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Université de Montréal

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Welcome Message

Dear friends and colleagues,

I would like to welcome you all in Montreal for the 15th workshop on Quantum Information Processing. This document contains most of the information you'll need in order to take advantage of all what the program has to offer.

The idea of holding QIP2012 in Montreal was triggered by the intention of the CRM (Centre de Recherches Mathématiques) to organize a thematic semester on quantum information from June to December 2011. The semester started with the 11th Canadian summer school on quantum information, and the 8th Canadian student conference on quantum information. Workshops on quantum computer science, quantum information in quantum many-body physics, quantum codes, geometry and random structures, and quantum foundations in the light of quantum information all took place at the CRM (University of Montreal) from October to December 2011. The thematic semester had two important figures of our field as Aisenstadt chairs: John Preskill and Renato Renner. The closing act of this successful semester is the reason why you are all here today.

Andreas Winter, general chair of QIP2011, described extremely accurately the state of mind that prevails when you realize you are the general chair for the next QIP. I won't repeat his description here except the three words he chose: disbelief, excitement and terror. My only contribution to this perfect description would be to propose a rotation of the three words one position to the right in order to represent the amplitude of each of my initial feelings in decreasing order.

At the end, the only reason this workshop was made possible is due to extremely dedicated and qualified persons having served different committees (see next page) and having helped us unstintingly. Without their altruism, nothing could have been done. The program committee, chaired by Dorit Aarhonov, did a tremendous job in a shorter time than usual to pick 40 papers and 122 posters. I offer all my gratitude to the program committee for having provided the solid foundation upon which this workshop could be erected. The CRM has been extremely important in helping us with all the stuff we did not know, we did not want to know, and did not even realize had to be known. With all these persons doing their job so professionally and relentlessly, the three words coined by Andreas (and initially rotated one position to the right) then started shifting to the left, finally leaving only the word 'excitement'.

The first goal of the local organizing committee was to find an illustration representing the location, our field, and the 20th anniversary of quantum teleportation discovered here in Montreal. I believe that teleporting ice hockey players will be one of the first Canadian applications of a working teleportation prototype. Or simply, teleporting Canadian ice hockey players in their suits will certainly contribute to remain among the top ice hockey countries in the world. What else could we do with this device? Why the Canadian government has contributed so generously to our field? I bet the answer is in our national sport.

I wish you all plenty of talks and posters that you will remember, meetings and experiences that you'll appreciate,

Have a good time in Montreal,

Louis Salvail
Committees

Program Committee

Dorit Aharonov [chair] (Hebrew University)
Michael Ben-Or (Hebrew University)
Fernando Brandao (Universidade Federal de Minas Gerais)
Sergey Bravyi (IBM, T.J. watson)
David DiVencenzo (Julich-Aachen)
Matt Hastings (UCSB)
Sandy Irani (UCI)
Hirotada Kobayashi (NII)
Debbie Leung (Waterloo)
Renato Renner (ETH)
Christian Schaffner (U. Amsterdam)
Norbert Schuch (Caltech)
Peter Shor (MIT)
Graeme Smith (IBM, T.J. Watson)
Thomas Vidick (UCB)
John Watrous (Waterloo)
Stephanie Wehner (NUS)
Ronald de Wolf (CWI)

Steering Committee

Ignacio Cirac (MPQ, Garching)
Eddie Farhi (MIT)
Aram Harrow (U. Washington)
Patrick Hayden (McGill)
Louis Salvail [chair] (U. de Montréal)
Barbara M. Terhal (RWTH Aachen)
Andreas Winter (U. Bristol/CQT, NUS)
Andrew Yao (Tsinghua)

Local Organisers

Kassem Kalach (Poster session)
Marc Kaplan (Visas and support)
Magalie Lascar (Coordinator)
Louis Salvail (General chair)
Benno Salwey (Rump session)
Dave Touchette (Webmaster)
# Table of Contents

Welcome Message .................................................................................................................. 1  
Committees ............................................................................................................................. 2  
Table of Contents .................................................................................................................. 3  
General Information .............................................................................................................. 4  
Workshop Overview ............................................................................................................... 4  
Instructions for Speakers ..................................................................................................... 4  
Business Meeting .................................................................................................................. 4  
About UdeM ............................................................................................................................ 5  
Quantum Information Processing at the University of Montreal (LITQ) .................................. 5  
About CRM ............................................................................................................................ 5  
About Montreal ...................................................................................................................... 6  
Transportation ....................................................................................................................... 6  
Medical Facilities .................................................................................................................. 6  
Lost Passport .......................................................................................................................... 6  
Useful Numbers ..................................................................................................................... 6  
Things to do, not to do, and see in Montreal ....................................................................... 7  
If you want to feel "local" ....................................................................................................... 7  
Where to have lunch around the conference location .......................................................... 8  
Conference Venue Information ............................................................................................ 9  
Venue Address ....................................................................................................................... 9  
Getting to Montréal City Centre ............................................................................................ 9  
Scientific Program ................................................................................................................ 10  
Poster Sessions ..................................................................................................................... 14  
Instructions for poster presenters ........................................................................................ 14  
Monday, December 12\textsuperscript{th} .................................................................................. 14  
Tuesday, December 13\textsuperscript{th} ...................................................................................... 18  
Social Dinner .......................................................................................................................... 22  
\textbf{Wednesday, December 14\textsuperscript{th}} ........................................................................ 22  
Rump Session ......................................................................................................................... 22  
\textbf{Thursday, December 15\textsuperscript{th}} .......................................................................... 23  
Rump submission guideline ................................................................................................. 23  
Venue .................................................................................................................................. 23  
Directions to the Rump session ............................................................................................ 23  
QIP Charter ............................................................................................................................. 24
General Information

Workshop Overview

Workshop Venue
Cœur des Sciences de l'UQAM, Amphithéâtre SH-2800
200, Sherbrooke West St, Montreal, Qc, Canada
**Métro:** Place des Arts
Monday, December 12th – Friday, December 16th, 2011
**Note:** Lunch will not be provided

Poster Sessions
Cœur des Sciences de l'UQAM, Salle Polyvalente
(Above amphitheatre) 200, Sherbrooke West St, Montreal
Monday, December 12th, 2011, 5:15 p.m.
Tuesday, December 13th, 2011, 5:15 p.m.

Social Dinner
Marché Bonsecours
350 rue Saint-Paul Est, Vieux Montréal, Québec, Canada
**Métro:** Champ de Mars
Wednesday, December 14th, 2011, 7 p.m.

Rump Session
Université de Montréal, Amphithéâtre K-500 + Hall d'honneur
Pavillon Roger Gaudry,
2900, Chemin de la Tour, Montréal
**Métro:** Université de Montréal
Thursday, December 15th, 2011, 7 p.m.

Instructions for Speakers
All speakers should provide their presentations before the start of the break taking place before their session. There will be one PC and one Mac from which your presentation can be shown. The 5 minutes between talks is only used for the transition between speakers. If your talk takes place in the first morning session then your presentation should be provided before 8:00 a.m. If your talk is scheduled in the first afternoon session then it should be provided before 1:00 p.m. Please send us your presentation at qip.speakers@iro.umontreal.ca.

Business Meeting
The business meeting is open to all participants to the conference. This is where the community can influence future QIP conferences. The organizers of the next QIP will present their venue and proposals for the following QIP conferences can be presented and discussed. An advisory vote is then taken among the participants. The final decision is taken by the Steering Committee as soon as possible after the conference. Other matters regarding the organization of our yearly meetings are also encouraged to be discussed.
About UdeM

Quantum Information Processing at the University of Montreal (LITQ)

Background

The LITQ (Laboratoire d'informatique théorique et quantique) is a laboratory of the computer science department at the University of Montreal, involved in theoretical and quantum computer science. The lab counts 6 professors and is very active both in research and education. The lab is working on several aspects of computer science and physics. In particular, classical and quantum cryptography, computational complexity, quantum information processing, the foundations of quantum mechanics and graph theory. See www.iro.umontreal.ca/~utheorie for more details.

Quantum Information Processing at the LITQ

The department of computer science at the University of Montreal is certainly one of the world first computer science department involved in research in quantum information processing, dating back to the early work of Gilles Brassard around 1981. Among other realizations of their members over the years, we mention quantum key distribution, quantum teleportation, quantum one-time-pad, quantum pseudo-telepathy, formalization of Grover algorithm, and the quantum bit commitment no-go theorem. This year, Gilles Brassard has been awarded the most prestigious science and engineering prize in Canada for his pioneer work in quantum information processing.

The laboratory has currently about a dozen graduate students (Postdoc, Ph.D., and Master) and four professors (Michel Boyer, Gilles Brassard, Louis Salvail, Alain Tapp) working on topics related to quantum information processing. The lab is always looking for students to join us.

About CRM

With its world-renowned thematic programming introduced by the CRM in the 80's, its scientific workshops and outreach activities, its 1,500 annual visiting scientists from around the world, and ten laboratories directly involving more than 200 researchers from twelve major universities in Quebec and Ontario, the Centre de recherches mathématiques (CRM) is a major hub for the mathematical sciences. The dual structure on which the CRM is built -- top level international scientific programming running in parallel with ten high-performance research laboratories -- is unique in Canada. It is also unique in the world.

The Centre de recherches mathématiques (CRM) was founded in 1968. Under the direction of Professor François Lalonde as of June 1, 2011, the Centre's mandate is to serve as a national centre for fundamental research in mathematics and their applications. The CRM's scientific personnel includes more than one hundred members and postdoctoral fellows. Further, the Centre hosts from year to year a large number of guest researchers.

The CRM coordinates advanced courses and is instrumental in the training of young researchers. Throughout the world one finds numerous researchers who have had the opportunity to complete their research training at the CRM. The Centre is a major meeting place where all members benefit from a large number of scientific exchanges and collaborative projects.
About Montreal

Transportation
The Montréal metro is made up of 68 stations spread out along four lines, running from 5:30 a.m. to somewhere between 0:30 and 1:30 a.m. depending on the line and day of the week. The bus network consists of 186 daytime and 23 nighttime service routes. You can travel with one ticket for 120 minutes regardless of neither the transport mode used nor the number of connections. There are also taxis everywhere: you can either call one, or get in one from taxi stands or hail one by the roadside. Here are some companies offering a bilingual service.

Taxi Diamond 514-273-6331
Coop de Taxi de Montréal 514-725-9885
Taxi Champlain 514-271-1111

Medical Facilities
In case of emergency (ambulance, police, fire), dial 911. You will talk to someone and then be redirected if necessary. If you have a medical question, you can dial 811 to talk to a nurse. Pharmaceuticals are available at pharmacies. The main ones are Jean Coutu, Pharmaprix, Brunet, Uniprix, and Proxim. They are usually open 7 days a week, from 8 a.m. to 10 p.m. You can also ask medical questions to a pharmacist.

Lost Passport
If you have lost your passport, you need to make a police report at any police station, then go to your embassy or consulate to get a temporary visa. Do not forget to ask a copy of the police report with the file number to hand it to your embassy.

Useful Numbers

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>QIP2012 Secretariat</td>
<td>514-343-6111 # 47612</td>
</tr>
<tr>
<td>Police/Ambulance/Fire</td>
<td>911</td>
</tr>
<tr>
<td>Directory assistance</td>
<td>411</td>
</tr>
<tr>
<td>Montreal Tourism Board</td>
<td>514-273-2015</td>
</tr>
</tbody>
</table>

To know the phone number of your embassy / consulate or high commission, dial 411.
Things to do, not to do, and see in Montreal

Do not cross the street out of the zebra crossing or when the red hand is on (you might be fined for that);  
Do not drink alcohol in the street (you might also be fined for that);  
Give 15% tip or more of the total amount of the invoice in restaurants, bars, cafés (because service is not included). Tips are also expected by taxi drivers. In bars, a good heuristic is to give 1$ tip per drink.  
Remember all displayed prices do not include taxes (add around 15%);  
Wait at the entrance of a restaurant to be seated.  

If you want to feel “local”  
Have your dinner/supper between 5 and 6 p.m.  
Always have something to drink (usually a coffee) or eat in your hands while you are walking in the street (a bit of a challenge with the snow!);  
Try one of the numerous cafés because Montréal has a café culture;  
Have a beer in a bar during a hockey game, supporting the “Canadiens” of course (the local team, they don't win often anymore, but who cares? Just enjoy!);  
Challenge your stomach by eating a “poutine” at the Banquise, open 24h/24 www.restolabanquise.com or somewhere else;  
Taste the famous “Smoked Meat” at Schwartz’s (3895 Bd St Laurent, www.schwartzsdeli.com);  
Taste a hot bagel at Fairmount, open 24h/24 (74 Fairmount West ave, www.fairmountbagel.com);  
Taste the multicultural cuisine of Montréal! (see our selection or the touristic guide);  
Stay warm by shopping in the “Underground City” named RÉSO, the biggest of all the man-made underground networks in the world; RÉSO has 32km (20 miles) of pedestrian walkways, indoor areas and tunnels linking many business centres, some 1,700 boutiques, 7 major hotels, banks, offices, dwellings, close to 200 restaurants, museums, exhibitions halls, 2 universities pavilions, 10 métro (subway) stations, 2 train stations, 2 regional bus stations and even an arena. It can be accessed through 120 different entrances.  
Stay warm by visiting a museum and even warmer by visiting the Biodôme:  

Biodôme de Montréal http://www2.ville.montreal.qc.ca/biodome/
Where to have lunch around the conference location

Here is our personal selection; you can also check the touristic guide given with your personal kit.

All along Parc avenue, until Prince Arthur, you will find places to eat at reasonable prices. You can also go to the city centre (stop at McGill metro station) and try one of the numerous food courts located at the bottom of the shopping centres. There is also a food court at the shopping centre Complexe Desjardins, just 5 min walk from the conference location. The Latin Quarter is a nice place to go (stop at Berri-Uqam metro station), along St-Denis street.

$ Benelux : Micro brewery and café: nice beers, paninis and European hot dogs
245, Sherbrooke West avenue, metro Place des Arts

$ Café République: sandwiches, burgers, pastas, grillades, fishes
3563, Bd St Laurent (550m from the Conference Venue), Bus 80

$ Lola Rosa Café: small but good vegetarian restaurant
545, Milton Street (650m from QIP2012)

$ Pikolo: sandwiches
Corner of Sherbrooke and Parc

$$ Chez Gautier: Parisian brasserie, free internet
3487, Parc Avenue

$ Patisserie Belge (next to Chez Gautier): nice sandwiches, quiches, take away

Marché 27: European bistro
27 Prince Arthur Street, corner of Clark

$ Amelio’s: pizzeria
201 rue Milton, coin Ste Famille

$$ Bistro Isakaya: sushi, fishes
3469, Parc avenue

$$ Brasserie T!: Québec, nouvelle cuisine
1425, rue Jeanne Mance, metro Place des Arts

$$ Circos Café Resto Bar: Mediterranean
380, Sherbrooke West St, métro Place des Arts

$$ Confusion/Tapas du Monde: France
1635-7 St Denis Street, metro Berri-Uqam

$$ Le Commensal: Very good vegetarian self-service restaurant
1720, St Denis Street, Berri-Uqam metro or 1204 McGill College (corner of Ste Catherine Street), McGill metro
Conference Venue Information

Venue Address

COEUR DES SCIENCES DE L’UQAM
Amphithéatre (SH-2800)
200, rue Sherbrooke Ouest
Montréal, Québec, Canada
www.coeurdessciences.uqam.ca/

Wireless

Choose « réseau invité ». Type password : faire

Activities at Cœur des Sciences de l’UQAM

Conference Talks December 12-16, Amphitheater SH2800
Welcoming Cocktail December 12th, 5:15 p.m., Salle Polyvalente
Poster Sessions December 12-13, Salle Polyvalente

Activities at Marché Bonsecours, Vieux-Montréal

Social Dinner December 14th, 7 p.m., Salle de la Commune

Activities at Université de Montréal

Rump Session December 15th, 7 p.m., K-500, pavillon Roger Gaudry

Getting to Montréal City Centre

By taxi

The journey to the city centre is a fixed fare of 38$. Don’t forget to give a tip!

By Express Bus 747 (STM)

The cost is 8$ for a one-way trip. At the airport, tickets are sold at the International Currency Exchange (ICE) counter on the international arrivals level.

More information http://www.stm.info/English/info/a-747.htm
Scientific Program

Monday, December 12th

8:15-9:00  Registration

9:00-9:15  Opening remarks
Guest of Honor: Dr François Lalonde
Director of the CRM (Centre de Recherches Mathématiques)
Université de Montréal

9:15  Sergey Bravyi (Plenary lecture)
Topological qubits stability against thermal noise

10:10  Omar Fawzi, Patrick Hayden, Ivan Savov, Pranab Sen and Mark Wilde (Featured talk)
Advances in classical communication for network quantum information theory

10:40  BREAK

11:05  Nilanjana Datta, Min-Hsiu Hsieh and Mark Wilde
Quantum rate distortion, reverse Shannon theorems, and source-channel separation

11:30  Graeme Smith, John A. Smolin and Jon Yard
Quantum communication with gaussian channels of zero quantum capacity

11:55  Nengkun Yu, Runyao Duan and Quanhua Xu
Bounds on the distance between a unital quantum channel and the convex hull of unitary channels, with applications to the asymptotic quantum Birkhoff conjecture

12:15  LUNCH BREAK

14:00  Markus Greiner (Plenary lecture)
Quantum Magnetism with Ultracold Atoms - A Microscopic View of Artificial Quantum Matter

14:55  André Chailloux and Iordanis Kerenidis (Featured talk)
Optimal Bounds for Quantum Bit Commitment

15:25  BREAK

15:50  Gilles Brassard, Peter Høyer, Kassem Kalach, Marc Kaplan, Sophie Laplante and Louis Salvail (Featured talk)
Merkle Puzzles in a Quantum World

16:25  Salman Beigi and Robert Koenig
Simplified instantaneous non-local quantum computation with applications to position-based cryptography

16:50  Harry Buhrman, Serge Fehr, Christian Schaffner and Florian Speelman
The Garden-Hose Game and Application to Position-Based Quantum Cryptography

17:15  Poster session #1
Tuesday, December 13th

9:00  **Itai Arad, Zeph Landau and Umesh Vazirani** (Plenary lecture)  
*An improved area law for 1D frustration-free systems*

9:55  **Spyridon Michalakis and Justyna Pytel**  
*Stability of Frustration-Free Hamiltonians*

10:15  **BREAK**

10:40  **Toby Cubitt, Martin Schwarz, Frank Verstraete, Or Sattath and Itai Arad**  
*Three Proofs of a Constructive Commuting Quantum Lovasz Local Lemma*

11:05  **Norbert Schuch**  
*Complexity of commuting Hamiltonians on a square lattice of qubits*

11:30  **Josh Cadney, Noah Linden and Andreas Winter**  
*Infinitely many constrained inequalities for the von Neumann entropy*

11:50  **LUNCH BREAK**

14:00  **Jeongwan Haah** (Plenary lecture)  
*Local stabilizer codes in three dimensions without string logical operators*

14:55  **Andrew Landahl, Jonas Anderson and Patrick Rice**  
*Fault-tolerant quantum computing with color codes*

15:15  **BREAK**

15:40  **Guillaume Duclos-Cianci, Héctor Bombin and David Poulin** (Featured talk)  
*Equivalence of Topological Codes and Fast Decoding Algorithms*

16:15  **Joseph M. Renes, Frederic Dupuis and Renato Renner**  
*Quantum Polar Coding*

16:40  **Sergey Bravyi and Robert Koenig** (Featured talk)  
*Disorder-assisted error correction in Majorana chains*

17:15  **Poster session #2**

Wednesday, December 14th

9:00  **Troy Lee and Jérémie Roland** (Featured talk)  
*A strong direct product theorem for quantum query complexity*

9:35  **André Chailloux and Or Sattath**  
*The Complexity of the Separable Hamiltonian Problem*

10:00  **Yaoyun Shi and Xiaodi Wu**  
*Epsilon-net method for optimizations over separable states*

10:20  **BREAK**

10:45  **Abel Molina and John Watrous**  
*Hedging bets with correlated quantum strategies*
11:10  **Jop Briet and Thomas Vidick**  
*Explicit lower and upper bounds on the entangled value of multiplayer XOR games*

11:35  **Gus Gutoski and Xiaodi Wu** (Featured talk)  
*Parallel approximation of min-max problems with applications to classical and quantum zero-sum games*

12:05  **LUNCH BREAK & FREE AFTERNOON**

19:00  **Conference diner** (Marché Bonsecours)

**Thursday, December 15th**

9:00  **Aleksandrs Belovs** (Plenary lecture)  
*Span Programs for Functions with Constant-Sized 1-certificates*

9:55  **Francois Le Gall**  
*Improved Output-Sensitive Quantum Algorithms for Boolean Matrix Multiplication*

10:20  **Dominic Berry, Richard Cleve and Sevag Gharibian**  
*Discrete simulations of continuous-time query algorithms that are efficient with respect to queries, gates and space*

10:40  **BREAK**

11:05  **Thomas Decker, Gábor Ivanyos, Miklos Santha and Pawel Wocjan**  
*Hidden Symmetry Subgroup Problems*

11:30  **Rahul Jain and Ashwin Nayak**  
*A quantum information cost trade-off for the Augmented Index*

11:55  **Sevag Gharibian and Julia Kempe**  
*Hardness of approximation for quantum problems*

12:15  **LUNCH BREAK**

14:00  **Jérémie Roland** (Plenary lecture, based on joint work with Maris Ozols and Martin Roetteler)  
*Quantum rejection sampling*

14:55  **Rolando Somma and Sergio**  
*Spectral Gap Amplification*

15:15  **BREAK**

15:40  **Troy Lee, Rajat Mittal, Ben Reichardt, Robert Spalek and Mario Szegedy** (Featured talk)  
*Quantum query complexity for state conversion*

16:15  **Fernando Brandao, Aram Harrow and Michal Horodecki** (Featured talk)  
*Local random quantum circuits are approximate polynomial-designs*

16:45  **Business Meeting**

19:30  **Rump Session** (Université de Montréal, K-500)
Friday, December 16th

9:00    Eric Chitambar, Wei Cui and Hoi-Kwong Lo (Plenary lecture)
Increasing Entanglement by Separable Operations and New Monotones for W-type Entanglement

9:55    Rodrigo Gallego, Lars Erik Würflinger, Antonio Acín and Miguel Navascués
Quantum correlations require multipartite information principles

10:15   BREAK

10:40   Martin Schwarz, Kristan Temme, Frank Verstraete, Toby Cubitt and David Perez-Garcia
Preparing projected entangled pair states on a quantum computer

11:05   Esther Haenggi and Marco Tomamichel
The Link between Uncertainty Relations and Non-Locality

11:30   Salman Beigi and Amin Gohari
Information Causality is a Special Point in the Dual of the Gray-Wyner Region

11:50   LUNCH BREAK

13:35   Marcus P. Da Silva, Steven T. Flammia, Olivier Landon-Cardinal, Yi-Kai Liu and David Poulin
Practical characterization of quantum devices without tomography

14:00   Robin Blume-Kohout
Paranoid tomography: Confidence regions for quantum hardware

14:25   Sandu Popescu (Plenary lecture)
The smallest possible thermal machines and the foundations of thermodynamics

15:15   Closing Remarks
Poster Sessions

Two poster sessions will be taking place on Monday, December 12th and on Tuesday, December 13th. The posters will be located at the salle polyvalente (SH-4800), just above the conference hall. The list of posters below is in an almost totally random order. All participants can vote for their favorite posters (in a few categories) using the ballots included in your kit. The welcoming cocktail will be held on Monday December 12th. Some drinks and food will also be served on Tuesday December 13th.

Instructions for poster presenters

Please check below whether your session is on Monday or Tuesday. Your poster number will tell you where to install it. You can install your poster starting from noon, the day of your session. Posters will be rewarded symbolic prices (at the social dinner) based on the outcome of the votes.

Monday, December 12th

1. A.C. Cem Say and Abuzer Yakaryilmaz
   Quantum computation with narrow CTCs

2. Miguel Navascues, David Perez-Garcia and Ignacio Villanueva
   Inverting the Central Limit Theorem

3. Christian Weedbrook, Stefano Pirandola, Seth Lloyd and Timothy Ralph
   Quantum Cryptography Approaching the Classical Limit

4. Iordanis Kerenidis and Shengyu Zhang
   A quantum protocol for sampling correlated equilibria unconditionally and without a mediator.

5. Johannes Wilms, Julien Vidal, Frank Verstraete and Sébastien Dusuel
   Mutual information in the Lipkin-Meshkov-Glick model

6. Bill Rosgen
   Testing quantum circuits and detecting insecure encryption

7. Anna Vershynina, Bruno Nachtergaele and Valentin Zagrebnov
   Lieb-Robinson Bounds and the Existence of the Thermodynamic Limit for a Class of Irreversible Quantum Dynamics

8. Loïck Magnin and Jérémie Roland
   Quantum adversary lower bounds by polynomials

9. Shen Chen Xu and Mark Wilde
   Sequential, successive, and simultaneous decoders for entanglement-assisted classical communication

10. David Lyons and Scott Walck
    Local unitary classes of symmetric mixed states
11. Maarten Van Den Nest  
   A monomial matrix formalism to describe quantum many-body states

12. Alastair Kay  
   The Capabilities of a Perturbed Toric Code as a Quantum Memory

13. Nengkun Yu, Runyao Duan and Mingsheng Ying  
   Distinguishing Maximally Entangled States by PPT Operations and Entanglement Discrimination Catalysis

14. Nilanjana Datta and Min-Hsiu Hsieh  
   One-shot entanglement-assisted classical communication

15. Sevag Gharibian, Jamie Sikora and Sarvagya Upadhyay  
   QMA variants with polynomially many provers

16. Rahul Jain and Ashwin Nayak  
   A short proof of the Quantum Substate Theorem

17. Sandeep Narayanaswami and Sean Halilgren  
   9-State 1-Dim Hamiltonians is QMA-complete

18. Andris Ambainis, Artūrs Bačkurs, Balodis Kaspars, Dmitry Kravcenko, Raitis Ozols, Juris Smotrovs and Madars Virza  
   Quantum strategies are better than classical in almost any XOR game

19. Akbar Fahmi  
   Inequalities for Testing Non-local Hidden Variable Models Versus Quantum Correlations

20. Zhaohui Wei and Shengyu Zhang  
   On characterizing quantum correlated equilibria

21. Shengshi Pang and Shengjun Wu  
   Unambiguously determining the orthogonality of multiple quantum states

22. Tsuyoshi Ito  
   Parallelization of entanglement-resistant multi-prover interactive proofs

23. Marcio F. Cornelio, Marcos C. De Oliveira and Felipe F. Fanchini  
   Entanglement Irreversibility from Quantum Discord and Quantum Deficit

24. Andrew Childs, Shelby Kimmel and Robin Kothari  
   The quantum query complexity of read-many formulas

25. Felipe Fanchini, Marcio Cornelio, Marcos De Oliveira and Caldeira Amir  
   Conservation law for distributed entanglement of formation and quantum discord

26. Marcelo França Santos, Marcelo Terra Cunha, Rafael Chaves and André Carvalho  
   Quantum computing with incoherent resources and quantum jumps

27. Masaki Owari and Masahito Hayashi  
   Asymptotic local hypothesis testing between a pure bipartite state and the completely mixed state
28. Matthew Mckague
   On the power quantum computation over real Hilbert spaces

29. Robin Blume-Kohout, Sarah Croke and Michael Zwolak
   The power of $O(1)$ qubits: perfect state discrimination with tiny quantum computers

30. Jin Woo Jun
   Entanglement Swapping in an Imperfect Channel

31. Gorjan Alagic and Edgar Bering
   Quantum Algorithms for Invariants of Triangulated Manifolds

32. Roman Orus and Tzu-Chieh Wei
   Topological Geometric Entanglement of Blocks in Toric Codes

33. David Rosenbaum and Aram Harrow
   Uselessness for an oracle model with internal randomness

34. Sadegh Raeisi, Nathan Wiebe and Barry Sanders
   Designing quantum circuits for efficient many-body quantum simulation

35. Clare Horsman
   Quantum picturalism for topological cluster-state computing

36. Yoshifumi Nakata, Peter Turner and Mio Murao
   Entanglement of phase-random states

37. Go Kato and Koji Azuma
   Optimal entanglement manipulation via coherent-state transmission

38. Tony Dorlas and Ciara Morgan
   The invalidity of a strong capacity for a quantum channel with memory

39. Joonwoo Bae, Won-Young Hwang and Yeong-Deok Han
   No-Signaling Principle, Guessing Probability, and General Structure of Optimal Quantum State Discrimination

40. Giannicola Scarpa and Simone Severini
   The Rank-1 Quantum Chromatic Number

41. Andris Ambainis, Arturs Backurs, Nikolajs Nahimovs, Raitis Ozols and Alexander Rivosh
   Search by quantum walks on two dimensional grid without amplitude amplification

42. Earl Campbell and Jens Eisert
   Gaussification and entanglement distillation of continuous variable systems: a unifying picture

43. Pawel Wocjan and Pradeep Sarvepali
   Quantum Algorithms for One-Dimensional Infrastructures

44. Farid Ablayev and Alexander Vasiliev
   Quantum Fingerprinting for Quantum Branching Programs

45. Mamdouh Abbara and Jean-Pierre Tillich
   Quantum turbo-codes with unbounded minimum distance and excellent error-reducing performance
46. Aman Chawla  
   Reliability of a classical-quantum communication system with noisy feedback

47. Martin Kliesch, Thomas Barthel, Christian Gogolin, Michael Kastoryano and Jens Eisert  
   Efficient simulation of dissipative quantum dynamics on a quantum computer

48. Runyao Duan, Simone Severini and Andreas Winter  
   On zero-error communication via quantum channels in the presence of noiseless feedback

49. Seiichiro Tani  
   Optimally Fast Quantum Solitude Detection on Anonymous Directed Networks

50. Mateus De Oliveira Oliveira  
   Band Diagonal Strategies for Two-Prover One-Round Entangled Non-Local Games

51. Marco Tlúio Quintino, Mateus Araújo, Daniel Cavalcanti, Marcelo França Santos and Marcelo Terra Cunha  
   Maximal CHSH violations with low efficiency photodetection and homodyne measurements

52. Mario Berta, Matthias Christandl, Fernando Brandao and Stephanie Wehner  
   Entanglement Cost of Quantum Channels

53. Mario Berta, Fabian Furrer and Volkher Scholz  
   The Smooth Entropy Formalism on von Neumann Algebras

54. Yun Shang, Xian Lu and Ruqian Lu  
   Linear bounded automata based on unsharp quantum logic

55. Sayyed Yahya Mirafzali and Ali Ahanj  
   Measurement-induced nonlocality for an arbitrary bipartite state

56. Matthias Ohliger, Vincent Nesme and David Gross  
   Quantum compressed sensing with general measurements

57. Robert Raussendorf, Pradeep Sarvepalli, Tzu-Chieh Wei and Poya Haghnegahdar  
   Measurement based quantum computation as a toy-model for a quantum theory of spacetime

58. Mirmojtaba Gharibi  
   Reduction from non-injective hidden shift problem to injective hidden shift problem

59. Iman Marvian and Robert Spekkens  
   A generalization of Schur-Weyl duality with applications in quantum estimation

60. Nathan Harshman  
   I Come To Bury Entanglement, Not To Praise It

61. Thiago Maciel, Andre Cesario and Reinaldo Vianna  
   Variational quantum tomographies with incomplete information
Tuesday, December 13th

62. Tiago Debarba  
Relativistic Quantum Bit via Foundations of Relativistic Quantum Theory

63. Oscar Dahlsten, Daniel Lercher and Renato Renner  
Tsirelson's bound from a Generalised Data Processing Inequality

64. Adrian Hutter, Li-dia Del Rio, Renato Renner and Stephanie Wehner  
An information-driven approach to thermodynamics

65. Peter Høyer and Jibran Rashid  
Quantum Nonlocal Boxes Exhibit Stronger Distillability

66. Santosh Shelly Sharma and Naresh Kumar Sharma  
Classification of Multipartite Entanglement via Negativity Fonts

67. Fernando Iemini  
Quantifying Quantum Correlations in Fermionic Systems using Witness Operators

68. Daniel J. Brod and Ernesto F. Galvão  
Extending matchgates into universal quantum computation

69. J K Sharma, Sushamana Sharma and Rajshri Vyas  
On obtaining maximally nonclassical state from arbitrary classical state using inverse boson operators

70. Laszlo Gyongyosi and Sandor Imre  
Superactivated Quantum Repeaters

71. Raphael Dias Da Silva and Ernesto F. Galvão  
Translating measurement-based quantum computation into compact quantum circuits

72. Mark Wilde and Saikat Guha  
Polar codes for classical-quantum channels

73. Ashley Montanaro, Richard Jozsa and Graeme Mitchison  
Exact quantum query algorithms for small boolean functions

74. Sheng-Mei Zhao, Xiang-Liang Dong, Fei Cao and Long-Yan Gong  
A novel quantum key distribution protocol and its experimental implement

75. Daniel Nagaj, Libor Caha and Sergey Bravyi  
Quantum 2-SAT in 1D with Qutrits

76. Raqueline A. M. Santos, Renato Portugal and Franklin L. Marquezino  
Decoherence on Szegedy's Quantum Walk

77. Davide Girolami and Gerardo Adesso  
Observable measure of quantum correlations

78. Courtney Brell, Stephen Bartlett and Andrew Doherty  
A Perturbative Approach to PEPS Parent Hamiltonians
79. Dominic Else, Stephen Bartlett and Andrew Doherty
Measurement-based quantum computation with the cluster state is robust to symmetric perturbations in the parent Hamiltonian

80. Fuyuhiako Tanaka and Takuma Takeuchi
Hypothesis testing of a maximally entangled state under the unknown unitary process

81. Prashant Kumar and Andrew Doherty
A Class of Quantum Double Subsystem Codes

82. Viv Kendon
Where to quantum walk?

83. Junghhee Ryu, James Lim, Changhyoup Lee and Jinhyoung Lee
Nonlocality test for continuous variable system with local symplectic operation

84. Naresh Kumar Sharma, Santosh Shelly Sharma and Paulo Jose Dos Reis
Entanglement generation between remote atomic qubits interacting with two mode Squeezed vacuum field

85. Santosh Shelly Sharma, Naresh Kumar Sharma and Paulo Jose Dos Reis
Classification of Four qubit Entangled States via negativity Fonts

86. Si-Hui Tan, Leonid Krivitsky and Berthold-Georg Englert
Measuring quantum correlations using lossy photon-number-resolving detectors with saturation

87. Yingkai Ouyang
Improved Upper Bounds on the Quantum Capacity of the Depolarizing Channel with Higher Dimension Amplitude Damping Channels

88. Mike Mullan and Emanuel Knill
Optimal Algorithms for Quantum Clocks

89. Radel Ben-Av and Iaakov Exman
Z-States Algebra for the Multi-Party Entanglement-Distillation Protocol

90. Smarajit Das, Naresh Sharma and Siddharth Muthukrishnan
On some special cases of the Entropy Photon-Number Inequality

91. Dvir Kafri and Jacob Taylor
Algorithmic Cooling of a Quantum Simulator

92. Christian Schuette-Nuetgen, Cyril Stark and Renato Renner
Dipole-Dipole-Interaction-Induced Anyon Dynamics in the Toric Code

93. Ernesto Galvao, Raphael Dias Da Silva and Elham Kashefi
Closed timelike curves in measurement-based quantum computation

94. Tina Yu and Chen-Hsiang Yeang
Quantum Clustering-Based Sampling Algorithms for Active Machine Learning
95. Abuzer Yakaryılmaz and A.C. Cem Say  
NP has log-space verifiers with fixed-size public quantum registers

96. Jean-Daniel Bancal, Stefano Pironio, Antonio Acín, Yeong-Cherng Liang, Valerio Scarani and Nicolas Gisin  
Revealing nonlocal correlations without measuring them: Hidden influence explanations of quantum correlations can not remain hidden

97. Siddhartha Santra, N. Tobias Jacobson, Lorenzo Venuti and Paolo Zanardi  
Exact infinite-time statistics of the Loschmidt echo for a quantum quench

98. Siddhartha Santra, Alioscia Hamma and Paolo Zanardi  
Quantum Entanglement in Random Physical States

99. David Reeb, Teiko Heinosaari, Anastasia Jivulescu and Michael M. Wolf  
Extension Theorems for Quantum Operations

100. Eyuri Wakakuwa and Mio Murao  
Extended Nonlocality-Assisted Random Access Coding and Information Causality

101. Maxime Hardy and William A. Coish  
Heisenberg scaling of time-limited quantum metrology with realistic decoherence

102. Yuji Hirono, Shojun Nakayama, David Jennings, Terry Rudolph and Mio Murao  
An extension of the exchange fluctuation theorem for initially correlated systems

103. Fernando Brandão, Jonathan Oppenheim and Sergii Strelchuk  
When does noise increase the quantum capacity?

104. Cedric Beny  
Causal structure of MERA

105. Marc Kaplan and Gilles Brassard  
Simulating equatorial measurements on GHZ states with finite expected communication cost

106. Rodrigo Gallego, Lars Erik Würflinger, Antonio Acín and Miguel Navascues  
Quantum correlations require multipartite information principles

107. Moritz Ernst and Rochus Klesse  
Tackling Quantum Channel Capacities using suitable Random Codes

108. Emilie Pelchat and David Poulin  
Degenerate Viterbi Decoding

Undecidability of quantum measurement occurrence

110. Yasuhito Kawano  
Extended Clifford Group Circuit and Applications

111. Jeonghoon Park and Soojoon Lee  
Zero-error classical capacity of qubit channels cannot be superactivated

112. Nicolas Menicucci, Steven Flammia and Peter Van Loock  
Graphical calculus for Gaussian pure states
113. Michael Walter, Matthias Christandl, Stavros Kousidis and Brent Doran  
Non-Abelian Duistermaat-Heckman Measures and the Quantum Marginal Problem

114. Keisuke Fujii and Yuuki Tokunaga  
Error Correction Property of the Surface Codes with General Lattices

115. Giulio Chiribella  
Perfect discrimination of no-signalling channels via quantum superposition of causal structures

116. Dmitry Kravchenko  
EWL Scheme for Quantum Voting

117. Paul Pham and Krysta Svore  
A Nearest-Neighbor Architecture for Shor's Factoring Algorithm with Sub-Quadratic Depth

118. Domingo Rodriguez  
A Computational Modeling Framework for Quantum Fourier Transform Algorithms

119. Philippe Faist, Johan Aaberg and Renato Renner  
On the Optimality of Work Extraction in Small Thermodynamical Systems

120. Pascal Basler, Normand Beaudry and Renato Renner  
In the search of operational quantities for characterizing large quantum systems

121. Devin Hugh Smith, Geoff Gillett, Marcelo P. De Almeida, Cyril Branciard, Alessandro Fedrizzi,  
Till J. Weinhold, Adriana Lita, Brice Calkins, Thomas Gerrits, Sae Woo Nam, Howard Wiseman and Andrew G. White  
Steering with superconducting transition edge sensors

122. Nilanjana Datta and Min-Hsiu Hsieh  
The apex of the family tree of protocols: Optimal rates and resource inequalities.
Social Dinner

Wednesday, December 14th

Venue
Marché Bonsecours, Salle de la Commune (lower level)
350 rue St Paul Est, Vieux-Montréal
**Métro:** Champ de Mars (orange line)

Time
7:00 – 11 p.m.

Theme
Illegal Casino in Nouvelle-France, 18th century…

Entertainment
Try your hand at the illegal gambling house where you may play and leave covered with gold…or debts!
Those who have lost everything at the Krabs, roulette or Black Jack will be able to console themselves by listening to sailors’songs and traditional music from the band “Les Murènes”. Beware of your wallets, there will be a magician in the room…

Food
You will have the chance to taste some Amerindian food and local gastronomy from Québec. For example, wild meats, cheeses, cider and micro brewed beers will be offered.

How does it work?
Upon your arrival, you will be given Spanish money for drinks and gambling at the cloakroom.

How to get there
From the métro station Champ de Mars, head for the Vieux-Montréal by turning on the right handside and getting under the highway (stairs down and up), then go up the rue Gosford, cross the street and then go down on street St Paul until its end and you will arrive right at the entrance of the Marché Bonsecours. It is about 400m from the metro.
Rump Session

Thursday, December 15th

The rump session has been introduced to our community at QIP2010 in Zurich. A rump session has also been organized in Singapore in 2011. QIP2012 is proud to continue the experiment. The rump session is the unique opportunity to give short presentations on new results, works in progress, open questions, announcements, and funny thoughts on topics of interest to the QIP community. Presentations are very short, something like 5 minutes each. The session takes place in a relax atmosphere with food and drinks served. Non-technical and humorous contributions are very much appreciated.

Organiser: Benno Salwey (DIRO, UdeM)
Session Chair: Claude Crépeau (McGill)

Rump submission guideline

Maximum 1/2 page (standard margin), single column, font size= 11pt min. Submissions will be made by email to: qip.rump@iro.umontreal.ca
Submissions are accepted from Monday, December 12 to Wednesday, December 14 at 2 p.m.

Venue

Université de Montréal
Amphitheatre K500, Pavilion Roger Gaudry
2900, Bvd Édouard Montpetit
Metro: Université de Montréal
Bus lines: 51, 119, 368

Time

7:00 – 10:30 p.m.

Directions to the Rump session

From the metro station, take the travelator, then go on your right handside, there will be a sign for K500 and a paper sign for QIP2012. Out of the building, walk up to the main building of the university and take the main entrance. The amphitheatre is right there!
QIP Charter

Goal of the Conference: The Workshop on Quantum Information Processing (QIP) is an annual conference about quantum computation and information which is usually held around January. Its goal is to represent the preceding year’s best research in the area, in the form of both plenary talks and submitted papers. The conference has no published proceedings, and commonly includes the presentation of work published in proceedings of other conferences or in journals.

The Steering Committee: The role of the Steering Committee (SC) is to determine the longer-term course of the conference and to decide upon venues for the next conferences, and to select and invite the plenary speakers for each meeting of the conference. It should also serve as a watchdog and make sure there are no obvious mistakes, e.g., in the choice of time of the conference by the local organizing committee. The SC consists of 9 people, including the local organizers of the previous, next, and subsequent QIPs, and is chaired by the local organizer of the next/current QIP. Members typically serve for 3 years, with the 3 longest-serving members being replaced once a year, typically soon after QIP. The current SC decides on the replacement of outgoing SC members. The SC chooses the chair of the programme committee (PC) for the next QIP. Starting typically in late summer, the SC invites roughly 5 plenary presentations (of the best recent research, but possibly also some 1 to 3 perspective or survey talks) and possibly some tutorial speakers, but otherwise leaves the details of the conference programme to the PC.

Business Meeting: At each QIP there is a business meeting that can be attended by all conference participants, to enable the community to influence the future of QIP democratically. There the organizer for the next QIP gives a presentation, and proposals for the venue of the QIP following the next one are presented and discussed, with an advisory vote taken among the participants. The actual decision about the venue is taken by the SC soon after that. Also other organizational matters can be discussed at the business meeting.

The Programme Committee: The role of the Programme Committee (PC) is to select the best submitted papers and to put together a programme for the next QIP. The PC chair chooses the members of the PC (helped by advice from the SC), typically 15 or more people representing the broad range of subfields, both from computer science and from physics. The PC chair determines (in cooperation with the SC) the rules for submission and puts out a call for submissions. The selection of talks among the submitted papers is competitive, with typically between 32 and 50 accepted submissions; it is recommended to keep the number of acceptances minimal but the PC has flexibility to accommodate exceptional breadth and quality of submissions in a given year. The PC can suggest to the SC promotion of a few of the best submitted papers to plenary status, and can distinguish between longer and shorter time slots for the rest (typically 30 and 20 minutes, called *featured* and *contributed* talks, respectively). Poster submissions will generally be accepted unless they are off-topic or clearly wrong, to enable people to obtain funds for travel. At the discretion of the PC, best poster prizes can be awarded.

Typical Conference Outline: On the days immediately preceding the conference, tutorials can take place, typically each a half or a full day of lectures on a specific topic, aimed at students. If no or only limited tutorials can be offered, this has to be decided by the local organizer in conjunction with the SC. The actual conference takes place from Monday to Friday, with (usually) Wednesday afternoon off for scientific discussions and social excursions. Each morning and afternoon session starts with a 40- to 45-minute plenary talk, followed by contributed/featured talks. Each talk is followed by 5 minutes for questions and for setting up the next talk. The poster session(s), business meeting, and a rump session (optional; for short impromptu presentations of very recent results) are held in late afternoons. The poster session forms an integral part of the QIP conference, and activities such as poster prizes or advertisements for excellent posters are encouraged.

Conflict of Interest:
1. SC member cannot be a plenary speaker, but PC members can be plenary speakers.
2. Both SC and PC member are allowed to submit papers and as a paper presenter if the paper submission is accepted.
3. PC members must declare a conflict of interest on certain submissions (such as their own), so that they are not involved in the discussion concerning these papers.
<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
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<tbody>
<tr>
<td>9h00</td>
<td>Welcome &amp; Opening Remarks</td>
<td>Itai Arad</td>
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**Notes:**
- **Monday:** Welcome & Opening Remarks, 9h00
- **Tuesday:** Itai Arad, Troy Lee, Aleksandrs Belovs, 9h00
- **Wednesday:** Sergey Bravyi, Spyridon Michalakis, 9h00
- **Thursday:** Spyridon Michalakis, Spyridon Michalakis, 9h00
- **Friday:** Martin Schwarz, Martin Schwarz, 9h00