Abstract Booklet

International Conference on Quantum Communication, Measurement and Computing (QCMC)

26-30 August 2024

Indian Institute of Technology Madras

Chennai, India

Day 1: 26th August (Monday) [Venue: D7 – Main Auditorium, IIT Madras Research Park]

8:15 am: Registration

9:15 am: Inauguration

10:10 am: Opening Plenary Talk – Mark Wilde (Cornell University)

Exact solutions for the fundamental limits of communication, discrimination, and estimation of bosonic dephasing channels

Dephasing is a prominent noise mechanism that afflicts quantum information carriers, and it is one of the main challenges towards realizing useful quantum computation, communication, and sensing. In the case of bosonic systems, central to many applications, bosonic dephasing channels (BDCs) form a key class of non-Gaussian channels modeling noise affecting superconducting circuits or fiber-optic communication channels. Here we consider communication, discrimination, and estimation of BDCs, when using general strategies for these tasks as allowed by quantum mechanics. We provide an exact formula for the quantum, private, two-way assisted quantum, and secret-key agreement capacities of all BDCs, proving that that they are all equal to the relative entropy of the distribution underlying the channel to the uniform distribution. For discrimination and estimation tasks, we reduce difficult quantum problems to simple classical ones based on the probability densities defining the BDCs. We present upper bounds on the performance of various distinguishability and estimation tasks and show that they are also achievable. To the best of our knowledge, this is the first example of a non-Gaussian bosonic channel for which there are exact solutions for all of these tasks. Joint work with Zixin Huang (Macquarie University) and Ludovico Lami (University of Amsterdam).

10.50 – 11.10 am: Coffee Break

11.10 am: Mihir Bhaskar (Amazon Web Services)

Integrated Diamond Quantum Memories

Optical photons are an ideal carrier of quantum information in communication and computing systems, as they can be routed and manipulated at scale using existing technologies such as photonic integrated circuits and optical fibers. The critical bottleneck that prevents their use in large-scale quantum computers and networks is optical loss. Quantum memories, such as individual atoms or defects in solids, can be used to overcome this bottleneck by enabling higher-efficiency quantum logic operations between photons over lossy channels [1]. However, utilization of quantum memories at scale remains a major engineering challenge that requires development of new device fabrication, integration, characterization, and packaging technologies. In this talk, I will describe our approach, latest advances [2, 3], and remaining challenges in using integrated diamond quantum memories as a scalable photonics platform for quantum information processing.

References:

[1] Bhaskar et al, Nature 580 (2020)
[2] Zeng et al, APL 123 (2023)
[3] Knaut et al, Nature 629 (2024)

11.50 am: Damian Pitalúa-García (University of Cambridge)
Security analyses for practical mistrustful quantum cryptography based on quantum state discrimination games
We present general security analyses based on maximum confidence quantum measurements that strongly bounds Alice's cheating probability in a broad class of quantum cryptographic protocols in realistic experimental setups, and discuss applications to specific protocols.

12.10 pm: Ravishankar Ramanathan (University of Hong Kong)
Optimal Measurement Structures for Contextuality Applications
The Kochen-Specker theorem is pivotal in quantum foundations. Specific substructures termed 01-gadgets capture the essential contradiction of the theorem. We show these gadgets and their generalizations provide an optimal toolbox for multiple contextuality applications.

12.30 - 2.00 pm: Lunch

2 pm: Saikat Guha (University of Maryland)
Photonic sensors enhanced by continuous-variable entanglement
It has been long known that squeezed light can enhance the sensitivity of estimating an optical phase in an interferometric setting, which has found diverse applications. The most prominent use case is gravitational wave detection in the LIGO, but there are also others such as in: RF photonic sensors, fiber-optic gyroscopes, precision beam pointing, and more. More recently, there have been both theory and experimental works, which showed that when squeezed light is split in a multimode interferometer, we generate a special class of Gaussian multi-mode entanglement that has strong metrological properties when used in estimating a parameter embedded in a collection of correlated phases across multiple modes. In this talk, I will present some new results on photonic sensors enhanced by continuous-variable entanglement, in three different applications: detection of a sudden change in optical loss in a communication channel, an optomechanical sensor for scanning probe beam deflectometry, and stand-off quantum radar for arbitrary target discrimination with known spatial-reflectance profiles.

2.40 pm: Nicholas Sanguoard (University of Paris-Saclay, CEA, CNRS)
Device-independent quantum key distribution : transitioning from first demonstrations to more practical prototypes
While quantum computers hold significant promise for advancing material sciences and chemistry, they also pose serious threats to communication security. To address these challenges, solutions such as post-quantum cryptography and quantum key distribution have been proposed. In this talk, I will focus on the latter and present the first experimental demonstration with a device-independent security—a security model that does not rely on assumptions about the inner workings of the quantum devices used for the key distribution. The talk will begin by attempts to quantify the quantum threat on classical cryptographic systems. I will then introduce the concept of device-independent quantum key distribution and explain the principles behind establishing a security proof in this framework. Following this, I will showcase an experimental setup developed in Oxford, which has successfully produced a key longer than the initial shared randomness, with a security guaranteed against the most general attacks. Finally, I will conclude by briefly discussing ongoing efforts to transition towards more practical and scalable prototypes of this technology.

3.20 – 3.40 pm: Coffee break

3.40 pm: Keshav Kapoor (University of Illinois Urbana-Champaign)

Public Quantum Network: The First Node

We present a publicly accessible quantum network that distributes entangled photons between the University of Illinois Urbana-Champaign and a public library in Urbana. We describe its implementation, ongoing experiments, and public interaction.

4.00 pm: Pooja Malik (Ludwig Maximilians University, Munich and MCQST)

Entanglement Distribution in Quantum Networks

We present a quantum node capable of distributing entanglement between a single atom and a photon over 100km telecom fiber. Enabled by significantly reducing the atomic decoherence which previously impeded high-fidelity entanglement distribution.

4.20 pm: Poster Session and Discussions

Day 2: 27th August (Tuesday) [Venue: D7 – Main Auditorium, IIT Madras Research Park]

9.30 am: Andreas Walraff (ETH Zurich)

10.10 am: Pranav Mundada (Q-CTRL)
Scaling quantum optimization to the utility scale
Quantum computing holds promise for revolutionizing how we solve complex optimization problems that are ubiquitous in various fields like logistics and networking. However, current noisy quantum hardware limits the applicability of hybrid quantum-classical algorithms that are theorized to perform well in ideal conditions. This study showcases how a novel hybrid algorithm combined with a comprehensive error suppression pipeline can efficiently solve large-scale binary optimization problems, pushing the boundaries of what is currently possible with existing quantum hardware and bringing us closer to an era where quantum computers can solve relevant real-world problems. Our novel implementation of QAOA demonstrates exceptional performance in solving binary-optimization problems on a 127-qubit gate-model IBM quantum computer by leveraging advanced error suppression techniques. We solve MaxCut on graphs up to 120 nodes and consistently find the maximal cut. For 127-node cubic spin-glass problems, we found the true ground state for 4 of the 6 problems we studied, including for a problem where a quantum annealer previously failed to find the solution.

10.50 – 11.10 am: Coffee break

11.10 am: Elham Kashefi (University of Edinburgh and Sorbonne University)
Scalable, Verifiable and Secure multi-users distributed quantum computing architecture
We propose and experimentally demonstrate a novel architecture for distributed quantum computing enabling the execution of multi-party algorithms, e.g. federated machine learning. Our proposal originality resides in four main strengths:
- scalability: since we eliminate the need for each participants to have its own trusted source or measurement device;
- low-loss: by optimizing the orchestration of classical communication between each part and sentral computing servers through fast classical electronic control;
- privacy: keeping the computation and data protected from malicious parties;
- verifiability: ensuring the correct performance of the requested computation while minimising the hardware assumptions on the employed devices.

11.50 am: Ananda Gopal Maity (Okinawa Institute of Science and Technology (OIST), Japan)
Noise is resource-contextual in quantum communication
We introduce a one-parameter family of channels for which as the parameter increases its one-way quantum and private capacities increase while its two-way capacities decrease. This demonstrates that noise is context dependent in quantum communication

12.10 pm: Ekta Panwar (University of Gdansk)
Robust self-testing of Bell inequalities tilted for maximal loophole-free nonlocality
We address an experimentally motivated question: Which quantum strategies achieve maximal loophole-free nonlocality with inefficient detectors? In the simplest Bell scenario, we show traditional methods like the sum of squares decomposition and Navascués–Pironio–Acín hierarchy fail.

12.30 – 2.00 pm: Lunch

2.00 pm: Arindam Ghosh (Indian Institute of Science Bengaluru)
New strategies of photon detection and counting for quantum applications
I shall describe our work on making new device platforms for making high-resolution photon detection with layered solids. Our methods are based on building heterostructures of two-dimensional materials with complementary electronic properties. We will show number-resolving capacity of the detectors, high sensitivity in the communication wavelength, and possibility to create and sense higher order optical states.

2.40 pm: Fedor Jelezko (Ulm University)
Spin qubits in diamond
Optically active spin qubits in diamond have recently emerged as a candidate material for a range of quantum-based applications, including quantum information processing, quantum communication and quantum sensing. In this talk, we will show the realisation of a spin-based solid-state architecture for a scalable quantum register consisting of strongly dipolarly coupled electron spins associated with NV centres and nuclear spins. Elements of quantum networks and quantum light-matter interface enabled by single GeV colour centres will be presented.

3.20 – 3.40 pm: Coffee break

3.40 pm: Matteo Fadel (ETH Zurich)
A mechanical Gaussian boson sampler
Acoustic resonators offer hundreds of accessible long-lived modes, making them ideal platforms for quantum simulations. I present the demonstration of squeezing and beam-splitting operations in these devices, enabling Gaussian boson sampling with phonons.

4 pm: Rama Kamineni (Krea University)
Vector sensing of AC magnetic fields using NV centers of single orientation in diamond
Vector detection of AC fields by conventional method requires NV-centers of three different orientations. Here, we propose and demonstrate a method for vector detection of AC magnetic fields by only using NV-centers of single orientation.

4.20 pm: Panel discussion – Quantum in Industry

Day 3: 28th August (Wednesday) [Venue: D7 – Main Auditorium, IIT Madras Research Park]

9.15 am: Quantum Award Ceremony

9.30 am: Quantum Award Talk – Hoi-Kwong Lo (University of Toronto)

40 years of quantum cryptography (a personal perspective)

It has been 40 years since the Bennett-Brassard (BB84) paper on quantum key distribution (QKD) was published. I have worked on quantum cryptography for three decades since 1994. In this talk, I will give my personal perspective and review my contributions on the subject over the decades. In the 20th century, much effort was spent on understanding the foundations of security of quantum cryptography. i.e., what quantum cryptography can or cannot do. I collaborated with H. F. Chau on the subject and competed with Dominic Mayers in proving the impossibility of quantum bit commitment and the information-theoretic security of QKD. In the new century, I have focused on bridging the big gap between the theory and practice of QKD. Among other things, I codeveloped the standard Gottesman-Lo-Lutkenhaus-Preskill security model of QKD and contributed to the development of the security proof, practical protocols and the first experiment of decoy state QKD around 2004-6. Around 2008-10, quantum hacking became a hot topic and my collaborators and I performed the world's first successful quantum hacking experiment against commercial QKD systems. This set the stage for the invention of measurement-device-independent (MDI)-QKD by Lo, Curty, and Qi in 2012. After that, I co-invented all photonics quantum repeaters, worked on silicon photonics QKD transmitter chip and contributed to developing twin-field QKD theory and experiment. Recently, my group and collaborators have invented fully passive QKD and implemented it experimentally.

10.10 am: Quantum Award Talk – Luming Duan (Tsinghua University)

Scaling for trapped ion quantum computing

In this talk, I will show a new approach for large-scale trapped ion quantum computing and simulation based on control and manipulation of large two-dimensional ion crystals in a cryogenic Paul trap. We report sideband cooling for 512 ions, quantum simulation of long-range Ising models with 300 ion qubits under tunable couplings, Hamiltonian learning for 300 qubits with 44,850 parameters, and realization of dual-type qubits with the same ion species that overcome the crosstalk errors for mid-circuit measurements and cooling.

10.50 – 11.10 am: Coffee break

11.10 am: Quantum Award Talk – Karol Zyczkowski (Jagiellonian University Cracow, and Polish Academy of Sciences (Warsaw))

Typical and atypical quantum structures

We analyze following quantum structures: the set Ω_N of mixed quantum states of order N, the set of discrete quantum operations (completely positive, trace preserving maps) acting on Ω_N and the set of Lindblad operators generating continuous dynamics in Ω_N. On one hand, we investigate typical quantum states, operations and Lindblad operators. In each case their statistical properties, studied with suitable ensembles of random matrices, serve as reference points. On the other hand, we look for atypical quantum objects with extremal properties and identify some examples of highly entangled multipartite states and strongly entangling quantum gates. Furthermore, we analyze discrete structures in the Hilbert space, including quantum t-designs: collections of M objects, chosen in such a way that the average over them approximates the average over the measure analyzed for all functions of degree t. In particular, we demonstrate a link between projective designs (consisting of pure quantum states) with classical simplex designs, mixed states quantum designs and quantum operation designs.

11.50 am: Yink Loong (Yale-NUS College & CQT)
Quantum metrology performances with proper resource accounting
We assess and quantify the resources in quantum metrology protocols, and propose to benchmark the estimation performance based on actual resource consumption rather than the number of probes used, leading to new insights and results.

12.10 pm: Ranjith Nair (Nanyang Technological University)
Quantum limits on sensing noisy phase-covariant optical channels
We find optimal entangled energy and mode-constrained probes for sensing phase-covariant optical channels. For Gaussian channels, the tightness of a resulting explicit upper bound on the QFI matrix is explored using TMSV probes.

12.30 – 2 pm: Lunch

2 – 3 pm: Comfort break

3 pm: Excursion (depart at 3 pm sharp) followed by Conference Banquet

Day 4: 29th August (Thursday) [Venue: D7 – Main Auditorium, IIT Madras Research Park]

9.30 am: Nilanjana Datta (University of Cambridge)

Zero-error communication under discrete-time Markovian dynamics

Consider an open quantum system with (discrete-time) Markovian dynamics. Our task is to store information in the system in such a way that it can be retrieved perfectly, even after the system is left to evolve for an arbitrarily long time. We show that this is impossible for classical (resp. quantum) information precisely when the dynamics is mixing (resp. asymptotically entanglement breaking). Furthermore, we provide tight universal upper bounds on the minimum time after which any such dynamics 'scrambles' the encoded information beyond the point of perfect retrieval. On the other hand, for dynamics that are not of this kind, we show that information must be encoded inside the peripheral space associated with the dynamics in order for it to be perfectly recoverable at any time in the future. This allows us to derive explicit formulas for the maximum amount of information that can be protected from noise in terms of the structure of the peripheral space of the dynamics.

10.10 am: Manik Banik (S N Bose National Centre for Basic Sciences, Kolkata)

Asymptotic Birkhoff-Violation in Operational Theories: Thermodynamic Implications and Information Processing

In accordance with the entropy principle of thermodynamics, under spontaneous evolutions, physical systems always evolve towards states with equal or greater randomness. But, where does this randomness originate? Does it arise due to our lack of knowledge (i.e., epistemic origin), or is it an intrinsic property of the systems (i.e., ontic origin)? Renowned Birkhoff–von Neumann theorem, often referred to as Birkhoff theorem, identifies source of this randomness to be the stochastic application of reversible operations on the system under study, thereby ensuring its epistemic origin. Analogue of this theorem is known to fail in the quantum case. We extend this investigation beyond quantum mechanics to a broader class of operational theories described within the framework of general probabilistic theories (GPTs). In this generalized framework, we establish Birkhoff violation as the prevalent trait; in fact the asymptotic variant of the theorem gets violated. We then demonstrate that Birkhoff-violation in GPTs can lead to consequences that are atypical to quantum theory. For instance, we report manifestation of Birkhoff-violation in a communication task, which otherwise is not observed in quantum world. We also show that, unlike the quantum case, in other operational theories the state transformation criteria can be distinct under mixtures of reversible transformations and doubly stochastic evolutions, leading to different resource theories of purity. Despite these exotic implications, we analyze a way forward to define a coherent notion of entropy in this generalized framework, while upholding alignment with von Neumann's thought experiment.

10.50 – 11.10 am: Coffee break

11.10 am: Hui Khoon Ng (Yale-NUS and CQT, NUS)

Fault-tolerant embedding of quantum circuits on hardware architectures via swap gates

In near-term quantum computing devices, connectivity between qubits remain limited by architectural constraints. A computational circuit with given connectivity requirements necessary for multi-qubit gates have to be embedded within physical hardware with fixed connectivity. Long-distance gates have to be done by first routing the relevant qubits together. The simplest routing strategy involves the use of swap gates to swap the information carried by two unconnected qubits to connected ones. Ideal swap gates just permute the qubits; real swap gates, however, have the added possibilities of causing simultaneous errors on the qubits involved and spreading errors across the circuit. A general swap scheme thus changes the error-propagation properties of a circuit, including those necessary for fault-tolerant functioning of a circuit. Here, we present a simple strategy to design the swap scheme needed to embed an abstract circuit onto a physical hardware with constrained connectivity, in a manner that preserves the fault-tolerant properties of the abstract circuit. The embedded circuit will, of course, be noisier, compared to a native implementation of the abstract circuit, but we show in the examples of embedding surface codes on heavy-hexagonal and hexagonal lattices that the deterioration is not severe. This then offers a straightforward solution to implementing circuits with fault-tolerance properties on current hardware. [arXiv:2406.17044]

11.50 am: Uthirakalyani G (Indian Institute of Technology Madras)

A Converse for Fault-tolerant Quantum Computation

As techniques for fault-tolerant quantum computation keep improving, it is natural to ask: what is the fundamental lower bound on space overhead? In this paper, we obtain a lower bound on the space overhead required for reliable implementation of a large class of operations that includes unitary operators. For the practically relevant case of sub-exponential depth and sub-linear gate size, our bound on space overhead is tighter than the known lower bounds. We obtain this bound by connecting fault-tolerant computation with a set of finite blocklength quantum communication problems whose accuracy requirements satisfy a joint constraint. The lower bound on space overhead obtained here leads to a strictly smaller upper bound on the noise threshold for noise that are not degradable. Our bound directly extends to the case where noise at the outputs of a gate are correlated but noise across gates are i.i.d.

12.10 pm: Pavithran Iyer Sridharan (Institute for Quantum Computing, University of Waterloo)

Enhancing Quantum error Correction with Partial Noise Characterization

We demonstrate a method to enhance the quantum error-correcting capabilities of a code by tailoring it to limited information from Cycle Error Reconstruction constituting K out of 4^n Pauli error rates in an n-qubit channel.

12.30 – 2 pm: Lunch

2 pm: Kunal Sharma (IBM Quantum)

Quantum algorithms at IBM

Quantum simulation is a promising early application of quantum computing, offering significant advantages over classical methods. In this talk, I will present improved techniques for quantum simulation that exploit the structure of Hamiltonians to reduce simulation costs. I will discuss also recent results and new techniques for approximating ground state energies, demonstrated on current IBM quantum devices. Additionally, I will discuss error mitigation strategies for estimating the expectation values of local observables.

2.40 pm: Ayan Majumder (Indian Institute of Technology Bombay)

Engineering a Mechanically Stable Hybrid Photonic Crystal Cavity Coupled to Color Defects in Diamond

Wavelength scale photonic, high-quality factor (Q-factor), and on-chip hybrid cavities could potentially provide a route toward scalable quantum technologies with color defects in diamonds. Various designs for photonic crystal cavities have been proposed; however, the challenging and multi-step fabrication processes required for such designs limit the experimentally observed Q-factors in addition to significant radiation loss. One possible way to minimize the radiation loss in a one-dimensional (1-D) photonic crystal cavity is by introducing a so-called Gaussian defect region around the cavity. In this work, we propose a hybrid waveguide-based Gaussian 1-D photonic crystal cavity. Our proposed mechanically stable and high-Q cavity could be crucial for the on-chip integration of different nanophotonic components for chip-scale photonic devices. We show via simulations that Q-factor > 10^5 can be achieved with the device.

3 pm: Jason Smith (University of Oxford)
Defect engineering of diamond – towards 1 million qubits on a chip
Laser processing of diamond allows the writing of coherent nitrogen-vacancy centres in precise locations and with high yield, suitable for realization of highly parallelized quantum memory chips for coupling to an external optical network

3.20 – 3.40 pm: Coffee break

3.40 – 4.20 pm: Lab tours (IIT Madras) and Industry Showcase

4.20 pm: Poster Session and Discussions

Day 5: 30th August (Friday) [Venue: D7 – Main Auditorium, IIT Madras Research Park]

9.30 am: Harald Weinfurter (LMU Munich)
Towards Quantum Networks
Quantum Networks will enable long distance quantum communication providing for example secure communication and connections between quantum computers on a global scale. Ideally. In view of recent experimental advances we will discuss further challenges, possible routes and where we are on that long journey.

10.10 am: Franceso Buscemi (Nagoya University)
Macroscopic states and entropy: properties, meaning, and some recent results
In addition to the quantity now eponymously known as von Neumann entropy, in his 1932 book von Neumann also discusses another entropic quantity, which he calls "macroscopic", and argues that it is the latter, and not the former, that is the relevant quantity to use in the analysis of thermodynamic systems. For a long time, however, von Neumann's "other" entropy was largely forgotten, appearing only sporadically in the literature, overshadowed by its more famous sibling. In this talk I will discuss a recent generalization of von Neumann's macroscopic entropy, called "observational entropy", focusing on its mathematical properties and logical interpretation, and presenting some recent results.

10.50 – 11.10 am: Coffee break

11.10 am: Mark Wilde (Cornell University)
Quantum algorithms for matrix geometric means
We present quantum algorithms for matrix geometric means, with applications to machine learning and estimation of quantum information theoretic quantities. We also show these can be used to solve the hardest problem for quantum computers.

11.30 am: Ritabrata Sengupta (IISER Berhampur)
Generating random Gaussian states
We develop a method for random sampling of (multimode) Gaussian states in terms of its covariance matrix (RQCM). We find distribution of marginals. and show that the eigenvalues of RQCM converge, in the large number of modes limit, to a shifted semicircular distribution. We make comments about entanglement of such states in terms of PPT criteria by using free probability.

11.50 am: Panel Discussion – DEI and Ethics in Quantum

12.30 – 2 pm: Lunch

2 pm: Gayatri Singh (Indian Institute of Science Education & Research (IISER) Mohal)
Weak measurement-based experimental quantum state protection using duality quantum algorithm
We present an experimental demonstration of protecting quantum states against amplitude-damping decoherence using weak-measurement and measurement reversal on 4-qubit NMR quantum processor by utilizing duality quantum algorithm to efficiently simulate non-unitary operations, including (WM,ADC,WMR).

2.20 pm: Madhavakkannan Saravanan (University of Basel)

Fiber-based optical spectrometer for single photon characterization

We present a high-resolution fiber-based optical spectrometer optimized for single photon spectroscopy, designed to measure the spectral output of a narrow-band photon pair source at the 87Rb D2 line. The spectrometer offers a 70 MHz resolution and a tuning range exceeding 300 GHz, enabling precise characterization of single photon sources, crucial for quantum communication and computation

2.40 pm: Kannan Vijayadharan (Università degli Studi di Padova)

Distribution of genuine time-bin entanglement at telecom wavelength

Loophole-free violation of Bell inequalities is a necessary condition for device independent quantum protocols. We mitigate the postselection loophole in time-bin entanglement with a postselection-free "genuine" time-bin entanglement scheme working with 1550 nm biphotons.

3 pm: Jack Postlewaite (University of Maryland)

Realization of the superadditive joint-detection optical receiver by time-domain Green-Hadamard Transform

We experimentally demonstrate an optical joint detection by a scalable time-domain Hadamard transform with single-photon detectors, dubbed the Green Machine receiver, whose capacity to decode BPSK shows superadditivity after backing out losses.

3.20 – 3.40 pm: Coffee break

3.40 pm: Closing Plenary Talk – Urbasi Sinha (Raman Research Institute)

Spatial and Temporal quantum correlations

We discuss photonic experiments that harness spatial [1,2,3] as well as temporal quantum correlations [4,5] to demonstrate breakthrough results in semi device-independent random number generation, higher dimensional entanglement quantification and quantum foundations.

1. Relating an entanglement measure with statistical correlators for two-qudit mixed states using only a pair of complementary observables, S. Sadana, S. Kanjilal, D.Home and U.Sinha, Quantum Information Processing 23, 138 (2024).
2. Direct determination of entanglement monotones for arbitrary dimensional bipartite states using statistical correlators and one set of complementary measurements, D. Ghosh, T.Jennewein, U.Sinha, Quantum Science and Technology, 7 045037, 2022.
3. Correlated photonic qutrit pairs for quantum information and communication, D.Ghosh, T.Jennewein, P.Kolenderski and U.Sinha, OSA Continuum 1 (3), 2018.
4. Loophole free interferometric test of macrorealism using heralded single photons, K.Joarder, D.Saha, D.Home, U.Sinha, PRX Quantum, 3, 010307, 2022.
5. Single system based generation of certified randomness using Leggett-Garg inequality, P.P.Nath, Debashis Saha, Dipankar Home, U.Sinha, Physical Review Letters, 133, 020802, 2024.

4.20 pm: Concluding Remarks

Poster Titles

1. Thermodynamic Signatures of Genuinely Multipartite Entanglement, Samgeeth Puliyil, Manik Banik and Mir Alimuddin

2. Discriminating chaotic and integrable regimes in quenched field Floquet system using saturation of Out-of-time-order correlation, Rohit Kumar Shukla, Gaurav Rudra Malik, S. Aravinda and Sunil Kumar Mishra

3. Minimal-error quantum state discrimination versus robustness of entanglement: More indistinguishability with less entanglement, Debarupa Saha, Kornikar Sen, Chirag Srivastava and Ujjwal Sen

4. Information revival without backflow: non-causal explanations of non-Markovianity, Francesco Buscemi, Rajeev Gangwar, Kaumudibikash Goswami, Himanshu Badhani, Tanmoy Pandit, Brij Mohan, Siddhartha Das and Manabendra Nath Bera.

5. Energy-gap modulation and majorization in three-level quantum Otto engine, Sachin Sonkar and Ramandeep Singh Johal

6. Device-independent quantum secure direct communication under non-markovian quantum channels, Pritam Roy, Subhankar Bera, Shashank Gupta and A. S. Majumdar

7. Correspondence between a single-reservoir measurement engine and a two-reservoir quantum Otto engine, Sidhant Jakhar and Ramandeep Singh Johal

8. Entanglement and Teleportation Beyond the Limit of Werner state: A Comparative Study, Nancy A and Balakrishnan S

9. Impact of non-Markovian quantum Brownian motion on quantum batteries, Gourab Bhanja, Devvrat Tiwari and Subhahsish Banerjee

10. Maximum Violation Bound for Bell-type Inequalities, Vishal Navani, Tomis Tomis and V. Narayanan

11. Steady charging in the open Jaynes Cummings battery, Vigneshwar B and Sankaranarayanan R

12. An Interferometric approach to get high fidelity Bell States using short pulsed Laser, Tomis and V. Narayanan

13. Scalable generation and detection of on-demand W-state in nanophotonic circuits, Govind Krishna, Jun Gao, Leonardo Santos, Zesheng Xu, Adrian Iovan, Stephan Steinhauer, Otfried Gühne, Philip J Poole, Dan Dalacu, Val Zwiller and Ali W Elshaari

14. Constant Runtime Error Mitigation, Gaurav Saxena and Thi Ha Kyaw

15. Decoding Error Correction Codes with Boundaries, Mark Bryan Myers II and Hui Khoon Ng

16. Assessing non-Markovian dynamics through moments of the Choi state, Bivas Mallick, Saheli Mukherjee, Ananda G. Maity and Archan S. Majumdar

17. Interplay between the Hilbert-space dimension of the control system and the memory induced by quantum SWITCH, Saheli Mukherjee, Bivas Mallick, Sravani Yanamandra, Samyadeb Bhattacharya and Ananda Gopal Maity

18. Vulnerability of Quantum-search based Quantum Secret Sharing Schemes, Santanu Majhi and Debajyoti Bera

19. Ultrastrong coupling limit to quantum mean force Gibbs state for anharmonic environment, Prem Kumar and Sibasish Ghosh

20. Microwave field sensing using Rydberg atom in thermal atomic vapor, Nandini Mondal, Surya Narayan Sahoo and Ashok K Mohapatra

21. Divisibility of infinite dimensional Dynamical maps, Bihalan Bhattacharya, Uwe Franz, Saikat Patra and Ritabrata Sengupta

22. Continuous variable entanglement using optomechanics, Greeshma Gopinath and Sankar Davuluri

23. Enhancing Bosonic cQED Systems: Integrating On-Chip Flux Line for Flux-Tunable Ancilla with Cavity Coherence Preservation, Aleksandr Dorogov, Fernando Valadares and Yvonne Y. Gao

24. Quantum networking with microfabricated atomic vapor cells, Roberto Mottola, Gianni Buser, Suyash Gaikwad, Madhavakkannan Saravanan and Philipp Treutlein

25. Counterintuitive yet efficient regimes of computation in symmetry protected spin chains, Arnab Adhikary, Wang Yang and Robert Raussendorf

26. Assessing the coupling of photonics quantum states with gravitation by interference in space, Francesco Vedovato, Daniel Terno, Giuseppe Vallone and Paolo Villoresi

27. Rydberg Atomic Sensor-based Quantum Radar, Neel Kanth Kundu

28. Optical atomic clock beyond standard quantum limit, Sreeshna Subhash and Sankar Davuluri

29. Dynamical tuning of tunnel barriers in electrostatically defined quantum dots, for efficient realization of spin qubits., Varsha Jangir and Suddhasatta Mahapatra

30. Novel schemes for the state encoding using temporal modes with very high contrast, Davide Scalcon, Elisa Bazzani, Giuseppe Vallone, Paolo Villoresi and Marco Avesani

31. Overcoming Traditional No-Go Theorems: Quantum Advantage in Multiple Access Channels, Ananya Chakraborty, Sahil Gopalkrishna Naik, Edwin Peter Lobo, Ram Krishna Patra, Samrat Sen, Mir Alimuddin, Amit Mukherjee and Manik Banik

32. Multiparty Local Bit Hiding: Non-Causal Advantage and Super-Activation of Causal Indefiniteness, Sahil Gopalkrishna Naik, Samrat Sen, Ram Krishna Patra, Ananya Chakraborty, Mir Alimuddin, Pratik Ghoshal and Manik Banik

33. Locally unidentifiable subset of quantum states and its resourcefulness in secret password distribution, Pratik Ghosal, Arkaprabha Ghosal, Subhendu B. Ghosh and Amit Mukherjee

34. Deep-learning-based Randomness assessment of Quantum Random Number Generators, Hamid Tebyanian

35. Experimental method for determining the atomistic details of the Quantum-well interface, Siddarth Rastogi and Suddhasatta Mahapatra

36. Certifying Beyond Quantumness of Locally Quantum No-Signaling Theories Through a Quantum-Input Bell Test, Edwin Peter Lobo, Sahil Gopalkrishna Naik, Samrat Sen, Ram Krishna Patra, Manik Banik and Mir Alimuddin

37. Ansatz circuit design for a fault tolerant variational quantum algorithm model with T-gate for efficient peptide folding using Aria-1, Akshay Uttarkar and Vidya Niranjan

38. Improvement in key generation rate with wavelength division multiplexing in quantum key distribution, Indranil Maiti and Mikolaj Lasota

39. Non-separability and multipartite entanglement in single particle accelerated multiqubit systems, Harsha Miriam Reji, Hemant S. Hegde and R. Prabhu

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