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International Year of Quantum Science and Technology (IYQ)-2025, at TCG CREST (Kolkata, India)

INTERNATIONAL YEAR OF
Quantum Science and Technology

Speaker

Prof. Archan S. Majumdar

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Kolkata, India

Area of Expertise:
- Quantum Information and Foundations:
  Quantum correlations: theory and applications
  Quantum non-locality; measurement problem, and decoherence
- General Relativity & Cosmology:
  Dark energy problem from different perspectives
  Primordial black holes & the gravitational wave spectrum

Title: Quantum Uncertainty Relations, Nonlocality and Information Theoretic Applications

Abstract

We present a brief overview of quantum uncertainty relations beginning from Heisenberg, Robertson-Schrodinger and other variance-based relations such as the sum uncertainty relation. An immediate connection is established with the Einstein-Podolsky-Rosen paradox, setting the stage for demonstration of quantum nonlocality in the form of EPR-Schrodinger steering. We next discuss entropic and fine-grained uncertainty relations and show how fine-graining leads to an optimal bound of uncertainty in the presence of quantum memory, as well as tighter secure key rates in both discrete and continuous variable quantum key distribution. We finally consider manifestations of uncertainty relations in the incompatibility of quantum measurements and quantum contextuality, revealing a clear quantum-over-classical advantage in communication tasks even without the presence of entanglement.

🗓 Date & Time
19th February 2025 @ 3:00 PM IST

📍 Venue
Classroom-4, TCG CREST

Join Zoom Meeting
📹 Click here to join

(or)

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Organized by:
CQuERE (Centre for Quantum Engineering, Research and Education), TCG CREST, Kolkata, INDIA

For more details, please visit the website: http://www.tcgcrest.org/iyq2025
For any queries, feel free to contact us through the email: iyq.2025@tcgcrest.org