Pre-conference Tutorial on Quantum Technologies and Applications

February 11, 2024

Venue: M. V. Seminar Hall, Academic Block 2, M.I.T, Manipal Academy of Higher Education (MAHE), Manipal

February 11, 2024 (Sunday)	
Registration & Breakfast	08:30 – 09:30
Vaibhav Madhok Basics of QM: Probability Amplitudes, Qubits, Bloch Sphere, Pure & Mixed States, Uncertainty Principle, Evolution and Measurements	09.30 – 10.30
Tea	
V. Balakrishnan Tensor products, Quantum Entanglement, Quantum Teleportation, Entanglement Swapping and their experimental realizations	11.00 – 12.30
Lunch	
S Lakshmibala Quantum Optics (Fock states, coherent states, squeezed states etc.)	14.00 – 15.30
High Tea	
Anil Prabhakar Superconducting Qubits, Ion Traps and Hardware for Quantum Technologies	16.00 – 17.30

Program Schedule **ICQTA -2024**

International Conference on Quantum Technologies and Applications

12-14 February 2024

Venue: Dr. TMA Pai Auditorium (3rd floor), Manipal Academy of Higher education (MAHE), Manipal

Day 1: February 12, 2024 (Monday)	
Registration & Breakfast	08:00 – 09:00
Inauguration: Chief Guest, Lt. Gen. (Dr.) M. D. Venkatesh, Vice Chancellor, MAHE, Manipal	09.00 – 09.50
Session 1 : Industrial development of Quantum technologies **Chair : T. Lazar Mathew, MAHE Manipal**	
Enrique Solano, Kipu Quantum, Germany Quantum Advantage with Digital, Analog, and Digital-Analog Quantum Computers	09.50 – 10.25
Susrutha Narayan Chaudhury, CADFEM, Ansys, India Leveraging the Potential of Ansys Lumerical Software for Photonics and Applications in Quantum Technology.	10.25 – 11.00
Tea	
Session 2 : **Quantum Information** **Chair: Apoorva Patel, IISc India**	
P C Deshmukh, IIT Tirupati, India Employing Photoionization Time-delay to Determine Lower Bound on the Speed of Quantum Information Processing	11.30 – 12.00
Jobin Jose, IIT Patna, India Time delay studies of atoms trapped in laser fields: An Investigation About Quantum Information System	12.00 – 12.30
Bodhaditya Santra Quantum simulation and computing using cold atoms with tunable interactions	12.30 – 13.00
Lunch	
Session 3 : Quantum Communication **Chair : Arul Lakshminarayan, IIT Madras, India**	
G Raghavan, DIAT Pune, India The gap between theory and practice of perfect randomness and physically assured privacy	14.00 – 14.30
Anil Prabhakar, IIT Madras, India Building Quantum Secure Terrestrial Optical Networks	14.30 – 15.00
Ranjan Sing, Nanyang Technological University, Singapore On-Chip THz Topological Photonics for 6G to XG Wirelesss	15.00 – 15.30
Bhaskar Kanseri, IIT Delhi, India Fibre based secure communication in the quantum world	15.30 – 16.00
Tea	
Session 4 : Quantum Computing **Chair: Adolfo del Campo, Uni. of Luxembourg, Luxembourg**	
Archana Kamal, University of Massachusetts-Lowell, USA Parametric QED: a new framework for quantum systems engineering	16.30 – 17.00
Prasanna Venkatesh, IIT Gandhinagar, India Quantum Otto Cycles - Asymmetric Protocols and Role of Monitoring	17.00 – 17.30
Narendra Hegade, Kipu Quantum, Germany Digitized Counterdiabatic Quantum Computing	17.30 – 18.00

Day 2: February 13, 2024 (Tuesday)	
Breakfast	08:00 – 09:00
Session 5 : Quantum Networks **Chair : G Raghavan, DIAT Pune, India**	
Apoorva Patel, IISc India Understanding Quantum Advantage in Unsupervised Machine Learning	09:00 – 09.30
Sergej Flach, PCS-IBS, South Korea Thermalization Universality Classes for Weakly Non-integrable Many-body Dynamics	09.30 – 10.00
Arul Lakshminarayan, IIT Madras, India Dual unitaries as maximizers of the distance to local product gates	10.00 – 10.30
Tea	
Session 6 : Quantum Materials **Chair: Sergej Flach, PCS-IBS, South Korea**	
Venu Gopal Achanta, CSIR-NPL, India Metamaterials for quantum applications	11.00 – 11.30
T.S Mahesh, IISER Pune, India Manipulating and Measuring the Energy of Nuclear Spin Qubits: Realizing Quantum Battery and Certifying Entanglement	12.00 – 12.30
Baladitya Suri, IISc Bangalore, India Superconducting Josephson junction based devices for quantum computation and quantum information processing	12.30 – 13.00
Prasanta K. Panigrahi, IISER Kolkata, India Information-Theoretic Aspects of Correlated Quantum Channels	12.30 – 13.00
Lunch	
Session 7 : Quantum Phase Transition **Chair: Venu Gopal Achanta, CSIR-NPL, India**	
Lincoln D. Carr, Colorado School of Mines, USA Case Studies on Physical Complexity in Quantum States: From Quantum Phase Transitions to Quantum Cellular Automata	14.00 – 14.30
Bishwajyoti Dey, SP Pune University, India Quantum Vortex States in Rotating Bose-Hubbard Model.	14.30 – 15.00
Adolfo del Campo, University of Luxembourg, Luxembourg Universal Vortex Statistics and Stochastic Geometry of Bose-Einstein Condensation	15.00 – 15.30
Dilip Angom, Manipur University, India Percolation and Quench Dynamics of Quantum Phases	15.30 – 16.00
Tea	
Session 8 : Quantum Devices **Chair** : **Bishwajyoti Dey, SP Pune University, India**	
Prabha Mandayam, IIT Madras, India Noise-adapted Quantum Error Correction and Fault Tolerance	16.30 – 17.00
P. Durganandini, SP Pune University, India Factorization, asymmetry and frameness in the spin-1/2 Heisenberg XXZ chain in the presence of Dzyaloshinskii-Moriya interaction	17.00 – 17.30
Amit Kumar Pal, IIT Palakkad, India Localizing entanglement in multiparty systems	17.30 – 18.00

Cultural Events and Conference Dinner Banquet	19.00 – 21.00
Day 3: February 14, 2024 (Wednesday)	
Session 9 : Quantum Simulations **Chair: Lincoln D. Carr, Colorado School of Mines, USA**	
Sonjoy Majumder, IIT Kharagpur, India Spin structure and dynamics of quantum Skyrmions in spinor Bose-Einstein Condensate	08.45 – 09.15
Dr. Arko Roy, IIT Mandi, India Finite temperature phase transition in coherently coupled Bose-Einstein condensates	09.15 – 09.45
Vaibhav Madhok, IIT Madras, India Quantifying operator spreading and chaos in Krylov subspaces with quantum state reconstruction	09.45 – 10.15
Utkarsh Mishra, Delhi University, India Localization Driven Quantum Sensing	10.15 – 10.45
Tea	
Session 10: Quantum Frontiers **Chair : Dilip Angom, Manipur University, India**	
Aditi Sen De, HRI Allahabad, India Quantum Networks	11.15 – 11.45
Sebastian Wuster, IISER Bhopal, India Quantum soliton collisions	11.45 – 12.15
Mikko Möttönen, Alto University, Finland Unimon qubit and single-shot readout using a thermal detector	12.15 – 12.45
Dr. R. Srikanth, Poornaprajna Institute of Scientific Research (PPISR), India Asymmetric steerability and quantum discord	12.45 – 13.15
Lunch and Poster	
Session 11 : Photonic-based Quantum Devices **Chair : Sonjoy Majumder, IIT Kharagpur, India**	
Rohith M Estimation of the degree of nonclassicality of light using quadrature fluctuations	3.15 – 3.30
Kaushik Paul Photonic counterdiabatic quantum optimization algorithm	3.30 – 3.45
Kuldeep Kumar Shrivastava Photon-photon and photon-magnon coupling based quantum devices engineering at room temperature for next generation hybrid quantum technology.	3.45 – 4.00
Valedictory Function: Chief Guest, Dr. Vinod V. Thomas, Registrar (Evaluation) MAHE, Manipal	4.00 – 4.40
Tea	