



A
State Level Seminar

On

EMERGING TRENDS IN HIGH ENERGY PHYSICS

Organized by

**DEPARTMENT OF PHYSICS
PATTAMUNDAI COLLEGE,
PATTAMUNDAI
KENDRAPARA ,ODISHA**

In Collaboration with

**Department of Physics
Kendrapara Autonomous College
Kendrapara, Odisha**

Date- 17.01.2025

**Venue: -Auditorium Hall
PATTAMUNDAI COLLEGE
PATTAMUNDI**



ABOUT THE COLLEGE

The genesis of Pattamundai College dates back to the sixties of the last century when its foundation was laid on 1st June, 1967, though it started functioning since 5th July of 1970. This locality, a breadbasket of the district, turned proverbially backward both socially and economically as it became the continual haunt of natural calamities like cyclone, flood and drought, as it is even now, and there was no scope at all for higher education, the obvious catalyst for socio-economic transformation. The only college at Kendrapara, some 20 kms away and logistically disadvantageous for access then, had limited scope to cater to the academic need of the aspiring young college-goers of this vast locality. At this crucial juncture, a team of education lovers and activists starting with some college stu

dents of this land in Cuttack city, to the local activists and enthusiasts from the social gentry, came forward for establishment of a college for the benefit of all concerned. Launched as an Arts college with only 128 students, it has grown to its present premier position with two other streams of science and commerce and 1475 students on its rolls with 15 programs at UG level. With an eventful history of 50 years and a picturesque sprawling campus of 14.6 acres, it is indeed a testimony to the dream and sacrifice of our predecessors. Its alumni, globally positioned today are its identity markers and this institution has been playing a pivotal role in development of its satellite localities. Affiliated permanently to Utkal University, this college has been listed under 2(f) and 12 B of the UGC Act vouchsafing its academic standard and administrative acumen. The addition of new buildings, hostels, library, laboratories and playground over the years has not only given a new dimension to its infrastructure but also has facilitated the expansion of curricular and extra-curricular horizons. Quite ahead of its contemporaries, it has adopted new technology of ICT facilities, library automation, Wi-Fi campus, online classes, green initiatives, etc. by adopting the modern change to meet the expectation of its stakeholders.

VISION

Vision of the College is

- To make higher education qualitative and value based for the socio-economic transformation of the nation.
- To instill a sense of discipline and morality among the student's community for the making the students socially responsible citizens.

MISSION OF THE COLLEGE

- To grow into an institution of excellence and exemplary at the university level.
- To provide literary, scientific, professional and technical education to the aspiring rural youth at a minimum cost.
- To be recognized as an institution with proven capacity to provide quality education in Science, Commerce & Arts; Humanities.

- To create symbiotic relationship with the society to meet the changing needs to introduce self-financing courses in multidisciplinary area.
- To adopt continues measures to improve the quality of the programme.
- To provide need-based career-oriented courses to the needs of the society to involve the Alumni for all round development of the college.

GENESIS OF THE DEPARTMENT

Pattamundai College, Pattamundai is a leading Degree College in the State imparting education in Arts, Science & Commerce Stream at Degree level. The college has successfully completed 53 years of its existence producing many bright scholars in different field. Pattamundai College, Pattamundai was established on 1970-71. Science in University level was opened during the academic year 1989-90 vide G.O. No- 54802/EYS dt.13.12.1990 and Physics at degree course was started on 1989-90. The Department of Physics also has a bright academic portfolio since its inception. From the very beginning, the department is extremely student co-operative and attracts brilliant students to study Physics as an honours. The department is constantly maintaining a 95% result in the examination conducted by Utkal University. The department annually conduct student seminar, extramural seminar, State level seminar, Mentor-Mentee Programme, Field visit to eminent institutions etc. Many of the students of the department have secured important position and pursuing career in Physics, which is available in the webpage of the institution www.pattamundaicollege.ac.in /alumni registration. The student of this department has excelled in different competition at college and inter college level. The faculties of this department are constantly updating their knowledge by joining national seminar, workshop, refresher course, FDP, short term course organized by premier educational institution of India. The department is well equipped with modern ICT facilities like LCD Projector, Mechanics Lab, Optics Lab, Electronics Lab, Computer Lab and Laptops etc. for the benefit of students. Currently Dr. Ramesh Kumar Sahoo is heading the department with other faculty members Mr. Baikunth Charan Roul, Mr. Amit Kumar Sahoo and Mr. Satyabrata Biswal with Lab Attendants Mr. Pandu Jena and Mr. Chandramani Jena.

ABOUT THE PROGRAMME THEME & OBJECTIVES

Creating a Baby Universe at the Large Hadron Collider

If the Universe is the answer, what is the question? The quest for understanding the beauty of nature in the domain of subatomic physics has made path-breaking discoveries in modern-day physics. The questions which appear always in our mind are: What are the ultimate building blocks of matter? How did the Universe start? What happens to matter when it is heated to 100,000 times the temperature at the core of the Sun? Why do protons and neutrons weigh 100 times more than the quarks they comprise? Can the quarks inside the protons and neutrons be freed? To address these fundamental questions, the Large Hadron Collider (LHC) experiment at CERN (European Center for Nuclear Research), Geneva, which is the world's largest particle physics experiment,

collides protons and heavy nuclei at a speed of 99.999999 % of the speed of light in vacuum. The LHC houses the 27 Km particle accelerator under the Swiss-French border with gigantic subatomic particle detectors to study the debris produced in these Big Bang collisions. In this public lecture, I shall try to address some of these fundamental questions and focus on how LHC has become a marvel of science and technology with potential discoveries with societal applications.

A double-slit experiment at LHC: from nanometre to femtometre

The scientific understanding of light has undergone significant evolution, marked by pivotal theories and experiments that have shaped modern physics. The journey began with Isaac Newton's corpuscular theory, which depicts that light consists of particles. This theory successfully explained optical phenomena such as reflection and refraction but struggled with diffraction and interference, indicating the need for a broader explanation. In response, Christiaan Huygens proposed a wave theory of light in the late 17th century. Huygens suggested that light travelled as waves in the ether, a hypothetical medium, with each point of a wavefront acting as a source for new wavelets, a principle that later bore his name. This theory offered a convincing explanation for phenomena that Newton's framework could not, particularly the wavelike behaviors of diffraction and interference.

The wave theory gained substantial empirical support from Thomas Young's double-slit experiment in the early 19th century. Young demonstrated that when light passes through two close slits, it creates an interference pattern on a screen, a hallmark of wave behavior. This experiment decisively supported the wave theory of light. Building on these ideas, James Clerk Maxwell made a groundbreaking contribution in the mid-19th century by formulating the theory of electromagnetism, which described light as an electromagnetic wave. Maxwell's equations unified previously separate theories of electricity and magnetism and predicted that light was a form of electromagnetic radiation, thus expanding the understanding of light to include the entire electromagnetic spectrum, not just visible light.

Entering the 20th century, the concept of light took another transformative turn with Albert Einstein's explanation of the photoelectric effect in 1905. Einstein proposed that light could also be understood as discrete packets of energy, or photons, effectively introducing the notion of wave-particle duality. This duality was further explored in experiments such as Claus Jönsson's electron double-slit experiment in 1961, which showed that even electrons exhibited wave-like interference patterns.

Most recently, the ALICE collaboration has extended this study of quantum interference at femtometer scales, pushing forward the frontiers of quantum physics. This study of the quantum interference from the coherently produced ρ^0 vector meson not only deepens our understanding of interference effects at the femto scale but also contributes to the broader exploration of the quantum behaviors of matter. This series of theoretical developments and experimental validations highlights the dynamic and evolving nature of scientific understanding, particularly in the realm of fundamental physics.

INVITED SPAEKERS

Prof. Raghunath Sahoo, Ph.D., FNASc, FInstP, Professor in Physics, Indian Institute of Technology Indore, Deputy spokesperson and Chairperson of the ALICE-STAR India Collaboration, CERN Scientific Associate during 2021-2022, Associate Dean of International Relations at IIT Indore, Elected Fellow of the National Academy of Sciences, India (NASI), the oldest Science Academy of India & Fellow of the Institute of Physics, United Kingdom



Dr. Arvind Khuntia, INFN Postdoctoral Fellow, INFN Bologna, Italy, Global Postdoctoral Fellow, Czech Technical University in Prague, Czech Republic, Adjunct Assistant Professor, IFJ PAN (Polish Academy of Sciences), Krakow, Poland



CALL FOR PAPER PRESENTATION & GUIDE LINES

Research Papers/Papers are invited in the form of original works from the researchers, teachers, research scholars, social workers and students. Two hard copies and one soft copy (CD) of full paper are to be submitted. Medium of research paper can be in English only in MS-word (Times Roman font size 12.5 having 1.5 spacings). Authors are requested to follow strictly the specification given below without which it would be very difficult for the selection of papers for publication. Submission of Abstracts and the research paper should be submitted with the following information and in this order

- Title of Abstract
- Name & Designation of Authors(s)
- Institutional affiliation
- E-mail address
- Mob- Number
- Body of Abstract
- Key Words alphabetically.

The abstract should not exceed three hundred words (300 Words) and a full paper not more than three thousand words (3000 words).

Authors are requested to kindly send the abstracts and full papers through E-mail Id physics.pmc@outlook.com.

CHIEF PATRON

Mr.Dillip Kumar Bhuyan, Principal

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13. Mr. Ganeswar Das, Demonstrator in Zoology
14. Mr. Gokuli Charan Dash, Demonstrator in Chemistry
15. Mr. Satyabrata Biswal, Demonstrator in Physics
16. Mr. Abhimanyu Mohanty, Demonstrator in Botany

There will be a provision for Tea/Snacks and Lunch. No TA/DA will be provided.



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<https://maps.app.goo.gl/QsdaMSpz4qtsezP17>



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