QPL 2025 program (14 - 18 July 2025 in Varna, Bulgaria)

Overview of the program

Welcome to Varna! Registration opens at 9:00 AM on Monday at Hotel Cherno More.

At 9:40 AM, there will be a welcome address from the organizers.

	Monday	Tuesday	Wednesday	Thursday	Friday
9:00 − 9:30	Registration (until 9:40)				
9:30 − 9:55	Welcome	Plenary sessions	Plenary sessions	Plenary sessions	
9:55 − 10:20	Plenary sessions				Plenary sessions
10:20 − 10:45			INDUSTRY*		
	Coffee break				
11:15 − 11:40	Plenary sessions	Plenary sessions	Plenary sessions	Plenary sessions	Plenary sessions
11:40 − 12:05					BUSINESS MEETING
12:05 − 12:30					
	Lunch break				
14:00 − 14:25	Parallel sessions	Parallel sessions		Parallel sessions	Parallel sessions
14:25 − 14:50			Guided museum tour		
14:50 − 15:15					
	Coffee break			Coffee break	
15:45 − 16:10	Parallel sessions	Parallel sessions		Parallel sessions	End of QPL 2025. Goodbye!
16:10 − 16:35					
16:35 − 17:00				ESPECIAL**	
17:00 − 19:00	Poster session (with reception)				
19:00 − 20:00			Drinks	(start at 19:30) Conference dinner	
20:00 − 21:30			Jazz concert		
21:30 − 22:00					

* INDUSTRY will last 30 min.
** ESPECIAL will last 40 min.

Monday

9:00 − 9:40	Registration
9:40 − 9:55	Welcome

	Session chair: Augustin Vanrietvelde (Hall Cherno More)
9:55 − 10:20	**Alastair Abbott, Mehdi Mhalla and Pierre Pocreau** **Classical and quantum query complexity of Boolean functions under indefinite causal order**
10:20 − 10:45	Tein van der Lugt and Robin Lorenz **Unitary causal decompositions: a combinatorial characterisation via lattice theory**

Coffee break

	Session chair: Ognyan Oreshkov (Hall Cherno More)
11:15 − 11:40	Raphaël Mothe, Alastair Abbott and Cyril Branciard **Correlations and quantum circuits with dynamical causal order**
11:40 − 12:05	Carla Ferradini, Victor Gitton and V. Vilasini **Cyclic quantum and classical causal modelling with a novel graph separation theorem**
12:05 − 12:30	Jessica Bavaresco, Ämin Baumeler, Yelena Guryanova and Costantino Budroni **Indefinite causal order in boxworld theories**

Lunch break

	Session chair: Vladimir Zamdzhiev (Hall Cherno More)	Session chair: Alastair Abbott (Hall Varna)
14:00 − 14:25	Amin Karamlou **Quantum Spoiler-Duplicator Games**	Hlér Kristjánsson, Tatsuki Odake, Satoshi Yoshida, Philip Taranto, Jessica Bavaresco, Marco Túlio Quintino and Mio Murao **Exponential separation in quantum query complexity of the quantum switch with respect to simulations with standard quantum circuits**
14:25 − 14:50	Louis Lemonnier **Non-Cartesian Guarded Recursion with Daggers**	Julian Wechs and Ognyan Oreshkov **Subsystem decompositions of quantum evolutions and transformations between causal perspectives**
14:50 − 15:15	Liyi Li, Federico Zahariev, Chandeepa Dissanayake, Jae Swanepoel, Amr Sabry and Mark Gordon **Quantum Simulation Programming via Typing**	Nick Ormrod and Robert Spekkens **Causation in Classical Mechanics**

Coffee break

	Session chair: Ravi Kunjwal (Hall Cherno More)	Session chair: James Hefford (Hall Varna)
15:45 − 16:10	Albert Aloy, Matteo Fadel, Thomas Galley, Caroline Jones and Markus P. Mueller **Theory-independent monitoring of the decoherence of a superconducting qubit with generalized contextuality**	Peng Fu, Kohei Kishida, Neil J. Ross and Peter Selinger **Proto-Quipper with Reversing and Control**
16:10 − 16:35	Laurens Walleghem and Lorenzo Catani **An extended Wigner's friend no-go theorem inspired by generalized contextuality**	Fabian Wiesner, Ziad Chaoui, Diana Kessler, Anna Pappa and Martti Karvonen **Why quantum state verification cannot be both efficient and secure: a categorical approach**
16:35 − 17:00	Laurens Walleghem, Rui Soares Barbosa, Matt Pusey and Stefan Weigert **A refined Frauchiger--Renner paradox based on strong contextuality**	Jean-Simon Lemay, Robin Cockett and Priyaa Srinivasan **Dagger Drazin Inverses**

17:00 − 19:00	Poster session (with reception)

Tuesday

	Session chair: Ross Duncan (Hall Cherno More)	
9:30 − 9:55	Andrey Khesin, Jonathan Lu and Peter Shor **Universal graph representation of stabilizer codes**	
9:55 − 10:20	Benjamin Rodatz, Boldizsár Poór and Aleks Kissinger **Floquetifying stabiliser codes with distance-preserving rewrites**	
10:20 − 10:45	Matthew Sutcliffe and Aleks Kissinger **Fast Classical Simulation of Quantum Circuits via Parametric Rewriting in the ZX-Calculus**	
Coffee break		
	Session chair: Nicola Pinzani (Hall Cherno More)	
11:15 − 11:40	Martin Plávala, Otfried Gühne and Marco Túlio Quintino **All incompatible measurements on qubits lead to multiparticle Bell nonlocality**	
11:40 − 12:05	Kai-Siang Chen, Gelo Noel Tabia, Chung-Yun Hsieh, Yu-Chun Yin and Yeong-Cherng Liang **Nonlocality of Quantum States Can be Transitive**	
12:05 − 12:30	Nadish de Silva, Ming Yin and Santanil Jana **A classification program for nonlocality paradoxes of three qubits**	
Lunch break		
	Session chair: Miriam Backens (Hall Cherno More)	Session chair: Jessica Bavaresco (Hall Varna)
14:00 − 14:25	Nadish de Silva and Oscar Lautsch **The Clifford hierarchy for one qubit or qudit**	Ivan Šupić, Maria Balanzo-Juando, Andrea Coladangelo, Remigiusz Augusiak and Antonio Acin **All pure multipartite entangled states of qubits can be self-tested up to complex conjugation**
14:25 − 14:50	Clément Poirson, Robert Booth and Joschka Roffe **CSS surgery: compiling any CNOT in any code**	Arthur Mehta, Connor Paddock and Lewis Wooltorton **Self-testing in the complied setting via tilted-CHSH inequalities**
14:50 − 15:15	Angelos Bampounis, Rui Soares Barbosa and Nadish de Silva **Matchgate hierarchy: Deterministic gate teleportation in matchgate circuits**	Rutvij Bhavsar, Lewis Wooltorton and Joonwoo Bae **A composable framework for device-independent state certification with local operations and classical communication**
Coffee break		
	Session chair: Cole Comfort (Hall Cherno More)	Session chair: Zixuan Liu (Hall Varna)
15:45 − 16:10	Boldizsár Poór, Razin A. Shaikh and Quanlong Wang **ZX-calculus is Complete for Finite-Dimensional Hilbert Spaces**	Matthias Salzger and John Selby **A decompositional framework for process theories in spacetime**
16:10 − 16:35	Mateusz Kupper, Chris Heunen, Niel de Beaudrap and Dominic Horsman **String diagrams for defect-based surface code computing**	Augustin Vanrietvelde, Octave Mestoudjian and Pablo Arrighi **Causal Decompositions of 1D Quantum Cellular Automata**
16:35 − 17:00	Titouan Carette, Renaud Vilmart and Daniela Cojocaru **The decohered ZX-calculus**	Maarten Grothus, Alastair Abbott, Augustin Vanrietvelde and Cyril Branciard **Routing Quantum Control of Causal Order**

Wednesday

	Session chair: Alejandro Díaz-Caro (Hall Cherno More)
9:30 − 9:55	Aaron David Fairbanks and Peter Selinger **On traces in categories of contractions**
9:55 − 10:20	John Selby, Maria Stasinou, Matt Wilson and Bob Coecke **Generalised process theories**
	INDUSTRY
10:20 − 10:35	Quantinuum − Ross Duncan
10:35 − 10:50	NeverLocal − Nicola Pinzani
	Coffee break
	Session chair: Anna Jenčová (Hall Cherno More)
11:15 − 11:40	Yīlè Yīng, Maria Ciudad Alanon, Daniel Centeno, Marco Erba, Thomas Galley, David Schmid, John H. Selby, Robert W. Spekkens, Sina Soltani, Jacopo Surace and Alex Wilce **Twirled worlds: symmetry-induced failures of tomographic locality (and its comparison with quantum theory over the real field)**
11:40 − 12:05	Vincenzo Fiorentino and Stefan Weigert **Quantum Theories with Alternative State-Update Rules**
12:05 − 12:30	Marco Erba and Paolo Perinotti **The composition rule for quantum systems is not the only possible one**
	Lunch break
14:20 − 17:00	Guided museum tour*
19:00 − 20:00	Drinks
20:00 − 21:30	Jazz concert**

* Guided tour of the Archeological Museum of Varna, which features the oldest gold treasure in the world (4600 - 4200 BC) discovered in the Varna Necropolis.

** Jazz concert by Bulgarian musician Hristo Yotsov in the yard of the museum.

Thursday

	Session chair: Aleks Kissinger (Hall Cherno More)	
9:30 − 9:55	Piotr Mitosek and Miriam Backens **An algebraic interpretation of Pauli flow, leading to faster flow-finding algorithms**	
9:55 − 10:20	Mehdi Mhalla, Simon Perdrix and Luc Sanselme **Shadow Pauli Flow: Characterising Determinism in MBQCs involving Pauli Measurements**	
10:20 − 10:45	Nathan Claudet and Simon Perdrix **Generalising Local Complementation to Capture Local Unitary Equivalence of Graph States**	
	Conference photo at 10:45 & coffee break	
	Session chair: Simon Perdrix (Hall Cherno More)	
11:15 − 11:40	Sarah Meng Li, Michele Mosca, Neil J. Ross, John van de Wetering and Yuming Zhao **A Complete and Natural Rule Set for Multi-Qutrit Clifford Circuits**	
11:40 − 12:05	Matthew Amy, Nadish de Silva and Kasra Masoudi **The Channel Representation and Non-Clifford Resources**	
12:05 − 12:30	Linh Dinh and Neil J. Ross **Contributions to the Theory of Clifford-Cyclotomic Circuits**	
	Lunch break	

	Session chair: Arianne Meijer-van de Griend (Hall Cherno More)	Session chair: Robert Booth (Hall Varna)
14:00 − 14:25	Vivien Vandaele **Lower T-count with faster algorithms**	Satoshi Yoshida, Yuki Koizumi, Michał Studziński, Marco Túlio Quintino and Mio Murao **One-to-one Correspondence between Deterministic Port-Based Teleportation and Unitary Estimation**
14:25 − 14:50	Mathias Weiden, Justin Kalloor, Ed Younis, John Kubiatowicz and Costin Iancu **High-Precision Fault-Tolerant Quantum Circuit Synthesis by Unitary Diagonalization**	Paul Herringer, Vir B. Bulchandani, Younes Javanmard, David T. Stephen and Robert Raussendorf **Measurement-based quantum computation in symmetry-enriched topological phases**
14:50 − 15:15	Tuomas Laakkonen **Synthesizing Controlled or Distributed Clifford Circuits**	Thomas Perez and Miriam Backens **Inserting planar-measured qubits into MBQC patterns while preserving flow**
	Coffee break	
	Session chair: Nadish de Silva (Hall Cherno More)	Session chair: Eleftherios Tselentis (Hall Varna)
15:45 − 16:10	Raman Choudhary and Rui Soares Barbosa **Exclusivity principle, Ramsey theory, and n-cycle PR boxes**	Nicetu Tibau Vidal and Giulio Chiribella **BMV experiment without spacetime superpositions**
16:10 − 16:35	Aziz Kharoof, Selman Ipek and Cihan Okay **Extremal simplicial distributions on glued cycle scenarios with arbitrary outcomes**	Bruna Larissa de Souza Sahdo E Silva, Natália S. Móller and Nelson Yokomizo **Gravitational quantum switch on a superposition of spherical shells**
	Session chair: Ognyan Oreshkov (Hall Cherno More)	
16:35 − 17:15	ESPECIAL – Bob Coecke, Stefano Gogioso, Aleks Kissinger, Selma Dündar-Coecke, Caterina Puca, Lia Yeh, Muhammad Hamza Waseem, Sieglinde M.-L. Pfaendler, Thomas Cervoni and Vincent Wang-Mascianica **High schoolers excel at Oxford post-graduate quantum exam: empirical evidence in support of quantum picturalism as a new formalism for quantum theory**	
19:30 − 22:00	Conference Dinner at restaurant Veranda, Club Horizont	

Friday

		Session chair: Julian Wechs (Hall Cherno More)
9:55 − 10:20		Yujie Zhang, David Schmid, Yìlè Yīng and Robbert Spekkens **Defining nonclassicality for individual quantum processes**
10:20 − 10:45		Sina Soltani, Marco Erba, David Schmid and John H. Selby **Noncontextual ontological models of operational probabilistic theories**
		Coffee break
		Session chair: Ana Belén Sainz (Hall Cherno More)
11:15 − 11:40		Nihil Shah and Anuj Dawar **Complexity of Satisfiablity in Kochen-Specker Partial Boolean Algebras**
11:40 − 12:30		BUSINESS MEETING
		Lunch break

	Session chair: Timothée Hoffreumon (Hall Cherno More)	Session chair: Lorenzo Catani (Hall Varna)
14:00 − 14:25	Anna Jenčová **On the structure of higher order quantum maps**	Theodoros Yianni and Farid Shahandeh **Complexity of Contextuality**
14:25 − 14:50	Ved Kunte and Cyril Branciard **A Higher Order Theory for Fermionic Systems**	Maiyuren Srikumar, Stephen. D. Bartlett and Angela Karanjai **How contextuality and antidistinguishability are related**
14:50 − 15:15	James Hefford and Matt Wilson **A BV-Category of Spacetime Interventions**	Yìlè Yīng, Tomáš Gonda and Robert Spekkens **Resource dependence relations and contextuality in asymmetry trade-offs**
	Coffee break	
15:45	End of QPL 2025. Goodbye!	

List of posters

Authors	Title
Alexander Koziell-Pipe, Richie Yeung, David Philipps and Matthew Sutcliffe	Towards Faster Quantum Circuit Simulation Using Graph Decompositions, GNNs and Reinforcement Learning
Matty Hoban, Tom Drescher and Ana Belén Sainz	A hierarchy of semidefinite programs for generalised Einstein-Podolsky-Rosen scenarios
Jad Issa, Christophe Chareton and Romain Péchoux	Compact and efficient formalism for resource estimation in quantum programs
Edwin Agnew, Lia Yeh and Richie Yeung	Algebraic Structure of Controlled States and Operators in the ZXW calculus
Rutvij Bhavsar, Hamid Tebyanian and Roger Colbeck	Semi Device Independent Randomness Expansion Protocols Secure Against Quantum Side Information and General Attacks
Martin van Ijcken and Aleks Kissinger	Generalized flow and determinism for hypergraph measurement patterns
Shintaro Minagawa, M. Hamed Mohammady, Kenta Sakai, Kohtaro Kato and Francesco Buscemi	Universal validity of the second law of information thermodynamics
Thomas Vinet, Romain Péchoux, Emmanuel Hainry and Kostia Chardonnet	A hybrid and reversible quantum language
Kuntal Sengupta	Achieving Maximal Causal Indefiniteness in a Maximally Nonlocal Theory
Johannes Fankhauser, Tomáš Gonda and Gemma De Les Coves	Epistemic Horizons From Deterministic Laws: Lessons From a Nomic Toy Theory
Nasra Daher Ahmed and Ravi Kunjwal	When can you trade causal order for locality?
Tein van der Lugt	An order-theoretic circuit syntax and the role of the concept lattice for causal faithfulness
Razin A. Shaikh, Lia Yeh and Stefano Gogioso	The Focked-up ZX Calculus: Picturing Continuous-Variable Quantum Computation
Haytham McDowall-Rose, Razin A. Shaikh and Lia Yeh	A graphical calculus for Fermion-to-Qubit mappings

Nicholas Godfrey	Toward a Quantum-Inspired Framework for Modelling Legal Rules
Luca Apadula, Alessandro Bisio, Paolo Perinotti and Marco Erba	A compositional characterization of higher-order transformations in operational probabilistic theories
Amrapali Sen, Matthias Salzger and Łukasz Rudnicki	Superluminal Quantum Reference Frames
Kyrylo Simonov, Luca Apadula, Giulio Chiribella, Paolo Perinotti and Alessandro Bisio	Higher-order quantum theory with indefinite input-output direction
Tomoaki Kawano	Dynamic Quantum Logic with Probability Values
Lee Gunderson, Davide Poderini and Gecia Bravo-Hermsdorff	Causal Bounds via Subgraph Inequalities
Rafael Macêdo, Patrick Andriolo, Santiago Zamora, Davide Poderini and Rafael Chaves	Witnessing Magic with Bell Inequalities
Scott Wesley	Enriched Categories for Parameterized Circuit Semantics
Kyrylo Simonov, Giulio Chiribella and Xuanqiang Zhao	Two-time states and weak values: Structure and efficient estimation
Zixuan Liu and Ognyan Oreshkov	Information causality for indefinite causal order
Davide Poderini and Marco Erba	Testing the quantum composition postulate
Haruki Emori, Akihisa Tomita and Masanao Ozawa	Parameterized quantum instruments
Kayo Tei, Haruto Mishina, Naoki Yamamoto and Kazunori Ueda	Optimization and Verification of Quantum Circuits using a Graph Rewriting Language
Vishal Johnson, Ashmeet Singh and Torsten Enßlin	The Born Rule in Unitary Quantum Mechanics
Kathleen Barsse, Romain Péchoux and Simon Perdrix	A quantum programming language for coherent control