



Physics Pulse

IIT (ISM) DHANBAD

VOL.II No.10

OCTOBER 31, 2025

PHYSICS NEWSLETTER*

PHYSICS NOBEL TALES

By DR. RITWIK MONDAL



Honoring the 2025 Nobel Laureates in Physics: Awarded to John Clarke, Michel H. Devoret, and John M. Martinis for the discovery of macroscopic quantum mechanical tunnelling and energy quantisation in an electric circuit.

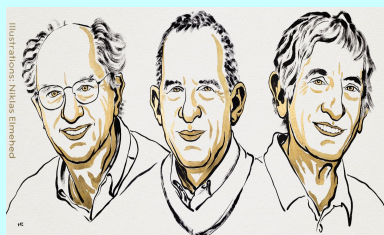
Each October, Stockholm in Sweden becomes the stage for science's biggest spotlight - the Nobel Prizes - and none stirs more curiosity than the Nobel Prize in Physics, honoring discoveries that can change human life. The very first Physics Nobel, in 1901, went to Wilhelm Conrad Röntgen for discovering X-rays. His work transformed hospitals, letting doctors see inside the human body without surgery. It set the tone: this was a prize for ideas that make the invisible visible. Albert Einstein, the most famous physicist of all time, won his Nobel in 1921—but not for relativity. Instead, he was honored for explaining the photoelectric effect, showing that light can behave like a particle. This insight launched quantum mechanics, the science behind computers, smartphones, and solar panels.

In the decades that followed, the prize often went to the pioneers of quantum theory, for instance Bohr, Heisenberg,

Schrödinger, Dirac, whose strange new mathematics revealed a universe of uncertainty and probability.

Nobel Prize in Physics 2025

Tunnelling Their Way to the Nobel Prize

John
ClarkeMichel H.
DevoretJohn M.
Martinis

The 2025 Nobel Prize in Physics was awarded jointly to John Clarke (University of California, Berkeley), Michel H. Devoret (Yale University and University of California, Santa Barbara), and John M. Martinis (University of California, Santa Barbara and Qolab, Los Angeles) for their pioneering work on the discovery of macroscopic quantum mechanical tunneling and energy quantization in an electric circuit. Their setup used superconductors separated by a thin insulating barrier, called a Josephson junction.

Read more »

Later, the Nobel began to recognize discoveries that reshaped everyday life. The transistor, which powers all modern electronics, earned the 1956 prize. Lasers, honored in 1964, now read barcodes at supermarkets and power high-speed internet. Even the faint “echo” of the Big Bang, the cosmic microwave background brought a Nobel in 1978, offering a glimpse into the universe's origins.

More recent prizes highlight the teamwork and technology that define today's science. In 2017, the Nobel went to the scientists who detected gravitational waves—tiny ripples in space-time predicted by Einstein. In 2018, Arthur Ashkin, at age 96, became the oldest Nobel winner for inventing “optical tweezers,” laser beams that can grab and move microscopic objects. Not everyone gets recognized. Jocelyn Bell Burnell discovered pulsars as a graduate student, but her supervisor received the prize instead. Lise Meitner, who helped explain nuclear fission, was overlooked entirely. Here come the rules and regulations for awarding a Nobel Prize. One of the important rules is that a prize may be shared by a maximum of three individuals, and the prize amount shall not be divided among more than three people.

Nonetheless, there are only two father-son pairs to both win Physics Nobels: William & Lawrence Bragg (1915, crystallography) and Niels & Aage Bohr (1922 and 1975). The only couple who have won Nobel prize in Physics is Marie & Pierre Curie (1903). The only person to win Physics prize twice: John Bardeen (1956 for transistor theory, 1972 for BCS superconductivity).

The youngest Physics laureate: Lawrence Bragg (1915, age 25) for X-ray crystallography (shared with his father, William Bragg). The oldest Physics laureate: Arthur Ashkin (2018, age 96) for optical tweezers. Only 5 women have won the Nobel prize in Physics so far: Marie Skłodowska Curie (1903, radiation phenomena), Maria Goeppert Mayer (1963, nuclear shell structure), Donna Strickland (2018, high-intensity ultra-short optical pulses), Andrea Ghez (2020, supermassive compact object at the center of galaxy), and Anne L'Huillier (2023, generation of attosecond pulses).

*Send your feedback to: physicspulse@iitism.ac.in

Physics News

Tunnelling Their Way to the Nobel Prize

At very low temperatures, due to local lattice distortions, electrons pair up as Cooper pairs that share the same quantum state, forming a supercurrent that flows without resistance. Classically, this current cannot cross the barrier, but quantum mechanics allows a small probability for it to tunnel through. Their experiments demonstrated this on a macroscopic scale and confirmed the quantised energy levels predicted by quantum theory.

Awards and Recognition

1. **Prof. Umakanta Tripathy**, Department of Physics, IIT (ISM) Dhanbad, has been appointed as an **Editorial Board Member of Nature Scientific Reports**. This prestigious recognition reflects his outstanding contributions to physics research and his dedication to advancing scientific knowledge. Wishing him continued success and many more achievements in his academic journey ahead!



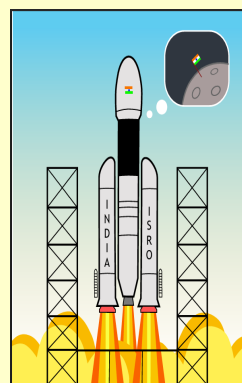
2. **Subodha K. Sahu** and **Tusar K. Rout**, research scholars

working under **Prof. Umakanta Tripathy**, both presented their work at the conference "Recent Advances and New Challenges in Physics (RANCP-2025)" held at Rural Institute of Higher Studies (RIHS), Bhogarai, from 5 to 6 September. The event was organised by the Government of Odisha, Department of Higher Education. Subodha Kumar Sahu delivered a 10-minute talk on "Linear and nonlinear photophysical processes", while Tusar Kanti Rout delivered a 10-minute talk on a related topic. Both received the best presentation award from the Vice Chancellor of FM University.

Congratulations to Subodha and Tusar!

Physics in History

- **4 October, 1957:** The Soviet Union launched Sputnik I, the first artificial satellite to orbit the Earth, marking the beginning of the Space Age.
- **9 October, 2007:** The Nobel Prize in Physics was awarded to Albert Fert and Peter Grünberg for the discovery of Giant Magnetoresistance (GMR).
- **18 October, 1967:** The Soviet Venera 4 probe entered the atmosphere of Venus, becoming the first spacecraft to transmit data from inside another planet's atmosphere.
- **22 October, 2008:** ISRO launched Chandrayaan-1, its first unmanned lunar mission.



Blasting Into History: Chandrayaan's journey to the Moon captured through the creative eyes of our young contributor- Mr. Gauranga Dutta, M.Sc. 1st year.

Physics Job Openings

1. **Intern-SiPhModeling at GlobalFoundries-Bengaluru, Karnataka, India:** GlobalFoundries seeks an intern to support the silicon photonics modeling team in developing compact models for optical/electro-optical devices. Tasks include device layout, Verilog-A model coding,

and automation scripting. Applicants should be pursuing a PhD in Physics or Electrical/Electronic Engineering with strong programming and analytical skills.

2. **Associate Materials Engineer - Material Science, R&D at MKS Inc.–Manesar, Haryana, India:** MKS seeks an Associate Materials Engineer for R&D and materials characterization (chemical & physical). Tasks: execute/evaluate tests (climate/corrosion, STEP, Coulscope, CoF, microscopy), prepare reports, maintain ISO9001/17025 quality systems, HSE & 5S compliance. Requires B.Tech/M.Tech in Materials/Material Eng. or MSc in Physics/Chemistry; 0–2 years' experience.

Research Publications

1. **M. Abdullah, D. Das, Soumya Bagchi, M. N. Harakeh,** Effect of Ground-State Shape Deformation on the Collective Excitations in Even-Mass Nd Isotopes, **Akito Arima Memorial Volume**, pp. 1-9 (2025), **World Scientific Connect**.
2. **Jyotsna Patra, Subhankar Nanda, Poulami Das, Satyaranjan Satyajit, Amitava Adak,** Fast dynamics and imaging of intense laser-driven liquid-confined copper plasma for controlled ablation and processing applications, **Optics & Laser Technology**.
3. **Pratyay Mukherjee, Aripa Dutta, Somasree Bhattacharjee, Shovon Pal, Ritwik Mondal,** Field-derivative torque induced magnetization reversal in ferrimagnetic $\text{Gd}_{\frac{3}{2}}\text{Yb}_{\frac{1}{2}}\text{BiFe}_5\text{O}_{12}$, **Physical Review Materials**.
4. **Prashant Singh Lohiya, S.K. Sharma,** A comprehensive study of the structural and optical properties of cesium-antimony based layered double perovskite for possible optoelectronic applications, **Physica Scripta**.
5. **Romario Mondal, Sk. Soyeb Ali, Saikat Nandi, S. Chattopadhyay, S. Gass, L. T. Corredor, A. U. B. Wolter 5, V. Kataev, B. Büchner, A. Alfonsov, S. Wurmehl, A. V. Mahajan, S. K. Panda, T. Dey,** Frustration-driven unconventional magnetism in the Mn^2 ($S = 5/2$) based two-dimensional triangular-lattice antiferromagnet $\text{Ba}_3\text{MnTa}_2\text{O}_9$, **Physical Review B**.
6. **Soumik Bandyopadhyay, Philipp Hauke, Sudipto Singha Roy,** Quantifying non-Hermiticity using single- and many-particle quantum properties, **Physical Review B**.

Editorial Board: **Chief Editor:** Prof. V. K. Rai (HOD), **Editors:** Prof. Tusharkanti Dey, Prof. Sudipto Singha Roy, Prof. Avijit Misra **Assistant-Editor:** Mr. Mithilesh Mishra, **Student Editors:** Mohana Priya. T, Rishit Raj, Surajit Das, Alwin S. S., Deep Karmakar, Vishnu Nayak, Sanchari Biswas, Aminul Hussain, Prashant Singh Lohiya, Ashutosh Yadav

Article Submission: [CLICK HERE](#)

Previous issues of Physics Pulse: [CLICK HERE](#)

Send your feedback to: physicspulse@iitism.ac.in