INTERNATIONAL YEAR OF
Quantum Science
and Technology

INDIAN INSTITUTE OF SCIENCE
भारतीय विज्ञान संस्थान

20th Edition of International Conference

TQC – 2025

Theory of Quantum Computing, Communication and Cryptography

15 –19 September 2025

National Science Seminar Complex, Indian Institute of Science, Bengaluru, India

Schedule

Schedule for 15th September, 2025 (Day 1 - Monday)

Time	Session 1	Session 2	Session 3
09:00–10:30	Registration		
10:30–11:00	High Tea		
11:00–11:30	Welcome Note		
11:30–12:30	The New Frontier in Low-Overhead Fault-Tolerant Quantum Computation *Hayata Yamasaki*		
12:30–14:00	Lunch Break		
14:00–14:30	The Clifford hierarchy for one qubit or qudit *Nadish de Silva et al.*	Maximal device-independent randomness in every dimension *Máté Farkas et al.*	Commuting Local Hamiltonians Beyond 2D *John Bostanci et al.*
14:30–15:00	Rise of conditionally clean ancillae for efficient quantum circuit constructions *Tanuj Khattar et al.*	A quantum cloning game with applications to quantum position verification *Llorènc Escola Farràs et al.*	Optimal Hamiltonian simulation for low-energy states *Rolando Somma et al.*
15:00–15:30	Locality and Parameter Tradeoffs for Subsystem Codes *Samuel Dai et al.*	PKE and ABE with Collusion-Resistant Secure Key Leasing *Fuyuki Kitagawa et al.*	Simulating chaos without chaos *Andi Gu et al.*
15:30–16:00	Tea Break		
16:00–16:30	Testing classical properties from quantum data *Matthias C. Caro et al.*	Self-testing in the compiled setting via tilted-CHSH inequalities *Connor Paddock et al.*	Quantum Routing and Entanglement Dynamics Through Bottlenecks *Dhruv Devulapalli et al.*
16:30–17:00	Chasing shadows with Gottesman-Kitaev-Preskill codes *Jonathan Conrad et al.*	Commitments are equivalent to statistically verifiable one-way state generators *Rishabh Batra et al.*	Mixing time of quantum Gibbs sampling for random sparse Hamiltonians *Akshar Ramkumar et al.*
17:00–17:30	Unitary Designs from Random Symmetric Quantum Circuits *Hanqing Liu et al.*	Untelegraphable Encryption and its Applications *Jeffrey Champion et al.*	A Hierarchy of Spectral Gap Certificates for Frustration-Free Spin Systems *Kshiti Sneh Rai et al.*
17:30–19:00	Poster Session – 1		
19:00–21:00	Dinner		

Schedule for 16th September, 2025 (Day 2 - Tuesday)

Time	Session 1	Session 2	Session 3
09:00–09:30			
09:30–10:30	Composing Quantum Algorithms *Stacey Jeffery*		
10:30–11:00	Tea Break		
11:00–11:30	Towards Non-Abelian Quantum Signal Processing: Efficient Control of Hybrid Continuous- and Discrete-Variable Architectures *Shraddha Singh et al.*	Phase Error Rate Estimation in QKD with Imperfect Detectors *Devashish Tupkary et al.*	Quantum Purity Amplification: Optimality and Efficient Algorithm *Zhaoyi Li et al.*
11:30–12:00	Polylog-Time and Constant-Space-Overhead Fault-Tolerant Quantum Computation with Quantum LDPC Codes *Shiro Tamiya et al.*	Asymptotic Robustness of Entanglement in Noisy Quantum Networks and Graph Connectivity *Fernando Lledó et al.*	A Quantum Algorithm for Khovanov Homology *Alexander Schmidhuber et al.*
12:00–12:30	Quantum Search with In-Place Queries *Blake Holman et al.*	Adaptive Channel Reshaping for Improved Entanglement Distillation *Dina Abdelhadi et al.*	Quantum Algorithm for Reversing Unknown Unitary Evolutions *Yu-Ao Chen et al.*
12:30–13:00	The Complexity of Gottesman–Kitaev–Preskill (GKP) States *Lukas Brenner et al.*	Quantum Position Verification in One Shot: Parallel Repetition of the f-BB84 and f-Routing Protocols *Llorènc Escola Farràs et al.*	Classical and Quantum Algorithms for Characters of the Symmetric Group *Sergey Bravyi et al.*
13:00–14:00	Lunch Break		

Time	Session 1	Session 2	Session 3
14:00–14:30	Full Classification of Pauli Lie Algebras *Gerard Aguilar Tapia et al.*	No Quantum Advantage Without Classical Communication: Fundamental Limitations of Quantum Networks *Justus Neumann et al.*	Directed st-Connectivity with Few Paths is in Quantum Logspace *Roman Edenhofer et al.*
14:30–15:00	Uniformity Testing When You Have the Source Code *Clément Canonne et al.*	Generalized Inner Product Estimation with Limited Quantum Communication *Srinivasan Arunachalam et al.*	The Space Just Above One Clean Qubit *Dale Jacobs et al.*
15:00–15:30	A Full Practical Theory of the Clifford Group Commutant *Lennart Bittel et al.*	Composably Secure Delegated Quantum Computation with Weak Coherent Pulses *Maxime Garnier et al.*	Quantum Threshold is Powerful *Jackson Morris et al.*
15:30–16:00	Factoring an Integer with Three Oscillators and a Qubit *Lukas Brenner et al.*	Polynomial-Time Quantum and Classical Algorithms for Representation Theoretic Multiplicities *Vojtěch Havlíček et al.*	Quantum Computational Complexity of Matrix Functions *Santiago Cifuentes et al.*
16:00–16:30	Tea Break		
16:30–17:30	Industry Talk - Quantum Computing at Fujitsu		
17:30–18:30	Mentorship Session Between Junior and Senior Researchers		
19:00–21:00	Dinner		

Schedule for 17th September, 2025 (Day 3 - Wednesday)

Time	Session 1	Session 2	Session 3
09:00–09:30			
09:30–10:30	Quantum algorithms for codes and lattices based on Regev's reduction (joint work with Jean-Pierre Tillich) *André Chailloux*		
10:30–11:30	Business Meeting and Tea Break		
11:30–12:00	SPAM-Free Sound Certification of Quantum Gates via Quantum System Quizzing *Nikolai Miklin et al.*	A Meta-Complexity Characterization of Quantum Cryptography *Bruno Cavalar et al.*	Quantum SAT Problems with Finite Sets of Projectors Are Complete for a Plethora of Classes *Ricardo Rivera Cardoso et al.*
12:00–12:30	Parallel Logical Measurements via Quantum Code Surgery *Alexander Cowtan et al.*	Copy-Protecting Puncturable Functionalities, Revisited *Prabhanjan Ananth et al.*	Classically Estimating Observables of Noiseless Quantum Circuits *Armando Angrisani et al.*
12:30–13:00	Quantum Catalytic Space *Harry Buhrman et al.*	Additivity and Chain Rules for Quantum Entropies via Multi-Index Schatten Norms *Omar Fawzi et al.*	Forrelation Is Extremally Hard *Uma Girish et al.*
13:00–14:00	Lunch Break		
14:00–16:00	Poster Session – 2		
16:00–17:30	Poster + Tea Break		
17:30–19:30	Cultural Event –Indian Musical Instruments Ensemble Concert by Layataranga		
19:30–21:00	Dinner		

Schedule for 18th September, 2025 (Day 4 - Thursday)

Time	Session 1	Session 2	Session 3
09:30–10:30	Post-quantum security of lattice-based cryptosystems *Rajendra Kumar*		
10:30–11:00	Tea Break		
11:00–11:30	Adaptive Syndrome Extraction *Noah Berthusen et al.*	Pseudorandom Function-like States from Common Haar Unitary *Minki Hhan et al.*	Quantum Perfect Matchings *David Cui et al.*
11:30–12:00	Bounding the Computational Power of Bosonic Systems *Varun Upreti et al.*	Efficient Quantum Pseudorandomness from Hamiltonian Phase States *John Bostanci et al.*	Polynomial-Time Quantum Gibbs Sampling for Fermi-Hubbard Model at Any Temperature *Štěpán Šmíd et al.*
12:00–12:30	X-Arability of Quantum States *Harm Derksen et al.*	Quantum One-Time Programs, Revisited *Aparna Gupte et al.*	Generalized Short Path Algorithms: Towards Super-Quadratic Speedup over Markov Chain Search for Combinatorial Optimization *Shouvanik Chakrabarti et al.*
12:30–14:00	Lunch Break		
14:00–19:00	Excursion: Bhoganandiswara Temple (9th Century Monument) and Nandi Hills		
19:00–21:00	Banquet Dinner		

Schedule for 19th September, 2025 (Day 5 - Friday)

Time	Session 1	Session 2	Session 3
09:00–09:30			
09:30–10:00	A Unified Theory of Quantum Neural Network Loss Landscapes *Eric R. Anschuetz et al.*	Strategic Codes: The Universal Spatio-Temporal Framework for Quantum Error-Correction *Andrew Tanggara et al.*	Quantum Spin Chains and Symmetric Functions *Marcos Crichigno et al.*
10:00–10:30	Online Learning of Quantum Processes *(Asad Raza et al.)*	Tesseract: A Search-Based Decoder for Quantum Error Correction *Laleh Aghababaie Beni et al.*	
10:30–11:00	Tea Break		
11:00–11:30	Quantum Advantage for Learning Shallow Neural Networks with Natural Data Distributions *Laura Lewis et al.*	Orthogonality Broadcasting and Quantum Position Verification *(Ian George et al.)*	Testing and Learning Structured Quantum Hamiltonians *Srinivasan Arunachalam et al.*
11:30–12:00	Hamiltonian Locality Testing via Trotterized Postselection *John Kallaugher et al.*	Unitary Designs of Symmetric Local Random Circuits *Yosuke Mitsuhashi et al.*	The Rotation-Invariant Hamiltonian Problem is QMAEXP-Complete *Jon Nelson et al.*
12:00–12:30	Classical Estimation of the Free Energy and Quantum Gibbs Sampling from the Markov Entropy Decomposition *Samuel Scalet et al.*	A New World in the Depths of Microcrypt: Separating OWSGs and Quantum Money from QEFID *Amit Behera et al.*	Time-Dependent Hamiltonian Simulation via Magnus Expansion: Algorithms and Discrete Superconvergence for Unbounded Hamiltonians *Di Fang et al.*

Time	Session 1	Session 2	Session 3
12:30–13:00	Towards a Complexity-Theoretic Dichotomy for (2+1)-Dimensional TQFT Invariants *Eric Samperton et al.*	Impossibility of Hyperefficient Shadow Tomography: Unbounded Multiple-Copy Secure Copy-Protection *Alper Cakan et al.*	RE-Completeness of Entangled Constraint Satisfaction Problems *Eric Culf et al.*
13:00–13:30	Closing Remarks		
13:30–14:30	Lunch Break		
14:30–21:00	Departure		