



QUANTUM SPEEDUP

January 29th-31st, 2025, Gdańsk

Venue: University of Gdańsk, Faculty of Mathematics, Physics, and Informatics, Wita Stwosza street, 57, Gdańsk, Poland

Programme

Wednesday, January 29th, 2025

12:00 Registration

14:00 **Official opening**

Session I

14:15 **Marek Żukowski**

QuantumSpeedUp at ICTQT

14:30 **Marcin Pawłowski**

Quantum Cybersecurity Research

15:00 **Łukasz Rudnicki**

Coarse-grained Quantum Technologies Research

15:30 *Coffee break*

Session II

16:15 **Ana Belen Sainz**

Theoretical Underpinnings of Quantum Technologies

16:45 **Marek Żukowski**

Multiphoton Quantum Optics for Quantum Information, and more

17:15 **Michał Horodecki**

Quantum thermodynamics at NQR&QT group and catalytic enhancement in thermal machines

18:00 *Welcome reception*



Thursday, January 30th, 2025**10:30 Organizational announcements**

Thursday SpeedTalk Sessions

10:35 – 11:00 SpeedTalks I

Borhan Ahmadi (ICTQT, UG)	Adamantia Zampeli (ICTQT, UG)
Marek Winczewski (WMFil, UG)	Rishav Sagar (ICTQT, UG)
Gerardo Suarez (ICTQT, UG)	Karthik Hosapete Seshadri (ICTQT, UG)
Andre Hernandes Alves Malavazi (ICTQT, UG)	Karol Horodecki (WMFil, UG)

Break & Discussion time

11:30 – 11:55 SpeedTalks II

Matthias Salzger (ICTQT, UG)	Pedro Dieguez (ICTQT, UG)
Piotr Mironowicz (SU)	Sebastian Borówka (QOT, UW)
Bartosz Kasza (QOT, UW)	Mateusz Mazelnik (QOT, UW)
Giovanni Scala (INFN)	Michał Parniak (QOT, UW)

Break & Discussion time

12:25 – 12:50 SpeedTalks III

Beata Zjawin (ICTQT, UG)	Konrad Schlichtholz (ICTQT, UG)
Wiktor Krokosz (QOT, UW)	Tomasz Prokop (QOT, UW)
Moein Naseri (QOT, UW)	Gabriel Ko (QOT, UW)

Lunch Break

15:00 – 17:00 Thursday Poster Session**Friday, January 31st, 2025****10:30 Organizational announcements**

Friday SpeedTalk Sessions

10:35 – 11:00 SpeedTalks IV

Antonio Mandarino (UNIMI)	Sina Soltani (ICTQT, UG)
Marcin Markiewicz (ICTQT, UG)	Amrapali Sen (ICTQT, UG)
Robert Okuła (GUT)	Paweł Mazurek (WMFil, UG)
Alexandre Orthey (IPPT, PAN)	Felipe Barretto (IFUSP)

Break & Discussion time

11:30 – 11:55 SpeedTalks V

Marcin Marciniak (WMFil, UG)	Vinicius Rossi (ICTQT, UG)
Marco Erba (ICTQT, UG)	Luis Cort Barrada (ICTQT, UG)
Amit Te'eni (BIU)	Akshata Shenoy (ICTQT, UG)
Sumit Rout (ICTQT, UG)	Marcin Klaczak (ICTQT, UG)

Lunch Break

14:00 – 16:00 Friday Poster Session

16:00 Closing remarks

List of speed talks / poster sessions

Thursday Sessions	
Borhan Ahmadi (ICTQT, UG)	Super-Optimal Charging of Quantum Batteries via Reservoir Engineering
Marek Winczewski (WMFil, UG)	Non-equilibrium Thermometry in The Strong Coupling Regime With Bosonic Sample and Probe
Gerardo Suarez (ICTQT, UG)	A CPTP map for Non-Markovian Open systems
Andre Hernandes Alves Malavazi (ICTQT, UG)	Weak measurement-based protocol for ergotropy protection in open quantum batteries
Paweł Mazurek (WMFil, UG)	Charging Quantum Batteries by an Incoherent Source
Rishav Sagar (ICTQT, UG)	Weak measurement-based protocol for ergotropy protection in open quantum batteries
Karthik Hosapete Seshadri (ICTQT, UG)	Extreme violations of Leggett-Garg inequalities for a system subjected to indefinite temporal dynamics
Karol Horodecki (WMFil, UG)	Quantification of energy consumption of quantum resource generation
Matthias Salzger (ICTQT, UG)	A decompositional framework for process theories in spacetime
Piotr Mironowicz (SU)	Optimization of experimental quantum randomness expansion
Bartosz Kasza (QOT, UW)	Fourier mode decomposition as a method for solving non-equilibrium steady states of fractured atomic loops for atomic microwave receiver
Giovanni Scala (INFN)	Robustness of chaotic-light correlation imaging against turbulence
Pedro Dieguez (ICTQT, UG)	Experimental demonstration of the equivalence of entropic uncertainty with wave-particle duality
Sebastian Borówka (QOT, UW)	All-optical receiving of weak microwave fields in room-temperature Rydberg atoms
Mateusz Mazelnik (QOT, UW)	Interactions-enhanced microwave sensing with Rydberg atoms
Michał Parniak (QOT, UW)	Rydberg atoms in space
Beata Zjawin (ICTQT, UG)	Activation of post-quantumness in bipartite generalised EPR scenarios
Wiktor Krokosz (QOT, UW)	Characterization of EHF band emitters using Rydberg atoms and metamaterials
Moein Naseri (QOT, UW)	Scalable noisy quantum circuits for biased-noise qubits
Konrad Schlichtholz (ICTQT, UG)	Superresolution in systems evolving under Brownian motion utilizing spatial mode demultiplexing
Tomasz Prokop (QOT, UW)	Optical beating frequency measurement with PLL
Gabriel Ko (QOT, UW)	Troubleshooting a weak vacuum optical cavity lock: A student's guide

Friday Sessions	
Antonio Mandarino (UNIMI)	Study of Quantum Systems with Physics-Informed Neural Networks
Marcin Markiewicz (ICTQT, UG)	Relativistically invariant encoding of quantum information revisited
Robert Okuła (GUT)	Device-independent Shannon entropy certification
Alexandre Orthey (IPPT, PAN)	Geometric monotones of violations of quantum realism
Sina Soltani (ICTQT, UG)	Noncontextual ontological models of operational probabilistic theories
Amrapali Sen (ICTQT, UG)	Operational Analysis of Superluminal Observers
Adamantia Zampeli (ICTQT, UG)	Causality principle and its violation
Felipe Barretto (IFUSP)	A Geometrical Relation Between Noncontextuality and Quantum State Discrimination
Marcin Marciniak (WMFiI, UG)	On the structure of the cone of k -positive maps
Marco Erba (ICTQT, UG)	The composition rule for quantum systems is not the only possible one
Amit Te'eni (BIU)	Oracle problems as communication tasks and optimization of quantum algorithms
Sumit Rout (ICTQT, UG)	Randomness-free Detection of Non-projective Measurements: Qubits & beyond
Vinicius Rossi (ICTQT, UG)	Testing nonclassicality in a photonic processor
Luis Cort Barrada (ICTQT, UG)	Keldysh field theory for density matrix formalism with applications in quantum information processing
Akshata Shenoy (ICTQT, UG)	Quantum state tomography of pure three-qubit states from its parts
Marcin Klaczak (ICTQT, UG)	Quantum machine learning models for cancer detection
Marek Żukowski (ICTQT, UG)	Against (unitary) interpretation (of quantum mechanics): removing the metaphysical load

Acronyms

UG – University of Gdańsk
ICTQT – International Centre for Theory of Quantum Technologies
WMFiI - Department of Mathematics, Physics and Informatics
UW – University of Warsaw
QOT – Centre for Quantum Optical Technologies, Centre of New Technologies
CFT PAN – Center for Theoretical Physics, Polish Academy of Sciences

IPPT PAN - Institute of Fundamental Technological Research, Polish Academy of Sciences
BIU - Bar-Ilan University, Israel
IFUSP - Instituto de Física da Universidade de São Paulo, Brazil
INFN - Istituto Nazionale di Fisica Nucleare, Italy
UNIMI - University of Milan, Italy
SU - Stockholm University, Sweden

Committees

Steering Committee

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Konrad Banaszek (QOT, UW)

Organising Committee

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