13th Workshop on Quantum Information Processing

QIP 2010

15th- 22ndJan Zürich Switzerland

idgenössische Technische Hochschule wiss Federal Institute of Technology Zi



PAULI CENTER for Theoretical Studies

Schweizerischer Nationalfunds zur Förderung der Wissenschaftlichen Forschung Tutorial programme: 15th- 17th Jan Conference: 18th- 22nd Jan www.qip2010.ethz.ch

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COT Singapore



Centre for Quantum Technologies **QAP** European Project



Sandia National Laboratories



Institute for Quantum Computing

IQC Institute for Quantum Computing

id Quantique



VENUE W-IAN ETH Zürich, Rämistrasse 101, CH-8092 Zürich Main building / Hauptgebäude 3. Open browser Conference Helpline **0041 (0)79 770 84 29** Login: qip2010 ETH Iniversitätsstrasse D ETH Zürich 2008 Bahnhofquai Neinbergstrasse ETH/-Universitätsspita dstras 6/10 Main entrance 6/9 10 Polybahn Central Bahnhofplatz Bahnhofstrasse 26 strass -Bus zum Hönggerberg Ummatquai Karl-Sch Strasse UnstlerBass Uraniastrasse Zum Bellevue 9 100 m

FLOOR E

Registration/Information desk Poster session Computer room E 26.3



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FLOOR F

Auditorium F 5: Tutorial (January 15 – 17, 2010) Auditorium maximum F 30: Scientific programme (January 18 – 22, 2010) F 33.1: Congress-Office, F 33.2: Cloak room Foyer and "Uhrenhalle": Coffee breaks, Poster session



RUMP SESSION

StuZ, ETH Zürich, Universitätsstrasse 6, CH-8092 Zürich CAB Building room No. CAB F21 to CAB F27 18.30 – 23.00 h (January 20, 2010)



CONFERENCE DINNER

Thursday, January 21, 2010, 19.00h

Restaurant Lake Side Bellerivestrasse 170 CH-8008 Zürich

Phone: +41 (0) 44 385 86 00

Directions from ETH main building

- (Tram No. 9 to "Bellevue" (direction "Triemli").
- Change into Tram No. 4 (direction "Tiefenbrunnen") or Tram No. 2 (direction "Tiefenbrunnen").
- Get off at stop "Fröhlichstrasse" (short walking distance to the restaurant).

See map on the back of this booklet



Restaurant Lake Side

COMMITTEES

PROGRAMME COMMITTEE

Scott Aaronson (MIT) David Bacon (University of Washington) Michael Ben-Or (Hebrew University of Jerusalem) (chair) Matthias Christandl (LMU Munich) David P. DiVincenzo (IBM Watson) Andrew Doherty (University of Queensland) Aram W. Harrow (University of Bristol) Julia Kempe (Tel-Aviv University) Iordanis Kerenidis (University of Paris) Masato Koashi (Osaka University) Norbert Lütkenhaus (University of Waterloo) Jonathan Oppenheim (University of Cambridge) Tobias J. Osborne (Royal Holloway University of London) John Preskill (Caltech)

STEERING COMMITTEE

Dorit Aharonov (Hebrew University of Jerusalem) Andrew Chi-Chih Yao (Tsinghua University) Eddie Farhi (MIT) Cris Moore (University of New Mexico / Santa Fe Institute) Renato Renner (ETH Zurich) (chair) Barbara M. Terhal (IBM Watson) John Watrous (University of Waterloo) Andreas Winter (University of Bristol / National University of Singapore) Ronald de Wolf (CWI, Amsterdam)

LOCAL ORGANIZERS

Quantum Information Theory at ETH Research group of Renato Renner Research group of Stefan Wolf Johan Aaberg (tutorials) Ilona Blatter (webmaster) Roger Colbeck (poster session) Oscar Dahlsten (publicity) Matthias Fitzi (rump session) Lidia del Rio (poster)

TUTORIAL PROGRAMME

January 15 – 17 , 2010 ETH main building, Rämistrasse 101, Zürich

FRIDAY JANUARY 15

- 9.00 10.00 Registration at ETH Zurich, main building, main entrance, E floor
- 10.00 10.45 Why should anyone care about computing with anyons? Jiannis Pachos, University of Leeds
- 10.45 11.10 Coffee 25 min
- 11.10 11.55 continued
- 11.55 12.00 Pause 5 min
- 12.00 12.45 continued
- 12.45 15.15 Lunch 2h 30 min
- 15.15 16.00 continued
- 16.00 16.25 *Coffee 25 min*
- 16.25 17.10 continued

SATURDAY JANUARY 16

Additivity of channel capacities 9.00 - 9.45 Pawel Horodecki, Gdansk University of Technology 9.45 - 9.50 Pause 5 min 9.50 - 10.35 continued 10.35 - 11.00 Coffee 25 min 11.00 - 11.45 **Regularization and its discontents** Graeme Smith, IBM, Watson Pause 5 min 11.45 - 11.50 11.50 - 12.35 continued 12.35 - 15.00 Lunch 2h 25 min Local Hamiltonians in quantum computation 15.00 - 15.45 Daniel Nagaj, Slovak Academy of Sciences Coffee 25 min 15.45 - 16.10 16.10 - 16.55 continued

SUNDAY JANUARY 17

- 15.00 15.45 **Classical simulation of many-body quantum systems** Ignacio Cirac, MPQ, Garching
- 15.45 16.10 Coffee 25 min
- 16.10 16.55 continued
- 16.55 17.00 Pause 5 min
- 17.00 17.45 continued

SCIENTIFIC PROGRAMME

January 18 – 22, 2010 ETH main building, Rämistrasse 101, Zürich

SUNDAY JANUARY 17

17:30h – 19:30h Early Registration at ETH Zurich, <u>main building</u>. Main entrance, E floor.

MONDAY JANUARY 18

08.00 – 9.00	Registration at ETH Zurich, <u>main building</u> . Main entrance, E floor.
9.15 - 9.25	Opening remarks
9.25 – 10.20	Invited perspective talk: <u>Umesh Vazirani</u> New bridges between Computer Science and Quantum Computation
	Coffee break
10.55 – 11.25	<u>Daniel Gottesman</u> and Sandy Irani The quantum and classical complexity of translationally invariant tiling and Hamiltonian problems
11.30 – 11.50	Rahul Jain, <u>Iordanis Kerenidis</u> , Greg Kuperberg, Miklos Santha, Or Sattath, and Shengyu Zhang <i>On the power of a unique quantum witness</i>
11.55 – 12.15	<u>Scott Aaronson</u> and Andrew Drucker A full characterization of quantum advice
	Lunch
14.45 – 15.40	Invited talk: <u>Rahul Jain</u> <i>QIP=PSPACE</i>
15.45 – 16.05	Antonio Acin, Antoine Boyer de la Giroday, Serge Massar and <u>Stefano Pironio</u> <i>Random numbers certified by Bell's theorem</i>
16.10 – 16.30	Dave Bacon and <u>Steve Flammia</u> Adiabatic gate teleportation
16.30 – 18.00	Poster session 1

TUESDAY JANUARY 19

9.15 - 10.10	Invited talk: <u>Ben Reichard</u> t Span programs and quantum algorithms
10.15 – 10.35	<u>David Gross</u> , Yi-Kai Liu, Steven Flammia, Stephen Becker, and Jens Eisert Non-commutative compressed sensing: theory and applications for quantum tomography
	Coffee break
11.10 – 11.40	<u>Norbert Schuch</u> , J. Ignacio Cirac, Dorit Aharonov, Itai Arad, and Sandy Irani An efficient algorithm for finding Matrix Product ground states
11.45 – 12.05	<u>Dominic W. Berry</u> and Andrew M. Childs The query complexity of Hamiltonian simulation and unitary implementation
12.10 - 12.30	<u>Maarten Van den Nest</u> Simulating quantum computers with probabilistic methods
	Lunch
15.00 – 15.55	Invited talk: <u>Philippe Corboz</u> Simulation of fermionic lattice models in two dimensions with tensor network algorithms
16.00 - 16.20	Boris Altshuler, <u>Hari Krovi</u> , and Jérémie Roland Adiabatic quantum optimization fails for random instances of NP-complete problems
	Coffee break
16.55 – 17.25	<u>Kristan Temme</u> , Tobias Osborne, Karl Gerd Vollbrecht, David Poulin, and Frank Verstraete <i>Quantum metropolis sampling</i>
17.30 – 17.50	<u>Sergey Bravyi</u> , David Poulin, and Barbara Terhal Tradeoffs for reliable quantum information storage in 2D systems
	WEDNESDAY JANUARY 20
9.00 - 9.55	Invited talk: <u>André Chailloux</u> Quantum coin flipping
10.00 - 10.20	Matthias Christandl, Norbert Schuch, and <u>Andreas Winter</u> Highly entangled states with almost no secrecy
10.25 – 10.45	Anindya De and <u>Thomas Vidick</u> Improved extractors against bounded quantum storage
	Coffee break
11.10 – 11.40	Ivan Damgård, Serge Fehr, <u>Carolin Lunemann</u> , Louis Salvail, and Christian Schaffner Improving the security of quantum protocols via commit-and-open

11.45 – 12.15	Robert Koenig, <u>Stephanie Wehner</u> , and Juerg Wullschleger Unconditional security from noisy quantum storage
12.20 – 12.50	Pablo Arrighi, <u>Vincent Nesme</u> , and Reinhard Werner <i>Unitarity plus causality implies localizability</i> <i>Lunch</i>
	Free afternoon

18.30 – 23.00 Rump session

THURSDAY JANUARY 21

9.15 – 10.10	Invited talk: <u>Aram Harrow</u> Quantum algorithms for linear systems of equations
10.15 – 10.35	<u>Stefano Chesi</u> , Beat Röthlisberger, Daniel Loss, Sergey Bravyi, and Barbara M. Terhal Stability of topological quantum memories in contact with a thermal bath
	Coffee break
11.10 – 11.40	<u>Robert Koenig</u> , Greg Kuperberg, and Ben Reichardt <i>Quantum computation with Turaev-Viro codes</i>
11.45 – 12.05	<u>Mark Howard</u> and Wim van Dam Tight noise thresholds for quantum computation with perfect stabilizer operations
12.10 - 12.30	Prabha Mandayam and <u>Hui Khoon Ng</u> A simple approach to approximate quantum error correction
	Lunch
15.00 – 15.30	Sergey Bravyi, Cristopher Moore, Alexander Russell, Christopher Laumann, Andreas Läuchli, <u>Roderich Moessner</u> , Antonello Scardicchio, and Shivaji Sondhi <i>Random quantum satisfiability: statistical mechanics of disordered quantum opti</i> <i>mization</i>
15.35 – 16.30	Invited talk: <u>Julia Kempe</u> A quantum Lovász Local Lemma
16.30 - 18.00	Poster Session 2
17.00 – 17.20	Business meeting (open to all QIP participants) place: ETH main building, F floor, auditorium HG F30
19.00 – 22.00	Conference dinner

	FRIDAY JANUARY 22
9.15 9.35	<u>Marcin Pawlowski</u> Information causality
9.40 - 10.00	Salman Beigi, <u>Sergio Boixo</u> , Matthew Elliot, and Stephanie Wehner Local quantum measurement and relativity imply quantum correlations
10.05 - 10.25	David Gross, <u>Markus Mueller</u> , Roger Colbeck, and Oscar Dahlsten All reversible dynamics in maximally non-local theories are trivial
	Coffee break
11.00 – 11.20	<u>Michael Wolf</u> , David Perez-Garcia, and Carlos Fernandez Measurements incompatible in quantum theory cannot be measured jointly in any other no-signaling theory
11.25 – 11.55	<u>Toby Cubitt</u> , Jens Eisert, and Michael Wolf Laying the quantum and classical embedding problems to rest
12.00 - 12.20	Salman Beigi, <u>Peter Shor</u> , and John Watrous <i>Quantum interactive proofs with short messages</i>
	Lunch
14.45 – 15.40	Invited talk: <u>Scott Aaronson</u> New evidence that quantum mechanics is hard to simulate on classical computers
15.45 – 16.05	Julia Kempe and <u>Oded Regev</u> No strong parallel repetition with entangled and non-signaling provers
	Coffee break
16.30 – 16.50	Toby Cubitt, Debbie Leung, <u>William Matthews</u> , and Andreas Winter Zero-error channel capacity and simulation assisted by non-local correlations
16.55 – 17.15	Jianxin Chen, <u>Toby Cubitt</u> , Aram Harrow, and Graeme Smith Super-duper-activation of the zero-error quantum capacity
17.15 – 17.20	Closing remarks

POSTER SESSIONS

There will be two poster sessions, the first one on Monday January 18 and the second on Thursday January 21. Below you find the list of accepted posters and the respective session.

POSTER SESSION 1

MONDAY JANUARY 18

- 1 Daniel Burgarth, Maruyama Koji, Michael Murphy, Simone Montangero, Tommaso Calarco, Franco Nori, and Martin Plenio Scalable quantum computation via local control of only two qubits
- 2 Gustavo Armendáriz and Jorge Craviato Experimental quantum logical gate
- 3 Francesco Buscemi and Nilanjana Datta Coding Theorems for Arbitrary Quantum Resources
- 4 Fernando Pastawski, Alastair Kay, Norbert Schuch, and Ignacio Cirac *Limitations of Passive Quantum Memories*
- 5 Roman Orus Lacort Entanglement in many-body systems and infinite PEPS: recent developments and perspectives
- 6 Howard Brandt Jacobi Fields in the Riemannian Geometry of Quantum Computation
- 7 Mario Berta, Matthias Christandl, and Renato Renner A New Proof of the Quantum Reverse Shannon Theorem
- 8 Diego de Falco and Dario Tamascelli Dissipative Quantum Annealing
- 9 Vlad Gheorghiu, Scott Cohen, and Robert Griffiths Most entangled states cannot be locally cloned
- 10 Antonio Soares Coelho, Felippe A S Barbosa, Katiuscia Nadyne Cassemiro, Alessandro Sousa Villar, Marcelo Martinelli, and Paulo Nussenzveig Three-color entanglement and observation of disentaglement for finite losses in continuous variables
- 11 Austin Fowler, David Wang, Thaddeus Ladd, Rodney Van Meter, and Lloyd Hollenberg Surface code quantum communication
- 12 Bill Rosgen Testing non-isometry is QMA-complete
- 13 Ognyan Oreshkov Holonomic quantum computation in subsystems

- 14 Miguel Aguado and Oliver Buerschaper From lattice gauge theories to string-nets: Relations among topological codes
- 15 Janet Anders, Erika Andersson, Dan Browne, Elham Kashefi, and Daniel Oi Ancilla-Driven Universal Quantum Computation
- 16 Neil Lovett, Sally Cooper, Matthew Everitt, Matthew Trevers, and Viv Kendon Universal quantum computation using the discrete time quantum walk
- 17 Héctor Bombín Topological Subsystem Codes
- 18 Marcus Huber, Beatrix Hiesmayr, and Philipp Krammer Computable entanglement measures in multipartite systems of high dimension
- 19 Rajamani Amuda and Brinda Arumugam Solitons in magnetic quantum dots: candidates for efiicient data transfer
- 20 Jagdish luthra and Federico Arboleda Bell like generalized basis for N qubits and its application to entanglement
- 21 Dong Pyo Chi, Kabgyun Jeong, Taewan Kim, Kyungjin Lee, and Soojoon Lee N-qubit bound entangled states violating M-setting Bell inequalities
- 22 Dong Pyo Chi, Kabgyun Jeong, Taewan Kim, Kyungjin Lee, and Soojoon Lee Minimal concurrence of assistance and Mermin inequality on three-qubit pure states
- 23 Borivoje Dakic, Milovan Suvakov, Tomasz Paterek, and Caslav Brukner Efficient hidden-variable simulation of measurements in quantum experiments
- 24 Marcio F. Cornelio and Marcos C. de Oliveira Strong superadditivity and monogamy of the Renyi measure of entanglement
- 25 Felipe Fanchini, Thiago Werlang, Carlos Brasil, Luiz Gustavo Arruda, and Amir Caldeira Non-Markovian Dynamics of Quantum Discord
- 26 Anahit Gogyan, Stéphane Guérin, Hans-Rudolf Jauslin, and Yuri Malakyan Deterministic Generation of Indistinguishable Single-Photon Pulses in the Single-Atom-Cavity QED System
- 27 Ivonne Guevara and Carlos Viviescas Entanglement dynamics in open systems: a quantum trajectory approach
- 28 Carlos Viviescas and Oscar Barbosa Entanglement generation in multipartite systems with chaotic dynamics
- 29 Lin Chen, Aimin Xu, and Huangjun Zhu Geometric measure of entanglement for pure multipartite states
- 30 Angel Rivas, Susana F. Huelga, and Martin B. Plenio Entanglement-based measures of non-Markovianity

- 31 Charles-Edouard Bardyn, Timothy Chi Hin Liew, Serge Massar, Matthew McKague, and Valerio Scarani Device independent state estimation based on Bell's inequalities
- 32 Oliver Buerschaper, Juan Martín Mombelli, Matthias Christandl, and Miguel Aguado Topological tensor networks, Hopf algebras, and duality
- 33 Ning Ning Chung Application of two-step approach to quantum information processing
- 34 Sang Min Lee and Hai-Woong Lee Direct, Local Measurement of I concurrence for Pure Bipartite Systems
- 35 Martin Plesch and Marcela Hrda Efficient compression of unknown quantum information
- 36 Thomas Zell, Friedemann Queisser, and Rochus Klesse Distance dependence of entanglement generation via a bosonic heat bath
- 37 Stefan Borghoff, Jakob Mueller-Hill, and Rochus Klesse Average and maximum regularized pure-state fidelity of a quantum channel
- 38 Jiyong Park, Su-Yong Lee, Ho-Joon Kim, and Hai-Woong Lee Verification of the Photon Commutation Relation through Cavity QED
- 39 Go Kato Optimal cloning of qubits from replicas of a qubit and its orthogonal states
- 40 Martin Schwarz Simulating Hadamard-Toffoli-Hadamard Circuits with a Promise
- 41 Francesco Buscemi Private quantum decoupling and secure disposal of information
- 42 Katherine Brown, Clare Horsman, Viv Kendon, and Bill Munro Cluster State generation using the Qubus
- 43 Martí Cuquet and John Calsamiglia Entanglement percolation in quantum complex networks
- 44 Bob Coecke and Aleks Kissinger Interacting Frobenius Algebras and the Structure of Multipartite Entanglement
- 45 Kisik Kim, Jaewan Kim, and Joonwoo Bae Quantumness and Quantum Correlations
- 46 Edward Farhi, Jeffrey Goldstone, David Gosset, Sam Gutmann, Harvey Meyer, and Peter Shor Quantum Adiabatic Algorithms, Small Gaps, and Different Paths
- 47 Guillaume Duclos-Cianci and David Poulin Fast Decoders for Topological Quantum Codes

- 48 Christian Gogolin Einselection without pointer states
- 49 Hannu Wichterich, Javier Molina-Vilaplana, Sougato Bose, and Pasquale Sodano Block-block entanglement at quantum critical points of spin chains
- 50 Ilze Dzelme-Berzina Latvian Quantum Finite State Automata and Logic
- 51 A.C. Cem Say and Abuzer Yakaryilmaz Quantum Function Computation Using Sublogarithmic Space
- 52 Yingkai Ouyang Quantum Generalized Reed-Solomon codes concatenated with random rate one inner stabilizer codes asymptotically attain the Quantum Gilbert-Varshamov bound
- 53 Ville Lahtinen and Jiannis Pachos Non-Abelian statistics as a Berry phase in exactly solvable models
- 54 Hui Khoon Ng, Daniel Lidar, and John Preskill Combining dynamical decoupling with fault-tolerant quantum computation
- 55 Olivier Landon-Cardinal and Richard MacKenzie Decoherence suppression via environment preparation
- 56 Yasuhito Kawano and Hiroshi Sekigawa Application of Matrix Decomposition to Finding Complex Hadamard Matrices
- 57 Kelvin Titimbo, Jorge Stephany, and Douglas Mundarain Entanglement Distillation with local common reservoirs in squeezed vacuum states
- 58 Matthew Broome, Marcelo de Almeida, Alessandro Fedrizzi, and Andrew White Improving linear optics quantum gate performance: An inexpensive approach
- 59 Milosh Drezgich and Shankar Sastry Quantum Experts Algorithm and Non-Zero Sum Games
- 60 Łukasz Pankowski and Michał Horodecki Low-dimensional quite noisy bound entanglement with cryptographic key
- 61 Marcin Wiesniak and Marcin Markiewicz Finding Traps in a Non-linear Spin Arrays
- 62 Damian Markham, Elham Kashefi, Mehdi Mhalla, and Simon Perdrix Information Flow in Secret Sharing Protocols
- 63 Thomas Schulte-Herbrueggen and Uwe Sander Symmetry in Quantum System Theory of Multi-Qubit Systems: Rules for Quantum Architecture Design

- 64 Jinho Jang, Sangyong Ahn, and Younghun Kwon About optimality distillation protocol of Bennett et al.
- 65 Tokishiro Karasawa, Masanao Ozawa, and Kae Nemoto Precision limits on a class of multi-qubit gates under conservation laws
- 66 Jinho Jang, Sangyong Ahn, and Younghun Kwon Structure of Quantum Channels for teleportation of arbitrary two-qubit state
- 67 James Wootton, Ville Lahtinen, Jiannis Pachos, and Benoit Doucot Experimentally accessible topological memories from simple stabilizer codes
- 68 Jiannis Pachos, Gavin Brennen, Demosthenes Ellinas, Viv Kendon, Ioannis Tsohantjis, and Zhenghan Wang *The Drunken Slalom: Quantum walk of an anyon*
- 69 Earl Campbell and Dan Browne Bound States for Magic State Distillation in Fault-Tolerant Quantum Computation
- 70 Bela Bauer, Guifre Vidal, and Matthias Troyer Applications of projected entangled-pair states to two-dimensional spin systems

POSTER SESSION 2

THURSDAY JANUARY 21

- 1 Michael Bremner, Richard Jozsa, and Dan Shepherd PostIQP=PP, hence classical simulations of temporally unstructured quantum computations imply a collapse of the Polynomial Hierarchy
- 2 Esther Haenggi, Renato Renner, and Stefan Wolf Amplification of Non-Signaling Secrecy
- 3 Jean-Daniel Bancal, Cyril Branciard, and Nicolas Gisin Simulation of equatorial von Neumann measurements on GHZ states using nonlocal resources
- 4 Milan Mosonyi and Fumio Hiai On the quantum Renyi relative entropies and related capacity formulas
- 5 Radoslaw Lapkiewicz, Peizhe Li, Christoph Schaeff, Nathan Langford, Sven Ramelow, Marcin Wiesniak, and Anton Zeilinger Most basic experimental falsification of Non-contextuality
- 6 Konrad H. Marti, Markus Reiher, Bela Bauer, Matthias Troyer, and Frank Verstraete Flexible non-linear tensor network expansion for the electronic wave function of molecules
- 7 James Sharam and Noah Linden Inhomogeneous Quantum Walks

- 8 Clare Horsman, Christopher Kuklewicz, and Sougato Bose Dimer-assisted communication in quantum spin chains
- 9 Tom Lawson, Noah Linden, Sandu Popescu, and Paul Skrzypczyk The Quantum Fridge
- 10 Luis Garcia and Jagdish Luthra Hybrid Implementation of the Deutsch-Jozsa Algorithm
- 11 Agnes Ferenczi and Norbert Lutkenhaus Connection between optimal eavesdropping and optimal cloning
- 12 Ivan Kassal and Alan Aspuru-Guzik Quantum Computers for Quantum Chemistry
- 13 Baris I. Erkmen, Vittorio Giovannetti, Saikat Guha, Seth Lloyd, Lorenzo Maccone, Stefano Pirandola, Jeffrey H. Shapiro, and Si-Hui Tan *Quantum Illumination with Gaussian States*
- 14 Hang Dinh, Cristopher Moore, and Alexander Russell Toward the Kempe – Shalev Conjecture
- 15 Zhen-Qiang Yin, Yi-Bo Zhao, Yong Yang, Zheng-Fu Han, and Guangcan Guo Stable quantum repeaters against channel noise
- 16 Kamil Bradler Single-letter formulas for the classical and quantum capacity of cloning channels unexpectedly motivated by relativistic quantum information
- 17 Mark Wilde Quantum Shift Register Circuits
- 18 Ashley Montanaro *Quantum search with advice*
- 19 Jonathan Allcock, Nicolas Brunner, Noah Linden, Sandu Popescu, Paul Skrzypczyk, and Tamas Vertesi Non-locality distillation and closed sets of correlations
- 20 Alok Pan and Dipankar Home Contextuality within quantum mechanics devoid of any realist model
- 21 Andrew Childs and Yi-Kai Liu Quantum algorithms for testing bipartiteness and expansion of bounded-degree graphs
- 22 Kenji Mishima and Koichi Yamashita Free-time and Fixed End-point Multi-target Optimal Control Theory: Application to Quantum Computing

- 23 Francesco Buscemi and Nilanjana Datta Towards a Theory of Entanglement for Finite Resources: Single-Shot Entanglement Cost
- 24 Tsuyoshi Ito Polynomial-space approximation of no-signaling provers
- 25 Sujit K. Choudhary, Sibasish Ghosh, Guruprasad Kar, and Ramij Rahaman Analytical proof of Gisin's theorem for three qubits
- 26 Josef Sprojcar Are there any untraceable quantum ballots?
- 27 Prabha Mandayam and Stephanie Wehner A transform of complimentary aspects with applications to entropic uncertainty relations
- 28 Mari-Carmen Banuls, Matthew B. Hastings, Frank Verstraete, and J. Ignacio Cirac Dynamical simulation of infinite chains using Matrix Product States
- 29 Reina Riemann and Peter Shor An Infinite Family of Good Topological Quantum Error-Correcting LDPC Codes
- 30 Frédéric Grosshans Robust and Efficient Sifting-Less Quantum Key Distribution Protocols
- 31 Julio de Vicente, John Calsamiglia, Ramon Munoz-Tapia, and Emili Bagan Estimation of quantum finite mixtures
- 32 Joseph M. Renes A Connection Between Quantum Channel Superactivation and Quantum Data Hiding
- 33 Andrew Childs and Robin Kothari Limitations on the simulation of non-sparse Hamiltonians
- 34 Ernesto Galvao Economical ontological models for discrete quantum systems
- 35 Brendan Juba On Learning Finite-State Quantum Sources
- 36 Christopher Portmann and Renato Renner On Trevisan's extractor in the context of quantum side information
- 37 Pradeep Sarvepalli and Robert Raussendorf Matroids and quantum secret sharing schemes
- 38 Yasuhiro Takahashi, Seiichiro Tani, and Noboru Kunihiro Quantum Addition Circuits and Unbounded Fan-Out
- 39 Hirotada Kobayashi, Francois Le Gall, Harumichi Nishimura, and Martin Roetteler Perfect Quantum Network Coding with Free Classical Communication

- 40 Dong Yang and Jens Eisert Entanglement combing
- 41 Sean Barrett, Tom Stace, and Andrew Doherty Thresholds for topological codes in the presence of loss
- 42 Akihito Soeda, Peter Turner, and Mio Murao Optimal entanglement for LOCC implementation of controlled-unitaries
- 43 Min-Hsiu Hsieh, Wen-Tai Yen, and Li-Yi Hsu High performance entanglement-assisted quantum error ccorrection codes need little entanglement
- 44 Christian Schilling, Jürg Fröhlich, and Peter Pickl Indeterminism and Decoherence in Standard Quantum Theory
- 45 Christina Kraus, Norbert Schuch, Frank Verstraete, and Ignacio Cirac *Fermionic Projected Entangled Pair States*
- 46 Kazuo Iwama, Harumichi Nishimura, Rudy Raymond, and Junichi Teruyama Quantum Counterfeit Coin Problems
- 47 Eric Chitambar, Carl Miller, and Yaoyun Shi Entanglement Classes and Transformations in 2xmxn Systems
- 48 Niel de Beaudrap Unitary-circuit semantics for measurement-based computations
- 49 Neil Lovett and Viv Kendon Spatial search using the discrete time quantum walk
- 50 Cedric Beny and Ognyan Oreshkov A system-environment reciprocity theorem and its application to approximate quantum error correction and state discrimination
- 51 Kristan Temme and Frank Verstraete Mixing times of quantum markov processes
- 52 Edward Farhi, David Gosset, Avinatan Hassidim, Andrew Lutomirski, and Peter Shor Quantum state restoration, or how to perform quantum state tomography with a single copy of a state
- 53 Su-Yong Lee and Hyunchul Nha Quantum state engineering by a coherent superposition of photon subtraction and addition
- 54 Albert Werner, Andre Ahlbrecht, Volkher Scholz, and Reinhard F. Werner Anderson Localization in Disordered Quantum Walks
- 55 Hari Krovi, Maris Ozols, and Jérémie Roland An adiabatic quantum algorithm for finding marked vertices in a graph

- 56 Marco Piani, William Matthews, and John Watrous Usefulness of entanglement in channel discrimination with and without restricted measurementst
- 57 Mafalda L. Almeida, Stefano Pironio, Nicolas Brunner, Antonio Acín, and Nicolas Gisin Conditional information transfer
- 58 Matty Hoban, Earl Campbell, Klearchos Loukopoulos, and Dan Browne *Multi-party Computational Bell inequalities*
- 59 Nati Aharon, Maor Ganz, and Jonathan Silman Quantum leader election
- 60 Debbie Leung, Aram Harrow, Avinatan Hassidim, and John Watrous Adaptive versus non-adaptive strategies for quantum channel discrimination
- 61 Steve Flammia, Alioscia Hamma, Taylor Hughes, and Xiao-Gang Wen Topological Entanglement Renyi Entropy
- 62 Hartmut Neven, Vasil Denchev, Geordie Rose, and William Macready Training a Large Scale Classifier with the Quantum Adiabatic Algorithm
- 63 Akira SaiToh, Robabeh Rahimi, and Mikio Nakahara Nonclassical-correlation witness for a single-run detection
- 64 Robin Blume-Kohout, Sarah Croke, and Daniel Gottesman Streaming distortion-free entanglement concentration
- 65 Ashwin Nayak and Falk Unger Fault-tolerant quantum communication with constant overhead
- 66 Jon Tyson Find the longest vector! (A simple approach to estimates in quantum information theory)
- 67 Markus Mueller, David Gross, and Jens Eisert Concentration of measure and the mean energy ensemble
- 68 Frédéric Dupuis One-shot quantum channel coding



Main building

