Indian Science Congress Association

Surendranath College

A Two Day National Conference
On
Science and Technology:Rural Development

20th-21st January 2020

Jointly organised by

Indian Science Congress Association Kolkata Chapter

&

Surendranath College Kolkata

DATE	TIME	
DAY 1 20.01.2020	09:00-10.00 AM	**REGISTRATION**
	10:00-11:00 AM	**INAUGURAL SESSION** **Venue : Surendranath Banerjea Auditorium, Surendranath College, Kolkata – 700009**
	11:00-11:30 AM	**KEY NOTE ADDRESS** **by** **Dr. Basanta Kumar Das**, Director, ICAR-Central Inland Fisheries Research Institute, Barrackpore, Kolkata, 700120 : **Fish for health and social wellbeing**
	11:30-11:45 AM	**TEA BREAK**
	11:45-01:45 PM	**PLENARY SESSION** **Prof. Jai Prakash Keshri**, Professor & Ex-Head, Department of Botany, University of Burdwan **Dr. Timir Baran Ghoshal**, Director, Geological Survey of India **Dr. Swarup Bhattacharya**, CURATOR, Maulana Azad Museum, Maulana Abul Kalam Azad Institute of Asian Studies **Dr. Malay Kumar Saha**, NICED, Scientist F –in charge-National HIV Reference laboratory
	01:45-02:15 PM	**LUNCH**

	TIME & SESSION	AUDITORIUM	BIOLOGY GALLERY	CHEMISTRY GALLERY	COMMON ROOM (Science Building, Ground Floor)
DAY 1 **20.01.2020**	**02:15 -04:15 PM** **TECHNICAL SESSION - I**	**Plant Sciences (Classical and Applied)** • Symposium Lecture • Invited Lecture • Oral Presentation	**Earth system and Environmental Sciences** • Symposium Lecture • Invited Lecture • Oral Presentation	**Chemical Sciences** • Symposium Lecture • Invited Lecture • Oral Presentation	**Judgment of Poster Session - I** • Physiology and Allied Sciences • Modern Biology • Physical Sciences and Engineering and Technology
	04:15-04:30 PM		**TEA/COFFEE**		
	04:30-06:30 PM **TECHNICAL SESSION - II**		**Modern Biology** • Symposium Lecture • Invited Lecture • Oral Presentation	**Physical Science** • Symposium Lecture • Invited Lecture • Oral Presentation	**Judgment of Poster Session - II** • Plant Sciences • Chemical Sciences
	HIGH TEA				

DAY 2 : 21.01.2020

DATE	TIME	
DAY 2 **21.01.2020**	**09:30-10:00 AM**	**REGISTRATION**
	10:00-11:30 AM	**PLENARY SESSION** **Dr. Jyotirmoy Samajder**, Psychiatrist, MD. DPM. MBBS **Dr. D.P. Duari**, Director, Birla Planetarium
	11:30-11:45 AM	**TEA BREAK**

	TIME & SESSION	AUDITORIUM	BIOLOGY GALLERY	CHEMISTRY GALLERY	COMMON ROOM (Science Building, Ground Floor)
DAY 2 **21.01.2020**	**11:45-01:45 PM** **TECHNICAL SESSION - III**	**Physiology And Allied Sciences** • Symposium Lecture • Invited Lecture • Oral Presentation	**Animal, Veterinary and Fishery Sciences** • Symposium Lecture • Invited Lecture • Oral Presentation	**Social and Behavioral Science A (Sociology, Psychology)** • Symposium Lecture • Invited Lecture • Oral Presentation	**Judgment of Poster Session - III** • Mathematical, Statistical and Computational Sciences • Social and Behavioral Sciences
	01:45-02:30 PM	**LUNCH**			
	02:30-04:30 PM **TECHNICAL SESSION - IV**	**Physiology And Allied Sciences** **Continues…..**	**Social and Behavioral Science B (Economics)** • Symposium Lecture • Invited Lecture • Oral Presentation	**Mathematics, Statistics, Computer Science** • Symposium Lecture • Invited Lecture • Oral Presentation	**Judgment of Poster Session IV** • Animal Sciences
	TEA/COFFEE				
	04:30 PM	**Valedictory** **Prize distribution for Oral & Poster Presentation** **Vote of Thanks**			

DETAILED PROGRAMME SCHEDULE

<table>
<tr>
<td>DAY 1
20.01.2020

02:15PM -06:30 PM

TECHNICAL SESSION – I & II

Plant Sciences (Classical and Applied)

(Parallel Session)
(AUDITORIUM)</td>
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Symposium Lecture

Prof. Kashinath Bhattacharya, Professor, Department of Botany, Visva-Bharati University : Migration of Plants from Aquatic to Land Habitat

Invited Lecture

Chaired by: Professor Jai Prakash Keshri & Professor Kashinath Bhattacharya

Dr. Debabrata Maity, Assistant Professor, Department of Botany, University of Calcutta: Role of taxonomy to uncover biodiversity
Dr. Supatra Sen, Associate Professor, Department of Botany, Asutosh College: Towards Zero Hunger: Abiotic Stress and Crop Productivity
Dr. Samudra Prasad Banik, Department of Microbiology, Maulana Azad College: Trehalose mediated stabilization of cellobiase aggregates – A cross-linking independent approach to improve cellulolytic enzyme efficiency
Dr. Partha Karak, Assistant Professor, Department of Botany, City College: Airborne spore allergens, air pollutants and socio economic status as risk factors for childhood allergic diseases in West Bengal, India

Oral Presentation

Chaired by: Professor Jai Prakash Keshri & Professor Kashinath Bhattacharya

Arghya Ghosh and Bhaskar Paul: MICROPROPAGATION OF Curcuma caesia Roxb
Dr. Amit Saha:EXPLOITATION OF MEDICINAL PLANTS
Dr. Anamika Basu: ETHNOPHARMACOLOGY OF ANTICANCER DRUGS IN RURAL BENGAL - AN IN SILICO STUDY
Bikash Jana: DIVERSITY OF ALPINE SEDGES AND CLIMATE CHANGE
Debarati Das and Asok K Biswas: INFLUENCE OF SELENATE ON GROWTH AND ANTIOXIDANT DEFENSE SYSTEM IN RICE (Oryza sativa L.) SEEDLINGS
Rajendra Yonzone: SOME MAJOR THREATS FOR THE PLANT DIVERSITY OF DARJEELING AND SIKKIM HIMALAYAN REGIONS OF INDIA
Satabdi Ghosh, Simren Saha and Amrita Dutta: COMPARING THE OXALATE OXIDASE ENZYME ACTIVITY IN MONOCOT PLANTS
Dwaipayan Sinha: CHIR PINE: A PLANT OF ETHNOBOTANICAL AND MEDICINAL IMPORTANCE
Dr. Joydeep Acharya: HERBAL REMEDIES AGAINST URINARY AILMENTS AS REVEALED FROM ETHNOMEDICINAL STUDIES UNDERTAKEN IN BANKURA DISTRICT, WEST BENGAL
•Subhojit Ojha and Biswajit Dey: ANTIOXIDANT PROPERTY ALONG WITH QUALITATIVE PHYTOCHEMICAL ANALYSIS OF Erigeron sp. FLOWERS

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<td>DAY 1</td>
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Symposium Lecture

Professor Anirudhho Mukhopadhyay, Professor, Department of Environmental Science, University of Calcutta : Environment and Beyond
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20.01.2020 **02:15 -04:15 PM** **TECHNICAL SESSION – I** **Earth system and Environmental Sciences** **(Parallel Session) (BIOLOGY GALLERY, SCIENCE BUILDING 2nd FLOOR)**	**Dr. Sandip Mukhopadhyay**, Associate Professor, Department of Marine Science, University of Calcutta: **Overview on biogeochemical dynamics of some of the estuaries at the land-ocean boundary of NE coast of the Bay of Bengal, India** **Gautam Ghosh**, Director (Geology), Selection Grade (Retd.) & Dipak Kumar Mukhopadhyay, Senior Geologist (Retired), GSI: **Impact on Human Health Due to Exposure to ArsenicContaminated Drinking Water and Food** • **Invited Lecture** **Chaired by: Dr. Timir Baran Ghoshal, Director, Geological Survey of India & Professor Anirudhho Mukhopadhyay** • **Dr. Chumki Chowdhury**, Assistant Professor, Department of Botany, Jangipur College, Murshidabad: **Biological pump, relating it to diatom bloom in the estuarine environments along the northeast coast of the Bay of Bengal, India** • **Dr. Sayani Mukherjee,** Associate Professor, Department of Geography, Asutosh College : **A geospatial analysis of impact of extreme climatic events on subsistence farmers along the coastal plain of east Mednipur, West Bengal** • **Dr. Ismail Mondal,** Assistant Professor, School of Oceanographic Studies, Jadavpur University: **Spatio-temporal modelling of sea level rising and shoreline migration its effect on Sundarban ecosystem, using remote sensing and GIS techniques, West Bengal, India** • **Oral Presentation** **Chaired by**: **Professor Anirudhho Mukhopadhyay & Dr. Sandip Mukhopadhyay** • **Subhendu Bachhar, Rajib Chakraborty and Rajat Halder**: DRONE: AN EYE ABOVE AGRICULTURAL FIELD • **Sohaniya Mandal, T.K. Saha and T.K. De**: NUMERICAL SIMULATION OF ONE-DIMENSIONAL SHALLOW WATER EQUATIONS • **Susmita Biswas, Mrinmoyee Bhattacharya, and Mourani Sinha**: THE DEEP LEARNING MODEL FOR ESTIMATION OF INDIAN OCEAN PARAMETERS
DAY 1 **20.01.2020** **02:15PM -04:15 PM** **TECHNICAL SESSION – I** **Chemical Sciences** **(Parallel Session) (CHEMISTRY GALLERY, SCIENCE BUILDING 1st FLOOR)**	• **Symposium Lecture** **Prof. Bijon Das**, Professor, Department of Chemistry, Presidency University: **Polyelectrolytes in Solutions: Their Size and Charge** **Prof. Samir Kumar Pal**, Senior Professor, Department of Chemical, Biological & Macromolecular Sciences, S.N. Bose National Centre for Basic Sciences: **Probing Crucial Interfacial Dynamics of Nanohybrids for Emerging Biomedical Functionalities** • **Invited Lecture** **Chaired by**: **Professor Samir Kumar Pal** • **Dr. Shouvik Chattopadhyay,** Associate Professor, Department of Chemistry, Jadavpur University: **Synthesis and characterization of carboxylate bridged di and polynuclear complexes of cobalt with reduced Schiff bases: Investigation of their ability to mimic phenoxazinone synthase** • **Dr. Kamalika Sen,** Assistant Professor, University of Calcutta: **Spatio-temporal modelling of sea level rising and shoreline migration its effect on Sundarban ecosystem, using remote sensing and GIS techniques, West Bengal, India** • **Oral Presentation** **Chaired by**: **Professor Samir Kumar Pal** • **Abhra Sarkar & Siddharth Pandey**: Fluorimetric Investigation Of 'Thermosolvatochromism' within Pure and Aqueous Ionic Liquids

DAY 1 **20.01.2020** **04:30 -06:30 PM** **TECHNICAL SESSION –II** **Modern Biology** **(Parallel Session)** **(BIOLOGY GALLERY, SCIENCE BUILDING 2nd FLOOR)**	• **Symposium Lecture** **Prof. Debashis Mukhopadhyay**, Professor, Saha Institute of Nuclear Physics • **Invited Lecture** **Chaired by**: **Prof. Debashis Mukhopadhyay** • **Dr. Mainak Snegupta,** Assistant Professor, Department of Genetics, University of Calcutta: **To smoke, or not to smoke: that is the question!** • **Dr. Gaurav Gupta,** Associate Professor, NIIT University, Rajasthan: **Long Pentraxin 3 (PTX3) Regulates IL-17A Mediated Immunity to Primary Leishmania major Infection** • **Dr. Mithun Maji,** Assistant Professor, Department of Botany, Dinabandhu Andrews College: **Cross-presentation: an approach against the life threatening diseases** • **Dr. Subhadeep Ganguly,** Assistant Professor, Department of Physiology, Vidyasagar College: **Production of L-glutamic acid by Corynebacterium glutamicum X680 using agro-based waste materials** • **Oral Presentation** **Chaired by**: **Dr. Gaurav Gupta & Dr. Subhadeep Ganguly** • **D.C. Bhattacharya:** LOW-COST SEWAGE TREATMENT : THE ROLE OF *SCENEDESMUS*SP, AN ALGAL MEMBER WITH NATURAL ADAPTABILITY • **Puja Dutta and Biswadev Bishayi**: INHIBITION OF RECEPTOR MOBILIZATION AND RECEPTOR SHEDDING DURING DUAL RECEPTOR (TNFR1 AND IL-1R) NEUTRALIZATION DOWNREGULATES CXCR1 EXPRESSION IN STAPHYLOCOCCUS AUREUS INFECTION
DAY 1 **20.01.2020** **04:30PM -06:30 PM** **TECHNICAL SESSION –II** **Physical Sciences and Engineering and Technology** **(Parallel Session)** **(CHEMISTRY GALLERY, 1st FLOOR)**	• **Symposium Lecture** **Dr. Sayed Minhaz Hossain**, Associate Professor, Department of Physics, IIEST, Shibpur, Howrah: **Optically enhanced hysteretic I-V characteristicsof nanocrystalline silicon based p-i-n heterostructure** • **Invited Lecture** **Chaired by**: **Dr. Sayed Minhaz Hossain** • **Dr. Kanik Palodhi,** Assistant Professor, Department of Applied Optics and Photonics, University of Calcutta: **Application of MIoT in rural areas** • **Dr. Arijit Ghosh,** Assistant Professor, Department of Physics, Ananda Mohan College: **On-chip particle accelarator and its future perspective** • **Dr. Kartick Malik,** Assistant Professor, Department of Physics, Vidyasagar Metropolitan College: **Low temperature Structural and Thermoelectric properties of Bi_2Te_3-Sb_2Te_3 mixed crystal** • **Dr. Amitava Moitra,** Assistant Professor, Department of Physics, Raidighi College: **Multiscale Materials Modeling to Understand the Role of Defects in Deformation Mechanism** • **Dr. Saurabh Niyogi,** Assistant Professor, Department of Physics, Gokhale Memorial Girl's College: **Electron (g-2) anomaly**

	• **Dr. Binita Ghosh**, St. Paul's Cathedral Mission College, Kolkata: **Investigation of Nonlinear Optical Properties of Perovskite Oxides for Use as Transparent Conducting Novel Material** • **Oral Presentation** **Chaired by**: • **Shaheen Akhtar, Anirban Chaudhuri, Shouvik Mahanty, Subarna Bhattacharyya and Punarbasu Chaudhuri**: A Case Study to Evaluate Nanoparticle Coated Concrete's Ability to Inhibit Fungal Growth
DAY 2 **21.01.2020** **11:45 -04:30 PM** **TECHNICAL SESSION - III& IV** **Physiology and Allied Sciences** **(Parallel Session)** **(AUDITORIUM)**	• **Symposium Lecture** **Chaired by** : **Dr. Amit Krishna De**, Executive Secretary, Indian Science Congress Association **Prof. Tania Das**, Professor, Division of Molecular Medicine, Former Dean, Bose Institute: **Do cancer stem cells have 'brains'?** • **Invited Lecture** **Chaired by**: **Prof. Tania Das** & **Dr. Asima Das**, Associate Professor,Department of Physiology, Serampore College • **Prof. Sanjit Dey,** Professor, Department of Physiology, University of Calcutta: **Rural or Urban, It's time to 'Bid farewell to Smokeless Tobacco (Gutkha) Chewing: It promotes neuronal cell death** • **Prof. Prabir Kumar Mukhopadhyay**, Reproductive and Environmental Toxicology Laboratory, Department of Life Sciences, Presidency University: **High protein diet, a remedy against arsenic-induced female reproductive catastrophe** • **Dr. Gauri Prasad Dutta**, Associate Professor, Department of Physiology, Ram Mohan College: **Anti-oxidative and Anti-inflammatory Potency of *Amorphophallus campanulatus* against Ethanol Induced Tissue Damage** • **Dr. Sujata Law,** Assistant Professor, Department of Biochemistry and Medicinal Biotechnology, Calcutta School of Tropical Medicine, Kolkata: **Chronic exposure to sunlight (ultra violet radiation) leads to alteration of Limbal Epithelial and Stem/Progenitor Cells in Cornea** • **Dr. Amit Bandyapadhyay,** Assistant Professor, Department of Physiology, University of Calcutta: **Sports, Exercise and Yoga – a Futuristic Approach for Rural Health Development** • **Dr. Rajen Haldar,** Assistant Professor, Department of Physiology, University of Calcutta: **Smoking augments oxidative damages in erythrocyte: role of vitamin-c as scavenger** • **Oral Presentation** **Chaired by**: **Dr. Bhaswar Mukherjee, Ex. Associate Professor, Department of Physiology, Surendranath College, Kolkata &** **Dr. Bulbul Thakur, Ex. Associate Professor, Department of Physiology, Raja Peary Mohan College, Uttarpara** • **Dibyendu Ray, Pushpa Jadav, Subrata Ghosh and Sandip Mukherjee**: CAPSAICIN PROTECTS SODIUM FLUORIDE-INDUCED OXIDATIVE DAMAGE OF LIVER IN RATS • **Roshnara Mishra, Farhat Nasim and Raghwendra Mishra**: ENVENOMATION - AN INFLAMMATORY DISORDER • **Anindita Singha Roy and Amit Bandyopadhyay**: PULMONARY FUNCTION STUDIES IN FEMALE SINGERS OF KOLKATA, INDIA

	• **Subhasish Pramanik, Chiranjit Bose, Koena Bhattacharya, Dr. Sutanu Dutta Chowdhury, Prof. Subhankar Chowdhury and Prof. Lakshmi Kanta Mondal**: SYSTEMIC AND OCULAR MARKERS OF HYPERGLYCEMIA INDUCED BIOCHEMICAL ANOMALIES BEHIND THE INITIATION OF DIABETIC RETINOPATHY • **Ishita Bhattacharjee and Amit Bandyopadhyay**: EFFECTS OF ACUTE HONEY SUPPLEMENTATION ON ENDURANCE PERFORMANCEIN MALE UNIVERSITY STUDENTS • **Soma Das, Md. Kutubuddin Halder and Amit Bandyopadhyay**: PHYSICAL FITNESS AND CREATIVITY: A STUDY ON ADOLESCENT GIRLS IN KOLKATA, WEST BENGAL • **Kartik Shaw & Sahana Mazumder**: SPECTROPHOTOMETRIC ANALYSIS OF GREENSYNTHESIZED SILVER NANOPARTICLES AND ITS EFFECT ON GROWTH OF CLINICAL DRUG RESISTANT *Staphylococcus aureus* • **Rishna Dalui and Amit Bandyopadhyay**: MOTOR FITNESS OF MALE KARATE ATHLETES AND JUDO PRACTITIONERS OF KOLKATA, INDIA • **Priti Sengupta, Sarmishtha Chanda and Aditya Bose**: RUTIN- SERUM ALBUMIN INTERACTION IN DIFFERENT MEDIA AND ITS EFFECTIVE DOSE SELECTION IN RADIATION-INDUCED CYTOTOXICITY ON HUMAN BLOOD CELLS • **Suchismita Daw and Sujata Law**: Myelodysplastic Syndrome Related Haematopathological And Cellular Signalling Abberations • **Tamal Ghorai, Amalendu Samanta & Sahana Mazumder**: NEED OF DESIGNING THE SITTING ARRANGEMENT OF SCHOOL CHILDREN BASED ONERGONOMICAL CONSCIOUSNESS • **Priyankar Pal and Prabir Kr. Mukhopadhyay**: STUDIES ON FLUORIDE INDUCED MALE REPRODUCTIVE DISORDERS- A DOSE DEPENDENT STUDY • **Sayantika Das, Subrata Goswami and Somnath Gangopadhyay**: OCCUPATIONAL STRESS AND POSTAL WORKERS • **Tapomoy Chatterjee, Amalendu Samanta and Sahana Mazumder**: POSTURAL LOAD OF UTENSIL (ALUMINIUM) MAKERS
DAY 2 **21.01.2020** **11:45 -01:45 PM** **TECHNICAL SESSION - III** **Animal, Veterinary & Fishery Sciences** **(Parallel Session)** **(BIOLOGY GALLERY, 2nd FLOOR)**	• **Symposium Lecture** **Prof. Sagartirtha Sarkar**, Professor, Department of Zoology, University of Calcutta • **Invited Lecture** **Chaired by: Prof. Sagartirtha Sarkar** • **Dr. Suman Bhusan Chakraborty,** Associate Professor, Department of Zoology, University of Calcutta: **In search of suitable alternative to synthetic steroids for monosex tilapia production: an approach towards eco-friendly sustainable tilapia culture** • **Dr.Sujoy Ghosh,** Assistant Professor, Department of Zoology, University of Calcutta: **Down Syndrome: Science & Society** • **Oral Presentation** **Chaired by**: **Dr. Suman Bhusan Chakraborty & Dr.Sujoy Ghosh** • **Subarna Ghosh and Probir Kumar Bandyopadhyay**: DEVELOPMENT AND APPLICATION OF AQUA-SOLUBLE HERBAL DRUG TO CONTROL THE PATHOGENS CAUSING HARM TO FISH INDUSTRY AND POPULARIZATION OF THE DRUG AMONGST THE FISH FARMERS FOR CAPACITY BUILDING OF YOUTHS OF WEAKER COMMUNITY IN WEST BENGAL • **Dr. Debraj Biswal**: ORGANOIDS: INNOVATIVE TOOLS FOR STUDYING HELMINTH INFECTIONS • **Md. Golam Ambiya and Santi Ranjan Dey**: THE POSSIBILITIES OF SUSTAINABLE MANAGEMENT OF AHIRAN LAKE: A CASE STUDY • **Sutapa Sanyal and Arnab Chatterjee**: ANTI-LISTERIA ACTIVITY OF FISH LACTIC ACID BACTERIA

DAY 2 **21.01.2020** **11:45 -01:45 PM** **TECHNICAL SESSION - III** **Social and Behavioral Science A (Sociology, Psychology)** **(Parallel Session)** **(CHEMISTRY GALLERY, 1st FLOOR)**	• **Symposium Lecture** **Dr. Rudraprasad Chakraborty**, MBBS, DPM, MD, Consultant Psychiatrist, Manobikashan, Murshidabad:**Mental health: present scenario and role of technology** **Dr. Debaprasad Chatterjee**, Associate Professor, Department of Sociology, Maulana Azad College: **Technology, Women Empowerment and Rural Development** • **Invited Lecture** **Chaired by**: **Dr. Rudraprasad Chakraborty & Dr. Debaprasad Chatterjee** • **Dr. Chandana Aditya,** Assistant Professor, Department of Psychology, Women's College: **Resolving gender binary through digitalization in rural India: Emphasis on women empowerment** • **Dr. Sraboni Chatterjee,** Assistant Professor, Bijoy Krishna Girls College: **Common Mental Disorders and Risk Factors of People Living in Rural Communities** • **Dr. Tinni Dutta,** Assistant Professor, Department of Psychology, Asutosh College: **Ego functioning of Women in Rural areas** • **Oral Presentation** **Chaired by**: **Dr. Rudraprasad Chakraborty & Dr. Tinni Dutta** • **Chaiti Dasgupta and Dr. Mallika Banerjee**: A CULTURAL EXPLORATION OF PROENVIRONMENTAL IN CHILDREN FROM KOLKATA • **Debashree Sinha**: USE OF SOCIAL NETWORKING SITES AMONG COLLEGE STUDENTS OF HOWRAH AND HOOGHLY AND ITS RELATION WITH THEIR SUBJECTIVE WELL-BEING • **Madhulina Bauri**: ECO FEMINIST STUDY OF SELECTED NOVELS OF TONI MORRISON • **Reni Pal**: ECOFEMINISM: WOMEN'S PROACTIVE ROLE IN ECO-REGENERATION • **Sujata Saha**: A COMPARATIVE STUDY ON MENOPAUSAL SYMPTOMS AND ITS EFFECT ON MENTAL HEALTH IN URBAN VERSUS RURAL
DAY 2 **21.01.2020** **02:30 -04:30 PM** **TECHNICAL SESSION - IV** **Social and Behavioral Science B (Economics)** **(Parallel Session)** **(BIOLOGY GALLERY, 2nd FLOOR)**	• **Symposium Lecture** **Dr. Kumarjit Mondal**, Associate Professor, Department of Economics, University of Calcutta • **Invited Lecture** **Chaired by**: **Dr. Kumarjit Mondal** • Dr. Sudip Mukherjee, Assistant Professor, Department of Economics,Dinabandhu Mahavidyalaya, Bongaon: **Effect of Climate Change on Indian Agricultural Productivity** • **Oral Presentation** **Chaired by : Dr. Kumarjit Mondal & Dr Kaushik Lahiri,** Associate Professor, Department of Economics, Surendranath College • **Avik Chattopadhaya and Tuhin Mukherjee:** PERCEPTION OF RURAL FARMERS REGARDING SUSTAINABLE CROP INSURANCE POLICIES IN INDIA: AN APPRAISAL • **Indira Halder**: TECHNICAL EXTRACTION OF GROUNDWATER FOR IRRIGATION. A BLESSINGS OR CURSE? A CASE STUDY IN MURSHIDABAD DISTRICT OF WEST BENGAL • **Sanjukta Mistri and Susmita Lahiri**: URBANIZATION IMPACT ON THE TRADITIONAL WASTEWATER AQUACULTURE SYSTEM AND SOCIO-ECONOMIC CONDITION OF EAST KOLKATA WETLANDS

DAY 2 **21.01.2020** **02:30 -04:30 PM** **TECHNICAL SESSION - IV** **Mathematics, Statistics and Computer Sciences** **(Parallel Session)** **(CHEMISTRY GALLERY, 1st FLOOR)**	• **Symposium Lecture** **Chaired by**: Dr. Bivas Chaudhuty, DDG AND Zonal Head, National Statistical Office, Government of India. **Professor Avishek Adhikari**, Professor, Department of Mathematics, Presidency University: **Security of Multimedia Data: Few Important Issues** **Professor Susmita Chakraborty**, Professor, Dept of Library Science, University of Calcutta: **Technology-enabled Information Services for uplifting the lives of rural people in India** • **Invited Lecture** **Chaired by**: **Professor Avishek Adhikari & Professor Susmita Chakraborty** • **Dr.Soumen De,** Assistant Professor, Applied Mathematics, University of Calcutta: **Interaction of Ocean waves with floating and submerged bodies** • **Dr. Sukanta Biswas,** Assistant Professor, Department of Mathematics, Ananda Mohan College: **Viscous dissipation and chemical reaction effects onmixed convective MHD oscillatory flow of Casson fluid** • **Mr. Subhrajit Roy,** Assistant Professor, Department of Mathematics, Heramba Chandra College: **A study of atmospheric acoustic-gravity waves and its linear analysis for different phase states** • **Oral Presentation** **Chaired by**: **Dr.Soumen De & Dr. Sukanta Biswas** • **Sagar Mondal and Dulal Pal**: ENTROPY GENERATION ANALYSIS ON MHD JEFFREY NANOFLUID FLOW IN THE PRESENCE OF NONLINEAR THERMAL RADIATION OVER LINEAR STRETCHING SHEET USING SPECTRAL QUASILINEARIZATION METHOD • **Sabyasachi Mukherjee**: CORRELATED SPATIOTEMPORAL DATA MODELING USING ADVANCED REGRESSION ANALYSIS TECHNIQUES • **Dr. Netai Roy**: THERMAL RADIATION EFFECT ON HEAT TRANSFER OF A NANOFLUID OVER STRETCHING SHEET • **Gaurab Bhattacharyya**: HEALTH DIAGNOSIS FOR RURAL & URBAN PEOPLE USING STATISTICAL TECHNIQUES - A STUDY ON PLASMA VOLUME & RED CELL INDEX • **Arun Sarkar**: Archimedean t-conorm and t-normbased Interval-valued Dual hesitant fuzzy prioritized aggregation operators and their application to multi-criteria group decision-making

Two-day National Conference on 20th & 21st January ,2020Technical Session II(Physical Sciences and Engineering and Technology)

Department of physics

Activity Report of Two-day National Conference on 20th & 21st January ,2020

Topic:

1. Condensed matter physics and material sciences
2. Recent advances in modern physics
3. Innovative technologies for development of rural areas
4. Recent trends in engineering and technology and their applications in rural development.
5.

Date : 20.01.2020, 04:30 PM -06:30 PM

Place: (CHEMISTRY GALLERY, 1st FLOOR)

Organised by : Indian Science Congress Association, Kolkata Chapter and Surendranath College (formerly Ripon College

Number of participants : 60

Summary : The seminar started with the inaugural lecture by our Principal, Dr. Indranil Kar, followed by the speaker's introduction. The lecture was attended by 12 postgraduate faculty members of about 15 different colleges, universities and research institutes. The esteem speakers, Dr. Sayed Minhaz Hossain, Associate Professor, Department of Physics, IIEST, Shibpur, Howrah delivered the lecture on the topic of Optically enhanced hysteretic I-V characteristics of nanocrystalline silicon based p-i-n heterostructure. Every question form

the audience discussed elaborately and promised to do the needful guidance for the undergraduate and postgraduate students in future correspondences. The speaker was formally given the vote of thanks by Dr. Asok Kumar Das. Beside this Dr. Kanik Palodhi, Assistant Professor, Department of Applied Optics and Photonics, University of Calcutta discusses Application of MIoT in rural areas ,Dr. Arijit Ghosh, Assistant Professor, Department of Physics, Ananda Mohan College discusses On-chip particle accelerator and its future perspective, Dr. Kartick Malik, Assistant Professor, Department of Physics, Vidyasagar Metropolitan College, discusses Low temperature Structural and Thermoelectric properties of Bi2Te3-Sb2Te3 mixed crystal,Dr. Amitava Moitra, Assistant Professor, Department of Physics, Raidighi College discusses Multiscale Materials Modeling to Understand the Role of Defects in Deformation Mechanism , Dr. Saurabh Niyogi, Assistant Professor, Department of Physics, Gokhale Memorial Girl's College discusses Electron (g-2) anomaly and Dr. Binita Ghosh, St. Paul's Cathedral Mission College, Kolkata discuss on the topic Investigation of Nonlinear Optical Properties of Perovskite Oxides for Use as Transparent Conducting Novel Material.

Invited Speakers :

DAY 1 **20.01.2020** **04:30PM -06:30 PM** **TECHNICAL SESSION –II** **Physical Sciences and Engineering and Technology** **(Parallel Session)** **(CHEMISTRY GALLERY, 1st FLOOR)**	• **Symposium Lecture** **Dr. Sayed Minhaz Hossain**, Associate Professor, Department of Physics, IIEST, Shibpur, Howrah: **Optically enhanced hysteretic I-V characteristicsof nanocrystalline silicon based p-i-n heterostructure** • **Invited Lecture** **Chaired by: Dr. Sayed Minhaz Hossain** • **Dr. Kanik Palodhi,** Assistant Professor, Department of Applied Optics and Photonics, University of Calcutta: **Application of MIoT in rural areas** • **Dr. Arijit Ghosh,** Assistant Professor, Department of Physics, Ananda Mohan College: **On-chip particle accelarator and its future perspective** • **Dr. Kartick Malik,** Assistant Professor, Department of Physics, Vidyasagar Metropolitan College: **Low temperature Structural and Thermoelectric properties of Bi_2Te_3-Sb_2Te_3 mixed crystal** • **Dr. Amitava Moitra,** Assistant Professor, Department of Physics, Raidighi College: **Multiscale Materials Modeling to Understand the Role of Defects in Deformation Mechanism** • **Dr. Saurabh Niyogi,** Assistant Professor, Department of Physics, Gokhale Memorial Girl's College: **Electron (g-2) anomaly**
	• **Dr. Binita Ghosh**, St. Paul's Cathedral Mission College, Kolkata: **Investigation of Nonlinear Optical Properties of Perovskite Oxides for Use as Transparent Conducting Novel Material** • **Oral Presentation** **Chaired by**: • **Shaheen Akhtar, Anirban Chaudhuri, Shouvik Mahanty, Subarna Bhattacharyya and Punarbasu Chaudhuri**: A Case Study to Evaluate Nanoparticle Coated Concrete's Ability to Inhibit Fungal Growth

Symposium Lecture

Dr. Sayed Minhaz Hossain, Associate Professor,
Department of Physics,
IIEST, Shibpur, Howrah

Optically enhanced hysteretic I-V characteristicsof nanocrystalline silicon based p-i-n heterostructure

Abstract

A p-i-n heterostructure containing electrochemically synthesized silicon (Si)nanorodsembedded in nonstoichiometric silicon oxide matrix sandwiched as i-layer between p-Si and n-type hydrogeneted amorphous Si shows hysteresis both in forward and reverse bias with an additional switching in forward bias. Conductivity in trace path is lesser than the retrace path. Hysteresis in reverse bias has been found to get enhanced up to three order of magnitude under illuminationby laser source (as shown in figure 1) of different intensity and wavelength showing the potential of the structure as an effective memory device. Hysteresis area and conductivity becomes maximum for red light and gradually decreases for green and violet light for fixed intensity. It is well known that Si nanocrystal - silicon oxide interface contains a lot of electron and hole trap levels within the band gap. Trapping and detrapping of photogenerated carriers at the trap/defect states are expected to affect the band bending at the junctions. The observed optically enhanced hysteresis has been explained through formation and destruction of the potential barrier at the junctions during trace and retrace paths respectively. The potential has been estimated by solving Poisson's equation and the current-voltage (*I-V*) relation for trace and retrace paths has been derived where rate of trapping and detrapping becomes different resulting in the observed hysteresis. Theoretically obtained *I-V* characteristics match well with the experimentally obtained results. The trap density in thei-layer estimated to be ~10^{11}/cm^2 is in good agreement for the trap density in similar systems.

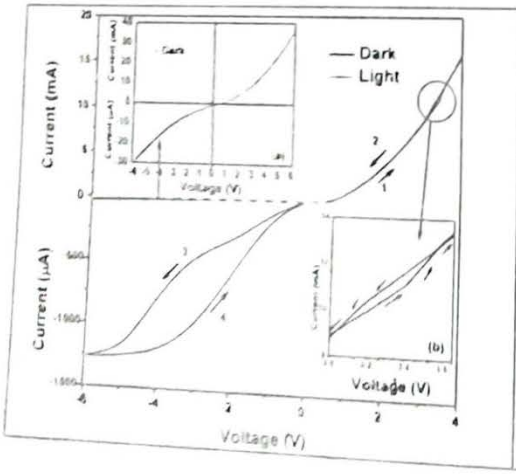

Fig 1: I-V characteristics of the p-i-n device under dark and under illumination by a red laser (632nm, 3.2mW) showing large hysteresis in the reverse bias under illumination; with inset (a) I-V characteristics in dark only showing the maximum current obtained in forward bias in mA order whereas that in the reverse bias in μA and (b) the magnified view of the switchingin forward bias

Chaired by:

Dr. Sayed Minhaz Hossain, Associate Professor,
Department of Physics,
IIEST, Shibpur, Howrah

Dr. Kanik Palodhi, Assistance Professor,
Department of Applied Optics and Photonics,
University of Calcutta

Application of MIoT in rural areas

Abstract

One of the most important areas of applications of science and technology is in the field of remote monitoring of health parameters. This is particularly important for rural population since lower density of health centres aggravates the problem of immediate attention to emergency health problems. IoT or Internet of Things provides the opportunity to access sensor data uploaded in the cloud for continuous monitoring of various parameters. It can also apply real-time analysis to these data for facilitating decision making and setting alarm during crisis.

MIoT or medical IoT is essentially the application of IoT to medical services with particular emphasis on rural development. In many cases, cheaper sensors built-in to wi-fi networks can be used for tracking and monitoring of elderly persons, for updating health parameters of vulnerable patients and even for measurement of dosage of medicine. With the advent of modern ICT i.e. Internet and Communication Technology, MIoT will be able to generate tremendous amount of attention of researchers who can implement it for the betterment of rural living.

Dr. Arijit Ghosh; Assistance Professor,
Department of Physics,
Ananda Mohan College

On-chip particle accelarator and its future perspective

Abstract

Accelarators are huge, expensive tubes sometimes few kilometers long that produce high energies for smashing tiny particles like protons, neutrons etc. or making intense X-ray beam. Fiber optics and silicon crystals could be used to build particle pathways, with high energy laser beams as driving force. Electrons are passed through tiny channels of silicon micro-structures and shined with infrared laser beam having wavelength twice that of the height of the channel. Under special conditions electon gets accelarated by the electric field of the laser light. As electron passes through the channel, gains energy between the oscillating electric fields and losses energy while the electric field reverses oscillation. The net result is a significant increase in energy for those electrons that are perfectly timed with the laser light. The accelarated electron will emit high energy X-ray while travelling through the patterned path. That X-ray is taken out from the channel using wave guide for further use.

Recently Sapra *et al* developed dielectric laser accelarator (DLA) at Standford University (**Sapra *et al.*, Science 367, 79–83 (2020)**). After comparing the measured electron energy spectra with particle-tracking simulations, they could acheive energy gain upto 0.915 kilo–electron volts over 30 micrometers, corresponding to an acceleration gradient of 30.5 mega–electron volts per meter. On-chip acceleration provides the possibility for a completely integrated mega–electron volt-scale DLA.

With further advancement that chip based accelerator could dramatically shrink particle accelerator size and could be used for nano science research and medical application.

Dr. Kartick Malik, Assistance Professor,
Department of Physics,
Vidyasagar Metropolitan College

Low temperature Structural and Thermoelectric properties of Bi2Te3-Sb2Te3 mixed crystal

Abstract

Thermoelectric material are those which converts heat into electricity and vice versa. Efficiency of the TE material is measured by the term = $\left(S^2\sigma/_k\right)T$ where S, σ and k are the thermopower, electrical conductivity and thermal conductivity respectively. $(Bi_{1-x}Sb_x)_2Te_3$ mixed crystal have been synthesized using solid state reaction method. The end members Bi_2Te_3 and Sb_2Te_3 are potential room temperature TE material and also belong to the intriguing class of material, topological insulator. In depth structural characterization of the synthesized samples have been performed using x-ray diffraction (XRD) data by Rietveld refinement method using MAUD software. Temperature dependent XRD is performed using the synchrotron facility at BL-12 beamline, INDUS-2, Raja Ramanna Centre for Advanced Technology, Indore. It is noteworthy to mention that $(Bi_{0.32}Sb_{0.68})_2Te_3$ shows structural phase transition at low-temperature. Further, lattice parameter, thermal expansion coefficient, Debye temperature etc. have been estimated from thermal variation of x-ray diffraction data. Temperature dependent resistivity [ρ(T)], carrier concentration (n) and thermopower [S(T)] measurement have been carried out down to 10K. S(T) data confirms that samples are p-type in nature. Temperature dependent Power factor ($PF=S^2/\rho$) has been estimated using [ρ(T)] and [S(T)]. Highest power factor obtained for x=0.80. Thermal variation of mobility and effective mass is calculated from the (n-T), (ρ-T) and (S-T) data. It is noteworthy to mention that temperature dependent resistivity, carrier concentration, thermopower data are corroborated and also correlated with the structural data.

Dr. Amitava Moitra, Assistance Professor,
Department of Physics,
Raidighi College

Multiscale Materials Modeling to Understand the Role of Defects in Deformation Mechanism

Abstract

Understanding how materials fail, ranging from earthquake to plane-crash, to bone-fracture, has always been of great importance to enable and advance technologies. These are governed by one common underlying theme: the breakdown of the basic constituents of material through defect-generation that leads to the failure of its overall structure and intended functionality. Computational modeling, in particular atomistic simulation, is becoming increasingly important in enriching our understanding at nanoscale materials behavior and in the development of such new technologies. In the present talk, I will be giving a general overview of the atomistic simulation in the context of multiscale modeling. It will be examined in the talk that how the defects are evolved in the system and how they interact with each other that leads towards particular material behavior. Finally it will be shown that with "inverse-multiscale-materials-modeling" approach, properly engineering these defects might lead to a platform of novel alloy design.

Keywords: *computer modeling and simulations, icme, atomistic simulation; nanoscale, material deformation*

Dr. Saurabh Niyogi, Assistance Professor,
Department of Physics,
Gokhale Memorial Girl's College

Electron (g-2) anomaly

Abstract

Experimentally, g*e* is one of the most precisely determined quantities in physics. In the Standard Model, g*e* is calculable as a function of α (the electromagnetic coupling constant) and other parameters. In the classical approximation g*e*=2, while the one-loop correction proportional to the first power of α was already known. A recent experiment in Berkeley announced a new ultra-precise measurement of the fine structure constant α using interferometry techniques. The Berkeley measurement allows one to reduce the relative theoretical error on *ae* down to 0.2 ppb (parts per billion) which matches in magnitude the experimental error and improves by a factor of 3 the previous prediction. The new measurement of g thus disfavours the Standard Model of Particle Physics which gives a tantalizing hint toward new physics.

A CASE STUDY TO EVALUATE NANOPARTICLE COATED CONCRETE'S ABILITY TO INHIBIT FUNGAL GROWTH

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Abstract: The vulnerability of concrete to microbial biodeterioration has been an important issue for concrete buildings' durability over time. Many researches have been conducted to prevent and treat concrete structures from deterioration among which the inclusion of nanotechnology is a recent one. Although the use of nanosilica in concrete industries for admixtures and nanocomposites has been known, the potency of nanosilica coating on concrete has not been widely evaluated yet. This study thus primarily emphasizes on the effectiveness of silicon dioxide nanocoating on concrete that has been subjected to fungal attack. A nanosilica coating was optimized and applied on concrete cube surface that was in turn infected with *Aspergillus tamarii* and monitored for any physical, chemical as well as visual changes for a period of six months. The visual analysis included colour changes, Stereo Microscopy and Scanning Electron Microscopy (SEM) which showed a considerable change in the surface deterioration and fungal colonization of biodeteriorated cubes more than the nanocoated concrete cubes. The physical tests included weight loss which showed positive in all the concrete specimens and compressive strength which increased in nanocoated concrete cubes more than that of the biodeteriorated ones. The chemical analysis included pH change in media, Fourier Transform Infrared Spectroscopy (FTIR) and Energy Dispersive X-Ray Fluorescence Spectroscopy (EDXRF) which showed that leaching of calcium ions from the concrete in biodeteriorated cubes was higher than that of nanocoated cubes. Altogether the effectiveness of silicon oxide nanocoating against biodeterioration of concrete by *Aspergillus tamarii* was concluded to be positive.

Keywords: Nanosilica, Concrete, SEM, FTIR, EDXRF.

POWER LAW MODEL APPROACH AND A LOOK INTO THE PARTICLE PRODUCTION DATA AT 530 GEV/C, 800GEV/C AND AT 7 TEV/C AND COMPARISONS WITH MIXED MODEL

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Abstract: Pions are most abundant variety of the secondaries produced in particles-particles and particle-nucleus collisions at high energies. At large transverse momentum (p_T), there is a copiousproduction of nutralpions, which decay mainly to $\gamma\gamma$, and are often studied simultaneously withπ^0 mesons. The ratio of η /π^0production is therefore sensitive enough to the relative fragmentation of the varieties of partons which can be obtained in the production of these secondaries. Our objective here is to provide an understanding of the nature of data on these two natural secondaries produced in π^--p,π^--Be, p-Cu and p-Be interactions at large transverse momenta and at high energies. We will deal with both(p_T) and rapidity (y) dependence of both the species of mesons andcomparisons between power law model and mixed model.
Keywords: Relativistic heavy ion collisions, proton - beryllium collision, π – beryllium collisions, inclusive production, power laws, mixed model.

SPECTRAL PROPERTIES OF BOUND AND RESONANCE DOUBLY EXCITED $^3F^e$ STATES OF HELIUM

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[a]Jogamaya Devi College Kolkata
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Abstract: Highly precise non-relativistic energy eigenvalues of doubly excited 2pnf ($^3F^e$)[n=4-9] meta-stable bound states of helium are being calculated by using Ritz variational method. The generalized variational equation has been used [1] for calculation. We have taken multi-exponent Hylleraas basis sets [1] to ensure the inclusion of electron correlation effects. The basis set contains total 1530-terms and the energy eigenvalues are obtained by diagonalization technique [2]. Resonance energies and widths for a wide range of resonance states ($^3F^e$) of helium below N = 3 ionization threshold of He^+have also been evaluated by using stabilization method [3]. Present data have been compared with the available theoretical estimates in the literature. The present resonance parameters *i.e.* the resonance energies and widths are in good agreement with the few available accurate theoretical results [4-6]. For the first time we have found the resonance states ($^3F^e$) of He atom above N = 3 ionization threshold of He^+. With the advancement of experimental techniques [7, 8], it becomes important to make precise theoretical studies on doubly excited states. The present method can be applied for other resonance states of different symmetries with sufficient number of terms in the Hylleraas basis set to yield accurate resonance parameters and to provide useful structural information of Helium like systems.
Keywords: Doubly excited states, variational method; Hylleraas basis; stabilization technique

DETERMINATION OF THE SINGLE PARTICLE DISTRIBUTION FUNCTION IN A WEAKLY CORRELATED WEAKLY INHOMOGENEOUS PLASMA

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Abstract: Plasma can be thought of as a many body system where coulomb interaction holds the key to determine its statistical nature. Lowering the temperature and raising the density of plasma gradually shifts the balance in a continuous manner so that the individual effects in the form of binary collision becomes important and drifts the system to the so called 'correlated plasma systems'. This is the regime where discrete nature of plasma begins to take effect. Consequently detail kinetic theory is needed to explore the system under consideration. In this context, an equation of pair correlation function has been derived from the Bogoliubov-Born-Green-Kirkwood-Yvon (BBGKY) hierarchy for inhomogeneous plasma under certain approximations. A solution of this equation has been obtained under certain conditions.

PREPARATION OF MESOPOROUS MANGANESE AND TITANIUM OXIDESNANOCOMPOSITE AS A NOVEL PHOTOCATALYST DEGRADATION OF ORGANIC DYES

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Abstract: In this study, mesoporous manganese oxide-titanium dioxide (TiO_2/Mn_2O_3) nanocomposites have been synthesized followingsol-gel method. Different molar ratios of Mn/Ti were evaluated and MT2 (1:5) showed the best photoactivity. From UV spectroscopy, it has been seen that the absorption properties of TiO_2/Mn_2O_3 over the whole region of visible light which enable the materials as remarkable photocatalyst for degradation of Malachite green under visible region.This composite possesses increased BET surface areas and large pore sizes. Simply, by adjusting the amount of manganese precursors in the synthesis the pore sizes can be tuned.The Langmuir-Hinshelwood model was delineated to calculate the reaction rate which was found to be highest for MT2 (min^{-1}). This was attributed to the high surface area (121.81 m^2/g) as per Brunauer-Emmett-Teller (BET) methodwhich are desirable for efficient photoactivity.

Keywords: Nanocomposite; mesoporous; photoactivity. Bet surface area.

THERMOACOUSTIC ENGINE: A NOVEL AND SIMPLE SOLUTION FOR RURAL POWER GENERATION

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Abstract: A thermoacoustic engine is capable of generation of electrical power by running a small generator. Proper application of the science of thermoacoustics may lead to the small scale development of a portable thermoacoustic engine which can act as a small power source in a rural set-up. Here the development of a simple stationary wave thermoacoustic source is discussed which can be assembled using simple day to day materials that can be procured from the laboratories of any under graduate college. The stack is generally known to be the essential part of any thermoacoustic engine and which may be of various physical and material characteristics. In our thermoacoustic engine a novel stack has been used for the first time. With proper implementation such thermoacoustic engine can utilize solar power and that too in an environment friendly way. The whole process of development of such engine can well be undertaken in a week long project by the undergraduate students majoring in Physics.
Keywords: Thermoaocoustics, Heat pump, Heat engine, Brayton cycle

PARA-FERRO PHASE TRANSITION IN DENSE QUARK SYSTEM

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Abstract: The cardinal focus of the present article is to investigate the possibility of the para-ferro phase transition of dense quark system. For these, the calculation of single-particle energies, ground state energy (GSE) densities, and spin susceptibility χ of degenerate quark matter with one gluon exchange interaction in terms of spin-dependent Landau parameters (LPs) have been presented. The expressions for the GSE and χ of cold and dense spin-polarized quark matter have derived with corrections due to correlation. Furthermore, the magnetic properties of spin-polarized quark matter have been discussed by evaluating the magnetization $\langle M \rangle$ and magnetic susceptibility χ_M in terms of LPs. Finally, the possibility of magnetic instability has been revealed by studying the density dependence of $\langle M \rangle$ and χ_M.

Fe_3O_4/REDUCED GRAPHENE OXIDE HYBRID: INVESTIGATION OF ELECTROCHEMICAL PROPERTIES FOR SUPERCAPACITOR APPLICATION IN PRESENCE OF EXTERNAL MAGNETIC FIELD

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[b]Surface Physics and Materials Science Division, Saha Institute of Nuclear Physics, Bidhannagar, West Bengal, India
[c]Department of physics, Presidency University, Kolkata, India

Abstract: The constant demands of energy storage on large scale instigate researchers to realize supercapacitor devices. In this work, we have fabricated reduced graphene oxide anchored Fe_3O_4 hybrid supercapacitor electrode material by a facile one-pot hydrothermal route. The electrochemical performance of the hybrid supercapacitor was tested in a two-electrode electrochemical device by coin cell method using 1 M Na_2SO_4 as an electrolyte. The external magnetic fields have huge impact on the electrochemical processes which enhance the supercapacitor performance of the magnetic samples. The capacitance value and energy density increased by almost two fold due to small external magnetic field. We have compared the performance of our supercapacitor with previously reported supercapacitor made from iron oxide, which shows that magnetic field assisted electrochemical performance of our fabricated supercapacitor electrode material is comparable to/better than other reported supercapacitor electrode material. We believe this straightforward fabrication of hybrid supercapacitor electrode and the capacitance enhancement in presence of magnetic field could be important for practical electronic and energy storage devices. These findings present a potential revolution of traditional electrochemical capacitors by simply applying an external magnetic field to enhance the capacitance dramatically without material replacement and structural modification.

Key words: Fe_3O_4 /rGO hybrid, cation intercalation/de-intercalation, long cycle life, magnetic field induced capacitance enhancement, high energy density

2-D BISMUTH OXYCHLORIDE NANOPLATES/MULTIWALL CARBON NANOTUBE NANOCOMPOSITES FLEXIBLE SUPERCAPACITOR

Shibsankar Dutta[a*], Shreyasi Pal[b], Debopriya Sikder[a] and Sukanta De[a]
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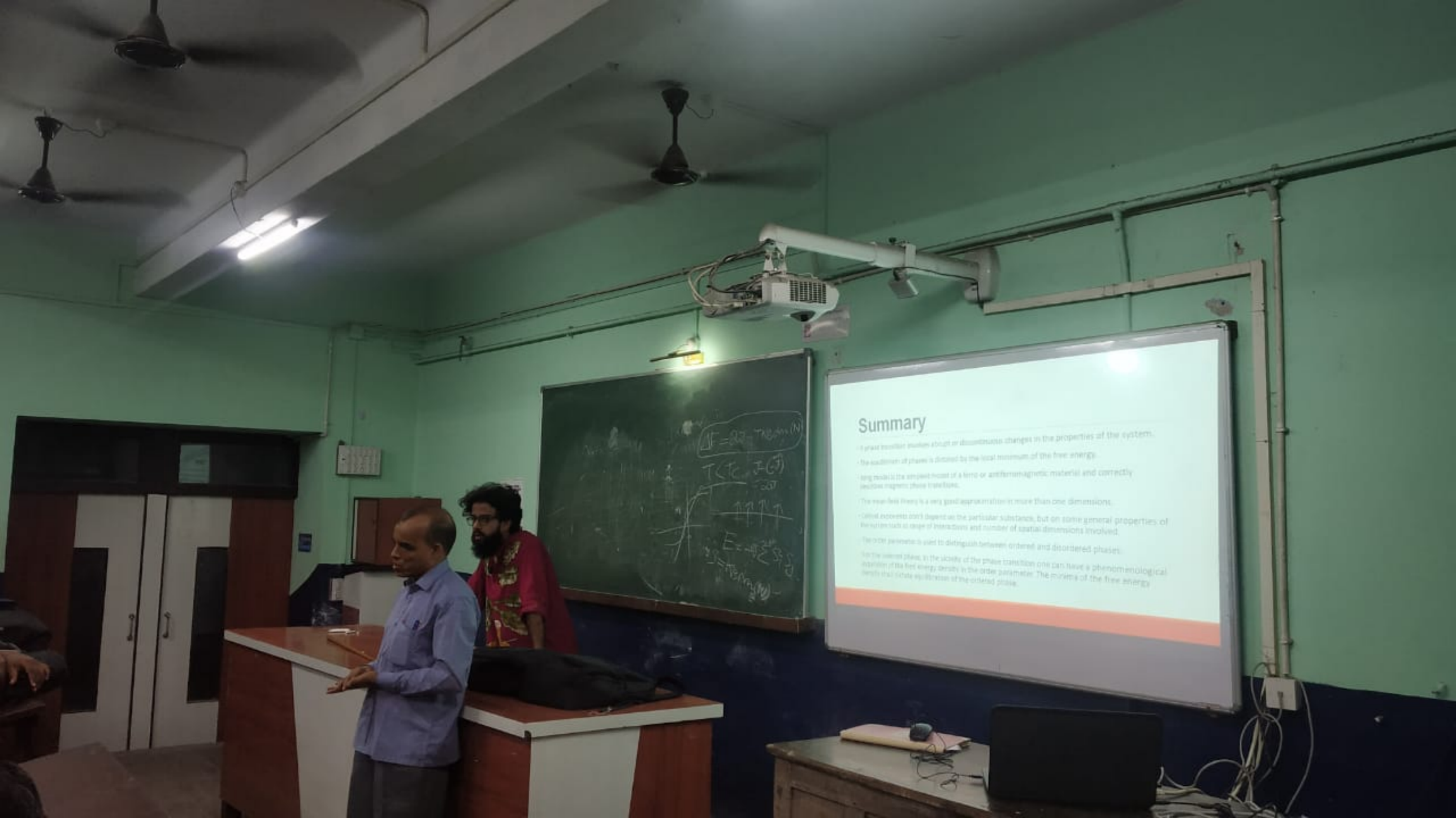
Abstract: We have adopted a simple, cost-effective hydrothermal approach for the fabrication of scalable amount of 2-D bismuth oxychloride (BiOCl) nanoplates. A remarkable electrochemical performance has been obtained for BiOCl/MWCNT flexible solid state symmetric supercapacitor (FSSC). Among the various weight ratios between the BiOCl and MWCNT, 60% BiOCl loaded electrodes ($FSSC_{60}$) delivers a highest specific capacitance of 421F/g at 5mV/s. Furthermore, $FSSC_{60}$ shows a high energy density of 14.62 Wh/kg at power density 947.5 W/kg compared to previously reported bismuth materials. The $FSSC_{60}$ shows excellent durability with 94% initial specific capacitance after 2000 cycles. On the other hand the specific capacitance value was almost remained same during different bending angles (0°, 45°, 90°, 135° and 180°) at10 mV/s.

Keywords: BiOCl nanoplates, Flexible Supercapacitor, High energy density, long cycle life.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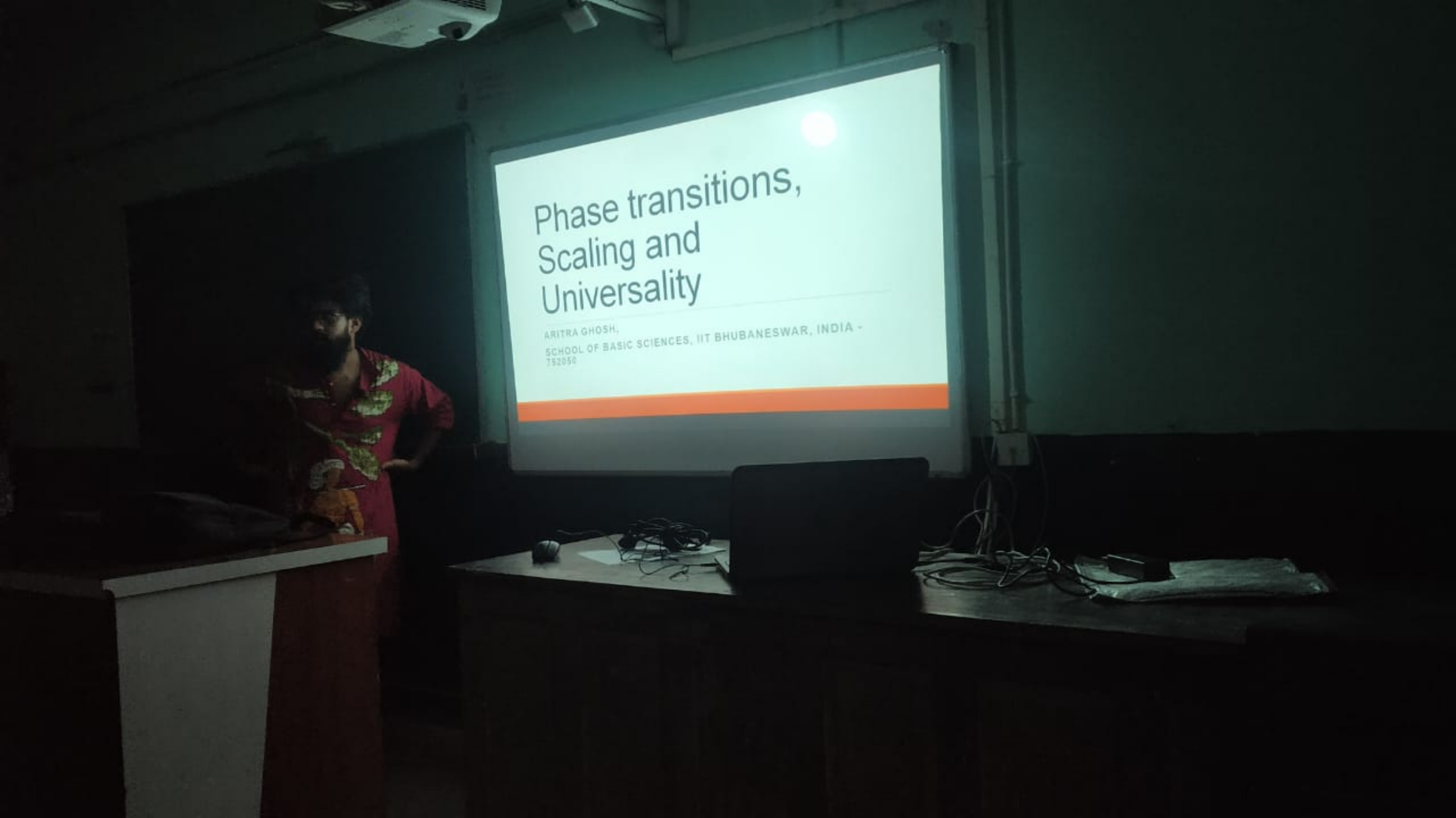
Phase transitions,
Scaling and
Universality
ARITRA GHOSH,
SCHOOL OF BASIC SCIENCES, IIT BHUBANESWAR, INDIA -
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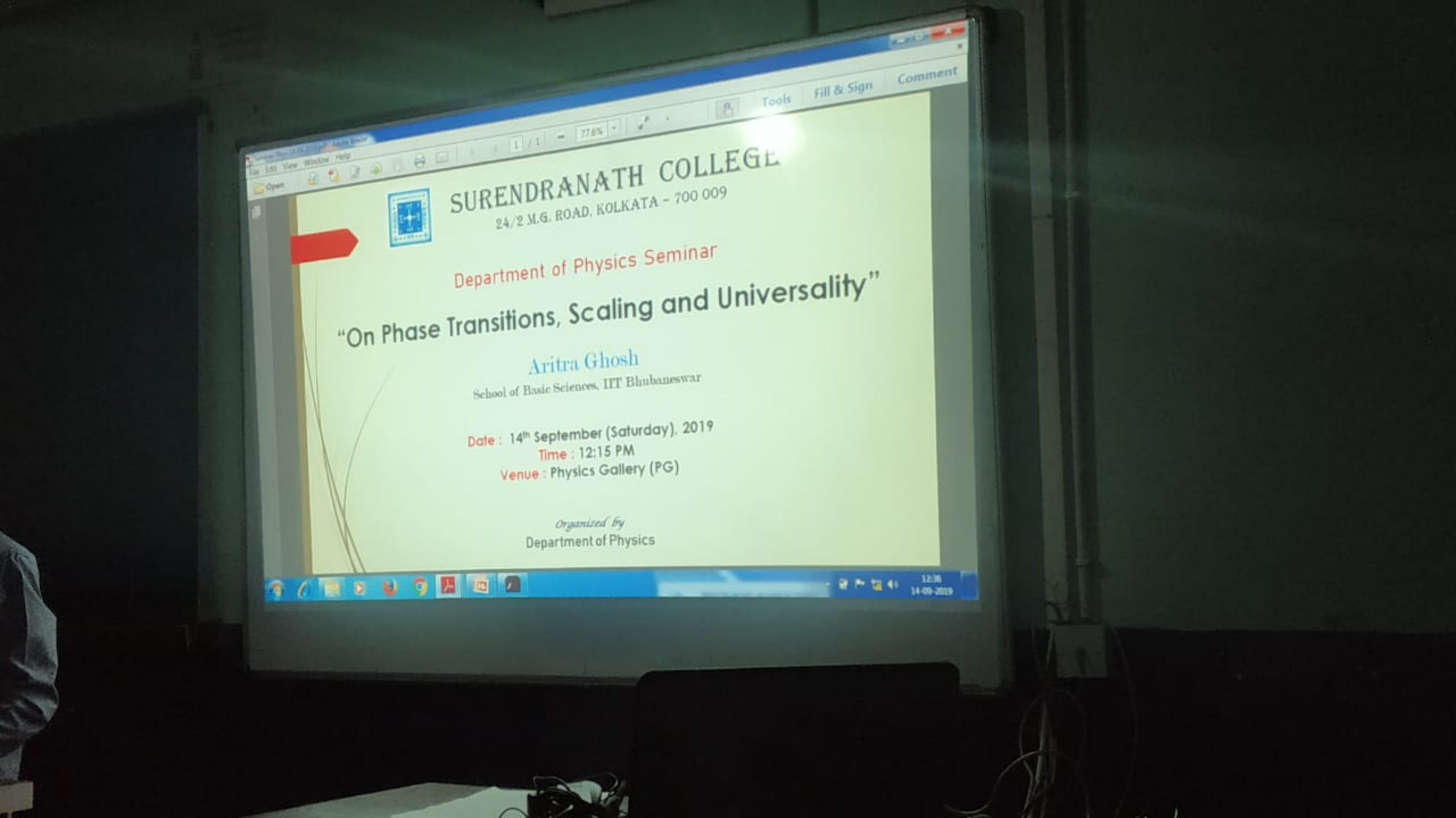
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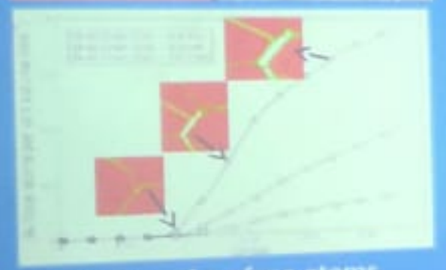
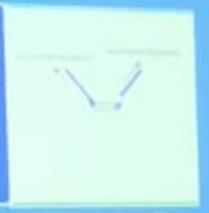
"On Phase Transitions, Scaling and Universality"
Aritra Ghosh
School of Basic Sciences, IIT Bhubaneswar
Date : 14th September (Saturday), 2019
Time : 12:15 PM
Venue : Physics Gallery (PG)
Organized by
Department of Physics

Deformation modes (voids, dislocations & twins)

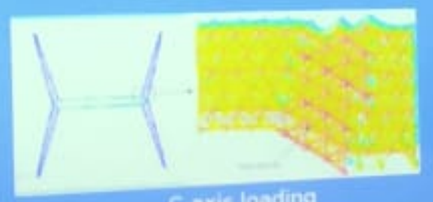


Evolution of surface atoms

Prismatic



C-axis loading



C-axis loading

TMS 2011 Proceedings, San Diego, CA

Comp. Mat. Sc. 48, 476, 2010


National Conference
on
SCIENCE & TECHNOLOGY - RURAL DEVELOPMENT
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Thermodynamic potentials and equilibria

Since thermodynamic phase transitions occur at a fixed value of p and T, the appropriate potential is the Gibbs' potential

$$G = G(T, p)$$

There is an exchange of particles between coexisting phases one may take $G = G(T, p, N)$ and define the chemical potential as:

$$\mu = \partial G / \partial N$$

Phase Transition

$G = H - TS$

At the phase transition the Gibbs free energy of the two states is identical

Image source: https://slideplayer.com


EXIT