



# National Symposium on Recent Trends in Physics - 2026

Organized by

Department of Physics

School of Natural Sciences

Central University of Jharkhand, Ranchi

in collaboration with Indian Association of Physics Teachers (IAPT-RC 20)

**DATE: February 3 - 4, 2026**



## ABOUT CENTRAL UNIVERSITY OF JHARKHAND, RANCHI

The Central University of Jharkhand (CUJ), established under the Central University Act, 2009, is a leading institution focused on innovative education and advanced research. It offers integrated UG/PG, postgraduate, and Ph.D. programs across diverse disciplines, emphasizing curricular flexibility, interdisciplinarity, and collaborative research. CUJ faculty are nationally and internationally recognized through fellowships, funded projects, and consultancy, contributing actively to academia, industry, and government. The university holds a NAAC A+ accreditation, ranks among India's top 300 institutions in NIRF, and was listed among the top 1000 universities worldwide by Times Higher Education (2020). Located in Ranchi, CUJ spans a 510-acre smart-city campus at Cheri-Manatu, Kanke, along with a 45-acre green campus at Brambe, offering a serene and well-equipped environment for learning and research.

## ABOUT SCHOOL OF NATURAL SCIENCES

The School of Natural Sciences (SNS) at CUJ comprises the Departments of Physics, Chemistry, Mathematics, Statistics, and Life Sciences, serving as a core pillar of the university's academic framework. SNS offers undergraduate, postgraduate, and Ph.D. programs with a strong emphasis on modern scientific advancements and project-based learning, fostering critical thinking, research orientation, and interdisciplinary exploration. The school is dedicated to nurturing ethically grounded, skilled professionals and future leaders by strengthening students' logical reasoning, problem-solving abilities, and research competence to meet contemporary and future scientific challenges.

## ABOUT THE DEPARTMENT OF PHYSICS

The Department of Physics (DoP) at CUJ offers B.Sc., M.Sc., and Ph.D. programs with a strong focus on cutting-edge technologies and interdisciplinary learning, serving both physics majors and students from across the university. The department builds a solid foundation in basic and engineering sciences while promoting early research exposure through faculty-led projects starting at the undergraduate level. Ph.D. research spans areas such as Experimental Condensed Matter Physics, Atomic and Molecular Physics, High Energy Physics, Experimental Nuclear Physics, and Applied Optics/Photonics. Supported by initiatives like DST-FIST, the department is developing state-of-the-art experimental and theoretical laboratories, integrating hands-on laboratory training with classroom learning. Active research areas include condensed matter and nanomaterials, graphene, photonics and nanophotonics, lasers, photovoltaics, sensors, optoelectronic materials, and quantum transport in nanosystems, preparing students to address present and future technological challenges.

## ABOUT NATIONAL SYMPOSIUM ON RECENT TRENDS IN PHYSICS - 2026

The Topics of Seminar are broadly classified into seven areas.

### I. Quantum Computing and Quantum Technologies

- Harnessing qubits to achieve computation beyond classical limits.
- Applications in cryptography, optimization, simulation and secure communication.
- Quantum algorithms such as Shor's and Grover's transforming computation paradigms.
- Quantum sensors enabling unprecedented precision in timekeeping and measurement.
- Research on scalable qubit architectures: superconducting, photonics, trapped ions, and spin-based systems.

### II. Artificial Intelligence & Machine Learning Applications in Physics

- Data-driven modeling for complex systems such as plasma, astrophysics and condensed matter.
- ML-enhanced simulations accelerating computational physics.
- AI-based pattern recognition in particle detectors and observatories.
- Neural networks for solving differential equations and quantum many-body problems.
- Automation of laboratories using intelligent experimental control systems.

### III. Advanced Materials and Smart Functional Materials

- Development of materials with tunable electrical, magnetic, and optical properties.
- Smart materials responding to heat, stress, fields, or chemical stimuli.
- Nanomaterials and metamaterials with engineered structure-dependent functionalities.
- Superconductors, topological insulators, and 2D materials for next-gen technologies.

### IV. Physics for Addressing the Global Energy Crisis

- Innovations in solar, wind, and fusion-based renewable energy technologies.
- Energy harvesting through quantum devices, thermoelectrics and advanced materials.
- High-efficiency battery and supercapacitor research driven by condensed-matter physics.
- Smart grids, power optimization, and minimal-loss transmission.
- Modeling climate-energy interactions for sustainable energy planning.

### V. Space Physics, Astrophysics & Planetary Science

- Study of cosmic rays, solar wind, magnetospheres, and interplanetary plasma.
- Advances in telescope technology, astrophysical detectors, and space missions.
- Exploration of black holes, gravitational waves, dark matter, and cosmology.
- Planetary magnetism, atmospheres, and exoplanet characterization.
- Earth-space interactions and their impact on communication, climate and satellites.

### VI. Physics in Everyday Life: Bridging Science and Society

- Physics behind household technologies: microwave ovens, smartphones, LEDs and GPS.
- Role of electromagnetic waves in communication and internet technologies.
- Mechanics, thermodynamics, and acoustics in daily appliances and transportation.
- Medical imaging, sensors, and wearables improving human life.
- Awareness of physics in safety, energy use, and environmental sustainability.

### VII. Physics for Skill Development and Societal Impact

- Hands-on physics training enhancing problem-solving and analytical skills.
- Development of technical skills: instrumentation, coding, electronics and data analysis.
- Outreach programs making physics accessible to schools and rural communities.
- Industry-academia collaboration fostering innovation and employment.
- Scientific literacy contributing to national development and informed decision-making.

### National Advisory Committee

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### Chairperson

Prof. S. Medhekar, HoD

### Convenor

Dr. Avijit Ghosh

### Co-Convenor(s)

Dr. Vineet K. Agotiya  
Dr. Jayanta K. Baral

### Important Dates:

Abstract Submission Start: January 5, 2026  
Extended Date of Abstract Submission: February 2, 2026  
Acceptance Notification: February 2, 2026  
Registration Start: Early bird: January 5, 2026  
Registration Deadline: February 2, 2026

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**Registration Fee:**  
₹ 500.00 for UG & PG Students  
₹ 700.00 for Research Scholars  
₹ 1000.00 for Faculty & Industry Personnel

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**Abstract Submission:** Authors are requested to submit their abstract in the provided template only through the online portal of abstract submission available on the website:

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