO) thin films, **Journal of Materials Science: Materials in Electronics** 30, 14269–14280 (2019) . (Impact Factor: 2.195)
35. Ravi Kumar, **Dilip K. Singh**, Prashant Kumar, Raj Kumar, S. R. Dhakate *Influence of degree of air oxidation and functionality on ensemble emission from nitrogen vacancy centers in nano-diamonds*. **Diamond and Related Materials** 97, 107431 (2019) . (Impact Factor: 2.650)
36. U. Ray , D. Banerjee, B. Das , N.S. Das , **S.K. Sinha** , K.K. Chattopadhyay, Aspect ratio dependent cold cathode emission from vertically aligned hydrophobic silicon nanowires, **Materials Research Bulletin**, 97 (2018) 232–237. (Impact Factor: 4.584)
37. Suman Choudhury & **Sanjay Kumar Sinha**, A comparative study of Mo films deposited on AISI 310SS and Al₂O₃ surface using anodic vacuum arc, **International Journal of Multidisciplinary Research and Modern Education (IJMRME)**, ISSN (Online): 2454 – 6119 (www.rdmodernresearch.org) Volume 4, Issue 1, 2018 146-151. (Impact Factor: 7.315)
38. Suman Choudhury, Suraj Kumar & **Sanjay Kumar Sinha**, Study of TiAlN deposited on Si wafer using magnetron sputtering, **International Journal of Multidisciplinary Research and Modern Education (IJMRME)**, ISSN (Online): 2454 – 6119 (www.rdmodernresearch.org) Volume 4, Issue 1, 2018 152-157. (Impact Factor: 7.315)
39. **S. K. Rout**, V. Chauhan, D. K. Kushvaha, **E. Sinha**, A. Hussain, B. Tiwari, Impact of multiple phases on ferroelectric and piezoelectric performances of BNKT-BZT ceramic, **J Mater Science: Materials in Electronics**, 29(22), (2018) 19524-19531. . (Impact Factor: 2.195)
40. Sreeja Loho Choudhury, **R. K. Paul**, "A new approach to the generalization of Planck's law of black-body radiation", **Annals of Physics(2018) Vol 395, Pages 317 - 325**. . (Impact Factor: 2.267)
41. A Satapathy, **E Sinha**, Optical band gap and photoluminescence studies of samarium-doped barium zirconate perovskite prepared by solid state reaction route, **Journal of Applied Spectroscopy** 84 (6), 948-953 (2018) (Impact Factor: 2.014)
42. Nalin Prashant Poddar, **S. K. Mukherjee**, Mukul Gupta, Anatase phase evolution and its stabilization in ion beam sputtered TiO₂ thin films, **Thin Solid Films**, 666, 113-120 (2018) (Impact Factor: 2.183)
43. Rajeshwari Chatterjee, **Sanat Kumar Mukherjee**, Spectroscopic analysis and performance studies of Jatropa extracted bio-diesel, **Waste and Biomass Valorization**, 9, 1579-1585 (2018) (Impact Factor: 2.323)
44. A. Barvat, N. Prakash, G. Kumar, **Dilip K. Singh**, A. Dogra, S. Khanna, P. Pal *Electronic structure of the PLD grown mixed phase MoS₂/GaN interface and its thermal annealing effect*. **Current Applied Physics** 18, 170–177 (2018) (Impact Factor: 2.480)
45. Jiagui Feng, Deepnarayan Biswas, Akhil Rajan, Matthew D Watson, Federico Mazzola, Oliver J Clark, Kaycee Underwood, Igor Markovic, Martin McLaren, Andrew Hunter, David M Burn, Liam B Duffy, **Sourabh Barua**, Geetha Balakrishnan, François Bertran, Patrick Le Fevre, Timur K Kim, Gerrit van der Laan, Thorsten Hesjedal, Peter Wahl, Phil DC King, *Electronic Structure and Enhanced Charge-Density Wave Order of Monolayer VSe₂*, **Nano letters**, 18, 7, 4493-4499, 2018. (Impact factor:11.238)
46. N. Ayyanar, D. Vigneswaran, Mohit Sharma, M. Sumati, M.S. Mani Rajan and **S.Konar**, "Hydrostatic pressure sensor using highly birefringence photonic crystal fibers", **IEEE Sensors Journal** 17, Issue: 3, 650-656 (2017). Impact Factor: 3.076)
47. **Sunita Keshri**, Parthasarathi Mohanty, Vibha Rani Gupta, Study on microwave dielectric properties of corundum type (Mg_{1-x}CO_x)₄Nb₂O₉ (x =0-0.6) ceramics for designing a microstrip branch-line coupler , **Journal of Materials Science: Materials in Electronics (Springer publication)**, 28, 2017, 14436–14445.). Impact Factor: 2.195)
48. Deep Shikha, Rakesh Tirky and **S. K. Sinha**, Biocompatibility studies of silver doped HAP/alumina by sol-gel method, **International journal of Multidisciplinary Research and Modern Education**, 3(1) (2017) 490-495. Impact Factor: 6.725)

49. Pankaj Kumar Singh, Arbind Kumar, **Sanjay Kumar Sinha** & Gajendra Prasad Singh COMPARISON OF STRUCTURAL, SURFACE HARDNESS, CORROSION RESISTANCE AND INTERFACIAL CONTACT RESISTANCE PROPERTIES OF AISI 304, 310 AND 316 STAINLESS STEEL, , **International Journal of Multidisciplinary Research and Modern Education (IJMRME)**, **Impact Factor: 6.725, ISSN (Online): 2454 – 6119, Volume 3, Issue 1, 2017.**
50. **S. K. Sinha**, Hari Mahato, Md. Shahid, D. Shikha, S. Murugesan, E. Mohandas, Preparation of MnO₂ from manganese natural ore, **Carbon – Sci. and Tech.** **9/1 (2017) 1-6.** ISSN 0974 – 0546 Impact Factor: 8.528)
51. P. Yadav, **S. K. Rout and Ela Sinha**, Correlation between optical properties and environmental parameter of ZnWO₄ ceramic using complex chemical bond theory **Journal of Alloys and Compounds**, **726 (2017) 1014-1023.** Impact Factor: 4.460)
52. Prabal Dev Bhuyan, Deobrat Singh, Shivam Kansara, Pritam Yadav, Sanjeev K. Gupta, Yogesh Sonvane, **Sanjeeb K. Rout, and Ela Sinha**, Experimental and theoretical analysis of electronic and optical properties of MgWO₄, **J Mater Science**,**52(9), (2017)4934-4943.** Impact Factor:3.442)
53. S. K. Ghosh, S. K. Deshpande and **S. K. Rout**, Concentration-driven structural stability and dielectric dispersion in lead free (Ba_{1-x}Sc_{2x/3})Zr_{0.3}Ti_{0.7}O₃ ceramics,**J Mater Science: Materials in Electronics**, **28(2), (2017) 1336–1351.** Impact Factor:2.195)
54. P. Yadav, **S. K. Rout** and **E. Sinha**, Correlation between optical properties and environmental parameter of ZnWO₄ ceramic using complex chemical bond theory, **Journal of Alloys and Compounds**, **726, 1014-1023 (2017)** Impact Factor: 4.460)
55. Prabal Dev Bhuyan, Deobrat Singh, Shivam Kansara, Pritam Yadav, Sanjeev K. Gupta, Yogesh Sonvane, Sanjeeb K. Rout, **E.Sinha**, Experimental and Theoretical Study on Electronic and Optical Properties of MgWO₄,**Journal of Material Science**, **52, 4934-4943 (2017)** Impact Factor: 3.442)
56. Sunit K. Roy, S. N. Singh, **S. K. Mukherjee**, K. Prasad, Ba_{0.06}(Na_{1/2}Bi_{1/2})_{0.94}TiO₃Ba(Fe_{1/2}Ta_{1/2})O₃: Gaint permittivity lead-free ceramics, **Journal of Materials Science: Materials in Electronics** **28, 4763–4771 (2017)** Impact Factor:2.195)
57. A. Barvat, N. Prakash, S. Singha, G. Kumar, **Dilip K. Singh**, A. Dogra, S. Khanna, A. Singha, and P. Pal.*Emerging photoluminescence from bilayer 2H-MoS₂ films grown by pulsed laser deposition on different substrates.***Journal of Applied Physics** **122, 015304 (2017)** Impact Factor:2.286)
58. Ashish Gupta, Sanjay R. Dhakate, Prabir Pal, Anamika Dey, Parameswar K. Iyer, **Dilip K. Singh** *Spectroscopic Study of Effect of Graphitization Temperature on Crystallinity and Electrical Conductivity of Poly-acrylonitrile based Carbon Nano-fibers* **Diamond and Related Materials (2017).** <https://doi.org/10.1016/j.diamond.2017.07.006> Impact Factor:2.650)
59. Munu Borah, Abhishek K Pathak, **Dilip K Singh**, Prabir Pal and Sanjay R Dhakate *Role of limited hydrogen and flow interval on the growth of single crystal to continuous graphene by low-pressure chemical vapor deposition.***Nanotechnology** **28(7), 075602 (2017).** Impact Factor:3.874)
60. **Sourabh Barua**, M. Ciomaga Hatnean, M. R. Lees and G. Balakrishan. "Signatures of the Kondo effect in VSe₂", **Scientific Reports** **7, 10964, 2017. (DOI:10.1038/s41598-017-11247-4)** Impact Factor:4.379) Nitu Borgohain, Milivoj Belic, **Swapan Konar**; Infrared supercontinuum generation in multiple quantum well nanostructures, **J. Optics** **18, 115001 (2016).** (Impact Factor: 2.753).
61. Nitu Borgohain and **S. Konar** The effects of control field detuning on the modulation instability in a three-level quantum well system; **Journal of Applied Physics** **119, 213103 (2016)** (Impact Factor: 2.286).

62. NMohit Sharma and **S.Konar**; Broadband supercontinuum generation in lead-silicate photonic crystal fibers employing optical pulses of 50 W peak power; **Optics Communications** **380**, 310–319(2016) (Impact Factor: 2.125).
63. itu Borgohain, Mohit Sharma and **S.Konar**; Broadband supercontinuum generation in photonic crystal fibers using cosh-Gaussian pulses at 835 nm wavelength" **Optik** **127**, 1630-1634 (2016) (Impact Factor: 2.187).
64. Parthasarathi Mohanty, **Sunita Keshri**, Manish Kumar Sinha, Vibha Rani Gupta, Study on microwave dielectric properties of corundum type $(Mg_{1-x}CO_x)_4Ta_2O_9$ ($x=0-0.6$) ceramics for designing a microwave low pass filter, **Ceramics International (Elsevier Publication)**, **42**, 2016, 5911–5920. (Impact Factor: 3.83).
65. **Sunita Keshri**, Sonali Biswas and Piotr Wisniewski, Studies on characteristic properties of superparamagnetic $La_{0.67}Sr_{0.33-x}K_xMnO_3$ nanoparticles, **Journal of Alloys and Compounds (Elsevier Publication)** **656**, Jan 2016, 245-252. (Impact Factor: 4.680).
66. S. K. Ghosh, Sujoy Saha, T. P. Sinha, and **S. K. Rout** Large electrostrictive effect in $(Ba_{1-x}Gd_{2x/3})Zr_{0.3}Ti_{0.7}O_3$ relaxor towards moderate field actuator and energy storage applications, , **Journal of Applied Physics**, **120**(2016) 204101-9p. (Impact Factor: 2.286).
67. T. Badapanda, S.Parida, **S.K.Rout**, Structural and optical properties of dysprosium doped barium zirconium titanate ceramic **Materials Letters**, **185** (2016) 415-419. Impact Factor: 3.019).S. K. Ghosh and **S. K. Rout**, Induced instability in local structure and ferroelectric polarization of rare earth modified BZT relaxor ceramics, **Current Applied Physics**, **16** (2016) 989-1000. Impact Factor: 2.480).
68. M. Reddy Prakash, **S.K. Rout**, Avishek Satapathy, T. P. Sinha, S. Md Sariful, Dielectric and ferroelectric properties of samarium substituted $BaBi_4Ti_4O_{15}$ Aurivillius oxides, **Ceramic International**, **42** (2016) 8798–8803 Impact Factor: 3.83).
69. Vidhi Chauhan¹, S. K. Ghosh, Ali Hussain, **S. K. Rout** Influence of niobium substitution on structural and opto-electrical properties of BNKT piezoelectric ceramics, **J. Alloys and Compds**, **674** (2016) 413-424. . (Impact Factor: 4.680).
70. **Nishi Srivastava**, S.K. Satheesh, Modulation in Direct Radiative Forcing caused by Wind Generated Sea-Salt Aerosols, **Aerosol and Air Quality Research** (doi: 10.4209/aaqr.2015.07.0462) Vol 16, No. 11, Nov 2016, PP 2869-ISSN 1680-8584 (paper)ISSN 2071-1409 (electronic) (Impact Factor: 3.063).
71. **Nishi Srivastava**, S.K. Satheesh, Nadège Blond & K. Krishna Moorthy (February, 2016) Anthropogenic aerosol fraction over the Indian region: model simulations versus multi-satellite data analysis, **International Journal of Remote Sensing**, 37:4, 782-804, (Impact Factor: 2.976).
72. Ravi Kumar, S. J. Yoon, K. G. Lee, Prabir Pal, R. P. Pant, C. K. Suman, S. R. Dhakate, Raj Kumar, Devesh K. Avasthi, **Dilip K. Singh** Purification Method Dependent Fluorescence from Nitrogen-vacancy (NV) Centers of Nano-diamonds.**RSC Advances** 6 (52), 47164-47173 (2016) (Impact Factor:3.36).
73. Nisha Prakash, Kritika Anand, Arun Barvat, Prabir Pal, **Dilip K. Singh**, Mukesh Jewariya, Srinivasa Ragam, Sonachand Adhikari, Kamlesh K. Maurya, Suraj P. Khanna *The impact of RF-plasma power in carrier relaxation dynamics of unintentional doped GaN epitaxial layers grown by MBE*.**Optical Materials** 54, 26-31 (2016). (Impact Factor:2.023)

THANK YOU