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Sandia National Laboratories
Dear friends and colleagues,

Welcome to Singapore and the 14th workshop on Quantum Information Processing. The booklet you’re holding in your hands contains the essential information for you to navigate the packed programme of this week.

Instead of boring you with things that you can read in it yourself, let me do so rather by a couple of personal reflections. When I first faced the possibility of organising QIP in Singapore, it was with a mixture of disbelief, excitement and terror. Disbelief that evidently responsible people would entrust to me the foremost conference in the field; obvious excitement over the prospect of bringing three hundred scientists to Singapore; terror in the face of daunting logistical challenges, not to mention the pitfalls of scientific credibility.

That I didn’t despair I owe to the thirty-five uniquely professional, enthusiastic and inspired persons of the committees listed overleaf (plus two of such eminent importance that we are not even allowed to name them). In particular the programme committee, chaired by Daniel Gottesman, did a tremendous job of sifting through more than two hundred papers submitted, to select 35 talks and 156 posters. Once local preparations started, we had our good moments too: “Schrödinger’s monkey” was the first discovery of QIP 2011 – and still remains to be entered into the books of taxonomists. The mighty durian on the other poster came to help later – although I should probably have anticipated that the fruit would divide the local organising committee sharply into lovers and loathers …

But enough of that: you don’t want to know the story of organising this QIP – you want to enjoy the talks and posters, to interact with your colleagues, and to explore Singapore.

Have fun

Andreas Winter
Committees

Programme Committee

Andris AMBAINIS (University of Latvia)
Steve BARTLETT (University of Sydney)
Sergey BRAVYI (IBM)
Wim van DAM (UC Santa Barbara)
Daniel GOTTESMAN (Perimeter Institute) (chair)
Pawel HORODECKI (Gdansk University of Technology)
Iordanis KERENIDIS (Universite Paris-Sud)
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Frank VERSTRAETE (University of Vienna)
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Renato RENNER (ETH Zurich)
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John WATROUS (University of Waterloo)
Andreas WINTER (University of Bristol / CQT, NUS) (chair)
Andrew Chi-Chih YAO (Tsinghua University)

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Rahul JAIN (Local Arrangement and Social Events)
Hartmut KLAUCK (Tutorials)
KWEK Leong Chuan (Sponsorship)
Darwin GOSAL (Webmaster)
Markus GRASSL (Outreach and Publicity)
Ethan LIM (Webmaster)
Matthew MCKAGUE (Tutorials)
Ciara MORGAN (Conference Booklet)
Tomasz PATEREK (Rump Session)
Miklos SANTHA (Advisor)
Stephanie WEHNER (Coordinator)
Andreas WINTER (Coordinator)
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General Information

Workshop Overview

**Tutorial Sessions**  Lecture Theatre 32, National University of Singapore Campus  
Saturday, 8 January & Sunday, 9 January 2011

**Welcome Reception**  Bob’s Bar, Level 2, The Capella, Sentosa, Singapore  
Sunday, 9 January 2011, 19:00

**Workshop Venue**  Grand Ballroom, Level 1, The Capella, Sentosa, Singapore  
Monday, 10 January – Friday, 14 January 2011

**Note:** Lunch will be provided each day

**Social Dinner**  Convention Centre Ballroom, Level 4, Marina Bay Sands, Singapore  
Wednesday, 12 January 2011, 19:00

**Rump Session**  Sapphire Pavilion, Siloso Beach, Sentosa, Singapore  
Thursday, 13 January 2011, 19:00 onwards

**Instructions for Speakers**
A laptop will be provided onto which all speakers are requested to upload their presentations before the relevant session. The 5 minutes scheduled before each talk should only be used for the transition between speakers.

**Business Meeting**
The business meeting can be attended by all conference participants, to enable the community to influence the future of QIP democratically. There, the organiser for the next QIP gives a presentation, and proposals for the venue of the QIP after that are presented and discussed, with an advisory vote taken among the participants. The actual decision about the venue is taken by the Steering Committee soon after that. Also other organisational matters can be discussed at the business meeting.
About CQT

Mission

Our mission is to conduct interdisciplinary theoretical and experimental research into the fundamental limits of information processing. The discovery that quantum physics allows fundamentally new modes of information processing has required the existing theories of computation, information and cryptography to be superseded by their quantum generalisations. We focus on the development of quantum technologies for coherent control of individual photons and atoms and explore both the theory and the practical possibilities of constructing quantum-mechanical devices for the purpose of cryptography and computation.

Origins

Research in quantum information science in Singapore was initiated in 1998 by Kwek Leong Chuan, Lai Choy Heng, Oh Choo Hiap and Kuldip Singh as a series of informal seminars at the National University of Singapore. The seminars attracted local researchers and resulted in forming the Quantum Information Technology Group, informally referred in Singlish as "quantum lah".

In February 2002 the support from the Agency for Science, Technology and Research (A*STAR) - the Temasek Project - consolidated research efforts in the field and led to a number of faculty appointments. In 2007 the Quantum Information Technology Group was selected as the core of the first Research Centre of Excellence in quantum information science and technology. Since then, the Centre has attracted a number of other researchers and continues to expand.

The Centre is funded by the Singapore National Research Foundation and the Ministry of Education. It is hosted by the National University of Singapore, but enjoys a significant autonomy both in pursuing its research goals and in governance. The Centre has its own Governing Board, a Scientific Advisory Board and is headed by Director Artur Ekert.
About Singapore

Transportation
Traveling around Singapore is a cinch! An efficient public transportation network of taxis, buses and the modern Mass Rapid Transit (MRT) rail system ensures that getting from point A to point B is hassle-free and extremely affordable. There are also taxis which can be hired from taxi stands, hailed by the roadside, or booked by phoning the numbers listed below. A booking fee is usually charged when hired by telephone.

CityCab +65 6552 2222
Comfort CabLink +65 6552 1111
SMRT Taxis Skytrek Bookings / Premier Cabs +65 6555 8888

Medical Facilities
Most hotels have an on-call doctor. In the case of emergency, dial 995 for an ambulance. Pharmaceuticals are available at many outlets including supermarkets, department stores, hotels and shopping centres.

Lost Passport / Singapore Immigration Service
If you have lost your passport, you need to make a police report, then go to the Immigration & Checkpoints Authority to get a temporary visa. Finally, inform your embassy so that you can get through customs when you reach home.

Website: http://www.ica.gov.sg

Things to do and see in Singapore

- Chinatown http://www.chinatown.org.sg
- Clarke Quay http://www.clarkequay.com.sg
- Esplanade Theatre Singapore http://www.esplanade.com
- Singapore Botanic Gardens http://www.sbg.org.sg
- National Museum of Singapore http://www.nationalmuseum.sg
- Singapore Art Museum http://www.singaporeartmuseum.sg
- Alliance Francais de Singapore http://www.alliancefrancaise.org.sg
**Useful Numbers**

<table>
<thead>
<tr>
<th>QIP 2011 Secretariat</th>
<th>+65 6516 7019</th>
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<tr>
<td>Police</td>
<td>999 (toll-free)</td>
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<tr>
<td>Ambulance / Fire</td>
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**Embassies / Consulates / High Commissions**

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<td>Switzerland</td>
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<td>Taiwan</td>
<td>+65 6500 0100</td>
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<td>Turkey</td>
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<tr>
<td>United States of America</td>
<td>+65 6476 9100</td>
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Conference Venue Information

Venue Address
The Capella Hotel
Grand Ballroom
1 The Knolls
Sentosa Island
Singapore

Telephone
+65 6377 8888

Website
www.capellasingapore.com

Wireless
Free Wi-Fi is available at the Capella without password

Activities at the Capella

Welcome Reception
Sunday, 9 January 2011, Bob’s Bar, Level 2, 19:00

Conference Talks
10-14 January 2011, Grand Ballroom, Level 1

Poster Sessions
10 & 11 January 2011, Outside Grand Ballroom, Level 1

Getting to Sentosa Island

By Taxi
You may instruct the cab driver to The Capella at The Sentosa Island.

By Mass Rapid Transit (MRT) and Sentosa Express
Take the North-East Line and alight at the Harbour Front MRT Station. From there, you may either go to the 3rd level (Lobby L) of VivoCity shopping mall, transfer onto the Sentosa Express or you may follow the signs to the HarbourFront Bus interchange. Hop onto the orange Sentosa bus and you'll be on your way to Sentosa.

More Information
Tutorial Programme

Venue
National University of Singapore (NUS) Campus, Lecture Theatre 32

Getting to NUS from Sentosa/Harbourfront (also see map on page 28)
Take the Sentosa Express from Sentosa to the Vivo City mall. Take the escalators down to
the first floor. Walk straight for a few meters and then turn right. You should see signs
pointing towards the bus stop and to the taxi stand nearby (a taxi from there should cost
approx. 8 S$). Alternatively, use the orange Sentosa bus and alight at the Harbourfront bus
stop. From the bus stop take bus 97, but avoid the express bus 97e. Alight at the bus stop
opposite Dover Institute of Technical Education, AYE, which is 13 stops after Vivo City and
12 stops after Harbourfront. From there it’s a short walk to the tutorial venue LT32.

Tutorial Schedule

Saturday, 8 January 2011

09:00 Registration

09:30 Patrick Hayden, McGill University Montreal
Quantum Information Theory via Decoupling

11:00-11:30 Coffee Break

13:00 Buffet Lunch

14:00 Ben Reichardt, IQC, University of Waterloo
Quantum Query Complexity

15:30-16:00 Coffee Break

17:30 End

Sunday, 9 January 2011

09:00 Registration

09:30 Maciej Lewenstein, ICFO Barcelona
Anything Goes, or Everything Fails: Quantum Simulators

11:00-11:30 Coffee Break

13:00 End

from 19:00 Welcome reception at The Capella, with registration
**Tutorial Abstracts**

**Quantum Information Theory via Decoupling**  
by Patrick Hayden, McGill University Montreal

Abstract  
Quantum information theorists are lucky. If a classical information theorist wants to send bits through a noisy channel, (s)he has little choice but to specify in detail matching encoding and decoding procedures that will protect the data from noise. Quantum information theorists only have to work half as hard: they need to specify the encoding but then the decoding comes for free. This "free lunch" is a consequence of the no-cloning theorem: if no information leaks to the environment, then the quantum information theorist can conclude that a decoding exists without having to worry about the details. Of course, the free lunch may be a bit hard to digest. Casual readers of papers on quantum channel capacities are often put off by what look like formidable technicalities. The tutorial will teach participants how to prove some key capacity theorems from start to finish, breaking the technicalities into bite-sized chunks. The end of the tutorial will be devoted to discussing potential consequences of the results to information leakage from black holes.

**Quantum Query Complexity**  
by Ben Reichardt, IQC, University of Waterloo

Abstract  
The general adversary bound is a lower bound on quantum query complexity that can also be used to design quantum algorithms with a very simple form. In this tutorial, we will study the adversary bounds and how to design quantum algorithms based upon them.

**Anything Goes, or Everything Fails: Quantum Simulators**  
by Maciej Lewenstein, ICFO Barcelona

Abstract  
"Anything goes" is a musical by Cole Porter. The title song of it was used in the beginning of Steven Spielberg's movie "Indiana Jones and the Temple of Doom". Here it applies to a concept of so-called quantum simulators, that is simple physical systems that are supposed to mimic other not so simple physical systems, i.e. serve as quantum computers of special purpose. In recent years most of such quantum simulators have been proposed in the area of quantum optics and atomic physics using ultracold atoms and ions. In this tutorial I will review the fundamentals of quantum simulators based on ultracold matter, and argue that although in principle "anything goes", sometimes "everything might fail".
Scientific Programme

Sunday, 9 January 2011
from 19:00   Welcome reception and registration: Bob’s Bar, Level 2, The Capella

Monday, 10 January 2011
08:00-09:00  Registration
09:00-09:30  Opening Remarks
Guest of Honor: Mr. Lam Chuan Leong
Chairman of the CQT Governing Board
Ambassador-at-large, Ministry of Foreign Affairs
Chairman, Competition Commission of Singapore
Director, Singapore Cooperation Enterprise
Director, ST Electronics (Info-Software Systems) Pte Ltd

09:30-10:20 Ashley Montanaro (plenary, based on joint work with A. W. Harrow)
An efficient test for product states, with applications to quantum Merlin-Arthur games

10:20-10:50 Break

10:50-11:20 Julia Kempe and Thomas Vidick (featured)
Parallel repetition of entangled games

11:25-11:45 Tsuyoshi Ito, Hirotada Kobayashi and John Watrous
Quantum interactive proofs with weak error bounds

11:50-12:10 Shengyu Zhang
Quantum strategic game theory

12:10-14:00 Lunch

14:00-14:50 John Martinis (plenary, based on joint work with H. Wang, M. Mariantoni,
R. C. Bialczak, M. Lenander, E. Lucero, M. Neeley, A. O’Connell, D. Sank,
M. Weides, J. Wenner, T. Yamamoto, Y. Yin, J. Zhao and A. N. Cleland)
Synthesis of complex microwave photon states with superconducting qubits

14:55-15:15 Tzu-chieh Wei, Ian Affleck and Robert Raussendorf (UBC);
Akimasa Miyake (PI)
The 2D AKLT state is universal for measurement-based quantum computation
15:15-15:45  Break

15:45-16:05  David Poulin, Angie Qarry, Rolando Somma and Frank Verstraete  
Quantum simulation of time-dependent Hamiltonians and the convenient illusion of Hilbert space

16:10-16:30  Ramis Movassagh and Alan Edelman  
Isotropic entanglement

16:35-16:55  Sarah Harrison, Norbert Schuch, Tobias Osborne and Jens Eisert  
Information propagation for interacting particle systems

from 17:15  Poster session 1  
organised by Cédric Bény

Tuesday, 11 January 2011

09:00-09:50  Oded Regev (plenary, based on joint work with B. Klartag)  
Quantum one-way communication can be exponentially stronger than classical communication

09:55-10:15  Loïck Magnin, Martin Roetteler and Jérémie Roland  
On the additive and multiplicative adversary methods

10:15-10:45  Break

10:45-11:15  Harry Buhrman, Oded Regev, Giannicola Scarpa and Ronald de Wolf (featured)  
Near-optimal and explicit Bell inequality violations

11:20-11:40  Marius Junge and Carlos Palazuelos  
Large violation of Bell inequalities with low entanglement

11:45-12:05  Tobias Fritz  
Tsirelson's problem and Kirchberg's conjecture

12:05-14:00  Lunch

14:00-14:20  Adán Cabello, Simone Severini and Andreas Winter  
(Non-)Contextuality of physical theories as an axiom

14:25-14:55  Jonathan Oppenheim and Stephanie Wehner (featured)  
The uncertainty principle determines the non-locality of quantum mechanics

14:55-15:30  Break
15:30-16:00 Hari Krovi, Frédéric Magniez, Maris Ozols and Jérémie Roland (featured)
Finding is as easy as detecting for quantum walks

16:05-16:25 Jianxin Chen, Xie Chen, Runyao Duan, Zhengfeng Ji, Zhaohui Wei and Bei Zeng
On the solution space of quantum 2-SAT problems

16:30-16:50 Andrew Childs and Robin Kothari
Quantum query complexity of minor-closed graph properties

16:55-17:15 Fernando Brandão and Michał Horodecki
Exponential quantum speed-ups are generic

from 17:15 Poster session 2
organised by Cédric Bény

Wednesday, 12 January 2011

09:00-09:50 Sergey Bravyi (plenary, based on joint work with M. B. Hastings and S. Michalakis)
Topological quantum order: stability under local perturbations

09:55-10:15 Teiko Heinosaari and Michael Wolf
Topological implications in quantum tomography

10:15-10:45 Break

10:45-11:15 Earl Campbell (featured)
Catalysis and activation of magic states in fault tolerant architectures

11:20-11:40 James Wootton, Robert Heath and Jiannis Pachos
Localization assisted quantum error correction in the toric code

11:45-12:15 Hector Bombin (featured)
Anyons, twists and topological codes

12:15 Lunch & free time

16:30-17:00 Registration and Reception for Public Lecture

17:00-18:00 Public Lecture
Information is Quantum
Charles Bennett, IBM Research, USA
Venue: Singapore Management University (SMU)
Thursday, 13 January 2011

09:00-09:50 Andrew Lutomirski (plenary, based on joint work with E. Farhi, D. Gosset, A. Hassidim and P. W. Shor)
Quantum money

09:55-10:15 Andrew Childs, David Jao and Vladimir Soukharev
Constructing elliptic curve isogenies in quantum subexponential time

10:15-10:45 Break

10:45-11:15 Sean Hallgren, Adam Smith and Fang Song (featured)
Classical cryptographic protocols in a quantum world

The McEliece cryptosystem resists quantum Fourier sampling attacks

11:45-12:05 Hirotada Kobayashi, François Le Gall, Harumichi Nishimura and Martin Roetteler
Constructing quantum network coding schemes from classical nonlinear protocols

12:05-14:00 Lunch

14:00-14:50 Omar Fawzi (plenary, based on joint work with P. Hayden and P. Sen)
From low-distortion norm embeddings to explicit uncertainty relations and efficient information locking

14:55-15:25 Fernando Brandão and Jonathan Oppenheim (featured)
The quantum one-time pad and superactivation

15:25-16:00 Break

16:00-17:00 Business meeting

from 19:00 Rump Session @ Sapphire Pavillion, Siloso Beach
chaired by Louis Salvail
organised by Stephanie Wehner and Tomasz Paterek
Friday, 14 January 2011

09:00-09:50  **Serge Fehr** (plenary, based on joint work with H. Buhrman, N. Chandran, R. Gelles, V. Goyal, R. Ostrovsky and C. Schaffner)
*Position-based quantum cryptography: impossibility and constructions*

09:55-10:25  **Debbie Leung, Laura Mancinska, William Matthews, Maris Ozols and Aidan Roy** (featured)
*Entanglement can increase asymptotic rates of zero-error classical communication over classical channels*

10:25-11:00  **Break**

11:00-11:20  **Christian Gogolin, Markus Müller and Jens Eisert**
*Under what conditions do quantum systems thermalise? New insights from quantum information theory*

11:25-11:45  **Man Hong Yung and Alán Aspuru-Guzik**
*A quantum-quantum metropolis algorithm*

11:50-12:10  **Erser Bilgin and Sergio Boixo**
*Preparing thermal states of quantum systems by dimension reduction*

12:10-14:00  **Lunch**

14:00-14:30  **Bill Fefferman and Christopher Umans** (featured)
*Pseudorandom generators and the BQP vs. PH problem*

14:35-14:55  **Michael Bremner, Richard Jozsa and Dan Shepherd**
*Classical simulation of commuting quantum computations implies collapse of the polynomial hierarchy*

14:55-15:30  **Break**

15:30-16:20  **Fernando Brandão** (plenary, based on joint work with M. Christandl and J. T. Yard)
*Faithful squashed entanglement*

16:20-16:30  **Closing Remarks**
Poster Sessions

There will be two poster sessions, one on Monday 10 January and one on Tuesday 11 January 2011. The posters will be located just outside the conference hall, and arranged loosely according to topic. The list of posters below is sorted by the last name of the first author.

Instructions for poster presenters

Please check your session (Monday or Tuesday) and poster number below. Your poster number will tell you where to attach it. You have the whole day to set up your poster. Please remove it at the end of your session. Posters will be rewarded by prizes presented during the social dinner.

Monday Session

29a Mamdouh Abbara and Jean-Pierre Tillich
Quantum serial turbo-like codes with minimum distance growing polynomially in the code length

65a Abbas Al-shimary and Jiannis Pachos
Energy gaps of Hamiltonians from graph Laplacians

5a Armen Allahverdyan and Karen Hovhannisyan
Transferring elements of a density matrix

32a Jonas Anderson, Andrew Landahl and Pat Rice
Fault-tolerant quantum computing with color codes

58a Motonori Ando, Takayuki Miyadera and Hideki Imai
The uncertainty principle for simultaneous measurement of arbitrary number of POVMs on a qubit

6a Koenraad Audenaert, Milán Mosonyi and Frank Verstraete
State discrimination bounds for finite sample size

33a Sean Barrett and Thomas Stace
Fault tolerant quantum computation with very high threshold for loss errors

60a Thomas Barthel, Martin Kliesch and Jens Eisert
For $D>1$ MERA states are a subclass of PEPS

70a Almut Beige and Jonathan Busch
Generating single-mode behavior in fiber-coupled optical cavities

20a Ville Bergholm and Jacob Biamonte
Categorical quantum circuits
<table>
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<tr>
<th>Page</th>
<th>Authors</th>
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<tr>
<td>43a</td>
<td>Dominic W. Berry</td>
<td>Quantum algorithm for solving linear differential equations</td>
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<td>21a</td>
<td>Jacob Biamonte, Stephen Clark, Dieter Jaksch and Ville Bergholm</td>
<td>Categorical tensor network states</td>
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<td>52a</td>
<td>Jan Bouda, Matej Pivoluska, Libor Caha, Paulo Mateus and Nikola Paunkovic</td>
<td>Quantum simultaneous contract signing</td>
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<td>1a</td>
<td>Kamil Bradler, Patrick Hayden and Prakash Panangaden</td>
<td>Private quantum capacity</td>
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<td>11a</td>
<td>Fernandao Brandão, Jens Eisert, Michal Horodecki and Dong Yang</td>
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Characterization of classical correlation states
Public Lecture

Information is Quantum:
how physics has helped us understand what information is and what can be done with it

Charles H. Bennett, IBM Research, USA

Abstract
The information revolution is largely based on what a physicist would call a classical view of information, assuming that it can be copied freely and is not disturbed by observation. Quantum effects in information processing, which prevent the information in microscopic objects like atoms or photons from being observed or copied accurately, were long regarded as a mere nuisance, but are now known to make possible feats such as quantum cryptography, quantum teleportation and dramatic computational speedups. Although progress toward a practical quantum computer is slow, other surprising quantum informational effects continue to be discovered, and quantum cryptographic systems are already available commercially. Most importantly, the quantum approach has led to a more coherent and powerful way of thinking about how physical objects interact and influence one another, and how that interaction can be used to compute, communicate, and protect privacy. This talk will avoid mathematical complications and instead aim to explain central quantum concepts like entanglement, which at first sight seem counterintuitive.

Date
Wednesday 12 January 2011

Registration
qip2011.quantumlah.org/publiclecture before 11 January 2011, 12:00

Venue
Singapore Management University
School of Accountancy/School of Law
Ngee Ann Kongsi Auditorium (Level 2)
60 Stamford Road

Registration & Reception
from 16:30

Lecture
17:00-18:00

Co-organised by
Centre for Quantum Technologies &
Singapore Management University

How to get to the Public Lecture at SMU (also see map on page 28)
You can take the North East MRT line from Harbour Front MRT (NE 1) to Dhoby Ghaut MRT (NE 6), from there it is a ca 800 m walk along Orchard Road/Stamford Road.

How to get to the Social Dinner after the Public Lecture
- walking in groups with local guides
- by bus:
  - walk north on Stamford Road, turn right into Bras Basah Road
  - board Bus No. 106 in front of NTUC Income Centre
  - alight at Marina Bay Sands MICE, Bayfront Avenue 10, 6 stops later (6-8 min.)
- by taxi
Social Dinner

Wednesday, 12 January 2011

Venue
Marina Bay Sands, Convention Centre Ballroom, Level 4
10 Bayfront Ave, Singapore 018956

Time
19:00

Entertainment
Musical performances by local groups

Prizes for posters presented earlier in the week will be awarded during the evening of the social dinner

Getting to the Marina Bay Sands

- **Circle Line (by foot):** Exit at Promenade MRT Station and take a 10-minute walk from the station to Bayfront Avenue via the pedestrian footpath adjacent to the public road
- **Circle Line (by bus):** Exit at Promenade MRT Station and board the public buses (no. 133, no. 97, no. 97e, no. 106) from bus stop along Temasek Ave outside the station.
- **North South Line:** Exit at Marina Bay MRT Station and board the public buses (no. 133, no. 97, no. 97e, no. 106) from the bus stop opposite the station.
- **From Harbourfront:** Take the no. 100 bus
Rump Session

The rump session is intended to be an informal session (2-3 hours) in which participants give short presentations on new results from tomorrow’s arXiv, work in progress, and other topics of interest to the QIP community, e.g., workshop announcements. The length of the rump presentation should not be longer than 4.31 minutes. The session will be in a relaxed atmosphere by the beach and there will be BBQ food and drinks served. In order to contribute to this spirit, non-technical and humorous contributions are highly encouraged.

Organisers  Stephanie Wehner (CQT, NUS) and Tomasz Paterek (CQT, NUS)
Session Chair  Louis Salvail (University of Montreal)

Rump Submission Guideline
Maximum (!!!) one page (standard margin), single column, font size = 11pt
*Online Submission will open on Monday, 10 January 2011, 10:00 (Singapore Time) and close on Wednesday, 12 January 2011, 13:00 (Singapore Time).*

**Date**  Thursday 13 January 2011, 19:00 – 23:00

**Venue**  Sapphire Pavilion, Siloso Beach, Sentosa Island

Rump Schedule
19:00   BBQ Buffet Opens
20:00  Talk Session I
20:45   Break
21:30   Talk Session II

**Directions to the Rump Session (also see map on page 28)**

- **By Sentosa Bus**
  Take the Red Line or Blue Line bus and alight at the Underwater World Station and walk to the Sapphire Pavilion.
- **By Sentosa Express**
  Alight at the Beach Station and walk about 5-8 minutes to the Sapphire Pavilion. Alternatively, you can also hop on to the Siloso Beach Tram from the Beach station.

**From City**
Take the North East Line (NEL) train and alight at the Harbour Front MRT station. From there take the Sentosa Express from Vivo City Shopping Centre, Level 3 and alight at the Beach Station.

**Note**
Beach tram service from 9am – 11pm (Sunday – Thursday), 9am – 12 midnight (Fri and Sat). Frequency: 15-20 minutes.
Blue Line service from 7am – 11pm, Last Bus: 10.40pm (Sunday – Thursday), 7am – 12.30am, Last Bus: 12mn (Fri and Sat).
Red Line service from 9am – 9pm daily.
QIP Charter

Goal of the Conference

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 invited and contributed talks. To be able to also represent work already published elsewhere, the conference has no published proceedings of itself.

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. 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 organisers of the previous, next, and subsequent QIPs, and is chaired by the local organiser of the next QIP. Members typically serve for 3 years, with the 3 longest-serving members being replaced once a year, typically soon after QIP. The SC chooses the chair of the programme committee (PC) for the next QIP. Starting typically in late summer, the SC invites roughly 5 presentations (of the best recent research, but possibly also some more perspective/survey talks) and possibly some tutorial speakers, but otherwise leaves the details of the conference programme to the PC. 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 organiser for the next QIP gives a presentation, and proposals for the venue of the QIP after that 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 contributed talks among the submitted papers is competitive, with typically around 32 accepted submissions. The PC can promote up to 4 of the best contributed talks to "invited" status, and can distinguish between longer and shorter time slots for the rest (typically 30 and 20 minutes). Poster submissions will generally be accepted unless they are off-topic or clearly wrong, to enable people to obtain funds for travel.

On the days preceding the conference, tutorials can take place, typically each a half or a full day of lectures on a specific topic, aimed at students. 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 45-minute invited talk (either invited by the SC or a contributed talk promoted to invited status by the PC), followed by contributed 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 (for short impromptu presentations of very recent results) are held in late afternoons.

Conflict of Interest

1. SC member cannot be an invited speaker, but PC members can be invited 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 paper
THE CENTRE FOR QUANTUM TECHNOLOGIES AND
SINGAPORE MANAGEMENT UNIVERSITY ARE PLEASED TO ANNOUNCE A
FREE PUBLIC LECTURE

Speaker:
Charles H. Bennett
IBM Research, USA

INFORMATION IS QUANTUM
HOW PHYSICS HAS HELPED US UNDERSTAND WHAT INFORMATION IS AND WHAT CAN BE DONE WITH IT

12 January 2011 (Wednesday), 5pm
Registration & reception at 4.30pm

Singapore Management University
School of Accountancy / School of Law
Ngee Ann Kongsi Auditorium (Level 2)
<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>09:00-09:30</td>
<td><strong>Welcome</strong>&lt;br&gt;Mr. Lam Chuan Leong, Chairman CQT GB</td>
<td>09:00-09:50</td>
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<tr>
<td>10:20-10:50</td>
<td><strong>Break</strong></td>
<td>10:15-10:45</td>
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<td>10:15-10:45</td>
<td>10:25-11:00</td>
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<tr>
<td>11:50-12:10</td>
<td>Shengyu Zhang 11:45-12:05</td>
<td>Tobias Fritz 11:45-12:15</td>
<td>Hector Bombin 11:45-12:15</td>
<td>François Le Gall 11:50-12:10</td>
<td>Ersen Bilgin 12:10-14:00</td>
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<td>12:10-14:00</td>
<td><strong>Lunch</strong></td>
<td><strong>Lunch</strong></td>
<td><strong>Lunch &amp; Free Afternoon</strong></td>
<td><strong>Lunch</strong></td>
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<td>14:00-14:50</td>
<td>John Martinis 14:00-14:20</td>
<td>Simone Severini 14:00-14:50</td>
<td>14:00-14:50</td>
<td>Omar Fawzi 14:00-14:30</td>
<td>Bill Fefferman 14:35-14:55</td>
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<td>15:15-15:45</td>
<td><strong>Break</strong></td>
<td><strong>Break</strong></td>
<td>15:25-16:00</td>
<td><strong>Break</strong></td>
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<td>15:45-16:05</td>
<td>David Poulin 15:30-16:00</td>
<td>Jérémie Roland 16:00-17:00</td>
<td>16:00-17:00</td>
<td><strong>Business Meeting</strong></td>
<td>15:30-16:20</td>
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<td>16:10-16:30</td>
<td>Ramis Movassagh 16:05-16:25</td>
<td>Xie Chen 16:30-17:00</td>
<td>Registration &amp; Reception @ SMU</td>
<td>16:20-16:30</td>
<td><strong>Closing Remarks</strong></td>
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<td>16:35-16:55</td>
<td>Norbert Schuch 16:30-16:50</td>
<td>Robin Kothari 16:30-17:00</td>
<td>Conference Dinner @ Marina Bay Sands</td>
<td>17:00-18:00</td>
<td>Public Lecture @ Siloso Beach</td>
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<td>16:55-17:15</td>
<td>Fernando Brandão 17:00-18:00</td>
<td>17:00-18:00</td>
<td>Public Lecture @ SMU Charles H. Bennett</td>
<td>19:00-21:00</td>
<td>Rump Session @ Siloso Beach</td>
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**Events:**
- **Poster Session 1** from 17:15
- **Poster Session 2** from 19:00
- **Conference Dinner @ Marina Bay Sands** from 19:00
- **Rump Session @ Siloso Beach** from 19:00