Report on the
Two Days National Conference on
RECENT ADVANCES IN PHYSICAL & CHEMICAL SCIENCES

Organized by: Department of Physics and Department of Chemistry, Kandi Raj College

In collaboration with: IQAC, Kandi Raj College

Funded by: Theoretical Physics Seminar Circuit, S. N. Bose National Centre for Basic Sciences, Kolkata & Kandi Raj College, Kandi, Murshidabad

Date: 12th & 13th December, 2024

Venue: NH Hall, Kandi Raj College, Kandi, Murshidabad.
Objective: The purpose of this conference is to inspire and engage undergraduate students in the fields of physics and chemistry. This conference provides a unique platform for students to kindle their interest in higher studies & research, solitary network with peers and professionals, and explore the latest advancements in these dynamic fields.

The Department of Physics and Department of Chemistry, Kandi Raj College, organized a two days national conference on **'RECENT ADVANCES IN PHYSICAL & CHEMICAL SCIENCES'** on 12th and 13th December, 2024. The event, attended by 127 Student Participants, 11 Invited Speakers and 8 Faculty members / Researcher (As contributory Oral/Poster Presenter) from various University/ Institute/ College.

Inaugural Session:

The conference began with **introductory speech by** Dr. Satyapriya Bhandari, one of the convenors from Kandi Raj College.
Green Inauguration took place by all present in the Hall followed by welcome address by Dr. Soma Datta, Principal, Kandi Raj College. Next was Address by IQAC Coordinator, KRC followed by Address by Convener, SNBNCBS Kolkata

Day 1, Session 1: This session was chaired by Dr. Anindita Shit, Assistant Professor, Department of Chemistry, Kandi Raj College

Speaker: Dr. Srestha Basu, *Chemical Sciences Division, Saha Institute of Nuclear Physics, Kolkata 700064, India.*
Time: 9:45 am – 10:45 am.
Title of the Talk: **Chiral Luminescent Materials for Theragnostic.**
Dr. Basu explained the application of Chiral nanostructures, constituted of both organic and inorganic materials, fabrication of circularly polarized luminescence (CPL) active materials, utilizing nanoscale particles as the fundamental building blocks. She discussed about the monitoring of cholinesterase enzyme activity in blood plasma using near infrared fluorescent single- walled carbon nanotubes (SWCNTs) as probes. The talk ended with a **10-minute Q&A.**

Speaker: Dr. Ritabrata Biswas, *Department of Mathematics, The University of Burdwan.*
Time: 10:45 am – 11:00 am.
Title of the Contributory Talk: **Spectroscopic Properties Near the Redshift where Dark Energy became Dominant**

Speaker: Dr. Md. Firoj Hossain, *Department of Chemistry, University of North Bengal.*

Time: 11:00 am – 12 noon.

Title of the Talk: **From Molecules to Miracles: How Chemistry Transforms Life**

Dr. Hossain delves into the fascinating world of molecular transformations, exploring how chemical reactions drive the innovations that define modern living. We'll uncover the secrets behind ground breaking research in pharmaceuticals, environmental science, and materials engineering, demonstrating how chemistry is essential in tackling global challenges. The talk ended with a **10-minute Q&A.**

Speaker: Dr. Manik Banik, *Department of Physics of Complex Systems, S. N. Bose National Centre for Basic Sciences, Kolkata.*

Time: 12 noon – 1:00 pm.

Title of the Talk: **বেল-এর উপপাদ্য: আইনস্টাইনের বাস্তবতা ও স্থানিকতা সম্পর্কিত ধারণা ও কোয়ান্টাম তত্ত্ব**

Dr. Banik explored concepts and their profound implications of Bell's theorem, which conclusively showed that no local hidden variable theory can replicate quantum predictions. The talk was followed by an **interactive discussion**.

Day 1, Session 2: **This session was chaired by** Dr. Sandip Bhattacharya, Assistant Professor, Department of Physics, Kandi Raj College

Speaker: Dr. Guru Prasad Kar, *Physics and Applied Mathematics Unit, Indian Statistical Institute, 203 B.T. Road, Kolkata 700108, India.*

Time: 2:00 pm – 3:00 pm.

Title of the Talk: **ABC of Special Relativity**

Dr. Kar discussed the Ether theory for light propagation and Michelson-Morley experiment in the context of mechanism of wave propagation in a medium. Then he discussed general consequences of the postulates of STR. The talk was followed by an **interactive discussion**.

Speaker: Dr. Rajib K. Mitra, *Department of Chemical and Biological Sciences, S. N. Bose National Centre for Basic Sciences, Kolkata.*

Time: 3:00 pm – 4:00 pm.

Physics and Chemistry of Life

Dr. Mitra showed that Biological systems and processes are complex and multi-steps involving various participants with a very large number of degrees of freedoms. However, all these processes are essentially governed by some basic physical and chemical laws. He tried to correlate a few of such complex processes in the light of simple Title of the Talk: physical laws. The talk ended with a **10-minute Q&A.**

Speaker: Dr. Ramij Rahaman, *Physics & Applied Mathematics Unit, Indian Statistical Institute 203 B.T. Road, Kolkata 700108*

Time: 4:00 pm – 5:00 pm.

Title of the Talk: **Secure communication beyond classical limits**

DR. Rahaman discussed several classical cryptographic protocols e.g., RSA, secret sharing, etc., and their security vulnerabilities, particularly in the context of quantum computers. The talk ended with **Q&A.**

Day 2, Session 1: This session was chaired by Dr. Shuvojit Paul, Assistant Professor, Department of Physics, Kandi Raj College

Speaker: Dr. Ananda Dasgupta, *Department of Physical Science, Indian Institutes of Science Education and Research Kolkata*
Time: 9:30 am – 11:00 am.
Title of the Talk: **How birds flock: a look at the physics of active matter**
Dr. Dasgupta explored simple models and notions drawn from non- equilibrium statistical mechanics to understand how this phenomenon emerges. The talk ended with **Q&A.**

Speaker: Dr. Sabyasachi Pramanik, Assam Energy Institute (center of Rajiv Gandhi Institute of Petroleum Technology, Jais, UP), Sivasagar, Assam -785697.
Time: 11:15 am – 12:15 pm.
Title of the Talk: **Chemistry in Petroleum Industry: Molecule to Market**
Dr. Pramanik discussed the journey from molecule to market in the petroleum industry is a complex chemical odyssey that transforms raw hydrocarbons into the fuels and products that power modern life. The talk ended with **Q&A.**

Speaker: Dr. Arindam Chakraborty, *Heritage Institute of Technology, Kolkata-107*
Time: 12:15 pm – 1:15 pm.
Title of the Talk: **Boson Realization of Deformed Higgs algebra**

Dr. Chakraborty extends the concept of Lie algebraic formulation in cases when the relevant commutation relations involve **polynomials of one or more of the generators** of the algebra and the subsequent representation of such algebras in terms of raising and lowering operators characteristic to a bosonic system, a trick called **boson realization**. One of the earliest mentions of PAMA is called **Higgs algebra.** The talk ended with I9 Q**&A.**

Speaker: Debabrata Pal, *Gokhale Memorial Girls' College*
Time: 1:15 pm – 1:30 pm.
Title of the Contributory Talk: **Impact of Physical and Chemical Sciences on the Progress of Nanoscience and Nanotechnology**

Day 2, Session 2: This session was chaired by Mr. Sourav Majumder, Assistant Professor, Department of Chemistry, Kandi Raj College

Poster Session:
Time: 1:30pm – 2:15 pm

1. **Title of the Poster:** Bright White Light & Food Colorant Detection with FRET-based Surfactant-Coupled Quantum Dot Complexes
   Presenter: Sumit Singha, University of North Bengal

2. **Title of the Poster:** Revamping Metal Halide Perovskites: The Key to Cutting-Edge White Light Emitting Nanocomposites
   Presenter: Dr. Mihir Manna, Saha Institute of Nuclear Physics

3. **Title of the Poster:** Artificial Neural Network (ANN) Mechanism: An Introduction
   Presenter: Dr. Basir Ahamed Khan, Krishnath College

4. **Title of the Poster:** Ab initio perturbative treatment of isomerization avenue of diphosphene and diphosphinylidene
   Presenter: Dr. Suvonil Sinha Ray, Ramananda College

Speaker: Hirak Kumar Chandra, *Krishnath College*
Time: 2.15 P.M. – 2.30 P.M
Title of the Contributory Talk: **Quantum spin Hall effect and emergence of conducting edge states in silicene supported by MX (M = Ga, In; X = S, Se, Te) monolayer**

Speaker: Dr. Debobrata Sheet, Chemistry, *Presidency University Kolkata*
Time: 2.30 P.M. – 3.30 P.M
Title of the Talk: **Immobilized Biomimetic Iron Complexes on Silica Nanospheres as Heterogenous Catalyst for Oxidative Degradation of Pharmaceutical-Pollutants from Water**

Dr. Sheet discussed the removal of organic pollutants, which may cause irreversible health issues, through contemporary biological degradation mechanisms and conventional physical techniques. The demand for clean water has stimulated technological innovations for removing these recalcitrant organic contaminants. The talk ended with Q**&A.**

Speaker: Dr. Shilaj Roy, Assistant Editor, Wiley
Time: 3.30 P.M. – 4.00 P.M
Title of the Talk: **Editor's Blackbox**

Dr. Roy explains that publishing an article in a reputed journal after successful accomplishment of research is very crucial to get recognized by the scientific community in terms of responsibility, fame and fortune. He showed us that at Wiley, publish plenty of journals from a wide range of scope of subjects, ranging from biomedical to polymer, material, energy, catalysis, optics, engineering, photonics, interface science and so on. The talk ended with Q**&A.**

Conclusion:

The seminar concluded with a **Vote of Thanks** by **Dr. Abhijit Dutta, Convener RAPCS-2024, Department of Physics, Kandi Raj College,**. The event provided valuable insights into national conflict, fostering intellectual exchange among students and faculty and inspire students for higher education and research.

All the photos of this conference are available in the following drive:

https://drive.google.com/drive/folders/1rJUjFrrZxsa7gDst4vMZXII8-lAPuA_P

All The Videos are available in Kandi Raj College Official YouTube Channel:

https://www.youtube.com/@kandirajcollegeactivities9884

Prepared By:
Dr. Abhijit Dutta
Convenor, RAPCS 2024
Head In-Charge,
Department of Physics,
Kandi Raj College, Kandi, Murshidabad.