

## REPORT

- **TITLE OF EVENT/ PROGRAMME (SEMINAR/ WEBINAR/ WORKSHOP/ EXTENSION LECTURE/ EXTENSION ACTIVITY/ ANY OTHER ACTIVITY):** SEMINAR.
- **THEME OF THE EVENT/ PROGRAMME:** Quantum Computing-Stealing the show in the zoo of Quantum Information Processing!
- **ACADEMIC SESSION:** 2024-25.
- **DATE:** 04.03.2025
- **VENUE:** Seminar Room, Centenary Building, Asutosh College.
- **OBJECTIVE/ PURPOSE:** Motivating young minds about the uncanny world of Quantum Information and Quantum Computation Theory.
- **SPEAKER/S / RESOURCE PERSON/S:** Prof. Shiladitya Mal.
- **TARGET AUDIENCE/ PARTICIPANTS:** Students of Semester-VI, Semester-III and Semester-I of Physics, Electronics, Mathematics and Computer Science Department.
- **ATTENDANCE SHEET:**
- **BRIEF REPORT ABOUT THE EVENT/ PROGRAMME:** The program was initiated around 12 pm in the Centenary Building with the invitation and introduction of various guests, followed by presenting them with tokens of appreciation for their participation. This was followed by a floral tribute to the late Prof. Asutosh Mukherjee's portrait followed by the late Prof. Angsutosh Khan & late Sri Debashis Chakraborty. Floral offerings were led by IQAC Coordinator Dr. Sraboni Ray. The tribute was then continued by the family members of Prof. Khan, CCTP Coordinator cum Sir Asutosh Mukherjee Charcha Kendra Coordinator Dr. Chandramalli Sengupta followed by the Head of the Department, Dr. Amit Kumar Bhattacharjee and our esteemed speaker, Dr. Shiladitya Mal. Finally, the offering ended with a floral tribute from various faculty members, non-teaching staff members and students of the Physics Department. A one-minute silence in remembrance of Prof. Angsutosh Khan & Sri Debashis Chakraborty is followed. Subsequently, IQAC Coordinator Dr. Sraboni Ray delivered a speech in their memory, followed by Prof. Chandramalli Sengupta, then Retired Prof. Bikash Pal. Mrs. Chaiti Khan (wife of Prof. Khan). A short tea break followed next.

Afterwards, Dr. Surjya Sarathi Bhattacharyya introduced the esteemed speaker Dr. Shiladitya Mal from Chennai Institute of Technology, who initiated his seminar on "Quantum Information" by discussing the historical development of quantum mechanics. He then moved the focus to quantum information – an intermingled intersection of quantum mechanics, information theory, and computer science. His

presentation touched on the basics of quantum mechanics, such as the uncertainty principle and Bell's inequality theorem. He vividly explained the concept of entanglement and correlation and the relation between them through the "CHSH inequality" which validates the non-locality of the Quantum Mechanics. In the next part, he explained no-go theorems, such as the no-cloning theorem, which states that an unknown quantum state cannot be duplicated. For example, if we have an A state and a 1 state, where the A state is unknown, no process that can produce two A states from one A state and one 1 state. He also discussed the no-deleting theorem, which states that no process can be created to destroy a quantum state.

Moving on, he explained how black holes are observed. He stated that to capture an image of a black hole, data from different observatories is collected. This data measures the light emitted from the accretion disk of the black hole. The next discussion was on Quantum Random Walk (QRW), which differs from the Classical Random Walk (CRW) in the sense that an unimodal distribution of finding the observable around the mean in CRW changes into a bimodal distribution peaking at the end far from the mean in QRW. He exemplified the application of QRW in finding elements from an unordered list. Finally, he concluded his presentation by discussing various applications of Quantum Mechanics, such as Quantum Swapping, where two sets of entangled pairs are taken and their links are swapped—connecting the closest and furthest pairs. This process increases the distance between the entangled pairs, forming the basis of quantum internet. He concluded the discussion with Quantum batteries and other related topics.

➤ **EXPECTED OUTCOME:** Knowledge enrichment of UG students.

➤ **GEO-TAGGED PHOTOGRAPHS:**



Welcoming the Speaker Dr. Mal



Remembrance by Mrs. Chaiti Khan (wife of Lt. Prof. Angsutosh Khan)



Remembrance by Dr. Bikash Pal, Ex-Faculty Dept. of Physics & Dr. Chandramalli Sengupta, CCTP Coordinator (IQAC Coordinator Dr. S.Roy & Dr. Mal is seated on chair).



Speaker Dr. Mal with his audience in the Auditorium.