Breakthrough Prize 2025 Awarded to CMS Collaboration Featuring IIT Hyderabad Physicists

The most prestigious Fundamental Physics Breakthrough Prize awarded to the CMS experimental collaboration, including researchers from IIT Hyderabad.

Highlights:

- *CMS Collaboration Wins 2025 Fundamental Physics Breakthrough Prize for transformative contributions to particle physics at CERN's Large Hadron Collider*
- *IIT Hyderabad Researchers from the Department of Physics actively participated in the award-winning CMS experiment*
- *Dr Saranya Ghosh, Assistant Professor at IIT Hyderabad, is listed as one of the laureates on the official Breakthrough Prize webpage*
- *Contributions include studies on the Higgs boson, search for new fundamental particles, and novel particle reconstruction techniques.*
- *IIT Hyderabad continues to lead cutting-edge research in experimental and theoretical particle physics, integrating advanced computational and machine learning tools*

Hyderabad, April 28, 2025 – The Fundamental Physics Breakthrough Prize, one of the most prestigious global awards in the field of Physics, has been awarded to the **Compact Muon Solenoid (CMS)** experimental collaboration that has active participation from researchers from the **Department of Physics at IIT Hyderabad**.

Also known as the **Fundamental Physics Prize**, this prize is awarded to physicists from theoretical, mathematical, or experimental physics who have made "**transformative contributions to fundamental physics and specifically for recent advances**". The 2025 Breakthrough Prize has been awarded to the co-authors of publications from the large experimental collaborations based at the Large Hadron Collider at CERN, that is the CMS, ATLAS, ALICE and LHCb experimental collaborations.

The prize was awarded to the collaborations for their "**detailed measurements of Higgs boson properties confirming the symmetry-breaking mechanism of mass generation, the discovery of new strongly interacting particles, the study of rare processes and matter-antimatter asymmetry, and the exploration of nature at the shortest distances and most extreme conditions at CERN's Large Hadron Collider**".

Researchers, including **faculty members and students, from the Department of Physics at IIT Hyderabad** have been actively working on the **CMS experiment**, on research areas such as studies of the Higgs boson, search for new fundamental particles and forces, and particle reconstruction at detectors amongst others. **Dr Saranya Ghosh**, Assistant Professor with the Department of Physics at IIT Hyderabad, is listed as one of the **laureates of the Fundamental Physics Breakthrough Prize 2025 on their webpage as a member of the CMS Collaboration**. Each of these large global experimental collaborations awarded have several personnel consisting of scientists, research students and engineers belonging to prestigious institutions across the world collaborating to achieve such breakthrough scientific research.

Researchers from IIT Hyderabad working in the field of particle physics, consisting of both theorists and experimentalists, continue to perform cutting-edge fundamental research to unearth the mysteries of nature and to gain a deeper understanding of the fundamental laws that govern the universe. On the experimental side, particle physics detector development and development of novel particle reconstruction techniques, often using advanced computational tools and machine learning techniques, are also pursued at IIT Hyderabad alongside research on fundamental particle physics.

Elated on the achievement, Dr Saranya Ghosh, Assistant Professor, Department of Physics, IITH, expressed "*This is a proud moment for myself and all the members of the experimental collaborations to have received this recognition following years of dedicated effort. This highlights the scientific progress that can be achieved through collaborative efforts. I hope that young researchers and students will be further motivated to pursue fundamental research by the recognition of such scientific endeavours.*"

Reflecting on the prestigious accolade, Prof Manish Niranjan, HoD, Department of Physics, IITH, commented "*I congratulate the researchers working on the breakthrough research awarded with this prestigious prize. At the Department of Physics, we are very proud of the high energy physics group, with scientists and research scholars doing excellent research on fundamental topics at the frontiers of our understanding of the universe. Such recognitions highlight the hardwork and dedication of our researchers keeping up with the frontiers of such fundamental research at the global level.***"**

Proud of the collaborative achievement, Prof B S Murty, Director, IITH shared "*It is truly an honour to be part of a global collaboration that is expanding the frontiers of our understanding of the universe. This recognition reflects the collective efforts and dedication of thousands of scientists, and I'm especially proud of the growing role India and IITH are playing in high-energy physics research***"**

About IIT Hyderabad:

IITH, established in 2008, as one of the second Generation IITs, has reached a respectable position in both academics, research, technology development and Startups in the short span of 16 years. In the recent Indian National Ranking (NIRF-2024), IITH is placed at 3rd in Innovation and 8th among Engineering institutes in India. IITH has been striving for excellence in academics, research, technology development and startup ecosystem with a motto of "Inventing & Innovating in Technology for Humanity (IITH)".

With 325+ full-time faculty and 5,300+ students (PG+PhD students accounting for about 60%), IITH has a strong research focus with ~4500 projects worth of Rs. 1400+ Cr of R&D funding (Rs. 250 Cr funding in 2023-24), 11,500+ publications, 2,15,000+ citations and h-index of 141, 500+ Patents (210 patents in 2024 and a commitment to "Patent a Day: Mission 365" for 2025 to earn 365 patents by the end of 2025), and about 260+ Startups (that have generated 1100+ jobs with a revenue of Rs.

1500+ Cr). The attached documents will give you a brief about IITH.

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