

Monday Feb 1

Session 1 (Session Chair: Earl Campbell)

08:30 AM-
9:30 AM

Thomas Vidick (invited talk)

Tsirelson's problem and $MIP^*=RE$

09:30 AM-
10:00 AM

Joonho Lee, **Dominic Berry**, Craig Gidney,
William Huggins, Jarrod McClean, Nathan
Wiebe and Ryan Babbush

Efficient quantum computation of chemistry
through tensor hypercontraction

Session 2 Plenary (Session Chair: Janis Nötzel)

11:00 AM-
11:30 AM

Peter Brown, Hamza Fawzi and Omar Fawzi

New quantum Rényi divergences and their
application to device-independent cryptography
and quantum Shannon theory

11:30 AM-
12:00 PM

Anne Broadbent and **Alex Bredariol Grilo**

QMA-hardness of Consistency of Local Density
Matrices with Applications to Quantum Zero-
Knowledge

Session 3A (Session Chair: David Sutter)

03:00 PM-
03:30 PM

Ramis Movassagh and **Yingkai Ouyang**

Constructing quantum codes from any classical
code and their embedding in ground space of
local Hamiltonians

03:30 PM-
04:00 PM

Kyungjoo Noh, Stefano Pirandola and Liang
Jiang

Enhanced energy-constrained quantum
communication over bosonic Gaussian channels
using multi-channel strategies

04:00 PM-
04:30 PM

Philippe Faist, Mischa Woods, Victor V. Albert,
Joseph M. Renes, Jens Eisert and John Preskill

Bipartite energy-time uncertainty relation for
quantum metrology with noise

Session 3B (Session Chair: Anne Broadbent)

03:00 PM-
03:30 PM

Gorjan Alagic, Andrew Childs, Andrea
Coladangelo, Alex Bredariol Grilo, **Shih-Han
Hung**, Thomas Vidick and Tina Zhang // Nir
Bitansky and **Omri Shmueli**

Non-interactive Zero-knowledge Protocols for
QMA and Post-quantum Zero-knowledge in
Constant Rounds

03:30 PM-
04:00 PM

Zvika Brakerski and Henry Yuen

Quantum Garbled Circuits

04:00 PM-
04:30 PM

Honghao Fu, Carl Miller and William Slofstra

The membership problem of constant-sized
quantum correlations is undecidable

Monday Feb 1

Session 3C (Session Chair: Frédéric Dupuis)

03:00 PM-03:30 PM	Vikesh Siddhu	Leaking information to gain entanglement via log-singularities
03:30 PM-04:00 PM	Laura Mančinska, Jitendra Prakash and Christopher Schafhauser	Constant-sized robust self-tests for states and measurements of unbounded dimensions
04:00 PM-04:30 PM	Marius Junge and Nicholas LaRacuente	Multivariate Trace Inequalities, Recovery, and p-Fidelity Beyond Tracial Settings

Session 4A (Session Chair: Jonas Helson)

07:00 PM-07:30 PM	Edward Farhi, Jeffrey Goldstone, Sam Gutmann and Leo Zhou	The Quantum Approximate Optimization Algorithm and the Sherrington-Kirkpatrick Model at Infinite Size
07:30 PM-08:00 PM	William Kirby , Andrew Tranter and Peter Love	Exploiting Contextuality in Variational Quantum Eigensolvers
08:00 PM-08:30 PM	James Bartusek , Andrea Coladangelo, Dakshita Khurana and Fermi Ma	On the Round Complexity of Two-Party Quantum Computation

Session 4B (Session Chair: Daniel Stilck França)

07:00 PM-07:30 PM	Alexander Dalzell , Nicholas Hunter-Jones and Fernando Brandao	Random quantum circuits anti-concentrate in log depth
07:30 PM-08:00 PM	Adam Bouland, Bill Fefferman, Zeph Landau and Yunchao Liu	Noise and the frontier of quantum supremacy
08:00 PM-08:30 PM	Dante Bencivenga , Xining Chen and Peter Høyer	Quantum sampling in Markov chains

Session 4C (Session Chair: Steve Flammia)

07:00 PM-07:30 PM	Michael Beverland , Aleksander Kubica and Krysta M. Svore	The cost of universality: A comparative study of the overhead of state distillation and code switching with color codes
07:30 PM-08:00 PM	Alexis Schotte , Guanyu Zhu, Lander Burgelman and Frank Verstraete	Quantum error correction thresholds for the universal Fibonacci Turaev-Viro code
08:00 PM-08:30 PM	David Aasen, Daniel Bulmash, Abhinav Prem, Kevin Slagle and Dominic Williamson	Topological Defect Networks for Fractons of all Types

Tuesday Feb 2

Session 1A (Session Chair: Bei Zeng)

08:30 AM-09:00 AM	Sam Roberts and Dominic Williamson	3-Fermion topological quantum computation
09:00 AM-09:30 AM	Bowen Shi, Kohtaro Kato and Isaac Kim	Entanglement bootstrap program
09:30 AM-10:00 AM	Kianna Wan , Soonwon Choi, Isaac Kim, Noah Shutty and Patrick Hayden	Fault-tolerant qubit from a constant number of components

Session 1B (Session Chair: David Perez-Garcia)

08:30 AM-09:00 AM	Cambyse Rouzé , Ivan Bardet, Ángela Capel and Daniel Stilck França	On the entropic convergence of quantum Gibbs samplers
09:00 AM-09:30 AM	Tomotaka Kuwahara , Alvaro Alhambra and Anurag Anshu	Improved thermal area law and quasi-linear time algorithm for quantum Gibbs states
09:30 AM-10:00 AM	Daniel Ranard, Freek Witteveen and Michael Walter	Classifying unitary dynamics with approximate light cones in one dimension

Session 1C (Session Chair: Alexander Belov)

08:30 AM-09:00 AM	William Kretschmer	The Quantum Supremacy Tsirelson Inequality
09:00 AM-09:30 AM	Justin Holmgren and Ran Raz	A Parallel Repetition Theorem for the GHZ Game
09:30 AM-10:00 AM	Satvik Singh and Ion Nechita	The PPT-squared conjecture holds for all Choi type maps

Session 1 Plenary (Session Chair: Bei Zeng)

10:00 AM-10:30 AM	Pablo Bonilla Ataides, David Tuckett, Stephen Bartlett, Steven Flammia and Benjamin Brown	The XZZX surface code
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Session 2A (Session Chair: Anna Pappa)

03:00 PM-03:30 PM	Alexander Müller-Hermes and Matthias Christandl	Fault-tolerant coding for quantum communication
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Session 2B (Session Chair: Burak Sahinoglu)

03:00 PM-03:30 PM	Daniel Ranard and Xiao-Liang Qi	Emergent classicality in multipartite channels
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Tuesday Feb 2

Session 2C (Session Chair: Michal Horodecki)

03:00 PM-03:30 PM **Minh Tran**, Abhinav Deshpande, Andrew Guo, Andrew Lucas and Alexey Gorshkov Optimal State Transfer and Entanglement Generation in Power-law Interacting Systems

Session 2 Plenary (Session Chair: Anna Pappa)

03:30 PM-04:00 PM Gorjan Alagic, **Prabhanjan Ananth**, Zvika Brakerski, Yfke Dulek, Rolando La Placa and Christian Schaffner Secure Software Leasing and Implications to Quantum Copy-Protection and Obfuscation

04:00 PM-05:00 PM **James Bartusek**, Andrea Coladangelo, Dakshita Khurana and Fermi Ma // **Alex Bredariol Grilo**, Huijia Lin, Fang Song and Vinod Vaikuntanathan Secure Computation is in MiniQCrypt

Session 3A (Session Chair: András Gilyén)

07:00 PM-07:30 PM **Greg Kuperberg** The Hidden Subgroup Problem for Infinite Groups

07:30 PM-08:00 PM Chenyi Zhang, **Jiaqi Leng** and Tongyang Li Quantum algorithms for escaping from saddle points

08:00 PM-08:30 PM Bill Fefferman and **Zachary Remscrim** // **Uma Girish**, Ran Raz and Wei Zhan Eliminating Intermediate Measurements in Space-Bounded Quantum Computation // Quantum Logspace Algorithm for Powering Matrices with Bounded Norm

Session 3B (Session Chair: Earl Campbell)

07:00 PM-07:30 PM **Aleksander Kubica** and Rafał Demkowicz-Dobrzański Using Metrological Bounds in Quantum Error Correction

07:30 PM-08:00 PM Sara Bartolucci, Patrick Birchall, Hector Bombin, Hugo Cable, Chris Dawson, Mercedes Gimeno-Segovia, Eric Johnston, Konrad Kieling, Naomi Nickerson, **Mihir Pant**, Fernando Pastawski, Terry Rudolph and Chris Sparrow Fusion-based quantum computation

08:00 PM-08:30 PM **Oscar Higgott** and Nikolas Breuckmann Subsystem codes with high thresholds by gauge fixing and reduced qubit overhead

Tuesday Feb 2

Session 3C (Session Chair: Richard Cleve)

07:00 PM- 07:30 PM	Burak Sahinoglu and Rolando Somma	Hamiltonian simulation in the low energy subspace
07:30 PM- 08:00 PM	Hakop Pashayan , Oliver Reardon-Smith, Kamil Korzekwa and Stephen Bartlett	Fast estimation of outcome probabilities for quantum circuits
08:00 PM- 08:30 PM	Matthew Coudron and Nolan Coble	Quasi-polynomial Time Approximation of Output Probabilities of Constant-depth, Geometrically-local Quantum Circuits

Wednesday Feb 3

Industry Session I (Session Chair: Andreas Winter)

10:30 AM- 11:00 AM	Runyao Duan (Baidu Research)	Quantum Computing at Baidu
11:00 AM- 11:30 AM	Bruno Taketani (IQM)	Co-designing quantum computers at IQM
11:30 AM- 12:00 AM	Dr. Johannes Klepsch (Product Owner Quantum Computing, BMW AG)	Application of quantum computing in the increasingly complex automotive value chain

Diversity Session I (Session Chair: Juani Bermejo-Vega)

12:30 PM- 1:30 PM	Havi Carel (invited talk)	How to promote social justice in academia
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Session 2A (Session Chair: Ashley Montanaro)

03:00 PM- 03:30 PM	Anurag Anshu and Chinmay Nirkhe	Circuit lower bounds for low-energy states of code Hamiltonians
03:30 PM- 04:00 PM	Srinivasan Arunachalam, Alex B. Grilo, Tom Gur , Igor C. Oliveira and Aarthi Sundaram	Quantum Learning Algorithms Imply Circuit Lower Bounds
04:00 PM- 04:30 PM	Dorit Aharonov, Jordan Cotler and Xiao-Liang Qi	Quantum Algorithmic Measurement

Session 2B (Session Chair: Roger Colbeck)

03:00 PM- 03:30 PM	Tony Metger , Yfke Dulek, Andrea Coladangelo, Rotem Arnon-Friedman and Thomas Vidick	Device-independent protocols from computational assumptions
03:30 PM- 04:00 PM	Srijita Kundu and Ernest Y.-Z. Tan // Anne Broadbent and Rabib Islam	Composably secure device-independent encryption with certified deletion // Quantum encryption with certified deletion
04:00 PM- 04:30 PM	Andrea Coladangelo, Christian Majenz and Alexander Poremba // Anne Broadbent, Stacey Jeffery, Sébastien Lord , Supartha Podder and Aarthi Sundaram	Quantum Copy-Protection of Compute-and- Compare Programs in the Quantum Random Oracle Model // Secure Software Leasing Without Assumptions

Wednesday Feb 3

Session 2C (Session Chair: Farzin Salek)

03:00 PM- 03:30 PM	Abhinav Deshpande , Alexey Gorshkov and Bill Fefferman	The importance of the spectral gap in estimating ground-state energies
03:30 PM- 04:00 PM	Anurag Anshu, Srinivasan Arunachalam, Tomotaka Kuwahara and Mehdi Soleimanifar	Sample-efficient learning of quantum many-body systems
04:00 PM- 04:30 PM	Sisi Zhou and Liang Jiang	Asymptotic theory of quantum channel estimation

Session 3 Plenary (Session Chair: Ted Yoder)

07:00 PM- 07:30 PM	Scott Aaronson, Shalev Ben-David, Robin Kothari, Shravas Rao and Avishay Tal	Degree vs. Approximate Degree and Quantum Implications of Huang's Sensitivity Theorem
07:30 PM- 08:30 PM	Matthew Hastings , Jeongwan Haah and Ryan O'Donnell	Fiber Bundle Codes: Breaking the $N^{1/2}$ polylog(N) Barrier for Quantum LDPC Codes

Thursday Feb 4

Session 1 Plenary (Session Chair: Angela Capel)

10:30 AM-
11:00 AM

Laura Mančinska and David Roberson

Quantum isomorphism is equivalent to equal homomorphism counts from planar graphs

Session 1A (Session Chair: Angela Capel)

11:00 AM-
11:30 AM

Giacomo De Palma, Milad Marvian, Dario Trevisan and Seth Lloyd

The quantum Wasserstein distance of order 1

11:30 AM-
12:00 PM

Simon Becker, Nilanjana Datta, Ludovico Lami and **Cambyse Rouzé**

Energy-constrained discrimination of unitaries, quantum speed limits and a Gaussian Solovay-Kitaev theorem

12:00 PM-
12:30 PM

Gergely Bunth, Christopher Perry, **Péter Vrana** and Albert H. Werner

The semiring of dichotomies and asymptotic relative submajorization

Session 1B (Session Chair: Troy Lee)

11:00 AM-
11:30 AM

Alexander Sherstov, Andrey Storozhenko and **Pei Wu**

An Optimal Separation of Randomized and Quantum Query Complexity

11:30 AM-
12:00 PM

Makrand Sinha and Nikhil Bansal

k-Forrelation Optimally Separates Quantum and Classical Query Complexity

12:00 PM-
12:30 PM

Anurag Anshu, Shalev Ben-David and **Srijita Kundu**

On Query-to-Communication Lifting of Quantum Adversaries

Session 1C (Session Chair: Michał Oszmaniec)

11:00 AM-
11:30 AM

Mirjam Weilenmann, Edgar A. Aguilar and Miguel Navascués

Quantum Preparation Games

11:30 AM-
12:00 PM

Harry Buhrman, Noah Linden, Laura Mančinska, Ashley Montanaro and **Maris Ozols**

Quantum majority and other Boolean functions with quantum inputs

12:00 PM-
12:30 PM

Zuzana Gavorova, Matan Seidel and Yonathan Touati

Topological obstructions to implementing controlled unknown unitaries

Session 2A (Session Chair: Henry Yuen)

03:00 PM-
03:30 PM

Atul Singh Arora, Jérémie Roland and Chrysoula Vlachou

Analytic quantum weak coin flipping protocols with arbitrarily small bias

03:30 PM-
04:00 PM

Anurag Anshu, Aram Harrow and **Mehdi Soleimanifar**

From communication complexity to an entanglement spread area law in the ground state of gapped local Hamiltonians

04:00 PM-
04:30 PM

Noah Shutty, Mary Wootters and Patrick Hayden

Tight Limits on Nonlocality from Nontrivial Communication Complexity

Thursday Feb 4

Session 2B (Session Chair: Cambyse Rouze)

03:00 PM-03:30 PM	Jonas Haferkamp , Felipe Montealegre-Mora, Markus Heinrich, Jens Eisert, David Gross and Ingo Roth	Efficient unitary designs with a system-size independent number of non-Clifford gates
03:30 PM-04:00 PM	Michał Oszmaniec , Adam Sawicki and Michal Horodecki	Epsilon-nets, unitary designs and random quantum circuits
04:00 PM-04:30 PM	Michael Gullans , Stefan Krastanov, David Huse, Liang Jiang and Steven Flammia	Quantum coding with low-depth random circuits

Session 2C (Session Chair: Dan Browne)

03:00 PM-03:30 PM	Piotr Czarnik , Andrew Arrasmith, Patrick Coles and Lukasz Cincio	Error mitigation with Clifford quantum-circuit data
03:30 PM-04:00 PM	Guang Hao Low, Vera von Burg , Thomas Haner, Damian Steiger, Markus Reiher, Martin Roetteler and Matthias Troyer	Quantum computing enhanced computational catalysis
04:00 PM-04:30 PM	Isaac Kim, Eugene Tang and John Preskill	The ghost in the radiation: Robust encodings of the black hole interior

Industry Session II (Session Chair: María García Díaz)

7:00 PM-7:45 PM	Cody Jones and Ryan Babbush, Google	Quantum Computer Science at Google
7:45 PM-8:15 PM	Sarah Sheldon, IBM	Demonstrating the capabilities of state-of-the-art quantum systems

Friday Feb 5

Session 1A (Session Chair: Ion Nechita)

08:30 AM-09:00 AM	Yuval Sanders , Dominic Berry, Pedro Costa, Louis Tessler, Nathan Wiebe, Craig Gidney, Hartmut Neven and Ryan Babbush	Compilation of Fault-Tolerant Quantum Heuristics for Combinatorial Optimization
09:00 AM-09:30 AM	Daniel Stilck França and Raul Garcia-Patron	Limitations of optimization algorithms on noisy quantum devices
09:30 AM-10:00 AM	Kun Fang and Zi-Wen Liu // Bartosz Regula and Ryuji Takagi	No-go theorems and limitations for quantum resource purification

Session 1B (Session Chair: Marco Tomamichel)

08:30 AM-09:00 AM	Amit Behera and Or Sattath	Almost Public Quantum Coins
09:00 AM-09:30 AM	Pierre Fraigniaud, Francois Le Gall, Harumichi Nishimura and Ami Paz	Distributed Quantum Proofs for Replicated Data
09:30 AM-10:00 AM	Alex Bredariol Grilo, Kathrin Hövelmanns, Andreas Hülsing and Christian Majenz	Tight adaptive reprogramming in the Quantum Random Oracle Model

Session 1C (Session Chair: Francois Le Gall)

08:30 AM-09:00 AM	Hsin-Yuan Huang , Richard Kueng, Michael Broughton, Masoud Mohseni, Ryan Babbush, Sergio Boixo, Hartmut Neven, Jarrod McClean and John Preskill	Fundamental aspects of solving quantum problems with machine learning
09:00 AM-09:30 AM	Shalev Ben-David, Andrew M. Childs, Andrés Gilyén, William Kretschmer , Supartha Podder and Daochen Wang	Symmetries, graph properties, and quantum speedups
09:30 AM-10:00 AM	Simon Apers , Troy Lee and Ronald de Wolf	Quantum speedups for graph sparsification, graph cut problems and Laplacian solving

Session 2A (Session Chair: Laura Mančinska)

11:00 AM-11:30 AM	Piotr Kopszak , Marek Mozrzyk, Michał Studzinski and Michał Horodecki	Multi-port teleportation schemes
11:30 AM-12:00 PM	Yuxiang Yang , Renato Renner and Giulio Chiribella	Optimal universal programming of unitary gates
12:00 PM-12:30 PM	Tanmay Singal , Filip Maciejewski and Michał Oszmaniec	Implementation of quantum measurements using classical resources and only a single ancillary qubit

Friday Feb 5

Session 2B (Session Chair: Alexander Müller-Hermes)

11:00 AM- 11:30 AM	Arne Heimendahl, Markus Heinrich and David Gross	The axiomatic and the operational approach to resource theories of magic do not coincide
11:30 AM- 12:00 PM	Guillaume Aubrun, Ludovico Lami , Carlos Palazuelos and Martin Plávala	Entangleability of cones
12:00 PM- 12:30 PM	Benjamin Yadin , Benjamin Morris and Gerardo Adesso	Mixing indistinguishable systems leads to a quantum Gibbs paradox

Session 2C (Session Chair: Christian Mendl)

11:00 AM- 11:30 AM	Ashley Montanaro and Changpeng Shao // Troy Lee , Miklos Santha and Shengyu Zhang	Quantum algorithms for learning graphs // Quantum algorithms for graph problems with cut queries
11:30 AM- 12:00 PM	Ankit Garg, Robin Kothari, Praneeth Netrapalli and Suhail Sherif	No quantum speedup over gradient descent for non-smooth convex optimization
12:00 PM- 12:30 PM	Jintai Ding, Vlad Gheorghiu, András Gilyén, Sean Hallgren and Jianqiang Li	Limitations of the Macaulay matrix approach for using the HHL algorithm to solve multivariate polynomial systems

Session 3 Plenary (Session Chair: Barbara Terhal)

03:00 PM- 04:00 PM	Jay Gambetta (invited talk)	Challenges and Directions of Quantum Information Technology
04:00 PM- 04:30 PM	John Napp , Rolando La Placa, Alexander Dalzell, Fernando Brandão and Aram Harrow	Efficient classical simulation of random shallow 2D quantum circuits
04:30 PM- 05:30 PM	Matthew B. Hastings, Umesh Vazirani and András Gilyén	(Sub)Exponential advantage of adiabatic quantum computation with no sign problem

Session 4A (Session Chair: Kristan Temme)

07:00 PM- 07:30 PM	Joel Klassen and Charles Derby	A Compact Fermion to Qubit Mapping
07:30 PM- 08:00 PM	Adrian Chapman and Steven Flammia	Characterization of solvable spin models via graph invariants
08:00 PM- 08:30 PM	Adam Bene Watts and J. William Helton	3XOR Games with Perfect Commuting Operator Strategies Have Perfect Tensor Product Strategies and are Decidable in Polynomial Time

Friday Feb 5

Session 4B (Session Chair: Chunhao Wang)

07:00 PM- 07:30 PM	Yuan Su , Hsin-Yuan Huang and Earl Campbell	Nearly tight Trotterization of interacting electrons
07:30 PM- 08:00 PM	Leo Zhou and Dorit Aharonov	Strongly Universal Hamiltonian Simulators
08:00 PM- 08:30 PM	Lin Lin and Yu Tong	Near-optimal ground state preparation

Session 4C (Session Chair: Zahra Khanian)

07:00 PM- 07:30 PM	Dmitri Maslov , Jin-Sung Kim, Sergey Bravyi, Theodore J. Yoder and Sarah Sheldon	Quantum advantage for computations with limited space
07:30 PM- 08:00 PM	Nathan Ju , Daniel Grier and Luke Schaeffer	Interactive quantum advantage with noisy, shallow Clifford circuits
08:00 PM- 08:30 PM	David Gosset, Daniel Grier, Alex Kerzner and Luke Schaeffer	Fast simulation of planar Clifford circuits