2nd ONE DAY NATIONAL SEMINAR ON "RECENT TRENDS IN APPLIED PHYSICS AND ENGINEERING (RTAPE-2024)" BY SHANTI SWARUP BHATNAGAR (SSB) AWARDEES

(APRIL 12, 2024)

Organized by Department of Applied Physics

Department of Applied Physics, DTU has started a unique initiative of bringing together the eminent scientist awarded with prestigious **Shanti Swarup Bhatnagar Award** in Physics and Engineering by organizing Ist National Seminar in 2020.

This award is named after the founder Director of the Council of Scientific & Industrial Research (CSIR) India, the late Dr (Sir) Shanti Swarup Bhatnagar'. The Prize is given each year for outstanding contributions to Science and Technology. The aim of the national Seminar is to provide a platform to the young researchers to interact with **Shanti Swarup Bhatnagar** (SSB) **Awardees** and get benefited from their research expertise. In continuation of this, a 2nd National Seminar is being organized by the Department on April 12, 2024 under the initiative of Viksit Bharat. Prof. V. Ramgopal Rao, Vice-Chancellor, Birla Institute of Technology & Science, Prof. Ajoy Ghatak (Shanti Swarup Bhatnagar Awardee and Former Professor, Department of Physics, IIT Delhi], Prof. Vikram Kumar (Shanti Swarup Bhatnagar Awardee and Former Director NPL, Delhi and SSPL, Delhi), Prof. Kehar Singh (Shanti Swarup Bhatnagar Awardee and Former Professor, Department of Physics, IIT Delhi), Prof. Anurag

Sharma (Shanti Swarup Bhatnagar Awardee and Former Professor, Department of Physics, IIT Delhi) were the invited speaker in the national seminar. The speakers discussed about Multidisciplinary Research Opportunities in Nanoelectronics, Einstein and his famous equation $E=mc^2$, Electrically active defects in Semiconductors and their role in devices, Laser Speckles Fundamentals and Some Applications and Photonics Around us.

More than 100+ participants attended the Expert talk.

Echoes from the Cosmos: A Journey Through the Invited Talk on Dark Matter and Black Hole Mergers

Delhi Technological University, Department of Applied Physics | 17th March 2025

It was a day where the fabric of space-time rippled—not just in theory, but in the hearts and minds of curious students, erudite professors, and visionary researchers. The Department of Applied Physics at Delhi Technological University (DTU) orchestrated an intellectually electric afternoon with an invited talk titled ***"Echoes of Dark Matter from Binary Black Hole Mergers."*** Held on March 17th, 2025, at the SPS-13 hall, this event was more than just an academic session; it was a celebration of human curiosity reaching into the cosmic unknown.

Prelude to Discovery

The program commenced at exactly 2:00 PM with the National Anthem, a moment that reminded everyone of the unity in our quest for knowledge. A traditional floral welcome followed, led by Prof. Rinku Sharma, Dean (PG), DTU—signifying the university's warm reception of brilliance and innovation. Prof. Vinod Singh, Head of the Department of Applied Physics, then delivered the welcome address. With clarity and enthusiasm, he set the stage for what would be an afternoon of cosmic contemplation.

A Cosmic Introduction

The energy in the room shifted as Prof. Prateek Sharma, the Honourable Vice Chancellor of DTU, took the podium. His address was a blend of academic pride and visionary foresight. He emphasized how such talks not only enlighten the students but also build bridges between theoretical physics and experimental curiosity.

Dr. Pawan Kumar Tyagi, Associate Professor and Convener of the event, introduced the guest speaker with precision and passion. "Today's talk," he said, "offers a rare window into the hidden corridors of the cosmos—where dark matter may leave behind its fingerprints in the aftermath of cosmic collisions."

The Star of the Show: Dr. Amitayus Banik

At the heart of the event stood Dr. Amitayus Banik, a post-doctoral researcher from Chungbuk National University, South Korea. With a background rooted in theoretical astrophysics, Dr. Banik brought forth a topic that could easily belong in a sci-fi novel, yet was grounded in hard science: ***Echoes of Dark Matter from Binary Black Hole Mergers.***

For one compelling hour—from 2:20 PM to 3:20 PM—Dr. Banik transported the audience into a universe teeming with enigmas. Using accessible language, vivid analogies, and striking visualizations, he explained how gravitational waves—ripples in the fabric of space-time—generated by merging black holes might carry subtle signals or "echoes." These echoes, he proposed, might be traced back to interactions with dark matter, a mysterious form of matter that neither emits nor absorbs light, yet forms most of the universe's mass.

He posed fascinating questions: Could these gravitational echoes be the whispers of dark matter? What if the black holes themselves aren't the final frontier? What if—beyond the event horizon—lies a dialogue between matter and the void?

For students and faculty alike, it was a chance to think beyond the classical textbooks, beyond the chalkboard equations, and into the speculative yet plausible realms of modern astrophysics.

Reflections from the Audience

One of the remarkable things about the session was the active engagement of the audience. Students asked questions that reflected their deep interest: "Can echoes from black hole mergers help identify the properties of dark matter?" asked a third-year B.Tech student. Another queried the impact of quantum gravity in analysing these echoes. Dr. Banik, calm and concise, answered each question with grace, often reflecting the excitement of discovery in his responses.

The talk didn't just cater to physics enthusiasts; it inspired those unfamiliar with the subject to look up and wonder. A few students from the arts and humanities stream were seen in the back rows, whispering theories to each other by the end of the session.

Closing the Event with Grace

At 3:20 PM, the session gracefully transitioned into a heartfelt vote of thanks delivered by Dr. Renuka Bokolia, Assistant Professor and Co-Convener. She acknowledged the speaker's valuable insights and appreciated the seamless coordination of the event by the Applied Physics Department.

A group photograph was then taken—a timeless capture of minds gathered in pursuit of cosmic knowledge. The frame, much like the universe, held an expanse of potential and purpose.

Conversations Over Chai

At 3:30 PM, the aroma of cardamom tea and warm samosas signaled the start of High Tea. Faculty, students, and the speaker mingled in informal discussion, extending the conversation beyond the academic hall. Ideas flowed, connections sparked, and a simple cup of tea transformed into a stimulant of thought. Some students were seen discussing potential research collaborations and even planning reading groups around gravitational physics.

Behind the Curtains: Organizing the Universe

Much credit goes to the meticulous planning of the Department of Applied Physics. From the minute-to-minute coordination to the vibrant digital banner that flashed on departmental screens for days leading up to the event, every detail was a testimony to their commitment. The event wasn't just a talk—it was an experience. The aesthetics, the punctuality, the engagement—it all blended into a successful celebration of scientific exploration.

The banner designed for the talk, featuring the merging silhouettes of black holes against a deep-space background, symbolized the heart of the topic: that the universe is talking to us, and it is up to us to listen.

Conclusion: Echoes That Linger

The event on March 17, 2025, will echo in the corridors of DTU for years to come. As students returned to their routines and professors to their research, one thing remained changed: perspective. Dr. Banik's talk was not just about black holes or dark matter; it was a gentle reminder that the universe is full of secrets, and it is only through collaborative curiosity that we can begin to unravel them.

In the end, whether or not we hear actual echoes of dark matter, this event proved one thing for certain—echoes of great ideas, when shared in rooms full of eager minds, reverberate far longer than we can imagine.

A lecture on **"lithium in stars-overview"** organized by Department of Applied Physics, Delhi Technological University (DTU), Delhi on January 5th, 2023

One-day national seminar on the occasion of **"National Science Day (NSD-2023)"** (Organized by Human Resource Development Centre (HRDC) Delhi Technological University (DTU), in association with Institution's Innovation Council (IIC) – DTU and Dept. Of Applied Physics, Delhi Technological University, Delhi)

One Day National Seminar on **"Recent Advancements in Semiconductor Devices and Materials (RASDM-2023)"** (organized by Department of Applied Physics, Delhi)

One Day National Seminar on **" Implementation of NEP-2020 in special reference to innovation & entrepreneurship"** (Organized by Department of applied physics in association with Institution's Innovation Council (IIC)- Delhi Technological University (DTU), Delhi)